

# Distributed Routing Software

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## clearVISN Router Configurator User's Guide

Part Number: AA-R08YA-TE

### **December 1996**

This manual provides information about installing and using the clearVISN Router Configurator.

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# Preface

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The clearVISN™ Router Configurator is a Graphical User Interface (GUI) application that enables you to create and load a basic configuration for bridging routers running Digital's Distributed Routing Software. This manual describes how to:

- Install the clearVISN Router Configurator software, either as part of the clearVISN package or standalone.
- Create a configuration for a bridging router.
- Modify a configuration for a bridging router.
- Enter Distributed Routing Software Command Line Interface (CLI) commands within the clearVISN Router Configurator, in order to configure features not supported by the GUI.
- Load a router from within the clearVISN Router Configurator.

## Audience

This guide is intended for persons who install and operate computer networks. Although experience with computer networking hardware and software is helpful, you do not need programming experience to use the clearVISN Router Configurator.

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## Digital Documents

The documents in the Distributed Routing Software manual set are listed below.

<b>This Document...</b>	<b>Describes...</b>
<i>DECswitch EE Installation</i>	Installation and use of the DECswitch EE router.
<i>DECswitch EF Installation</i>	Installation and use of the DECswitch EF router.
<i>DECswitch ET Installation</i>	Installation and use of the DECswitch ET router.
<i>RouteAbout Access EI Installation</i> EK-DEXBR-TE	Installation and use of the RouteAbout Access EI router.
<i>RouteAbout Access EW Installation</i> EK-DE28R-IN	Installation and use of the RouteAbout Access EW router.
<i>RouteAbout Access TW Installation</i> EK-DEWTR-IN	Installation and use of the RouteAbout Access TW router.
<i>RouteAbout Central EW Installation</i> EK-DEZ8R-IN	Installation and use of the RouteAbout Central EW router.
<i>RouteAbout Central EI Installation</i> EK-DEZBR-IN	Installation and use of the RouteAbout Central EI router.
<i>Bridging Configuration Guide</i> AA-QL29D-TE	The configuration and monitoring procedures for bridging methods. Bridging features that enhance system performance.
<i>Event Logging System Messages Guide</i> AA-QL2AD-TE	How events are logged, how to interpret Event Logging System (ELS) messages. Provides a description of each ELS message with a corresponding corrective action.
<i>Network Interface Operations Guide</i> AA-QL2BD-TE	Configuring and monitoring the network interfaces in the Distributed Routing Software bridging router.



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<b>This Document...</b>	<b>Describes...</b>
<i>Routing Protocols User's Guide</i> , AA-QL2CD-TE	How to configure and monitor the following protocols: <ul style="list-style-type: none"> <li>• AppleTalk Phase 1</li> <li>• AppleTalk Phase 2</li> <li>• ARP</li> <li>• Bandwidth Reservation</li> <li>• BGP4</li> <li>• DVMRP</li> <li>• IP</li> <li>• IPX</li> <li>• OSPF</li> <li>• OSI/DNA V</li> <li>• PIM</li> <li>• SNMP</li> </ul> How to use the Digital Trace Facility.
<i>Protocol Quick Reference Card Set</i>	How to configure and monitor a protocol, feature, or interface, and lists the associated commands.
<i>Routing Protocols Reference Guide</i> AA-QL2CD-TE	Reference information about the micro-operating system structure, and the protocols and interfaces supported by bridging routers.
<i>Systems Network Architecture Guide</i> AA-QU5SB-TE	SNA interfaces and protocols for the Distributed Routing Software System.

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## Conventions Used in This Guide

This section describes the conventions and symbols used in this book.

Special type	This special type in examples indicates system output or user input.
<b>Boldface</b>	Boldface type in examples indicates user input.
<i>lowercase-italics</i>	Lowercase italics in command syntax or examples indicate variables for which either the user or the system supplies a value.
<span style="border: 1px solid black; padding: 2px;">key</span>	Indicates that you press the specified key.

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## Introduction

### 1.1 Overview

This chapter describes the clearVISN™ Router Configurator. You can install and use the clearVISN Router Configurator either standalone or as part of the clearVISN package.

In this manual, the clearVISN Router Configurator is also referred to as the Router Configurator.

#### 1.1.1 What Is the clearVISN Router Configurator?

The clearVISN Router Configurator is a software application that enables you to create, modify and load configuration information for supported bridging routers.

The Router Configurator has a Graphical User Interface (GUI). You configure individual bridging routers by entering information on tab pages for the various router features that you want.

#### 1.1.2 Supported Routers

You can use the Router Configurator to configure and load the following bridging routers:

- RouteAbout Access EW.
- RouteAbout Access TW.
- RouteAbout Central EW.
- DECswitch 900 EE.
- DECswitch 900 EF.
- DECswitch 900 ET.

## Introduction

### 1.2 What Can You Do in the Router Configurator?

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- RouteAbout Access EI and RouteAbout Central EI (partial support). You can configure the Ethernet and serial ports using the Router Configurator GUI. You can only configure the ISDN ports using Distributed Routing Software CLI (command line interface) commands. See Chapter 4 for information about creating a script of CLI commands within the Router Configurator.

The supported bridging routers all run Distributed Routing Software, described in the Distributed Routing Software documentation set.

In the rest of this manual, supported bridging routers will be referred to simply as **routers**.

#### 1.1.3 Router Configurator Environment

The clearVISN Router Configurator runs on a IBM®-compatible personal computer running Windows NT™ or Windows 95®.

### 1.2 What Can You Do in the Router Configurator?

The clearVISN Router Configurator enables you to do the following:

- Create one or more configurations for a router
- Modify previously created configurations
- View a summary file containing details of a given configuration
- Configure features not supported in the Router Configurator using Distributed Routing Software CLI commands
- Load the router, using TFTP

#### 1.2.1 Features You Can Configure

The Router Configurator allows you to configure a basic set of features and parameters for supported routers. You can configure the following:

- General system information, including required management addresses, and information about Hub membership, SNMP management, permitted users, system time, BOOTP EasyStart, and BOOTP relay agents
- IP Routing, including OSPF and RIP routing
- DECnet Phase IV routing
- DECnet Phase V/OSI routing

- NetWare IPX routing
- Bridging, including Transparent (spanning tree) and Source Route bridging

The Router Configurator lets you configure most of the features and parameters supported by the Distributed Routing Software utility QUICK CONFIG. In order to configure the full set of features, you need to use the router's CLI commands. The Distributed Routing Software documentation contains detailed information about the CLI commands.

### 1.2.2 Entering Extra Commands

The Router Configurator has a facility known as the **Extra** page which allows you to use Distributed Routing Software CLI commands to configure features not supported by the GUI tab pages. The Extra page allows you to create and test a script of CLI commands, save it as part of the router's permanent configuration, and load it when the GUI configuration is loaded. Refer to Chapter 4 for details.

## 1.3 The Router Data File

The Router Configurator saves router configuration information in the **router data file**. The router data file is the Configurator's own record of a router's configuration, kept on the PC. There is a router data file for each router configuration you create.

You can view or change the name of the router data file on the **New Router Configuration** window. You see this window when you first create a new configuration for a router.

The information in the data file is used:

- When you open a previously configured router, to show the information that you entered
- When you load the router, to indicate the information to be loaded

## Introduction

### 1.4 Required Steps

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#### 1.4 Required Steps

To use the Router Configurator to configure a router, you need to do the following:

Step	Action	Refer to...
1.	Install the Router Configurator software.	Chapter 2
2.	Start the Router Configurator.	Chapter 3
3.	Configure the router, using the tab pages.	Chapter 3 and Chapter 5
4.	If you wish, create a script of CLI commands.	Chapter 4
5.	Load the router.	Chapter 6

#### 1.5 Using Help in the Router Configurator

This manual does not give detailed guidance on using the Router Configurator, or on the parameters you need to enter. However, the Router Configurator contains extensive online help; see Section 3.8 for more about using online Help.



# 2

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## Installing the clearVISN Router Configurator

This chapter describes how to instal the clearVISN Router Configurator.

### 2.1 Introduction

You can instal the Router Configurator in either of two ways:

- From the clearVISN application
- Standalone

This chapter describes both types of installation.

## Installing the clearVISN Router Configurator

### 2.2 Preinstallation Information

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### 2.2 Preinstallation Information

Table 2–1 lists the software and hardware required for installation. It applies to both standalone and clearVISN installation.

**Table 2–1 Installation Requirements**

<b>P C Hardware re- quired</b>	Intel®-based 80486 or PentiumR PC with clock speed exceeding 33 Mhz. The PC must also have the following: <ul style="list-style-type: none"> <li>• Memory: at least 8 Mbytes on Windows 95 at least 16 Mbytes on Windows NT</li> <li>• VGA or better monitor</li> <li>• LAN network adaptor (Token Ring or Ethernet)</li> <li>• CD-ROM drive if installing from clearVISN</li> <li>• Mouse compatible with Microsoft Windows NT or Windows 95</li> </ul>
<b>PC Software required</b>	<ul style="list-style-type: none"> <li>• Microsoft Windows NT V3.51 or higher, or Windows 95</li> <li>• Microsoft TCP/IP network protocol stack (included in Windows NT/95)</li> <li>• Driver installed for network adaptor, or default driver installed with Windows NT/95</li> </ul>
<b>Disk space required</b>	During installation: 11 Mbytes During use: 5 Mbytes
<b>Routers supported</b>	<ul style="list-style-type: none"> <li>• RouteAbout Access EW.</li> <li>• RouteAbout Access TW.</li> <li>• RouteAbout Central EW.</li> <li>• DECswitch 900 EE.</li> <li>• DECswitch 900 EF.</li> <li>• DECswitch 900 ET.</li> <li>• RouteAbout Access EI and RouteAbout Central EI (partial support). You can configure the Ethernet and serial ports using the Router Configurator GUI. You can only configure the ISDN port(s) using <b>Extra</b> Command Line Interface (CLI) commands.</li> </ul>
<b>Router software re- quired</b>	The appropriate Distributed Routing Software (described in the Distributed Routing Software manuals).

