HEWLETT® PACKARD

User's Guide

Commands and Procedures

HP AdvanceStack Routers

Hewlett-Packard Series 200, 400, and 600 Routers

User's Guide

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Product Numbers and Software Version

This guide provides information for Hewlett-Packard routers running software with the following version numbers:

A.08 series

B.08 series

C.08 series

Earlier and later software versions may operate differently than described in this manual.

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Hewlett-Packard
8000 Foothills Boulevard
Roseville, California 95747-6588
916-786-8000

Preface

Why and When To Use This Guide

This guide describes how to use the Hewlett-Packard router commands and features to configure, monitor, and manage local and remote HP routers through the console interface and through SmartBoot.

Use this guide when you need help with the operations that begin after the router hardware has been installed and verified according to the instructions in the installation guide.

Coverage Note

This manual addresses the entire range of commands and other software features found in Hewlett-Packard routers, including features that are not found on all router models. Thus, for some routers, such as the HP Router PR (J2540), certain features described in this manual are not available in the router. For information on the features available in your router, refer to the release notes you received with the router or most recent software upgrade.

Audience

This guide is intended for network managers and other technicians who install and manage routers.

Note

The network design and network map should be completed before using this guide.

Organization

Chapter 1, "Overview of Initializing and Verifying Router Software", defines "initializing and verifying" a router, and introduces you to the router console interface and the tools it offers for managing a router.

Chapter 2, "How To Use the Main Menu", describes how to access and operate the main menu.

Chapter 3, "How To Use Quick Configuration To Create or Change a Minimal Configuration", describes how to use this time-saving utility to quickly create a functional configuration.

Chapter 4, "How To Use the Configuration Editor To Create or Change a Configuration", describes the tool to use for creating the extensive configurations needed for many router applications.

Chapter 5, "How To Use the Event Log To Analyze Router Operation" describes how to access and interpret Event Log messages.

Chapter 6, "How To Use the Statistics Screens To Analyze Router Operation" describes how to use the router statistics features.

Chapter 7, "How To Use the Network Control Language (NCL) Commands To Manage a Router", describes how to use the Network Control Language Interpreter (NCL) and the various NCL commands. This chapter includes the use of Telnet to manage or reconfigure a remote router.

Chapter 8, "How To Use Quick Remote To Configure a Remote Router", describes how to automatically configuring a remote router from a central site via a WAN link.

Appendix A: "Parameter Locator", is an aide to locating individual parameters in the Configuration Editor structure.

Subject Index

Other HP Router Manuals

For a current listing of manuals designed for use with your Hewlett-Packard router, refer to the *Hewlett-Packard Router Products Release Notes* shipped with your router or most recent software update.

Contents

1

Overview of Initializing and Verifying Router Software

Note

This chapter provides an overview of getting started with a router. For actual operating instructions, refer to chapters 2 through 8.

After a router has been installed and the hardware verified as described in the installation guide, you are ready to use the console to initialize and verify the router's software operation. This chapter provides an overview of these topics as well as an introduction to the console interface and the software tools for creating or modifying a configuration.

If you are new to Hewlett-Packard routers, this chapter can help you to become more familiar with the functions of the console interface before you actually begin to use it. *If you are already familiar with HP routers, you may want to bypass this chapter and use the following chapters in this guide as needed for reference.*

Note

In the case of a router that is automatically configured and subsequently managed via Telnet from another location (such as configuration via Quick Remote from another Hewlett-Packard router), local operator intervention is usually unnecessary. In such cases, it may be unnecessary for a local operator to use the features described in this manual.

Initializing the Router Software

When the router is installed with (or reset to) the factory default, it boots and begins operation with all networking ports configured for bridging. At this point you are ready to use the console interface to