## Installing the clearVISN Router Configurator

### 2.3 Installing the Router Configurator from clearVISN

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## 2.3 Installing the Router Configurator from clearVISN

### 2.3.1 Before You Begin

Before you install the Router Configurator, close down all other applications running on your PC.

### 2.3.2 Installation Procedure

To install the Router Configurator from clearVISN, follow these steps:

1. Run clearVISN setup, as described in the manual, *clearVISN Installation*.
2. Click on the Router Configurator line in the clearVISN **Component Installation** window.
3. Complete clearVISN setup.

## 2.4 Installing the Router Configurator Standalone

### 2.4.1 Before You Begin

Before you install the Router Configurator, close down all other applications running on your PC.

### 2.4.2 Installation Procedure

To install the Router Configurator standalone, follow these steps:

1. Create a temporary installation directory. For example, on a Windows NT system, start **File Manager**, and select **Create Directory** on the File menu.

You can delete the directory once the installation is complete.

2. Copy the Router Configurator kit to the temporary directory from its World Wide Web (WWW) location. You can find this location by going to:

<http://www.networks.digital.com/dr/crc/index.html>

Alternatively, you can do the following:

- a. Go to the location <http://www.networks.digital.com>
- b. Click **Search**, and enter:  
clearVISN Router Configurator

## Installing the clearVISN Router Configurator

### 2.5 Post-installation (clearVISN and Standalone)

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3. Once you have copied the Router Configurator to the temporary directory, run the following file in the temporary directory:

RTRCONFIG.EXE

This will extract the contents of the kit.

4. In the temporary directory, run the installation procedure by double-clicking the following file:

SETUP.EXE

5. The installation procedure will ask you to enter a directory for the Router Configurator. The default directory is RCONFIG.

### 2.5 Post-installation (clearVISN and Standalone)

Once you have installed the Router Configurator, you can start it, and use it to configure supported routers. However, in order to be able to load a configuration to a router, manage it over the network, or configure it using CLI commands, you must meet the requirements listed in Section 2.5.1.

#### 2.5.1 Setting Up the Router

Before you attempt to load the router, the following requirements must be met:

- The router must be loaded with the appropriate Distributed Routing Software.
- The router and the PC must be connected to the same IP network.
- The router must have an IP address. If the router is new, or its configuration information has been cleared, it will not have an IP address.

There are two methods for giving a router an IP address, depending on the Distributed Routing Software (DRS) version:

- For Version 1.1 or earlier, you must use the console setup port to enter an in-band IP address and, if necessary, a gateway IP address. You also need to supply the same in-band IP address and gateway IP address (if used) within the Router Configurator; see Section 3.5.
- For Version 2.0 or later, the *EasyStart* facility enables the router to act as a BOOTP client, and obtain its IP address from a local BOOTP server or another BOOTP server on the network. Refer to Chapter 5 for more information.

## Installing the clearVISN Router Configurator

### 2.5 Post-installation (clearVISN and Standalone)

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Note also that these requirements only apply to sending CLI commands to the router or loading it. You can install the Router Configurator and use it to create a configuration without being connected to the router.

#### 2.5.2 Using the Setup Port (Version 1.1 or Earlier)

If you are running DRS Version 1.1 or earlier, you need to use a console terminal connected to the router's setup port to provide basic configuration information for DECswitch or Routeabout routers. This information includes the in-band IP address and the gateway IP address.

- **DECswitch and Routeabout Central routers** do not have their own setup port; instead, they use the setup port on the DEChub™ in which they are installed.
- **RouteAbout Access routers** have their own setup port.

For detailed information about using the setup port, refer to the DECswitch and RouteAbout *Installation* manuals.

#### Procedure: Routeabout Access Routers

This section summarizes the steps needed to use the setup port to configure an in-band IP address and gateway IP address on RouteAbout Access routers.

1. Install the router, either standalone, or in a DEChub 90 or a DEChub 900 Multi-switch hub.
2. Connect a PC or terminal to the setup port, as described in the router's *Installation* manual. Note that if you are installing the router in a DEChub 900, you may want to redirect the DEChub 900 setup port to the RouteAbout Access setup port.
3. Select the IP configuration option from the Installation menu.
4. Enter the router's in-band IP address.
5. If the PC from which you load and/or manage the router is on a different subnet from the router, enter a default gateway address. This is the address of another router that the router can use to communicate with the PC.
6. Restart the router.

## Installing the clearVISN Router Configurator

### 2.6 Updating a Router Configuration

---

#### Procedure: DECswitch and Routeabout Central Routers

This section summarizes the steps needed to configure an in-band IP address and gateway IP address on RouteAbout Central and DECswitch routers.

1. Install the DECswitch or RouteAbout Central router in a DEChub ONE-MX or a DEChub 900 Multiswitch hub.
2. Connect a PC or terminal to the DEChub setup port, as described in the *Installation* manual. Note that if you are installing the router in a DEChub 900, you need to redirect the DEChub 900 setup port to the router's setup port.
3. Select the IP configuration option from the Installation menu.
4. Enter the router's in-band IP address.
5. If the PC from which you load and/or manage the router is on a different subnet from the router, enter a default gateway address. This is the address of another router that the router can use to communicate with the PC.
6. Restart the router.

#### 2.5.3 Using EasyStart BOOTP (DRS Version 2.0 or Later)

Refer to Chapter 5.

## 2.6 Updating a Router Configuration

When you load a new version of Distributed Routing Software to the router, you can also update the configurations you have created in the Router Configurator to be compatible with the new version. Note that this is not required.

### 2.6.1 Procedure

Follow these steps:

1. Start the Router Configurator, as described in Chapter 3.
2. Select a configuration in the Browser.
3. On the **Router** menu, select **Modify**, and then select **Router software**.
4. A window will appear, on which you can change the version number of the software. You can also change the type of license, if you wish.

---

## Starting and Using the Router Configurator

### 3.1 Introduction

This chapter describes how to start and use the clearVISN Router Configurator.

For detailed information about the information you enter, refer to the Router Configurator's online help.

#### 3.1.1 Starting the Router Configurator

You can start the Router Configurator either from the clearVISN network management program, or as a standalone program.

### 3.2 Starting the Router Configurator from clearVISN

There are two ways to start the Router Configurator from clearVISN:

- From the clearVISN pull-down **File** menu
- From a clearVISN **Device** icon popup menu

#### 3.2.1 Starting from the File Menu

On the clearVISN main window, select the option **Router Configurator** on the pull down File menu. The Main Router Configurator window will appear.

#### 3.2.2 Starting from a Device Popup Icon Menu

##### 3.2.2.1 Before You Begin

Before you can start from a Device icon popup menu, you must create a clearVISN device for at least one router. Refer to Section 3.2.3 for details.

## Starting and Using the Router Configurator

### 3.2 Starting the Router Configurator from clearVISN

---

#### 3.2.2.2 Procedure

Follow these steps:

Step	Action	Result
1.	On the File menu, select <b>Show Devices</b> .	The Device window appears, with icons for network devices.
2.	If there is no icon for a router device, create one, as described in Section 3.2.4.	The new device will appear in the Device icon window.
3.	Select the router device while holding down the right mouse button.	The Device popup menu appears.
4.	On the popup menu, select Router Configurator.	The Router Configurator Main window appears. You can now create a new configuration or modify an existing one. Note that you can create a new configuration for any supported router, not just the one whose device you selected.

---

#### 3.2.3 The Router Configurator and clearVISN Devices

In order to use clearVISN to manage a network device (such as a router), you need to create a device icon to represent the device.

The Router Configurator does not automatically create router device icons. You need to create router device icons as described in Section 3.2.4.



## Starting and Using the Router Configurator

### 3.3 Starting the Router Configurator Standalone

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#### 3.2.4 Creating a clearVISN Device for a Router

To create a clearVISN device for a supported router, follow these steps:

Step	Action	Result
1.	On the File menu, select <b>New Devices</b> .	You are asked for the IP address and an SNMP community name for the router.
2.	Type in the router's in-band IP address and a community name, and click <b>OK</b> (refer to Chapter 2 for more about the in-band IP address).	clearVISN will try to reach the router over the network, using SNMP. If the router is available over the network, clearVISN will create a device icon for the router. If the router is not available, no icon will be created. Go to Step 4.
3.	To see the device icon, select <b>Show Devices</b> from the File menu.	The Device window appears, with the device icons.
4.	When the router has been connected to the network, select <b>Discover Devices</b> from the <b>Tools</b> menu.	clearVISN will create a device icon for the router.

### 3.3 Starting the Router Configurator Standalone

To start the Router Configurator standalone, follow these steps:

1. Double click the icon **Digital Configurators**.
2. Double click the icon **clearVISN Router Configurator**.

### 3.4 Using the Router Configurator

#### 3.4.1 Introduction

When you start the Router Configurator, it displays the Router Configurator main Window. This window contains a **menu bar** and the **Browser**.

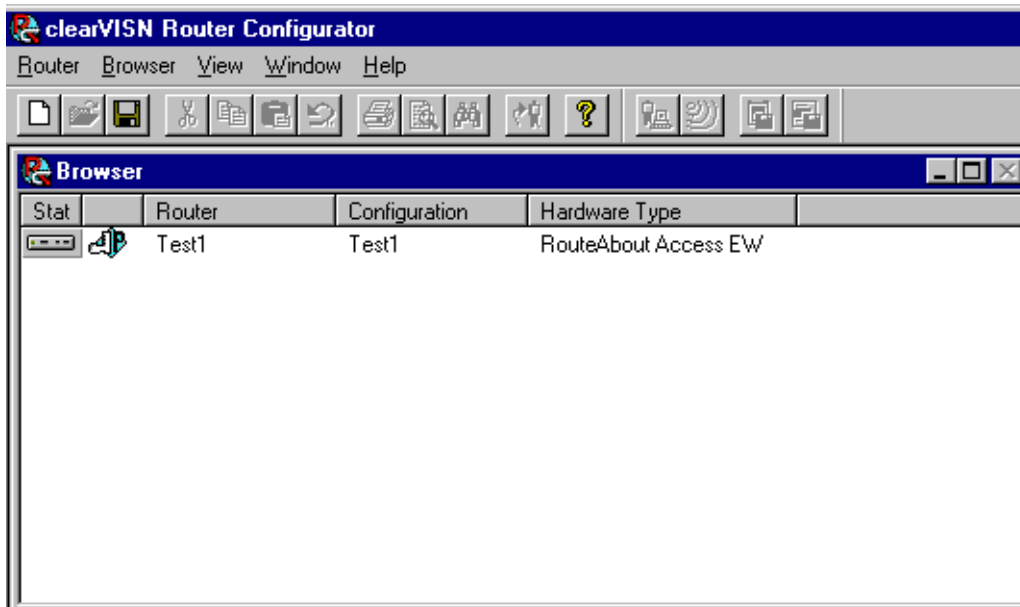
If you are starting the Router Configurator for the first time, it also displays the **New Router Configuration** window; see the example in Figure 3-3.

## Starting and Using the Router Configurator

### 3.4 Using the Router Configurator

---

Figure 3–1 Example Router Configurator Main Window



#### 3.4.2 The Browser

The Browser contains a list of previously created router configurations. When you start the Router Configurator for the first time, the Browser only contains column headings.

By default, the Browser shows the following information for each configuration:

- The name of the router for which the configuration was created
- The name of the configuration. A single router can have multiple configurations
- Whether the configuration is currently loaded
- The hardware type of the router - for example, DECswitch 900 EF

You can display additional information by selecting additional options from the **Browser** menu on the menu bar.

## Starting and Using the Router Configurator

### 3.4 Using the Router Configurator

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#### 3.4.3 The Menu Bar

The menu bar varies slightly depending on what you are doing in the Router Configurator. If you have not started configuring a router, the menus are as follows:

- **Router** menu. Lets you create new configurations, modify existing router configurations or software versions and license types, delete configurations, rename a router or configuration, produce multiple identical configurations for a router, or exit from the Router Configurator.
- **Browser** menu. Lets you display additional information in the Browser window - for example, the date when the configuration was created, the router's hardware address and/or IP address, the version of Distributed Routing Software running on the router, or the type of software license.
- **Window** menu. Lets you arrange icons or views of the Main Navigation window.
- **Help**. Takes you to the Help menu.

#### 3.4.4 The Main Navigation Window

When you create or modify a configuration, the **Main Navigation** window appears. This window enables you to do the following:

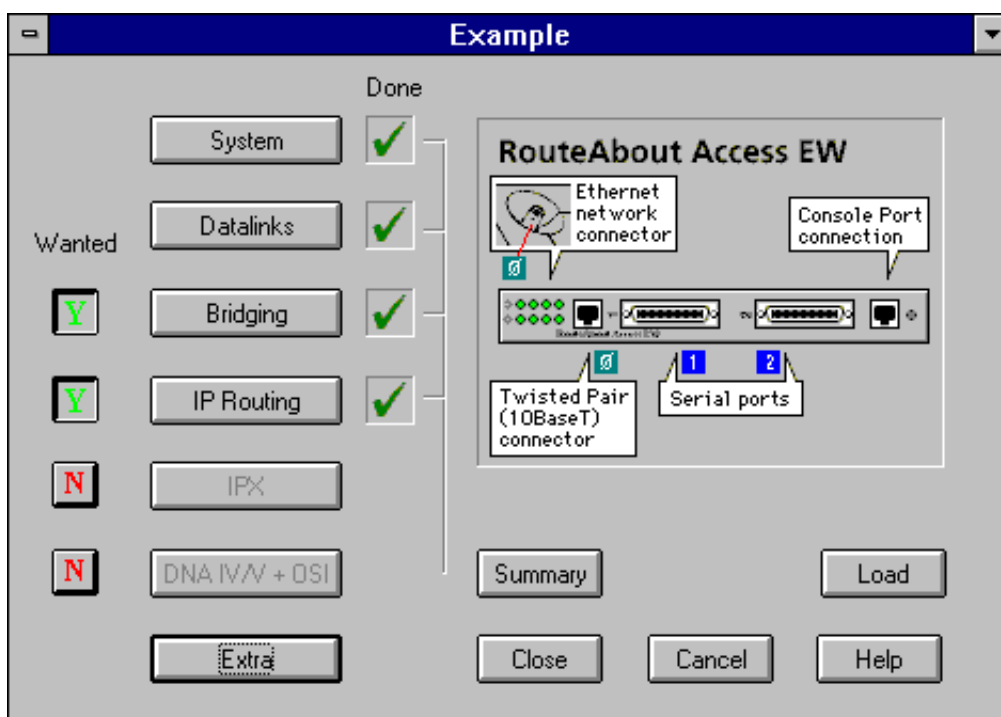
- Go to the tab pages for the features you want to configure
- Go to the **Extra** page for the router
- Load the router
- View or print a summary of a router's configuration

## Starting and Using the Router Configurator

### 3.4 Using the Router Configurator

---

Figure 3–2 Example Main Navigation Window



#### 3.4.4.1 Using the Main Navigation Window

The Main Navigation window has the following features:

- Feature buttons. These are: **System**, **Datalinks**, **Bridging**, **IP Routing**, **IPX** and **DNA IV/V + OSI**. When you click a features button, you go to the tab pages for that feature.
- **Wanted** column. Initially, the boxes in the Wanted column show **N**, to mean not wanted. If you want to configure a feature, you must first click the box next to it so that it shows a **Y**.
- **Done** column. When you have provided all the mandatory information for a feature on its tab pages, a box with a green check appears next to the feature in the Done column.
- The **Extra** button takes you to the **Extra** page, where you can create an Extra script of CLI commands.

## Starting and Using the Router Configurator

### 3.5 Creating a Router Configuration

---

- The **Summary** button displays a printable text file with a summary of the router configuration. You cannot display or print a summary until you have completed a valid configuration for the router.
- Clicking the **Load** button loads the router with your configuration. This is greyed out until you have completed a valid configuration; that is, until you have provided all the mandatory information for the features you want.

### 3.5 Creating a Router Configuration

The general method for creating a configuration is as follows:

Step	Action	Result
1	Start the Router Configurator.	The main Window appears.
2	Select <b>New</b> from the <b>Router</b> menu.	The <b>New Router Configuration</b> window appears; see the example in Figure 3–3.
3	Enter a router name and configuration name, and select the other information from the menus. Click <b>OK</b> .	The Main Navigation window appears.
4	On the Main Navigation window, click the <b>System</b> button.	You go to the <b>General</b> tab page within the group of <b>System</b> tab pages.
5	Complete the options on the General tab page. The hardware address and in-band IP address are mandatory. If you wish, configure any of the other System tab pages. Click <b>OK</b> .	If you have configured the mandatory information, and there are no syntax errors, the information is saved, the tab pages are closed, and you go back to the Main Navigation window.
6.	In the Wanted column, click the boxes next to the features you want.	When you click a box in the Wanted column, the button next to it becomes operational.
7.	Click a features button.	You go to the feature's tab pages.
8.	Enter the required information on the tab pages and click <b>OK</b> .	The result is the same as for Step 5.
9.	Repeat Steps 7 and 8 until you have configured all the features you want.	The Done boxes for the features all have a green check, and the <b>Load</b> button is operational.
10.	If you wish, click the <b>Extra</b> button and create an Extra script of CLI commands.	You go to the Extra page. When you have finished creating an Extra script, click <b>Close</b> .

## Starting and Using the Router Configurator

### 3.6 Entering Extra Commands

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11. Click the **Load** button . The Router Configurator attempts to load the router.
- 

**Figure 3–3 Example New Router Configuration Window**

The screenshot shows a dialog box titled "New Router Configuration". It contains the following fields and controls:

- Router Name:** A text input field with a dropdown arrow on the right.
- Configuration Name:** An empty text input field.
- File Name:** A text input field containing "C:\RCONFIG\rfde512a" and a "Browse" button to its right.
- Hardware Type:** A dropdown menu with "RouteAbout Central EW" selected.
- Software Version:** A dropdown menu with "2.0" selected.
- Licence Option:** A dropdown menu with "MULTIPROTOCOL" selected.
- Buttons:** "OK", "Cancel", and "Help" buttons are located at the bottom of the dialog.

### 3.6 Entering Extra Commands

When you click the Extra button on the Main Navigation window, the **Extra** page is displayed. Refer to Chapter 4 for more information.

### 3.7 Loading the Router

When you click the **Load** button on the Main Navigation window, the Router Configurator attempts to load the router. Refer to Chapter 6 for more information.

## Starting and Using the Router Configurator

### 3.8 Online Help in the Router Configurator

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### 3.8 Online Help in the Router Configurator

The Router Configurator provides online help in standard Windows® format. You can find Help in either of in two ways:

- Click the **Help** button on a tab page.
- Select Contents on the **Help** menu on the Router Configurator menu bar.

To find out more about using Windows help, select **Using Help** on the Help menu.





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## Entering Extra Commands

### 4.1 Introduction

The **Extra page** in the clearVISN Router Configurator enables you to configure features that are supported by the router's Command Line Interface (CLI), but not supported by the Router Configurator's Graphical User Interface (GUI). From the Extra page, you can do the following:

- Create an Extra script of CLI commands, and save it in the router data file.
- Save prebuilt Extra script files as part of the router configuration file. Example Extra script files are supplied with the Router Configurator kit.
- Test individual CLI commands interactively by Telneting them to the router.
- Test an entire Extra script by Telneting it to the router.
- Save CLI commands in a text file.
- Specify a surrogate router to use for testing CLI commands.

#### 4.1.1 What Is an Extra Script?

An Extra script contains two kinds of information:

- **CLI commands.** These are the mechanism used by the Distributing Routing Software to configure the router.
- **Keyword directives** inserted between the CLI commands. These provide synchronization, timing and error checking facilities needed to make a succession of CLI commands run as if they were being entered interactively.

#### 4.1.2 Why Keyword Directives Are Needed

Keyword directives are needed because of the way the Router Configurator sends CLI commands to the router.

## Entering Extra Commands

### 4.2 Overview of the Extra Page

---

The Router Configurator sends CLI commands to the router by running the Distributed Routing Software utility CONFIG within a Telnet session. The CONFIG utility assumes that you are entering commands interactively – that is, entering a command, waiting for a prompt, entering another command, and so on. If the Router Configurator is Telnetting an Extra script – that is, a succession of saved CLI commands - it must provide a substitute for the human action of waiting for prompts or responding to messages. It does this by inserting keyword directives.

For more about keyword directives, read Section 4.3.

#### 4.1.3 Sending Extra Scripts to the Router

The Router Configurator sends CONFIG CLI commands regardless of whether you are loading an Extra script, testing an Extra script, or entering commands interactively. In each case, the Router Configurator does the following:

1. Starts a Telnet session to the router console
2. Runs CONFIG, and uses TFTP to load the information configured in the GUI.
3. Depending on what you have chosen, either sends an Extra script, or allows you to enter commands interactively

For more information, refer to Section 4.12.1.

#### 4.1.4 Saving an Extra Script

Once you save an Extra script, it becomes part of the router data file. This means that if you reload a router from the Router Configurator, the last saved Extra script will automatically be Telnetted to the router, after the GUI configuration has been loaded.

In addition to saving an Extra script in the router data file, you can save it in a text file; refer to Section 4.10 for details.

## 4.2 Overview of the Extra Page

This section gives an overview of the facilities offered on the Extra page, and how to use them.

### 4.2.1 How to Get to the Extra Page

To go to the Extra page, click **Extra** on the **Main Navigation** window.

## Entering Extra Commands

### 4.2 Overview of the Extra Page

#### 4.2.2 The Windows on the Extra Page

There are two windows available on the Extra page:

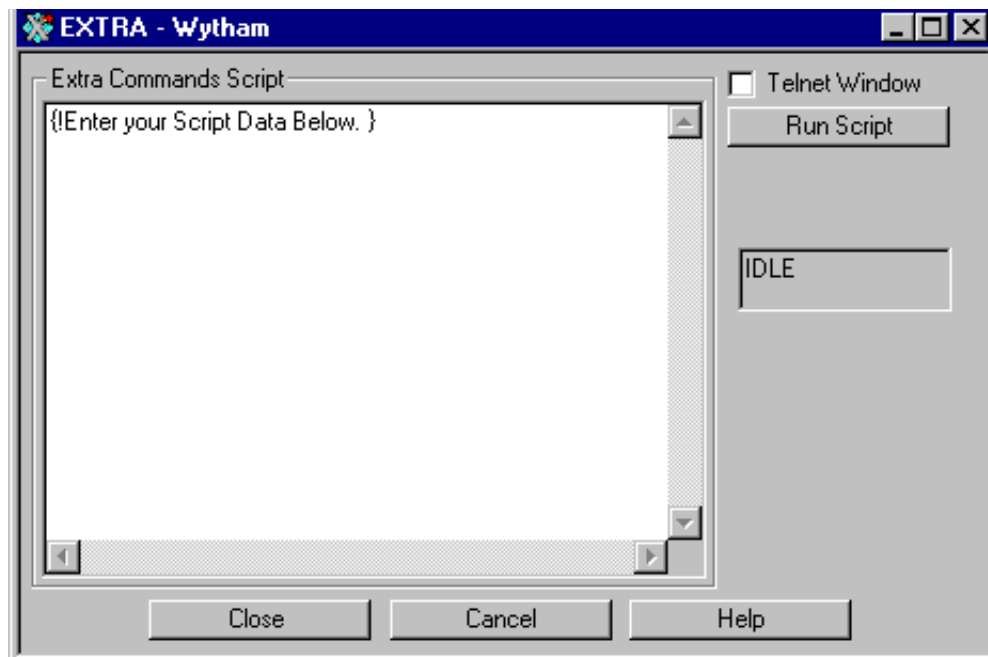
- The **Extra Commands Script** window
- The **Router Dialog** window

##### 4.2.2.1 The Extra Commands Script Window

The first window you see on the Extra page is the Extra Commands Script window; see Figure 4–1. You use this window to type or paste in CLI commands, or specify existing CLI script files. When you click the **Close** button, the contents of the window is saved as part of the router data file.

The **Run Script** button lets you test an Extra script displayed or specified in the Extra Commands Script window. When you click **Run Script**, the Router Configurator displays the Router Dialog window in Figure 4–2, and then Telnets the Extra script to the router.

**Figure 4–1** Extra Commands Script Window



## Entering Extra Commands

### 4.2 Overview of the Extra Page

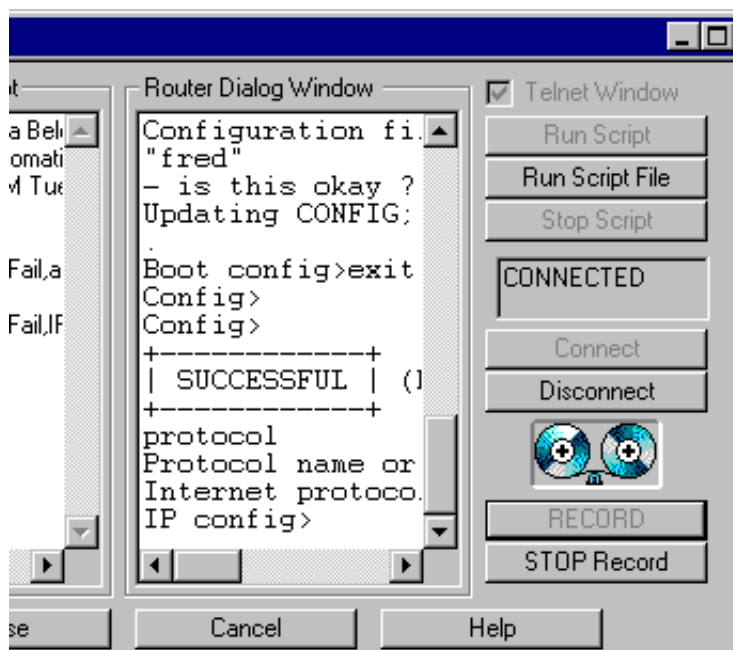
---

#### 4.2.3 The Router Dialog Window

You use the Router Dialog window (Figure 4–2) to conduct a Telnet session to the router console. This window enables you to test the correctness of CLI commands, and record the commands.

The Router Dialog window appears to the right of the Extra Commands Script window if you do either of the following:

**Figure 4–2 Router Dialog Window**



- Click **Run Script**. The Router Configurator displays the Router Dialog window, starts a Telnet session, and sends the contents of the Extra Commands Script window to the router. The Router Dialog window displays each command as it is sent and the response returned by the router.
- Check the **Telnet Window** box. The Router Configurator displays the Router Dialog window, empty. You can then use the window to Telnet commands to the router, and see the router's responses. You can also record the Telnet session in the Extra Commands Script window.

## 4.3 Keyword Directives

Keyword directives constitute a simple command language. Their purpose is to enable an Extra script to run as if were a succession of CLI commands entered interactively.

### 4.3.1 Viewing Keyword Directives

You will see keyword directives in the following circumstances:

- When you **record** a Router Dialog Telnet session. The Router Configurator automatically inserts keyword directives between the CLI commands displayed in the Extra Commands Script window; see Figure 4–3.
- In the example Extra script files provided with the Router Configurator kit; see Section 4.6.3.

### 4.3.2 Using Keyword Directives

There are some circumstances in which you need to insert keyword directives yourself. These are:

- If you create an Extra script by typing commands into the Extra Commands Script window, rather than recording them from the Router Dialog window.
- If you create an Extra script yourself, outside the Configurator, without using an example script.
- You wish to modify a script to add control features or error checking.

The keyword directives that you might use or see are listed in Table 4–1.

**Table 4–1 Keyword Directives**

Keywords	Description
{! <i>comment</i> } where <i>comment</i> is your comment	If the first character after the opening brace is ! then the contents are ignored.
{INDIRECT, <i>File-name</i> } where <i>File-name</i> is the name of an Extra script file.	This specifies an Extra script file to be executed. To specify more than one script file, repeat the keyword directive with the new file name.
{SEND, <i>Text</i> }	<i>Text</i> specifies text to be sent. This is useful for sending control characters. For example, Ctrl P is {Send, ^P}

## Entering Extra Commands

### 4.4 Using the Extra Page

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**Table 4–1 Keyword Directives (Continued)**

Keywords	Description
{GAPTIME, <i>timeout-value</i> } where <i>timeout-value</i> is a period of time, in milliseconds.	This sets a default time-out value. By default, the Configurator will wait this amount of time between sending each line of CLI command text. Note that this value may be overruled by another keyword directive.
{WAITFOR, <i>time,label,text</i> } where: <i>time</i> is a period of time, in milliseconds. <i>label</i> is text marking a location in the script to be used for error handling <i>text</i> is text expected from the router.	This tells the Configurator to wait before sending the next line in the script until the router returns some text that matches <i>text</i> - for example, a command prompt. If the period specified by <i>time</i> elapses without receiving the <i>text</i> , the Configurator will go to the point in the script where a keyword directive <i>{:label}</i> appears.
<i>{:label}</i> where <i>:label</i> is text.	This marks the destination for another keyword directive, such as WAITFOR.
{GOTO, <i>label</i> } where <i>label</i> is text marking a location in the script.	This tells the Configurator to go to the point in the script where the keyword directive <i>{:label}</i> appears.
{PAUSE, <i>time</i> } where <i>time</i> is a period of time, in milliseconds.	Causes the script to wait for the specified number of milliseconds
{DISCONNECT}	This disconnects the Telnet session
{END}	This stops or completes script execution.
{EXT_DISCONNECT}	This directive is used if it is expected that the session to the router will be dropped by an external event, such as when the restart command is issued. It is like DISCONNECT, except that it expects the router to disconnect before continuing.

## 4.4 Using the Extra Page

The Extra page enables you to create and test Extra scripts of CLI commands, and save them in the router data file. This section describes how the Extra page enables you to do this.

## Entering Extra Commands

### 4.5 Entering Commands Interactively

---

#### 4.4.1 Methods for Creating, Testing, and Saving Extra Scripts

There are three methods you can use to create, test and save Extra scripts:

- Enter commands interactively in the Router Dialog window while using the **Record** facility. This method helps you to determine correct CLI command syntax by means of CLI prompts and messages. Refer to Section 4.5.2.
- Create an Extra script file outside the Router Configurator. This is referred to in this chapter as a **prebuilt** script. Typically, you would use one or more example Extra files as the basis for your script, tailoring the commands for your router. Once you have created a prebuilt script, you can test and save it. Refer to Section 4.6.
- Type CLI commands in the Extra Commands Script window. It is recommended that you do this only if your Extra script is extremely simple.

Refer to the following sections for information you will need when creating Extra scripts:

- **Keyword Directives**, Section 4.3
- **Advice on Creating Extra Scripts**, Section 4.7

## 4.5 Entering Commands Interactively

This section describes how to use the Router Dialog window to conduct a Telnet session with the router console, and **record** the commands you enter.

### 4.5.1 Before You Begin

Before you go to the Extra page, be sure to complete the GUI configuration.

#### 4.5.1.1 Connecting to the Router

Before you connect to the router, you should check the following:

- If you want to test the CLI commands on a router other than the one you are configuring, specify a surrogate router, as described in Section 4.11.
- Check that the router you use for testing is connected to the network and is reachable from the PC.

## Entering Extra Commands

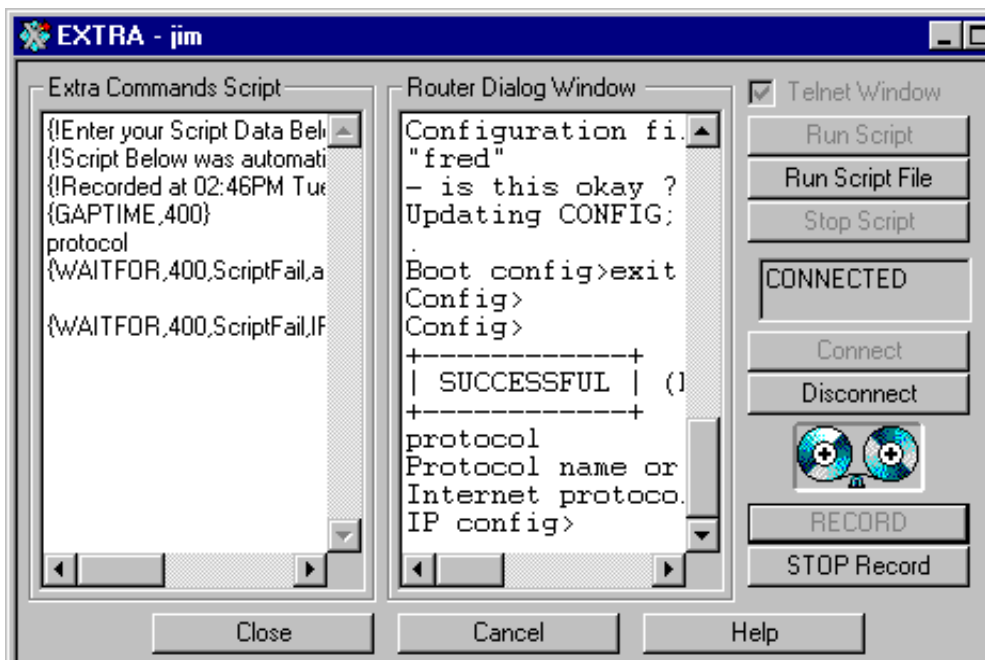
### 4.5 Entering Commands Interactively

- After you connect to the router, the CONFIG utility is automatically started. If CONFIG was run on the router previously, you should check that its last prompt was either the `Config>` prompt or an interface or protocol prompt (for example `IP Config>`). If its last command was not completed - that is, it was still asking for a parameter - then script execution may fail.

#### 4.5.2 Recording a Router Dialog

To **record** the commands in the Router Dialog window, click the **Record** button.

Figure 4-3 Recording CLI Commands



**Record** does not record the complete dialog shown in the Router Dialog window. Instead, it records in the Extra Script Commands window the script needed to reproduce the actions in the Router Dialog window. This script consists of the commands you have entered, and the required keyword directives.

##### 4.5.2.1 Example

Suppose that the following dialog is displayed in the Router Dialog window (text you enter is in bold):



## Entering Extra Commands

### 4.5 Entering Commands Interactively

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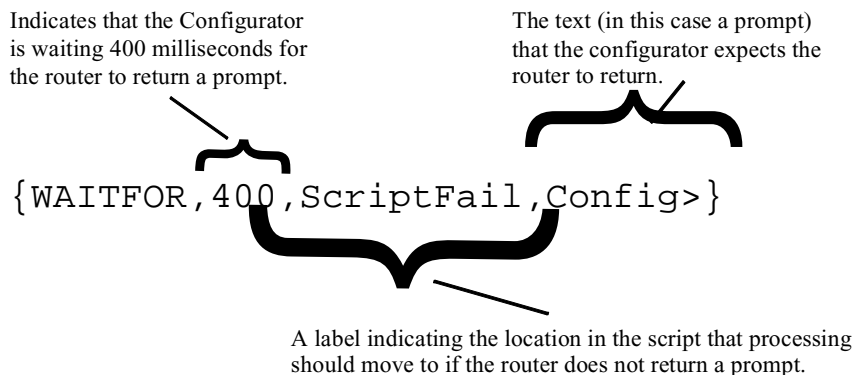
```
Config>protocol
Protocol name or number [IP]? IP
Internet protocol user configuration
IP config>add address
```

In the **Extra Script Commands** window, the following record would appear:

```
{WAITFOR,400,ScriptFail,Config>}
protocol
{WAITFOR,400,ScriptFail,ame or number [IP]? }
IP
{WAITFOR,400,ScriptFail,IP config>}
add address
```

Figure 4–4 explains the parameters in these keyword directives.

**Figure 4–4 Example Keyword Directive**



## Entering Extra Commands

### 4.5 Entering Commands Interactively

---

#### 4.5.3 Using the Router Dialog Window

The table shows the steps required to create, record and save an Extra script using the Router Dialog window. The procedure assumes that the Router Configurator is running and the **Extra** page is displayed.

Step	Action	Result
1.	If the Router Dialog window is not up, check the <b>Telnet Window</b> box.	The Router Dialog window appears.
2.	Click the <b>Connect</b> button.	The Configurator tries to Telnet to the router console. If it succeeds, the field showing IDLE changes to CONNECT. The Configurator then starts CONFIG and uses TFTP to load the GUI configuration. See Section 4.12.1 for an example of the output.
3.	If the <code>Config&gt;</code> prompt does not appear, press the <b>Enter</b> key.	The <code>Config&gt;</code> prompt is displayed.
4.	Click the <b>Record</b> button.	The Configurator starts recording the commands in the Router Dialog window in the Extra Commands Script window.
5.	Enter a command at the <code>Config&gt;</code> prompt.	The Configurator sends the command to the router, and waits for a response - a prompt, or a failure message.
6.	Repeat Step 5 until you have finished entering CLI commands. If necessary, you can type <code>?</code> to get help.	
7.	Click the <b>Stop Recording</b> button.	The Configurator stops recording commands and responses.
	Click the <b>Disconnect</b> button.	The Configurator ends the Telnet session.
8.	Edit the contents of the Extra Commands Script window to remove unwanted text, for example, wrong commands.	
9.	Test the script again by clicking <b>Run Script</b> .	The Configurator Telnets the complete script to the router.
10.	When you are satisfied that the script is correct and complete, click <b>Close</b> .	The Configurator saves the script in the router data file.

---

## 4.6 Creating Prebuilt Extra Scripts

You can create an Extra script file outside the Router Configurator, and test and save it on the Extra page.

### 4.6.1 Naming Extra Script Files

It is recommended that you give Extra script file names the extension .SCP. This is the default extension used by the Router Configurator.

### 4.6.2 Testing and Saving Prebuilt Extra Script Files

After creating your Extra script file, you need to test and save it.

To test your Extra script file, refer to Section 4.8. To save your Extra script file, refer to Section 4.9.

### 4.6.3 Using Example Extra Script Files

The Router Configurator kit includes a number of example Extra script files. The simplest way to create Extra scripts for your router is to base your Extra script file on one or more of the example Extra files.

#### 4.6.3.1 Location of Example Extra Script Files

The example Extra script files are in the following directories:

*installation-directory*\SAMPLES  
*installation-directory*\SAMPLES\LIBRARY

where *installation-directory* is one of the following directories:

- If you installed standalone, the directory where you installed the Router Configurator software.
- If you installed under clearVISN, the following subdirectory:

*clearVISN-installation-directory*\COMET

where *clearVISN-installation-directory* is the directory where clearVISN was installed.

A complete list of the example files supplied, and some advice on their use, is in the file README.DOC in the directory *installation-directory*\SAMPLES.

## Entering Extra Commands

### 4.7 Advice on Creating Extra Scripts

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#### 4.6.3.2 What Is in an Example Script File?

An example Extra script file contains a series of CLI commands, interspersed with keyword directives. For example, each CLI command is preceded by a WAITFOR keyword directive, instructing the Router Configurator to wait before issuing the command until it receives the correct command prompt from the router.

Each example Extra script file has an accompanying text file containing notes on the configuration process.

Example Extra script files have the extension .SCP. Each explanatory text file has the same name as the script file it is associated with, except that it has the extension .TXT

#### 4.6.3.3 Editing Example Extra Script Files

It is recommended that you do not edit the example script files directly, as it is useful to keep them for guidance. Instead, you should make a copy of each example script file you want to use, and edit that.

#### 4.6.4 Creating Extra Script Files

Before you create an Extra script, refer to Section 4.3, and Section 4.7 below.

### 4.7 Advice on Creating Extra Scripts

This section provides guidelines on creating Extra scripts. It assumes that you are creating an Extra script by entering CLI commands interactively in the Router Dialog window while using the **Record** facility, as described in Section 4.5.3.

#### 4.7.1 Requirement

You should be familiar with the syntax of the Distributed Routing Software CLI commands. This section does not describe individual commands.

## Entering Extra Commands

### 4.7 Advice on Creating Extra Scripts

---

#### 4.7.2 Before You Begin

Before you create an Extra Script, you should do the following:

- Check that you know the commands needed to configure the additional router features you want.
- Review the GUI configuration in the **Summary** window; refer to page 3-7 for more information about the Summary window.

#### 4.7.3 Creating Modular Extra Scripts

If you have a complex configuration, it is advisable that you break down the Extra script into functionally related modules, and store the commands in these modules in separate files. This will help to improve the reliability of your scripts and make testing easier.

Creating the Extra script as a set of modules can also be useful if you want to:

- Create modules that can be re-used in several configurations.
- Enforce shared or standard settings on multiple routers. In this case, each Extra script an individual router would include a common script module that produces the same set of policies or settings for all the routers.

##### 4.7.3.1 Checklist for Creating Modular Extra Scripts

Before you create the modules that will make up your final Extra script, you should consider the following:

- What the major components are in your configuration
- What files you want to produce and where they will be stored

It is good practice to form a directory structure in which you can easily find the scripts and components needed. At the very least, it is advisable to create a subdirectory for your script files underneath the location for the Router Configurator software.

- Where each of the scripts will start and stop

When you produce modular scripts you should make sure that they all begin and end processing at a standard command prompt. All example Extra script files supplied expect to start processing at the "Config>" prompt.

## Entering Extra Commands

### 4.7 Advice on Creating Extra Scripts

---

#### 4.7.3.2 Procedure for Creating Modular Extra Scripts

This section goes through the steps needed to create an Extra script consisting of a number of script file modules. For each module, do the following:

1. Follow the steps in the table on page 4-11, through step 9.
2. When the script module runs without errors, remove the generated labels at the end of the script text - that is, the text beginning at {GOTO,ScriptExit}. This is error handling text, which only needs to appear once in the top level script. If it is left in all script modules, it will cause a duplicated label error.
3. Save the script to a file, as described in Section 4.10. Clear the window, by selecting **Clear Window** on the **Edit** menu.
4. Repeat steps 1 to 3 until you have produced all of the script file modules needed for your router.
5. Test the top level Extra script. To do this, type a series of {INDIRECT,} directives in the Extra Commands Script window (described in Section 4.8.2.1). Then click **Run Script**.
6. Finally, save the top level Extra script in the router data file by clicking Close.

**Note:** Make sure the error handling text appears in one of the script modules, in a suitable location. You could place it:

- At the end of the last script module in the series
- In a script module file of its own, to be run last
- As text in the Extra Commands Script window

#### 4.7.4 Editing a Recorded Extra Script

This section gives advice on editing the recorded script.

##### 4.7.4.1 General Advice

You will need to edit the Extra script to do the following:

- Remove unwanted responses (for example, help text or error messages).
- Remove incorrect or unwanted commands (for example, the ? entered to get help).
- Add or modify keyword directives. For example, you may want to change the time the Configurator will wait for responses. Also, see Section 4.7.4.2 below.

## Entering Extra Commands

### 4.7 Advice on Creating Extra Scripts

---

#### 4.7.4.2 Constructing Reliable WAITFOR Keyword Directives

The purpose of the WAITFOR directive is to check that the correct response is received from a router before the next CLI command is sent. It is important that you construct the WAITFOR directive so that it makes these checks reliably.

Each WAITFOR directive includes a text string indicating the prompt expected from the router in response to the last command. If the prompt actually received does not match the “expected text” in the WAITFOR directive, the script fails, with an error. If it does match, the next command is sent.

In order to match the text specified in the WAITFOR directive, the router’s response must include the entire text string specified in the WAITFOR directive. However, the response is allowed to contain additional characters. For example, the router response **timer in minutes [10]?** will match a WAITFOR directive with the text portion **timer in minutes**.

When you create a script using the **Record** facility, the Router Configurator will generate the required keyword directives, including WAITFOR directives. Each WAITFOR directive will contain as its “expected text” the last 20 characters of the exact response received to the command it follows.

For example, in the table below, the user enters a **set inactivity** command. The Configurator takes the last 20 characters of the response (**mer in minutes [10]?**) and inserts it into the WAITFOR directive as the expected text string.

Commands Entered	Resulting Script
Config> <b>set inactivity</b>	set inactivity
Console inactivity timer in minutes [10]? <b>20</b>	{WAITFOR,1000,ScriptFail,mer in minutes [10]?} 20  {WAITFOR,1000,ScriptFail,Config>}

However, this can cause problems when the router response includes a preconfigured default. For example, the WAITFOR directive in the table shows that it expects a prompt including the characters **[10]?** However, if this script were sent to a router which had a different default, or no default, the WAITFOR directive would not get its expected response, and the script will fail.

To overcome this sort of problem, make sure that specific defaults are removed from any recorded scripts. The table below shows how you might achieve this.

## Entering Extra Commands

### 4.8 Testing CLI Commands and Extra Scripts

---

Generated Script	Edited Script
set inactivity	set inactivity
{WAITFOR,1000,ScriptFail,mer in minutes [10]?}	{WAITFOR,1000,ScriptFail,timer in minutes}

### 4.8 Testing CLI Commands and Extra Scripts

This section describes how to test CLI commands and Extra scripts. Before you do any testing, check the notes in Section 4.12.

#### 4.8.1 Testing CLI Commands in the Extra Commands Script Window

To test a series of CLI commands that you have recorded, typed or pasted in the Extra Commands Script window, click **Run Script**.

**Result:** The Router Configurator loads the GUI configuration, and then Telnets the contents of the Extra Commands Script window to the router.

#### 4.8.2 Testing a Prebuilt Extra Script

There are two ways to test a prebuilt Extra script:

- Specify one or more script files using the {INDIRECT...} keyword directive.
- Use the **Run Script File** option.

##### 4.8.2.1 Using {INDIRECT} Keyword Directives

Follow these steps:

1. Type the following in the Extra Commands Script window:

```
{INDIRECT filename}
```

where *filename* is the name of your script file.

To specify several example scripts, enter a series of {INDIRECT} directives, each on a new line.

2. Click **Run Script**.

**Result:** The Router Configurator reloads the GUI configuration, and then Telnets the specified script(s) to the router.



## Entering Extra Commands

### 4.9 Saving an Extra Script

---

#### 4.8.2.2 Using the Run Script File Option

You can only specify one file with this method. Follow these steps:

1. Bring up the Router Dialog window, by clicking the **Telnet Window** box.
2. Click the **Run Script File** button. The **Select Script File to Send** window appears.
3. Select or enter a script file name. Click OK.

**Result:** The Router Configurator Telnets the specified script to the router. Note: the Configurator does not reload the GUI configuration.

## 4.9 Saving an Extra Script

This section summarizes the methods you use to save an Extra script to the router data file.

### 4.9.1 Saving the Contents of the Extra Commands Script Window

To save a series of CLI commands that you have recorded, typed or pasted in the Extra Commands Script window, click the **Close** button.

### 4.9.2 Saving a Prebuilt Extra Script

Follow these steps:

1. Type the following keyword directive in the Extra Commands Script window:

```
{INDIRECT filename}
```

where *filename* is the name of your Extra script file.

To specify several example scripts, enter a series of {INDIRECT,} keyword directives, each on a new line.

2. Click the **Close** button.

If you are saving a number of Extra script file modules, so that they will make up one top level script, check that you have followed the steps in Section 4.7.3.2, “Procedure for Creating Modular Extra Scripts.”

## Entering Extra Commands

### 4.10 Saving Commands in a Text File

---

#### 4.9.2.1 How the Router Configurator Saves Prebuilt Extra Scripts

In the case of the prebuilt script files specified in {INDIRECT,} keyword directives; the Router Configurator saves the pointers to the specified file names, rather than the contents of the script files. This means that you can modify script files without needing to save them again in the Configurator.

#### 4.9.3 Result of Saving Extra Scripts

When you click the **Close** button, the Router Configurator saves the contents of the Extra Commands Script window to the router data file.

Once the scripts are saved in the router data file, the Router Configurator considers them part of the router's configuration. This means that it will automatically Telnet the commands to the router whenever you load the router from within the Configurator.

### 4.10 Saving Commands in a Text File

You can save either selected text, or the entire contents of the Router Dialog window or the Extra Commands Script window to a text file.

Follow these steps:

1. To save selected text, select **Save Selected Text** on the Edit menu.

To save the entire contents of the a window, select **Save Window As** on the Edit menu. The Configurator will save the active window - that is, the one that the cursor is in.

The **Save Window to File** window appears.

2. Enter or select a file name. Give the file name the extension **.SCP**.
3. Click **OK**.

## 4.11 Using a Surrogate Router

You can, if you wish, specify a surrogate router for testing CLI commands - that is, a router other than the one you are configuring. There are two main reasons for using a surrogate router for testing:

- If the router you are configuring has not been configured previously. In this case, you **must** use a surrogate router for testing, because a router will only respond to CLI commands if it contains a configuration.
- Generally, to allow you to produce and debug your router configuration without affecting other users of the network.

### 4.11.1 How Testing Works

You can use a surrogate router for testing without changing its current active configuration, or permanently altering the configuration in nonvolatile memory. The next sections explain how this works.

#### 4.11.1.1 Background

Each DRS router holds two configurations at the same time:

- The **permanent** configuration in nonvolatile memory.
- The **active** configuration in volatile memory. This is the configuration the router is actually using.

You create the **permanent** configuration by loading a Router Configurator configuration file, by running CONFIG interactively and entering Talk 6 commands, or both. This permanent configuration only becomes the **active** configuration when you restart or reboot the router.

This means that the commands you enter interactively using CONFIG do not take effect immediately. However, they are checked for syntax errors.

#### 4.11.1.2 What Happens When You Test

When you test CLI commands on a surrogate router, the configurator:

1. When you connect to the surrogate router on the Extra page, saves the surrogate router's permanent configuration in a file on the PC.
2. Sends the CLI commands to the surrogate router, as described in Section 4.8.
3. When you disconnect, restores the surrogate router's permanent configuration.

## Entering Extra Commands

### 4.11 Using a Surrogate Router

---

#### 4.11.2 Requirements for Using a Surrogate Router Successfully

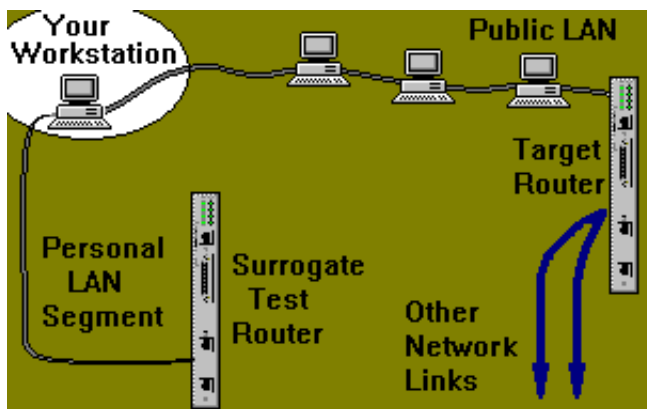
In order for you to use this feature successfully:

- You must have exclusive access to the surrogate router while you create or modify the Extra script interactively, so that no one else can modify the surrogate router's permanent configuration while you are testing .
- You must ensure that the surrogate router cannot interact with the real router which will eventually be loaded with the configuration.

##### 4.11.2.1 Using a Surrogate on a Private LAN

One way to achieve these conditions is to use a second network adapter on your PC to create a private LAN, as shown in Figure 4–5. You can then use the surrogate router to experiment with a configuration and incrementally change it without affecting the real network and its users.

Figure 4–5 Surrogate Router on a Private LAN



**Note:** Do not restart the surrogate router during testing. If you do, the result may be that the surrogate router and the router you are configuring have the same configuration (including the same IP management address).

#### 4.11.3 Procedure

To specify a surrogate router, follow these steps:

1. On the **Load** menu on the main menu bar, select **Options**.

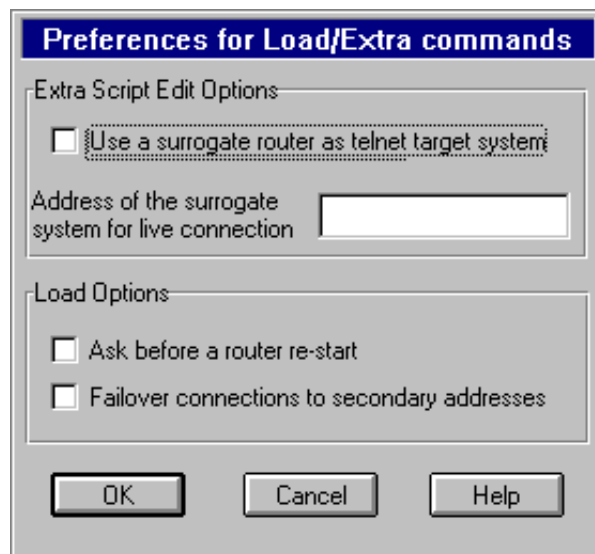
## Entering Extra Commands

### 4.12 Connecting to the Router

---

2. The window in Figure 4–6 appears. Check the **Use a surrogate router** box.
3. Enter the IP address of the router you want to use as the surrogate.
4. Click **OK**.

**Figure 4–6 Preferences for Load/Extra Commands**



## 4.12 Connecting to the Router

When you click either the **Connect** button or the **Run Script** button, the Router Configurator attempts to put the router in the same state that it would be in if you were actually loading a configuration. It does this by using TFTP to load the GUI configuration for the router. The purpose of this is to ensure that:

- The router can respond sensibly to the CLI commands.
- The CLI commands will be compatible with the rest of the configuration.

## Entering Extra Commands

### 4.12 Connecting to the Router

---

#### 4.12.1 What Happens When Connecting to the Router

When you click **Connect** or **Run Script**, the router displays these prompts:

```
Copyright 1995-1996 Digital Equipment
Corp.
MOS Operator Control
```

```
+-----+
| Preparing - Please wait... |
+-----+
```

```
*
*
*talk 6
```

} 1. Starts CONFIG

```
Config>exit
Command error
Config>exit
Command error
Config>exit
Command error
```

} 2. Enters Exit three times. This takes you to the Config> prompt if CONFIG was displaying a protocol or interface prompt from a previous session.

```
Config>boot
TFTP Boot/dump configuration
Boot config>TFTP PUT CONFIG 16.39.160.186
host filename [102410A2.cfg]?
C:\COMET\rfa00069.SRx
TFTP transfer complete, status: OK

Boot config>
Boot config>TFTP GET CONFIG 16.39.160.186
host filename [102410A2.cfg]?
C:\COMET\rfa00069.SRM
TFTP transfer complete, status: OK
Configuration file originated on host
named: "raew"
- is this okay ? (Yes or [No]): yes
Updating CONFIG; Do Not Interrupt!
```

} 3. Loads the GUI configuration, using TFTP.

```
Boot config> Exit
Config>
Config>
```

```
+-----+
| SUCCESSFUL | (Replay)
+-----+
```

} 4. Returns to CONFIG> prompt.

---

## Using EasyStart BOOTP

### 5.1 Introduction

Version 2.0 and later of the Distributed Routing Software includes the *EasyStart* facility. Easystart enables a router to do the following:

- Act as a BOOTP client when it has no configuration information available. This eliminates the need to use the console setup port to provide initial configuration information.
- Download its configuration file from a host using the TFTP protocol.

EasyStart can send and receive BOOTP messages on all LAN interfaces, and on PPP and Proteon Serial Line (PSL) WAN interfaces.

The *System Software Guide* gives a detailed description of EasyStart. This chapter describes how the Router Configurator supports EasyStart BOOTP, and the steps needed to configure the router's WAN interfaces for BOOTP.

#### 5.1.1 About BOOTP

BOOTP is a protocol used by a router (or other diskless system) to learn its IP address and the location of its load file. A router sending BOOTP requests to find this information is a *BOOTP client*. The host that holds the information and can respond to BOOTP requests is a *BOOTP server*.

A BOOTP server holds a list of the BOOTP clients it is responsible for. This list is known as a *BOOTP database*. The BOOTP database contains each client's IP address, hardware address (sometimes called a MAC address), and the location of a file to be loaded; it may also contain other information. To find a client's IP address, the BOOTP server matches the hardware address in the client's BOOTP request to a hardware address in the BOOTP database, and then finds the IP address associated with the hardware address.

## Using EasyStart BOOTP

### 5.2 Setting Up BOOTP on LAN Interfaces

---

#### 5.1.2 EasyStart and the Router Configurator

The Router Configurator does the following to support EasyStart:

- Provides BOOTP server software. This enables the PC on which it is running to act as a BOOTP server.
- Sets up a BOOTP database on the PC, and creates entries for configured routers. It creates one entry for each router interface used for BOOTP.
- Provides a tab page to configure PPP and PSL interfaces for BOOTP.

### 5.2 Setting Up BOOTP on LAN Interfaces

The Configurator automatically creates an entry in the BOOTP database for each LAN interface, using information taken from the **General** tab page under **System**. You do not need to enter any information for BOOTP on LAN interfaces, other than the mandatory information on the **General** tab page.

#### 5.2.1 LAN Interface Information in the BOOTP Database

The router configurator enters the following information in the BOOTP database for each LAN interface:

- The *hardware address* for the interface. This is taken from the *hardware address* on the **General** tab page. If there is only one LAN interface, the hardware address is identical to the hardware address. If there is more than one, the hardware address for an interface consists of the first 11 digits of the hardware address and, for the twelfth digit, the port number of the interface.
- The *IP address* of the router. This is the in-band IP address on the **General** tab page. The IP address is the same for each LAN interface.
- The *location of the configuration file*. This is the file created by the Configurator and loaded to the router.

### 5.3 Setting Up WAN Interfaces for BOOTP

To set up WAN interfaces to use BOOTP, you enter information on the **BOOTP EasyStart** tab page under **System**.



## Using EasyStart BOOTP

### 5.3 Setting Up WAN Interfaces for BOOTP

---

#### 5.3.1 The BOOTP Protocol and WAN Interfaces

BOOTP is generally not implemented over WAN interfaces, since WAN interfaces do not use hardware addresses. However, EasyStart provides a special format for WAN interface hardware addresses that allows the router to use BOOTP over WAN interfaces. In the Router Configurator, you provide the information required to construct the special format hardware addresses for WAN interfaces.

#### 5.3.2 Requirements for Using BOOTP on WAN Interfaces

To use BOOTP over WAN interfaces, the following requirements must be met:

- The WAN interfaces must be connected to a BOOTP relay agent that can communicate with the BOOTP server.
- The WAN interfaces on the router and on the BOOTP relay agent must be running either PPP or the PSL protocol.
- Each BOOTP WAN interface on the BOOTP relay agent must have an IP address.

#### 5.3.3 Procedure

To set up BOOTP WAN interfaces in the Router Configurator, follow these steps:

1. Make sure that the WAN interfaces that you want to use for BOOTP are configured as PPP or PSL links.
2. Go to the **EasyStart BOOTP** tab page under **System**. For each WAN interface to be used for BOOTP, enter the IP address of the BOOTP relay agent WAN interface to which it connects; this is called the *neighbor IP address* on the tab page.

To prevent an interface from being used for BOOTP, leave the IP address as 0.0.0.0.

#### 5.3.4 WAN Interface Information in the BOOTP Database

The router configurator enters the following information in the BOOTP database for each WAN interface :

- The *hardware address* for the interface. This is a special format hardware address, based on the IP address of the BOOTP relay agent interface to which the router's WAN interface connects.

## Using EasyStart BOOTP

### 5.4 The Router Configurator and BOOTP Servers

---

- The *IP address* of the router. This is the same as for LAN interfaces.
- The *location of the configuration file*. This is the file created by the Configurator and loaded to the router.

### 5.4 The Router Configurator and BOOTP Servers

BOOTP server software is included with the Router Configurator. If the Configurator is running standalone, it automatically starts its BOOTP server when you load the router (unless the BOOTP server is running already).

If the Configurator is running as part of the clearVISN package, the Router Configurator uses the BOOTP server provided by clearVISN.

#### 5.4.1 Running the BOOTP Server Independently

If you are running the Router Configurator standalone, you can run the Router Configurator's BOOTP server independently.

To start the BOOTP server, just click on the BOOTP server icon in the Digital Routers program group. If you want the BOOTP Server to start automatically when you start up your PC, move the BOOTP server icon to your startup program group.

### 5.5 Turning Off BOOTP for a Router

To prevent the Router Configurator from setting up an entry for a router in the BOOTP database, follow these steps:

1. In the Browser, select a router configuration.
2. On the Router menu, you will see the **Use BOOTP** option. If it is ticked, click on it to remove the tick. If it is not ticked, BOOTP has already been turned off for that router.

# 6

---

## Loading the Router

This chapter describes how to use the Router Configurator to load the router.

### 6.1 Requirements for Loading the Router

The router you are going to load must meet the following requirements:

- Its software must be installed.
- The router must have an IP address. If the router is new, or its configuration information has been cleared, it will not have an IP address.

There are two methods for giving a router an IP address, depending on the Distributed Routing Software (DRS) version:

- For Version 1.1 or earlier, you must use the console setup port to enter an in-band IP address and, if necessary, a gateway IP address. Refer to Section 2.5.1.
  - For Version 2.0 or later, the *EasyStart* facility enables the router to act as a BOOTP client, and obtain its IP address from a BOOTP server on the network. Refer to Chapter 5 for more information about EasyStart.
- You must be able to reach (ping) the router from the PC over the network.

### 6.2 Steps in Loading: DRS Version 1.1 or Earlier

The basic steps are as follows:

1. If the router does not have an IP address, use the router's setup port to enter an in-band IP address and, if necessary, a gateway IP address.
2. Use the Router Configurator to create or modify a configuration.
3. If you wish, configure Load Options, as described in Section 6.4.
4. Click the **Load** button on the Main Navigation window.

If you wish to load the router at a later time, click **Close** instead of **Load**.

## Loading the Router

### 6.3 Steps in Loading: DRS Version 2.0 or Later

---

#### 6.3 Steps in Loading: DRS Version 2.0 or Later

The basic steps are as follows:

1. Use the Router Configurator to create or modify a configuration.

If you want the router to run BOOTP over its WAN interfaces, enter information on the **BOOTP EasyStart** tab page (under **System**). Refer to Section 5.3 for details.

2. If you wish, configure Load Options, as described on Section 6.4.
3. Click the **Load** button on the Main Navigation window.

If you wish to load the router at a later time, click **Close** instead of **Load**. As well as saving the configuration file, this creates BOOTP entries for the router.

4. If necessary, clear and restart the router. Refer to the *System Software Guide* for instructions on how to do this.

#### 6.3.1 Loading Without Using the Configurator

If the BOOTP server is running, you can load a router without using the Configurator. Follow these steps:

1. Follow steps 1 and 2 in Section 6.3.
2. Click the **Save** button on the Main Navigation window.
3. When you wish to load the router, do the following:
  - a. Make sure the BOOTP server is running on the PC.
  - b. Clear and restart the router. Refer to the *System Software Guide* for instructions on how to do this.

The router will load the configuration that is held on the PC.

## 6.4 Setting Load Options

To set load options, select **Options** from the **Load** menu. The Router Configurator displays the **Preferences for Load/Extra Commands** window.

There are two Load options:

- **Ask before a router restart.** When you request a load, the Router Configurator by default restarts the router to enable the new configuration to take effect. If you tick this box, the Router Configurator will ask for confirmation before restarting the router.

When you restart the router, it is temporarily removed from the network.

- **Failover connections to secondary addresses.** When you load the router, the Router Configurator tries to load the configuration to the in-band IP address specified for the router. If this fails, by default, the Router Configurator gives up the attempt to load.

If you tick this box, then, if a load to the in-band IP address fails, the Router Configurator will try to load to each IP interface address in turn.

## 6.5 Result of Requesting a Load

### 6.5.1 Records and Files Created

When you click the **Load** button (or the **Close** button), the Router Configurator does the following:

- Creates a binary (SRAM) configuration file for the router. This file contains the information you have entered on the GUI tab pages, plus default parameter values supplied by the Router Configurator. This is the configuration file initially loaded to the router.
- Saves the router's configuration in the router data file.
- Creates entries for the router's BOOTP interfaces in the BOOTP database. These entries include the location of the SRAM configuration file.

## Loading the Router

### 6.6 Configuration File Names

---

#### 6.5.2 Loading the Router

Once the Configurator has created the configuration file and BOOTP entries, it does the following:

1. Telnets to the router, and starts the CONFIG utility.  
If the Router Configurator cannot connect to the router (for example, because the router has not yet learned its IP address), it waits until the router becomes reachable.
2. From the `BOOT CONFIG>` prompt, issues a TFTP **get** request from the router to the PC, requesting that the configuration file be loaded.
3. If the configuration file loads successfully, Telnets the Extra script to the router.
4. Restarts the router.
5. Once the router is restarted, Telnets to the router and starts the CONFIG utility again.
6. From the `BOOT CONFIG>` prompt, issues a TFTP **put** request to copy the complete router configuration back to the PC.

The complete router configuration consists of an SRAM file containing both the GUI configuration and the SRAM version of the Extra script.

### 6.6 Configuration File Names

Once the Router Configurator loads a router, there are two SRAM configuration files for the router:

- The file created from the GUI configuration. This is the file initially loaded to the router, after you have created or modified a configuration. The name of this file is:

*file-name.SRM*

where *file-name* is the router's configuration name

- The complete router configuration copied back to the PC after the router is loaded. This contains both the GUI configuration and the SRAM version of the Extra script. The name of this file is:

*file-name.SRV*

where *file-name* is the router's configuration name

#### 6.6.1 Viewing the Progress of a Load

The Router Configurator displays a **Load** window during the load. This indicates the progress of the load.

If the Configurator cannot connect to the router, it displays a message giving possible reasons.

#### 6.6.2 Cancelling a Load

The Router Configurator displays a **Load** window during the load. This indicates the progress of the load.

### 6.7 Reloading an Existing Configuration File

Once you have loaded a router, the Router Configurator copies the entire loaded configuration back to the PC. This configuration is a binary SRAM file, consisting of:

- The SRAM created by the Router Configurator from the information entered on the tab pages - that is, the GUI configuration
- The SRAM version of the CLI commands in the Extra script (if any)

You may want to reload this new configuration file at some point.

#### 6.7.1 Loading a New Router

If you are loading a new router, it is recommended that you do not start the router until after you have clicked the **Load** button or the **Close** button. The reason for this is as follows:

As soon as you start the router, EasyStart will send BOOTP requests to find the router's IP address. In order for it to find the IP address, there needs to be a BOOTP database entry for the router on a BOOTP server host. However, the Configurator only creates a BOOTP database entry for a router when you click the **Load** or **Close** button. This means that EasyStart will not be able to find the router's IP address until after you have clicked **Load** or **Close**. If EasyStart BOOTP cannot find the address within x minutes, it gives up sending BOOTP messages.

Clicking the **Load** (or **Close**) button before starting the router avoids this problem. At first, the Router Configurator will find the router to be unreachable, until it learns its IP address. However, this does not matter, as the Router Configurator Load facility will simply ping the router at intervals until it eventually becomes reachable.





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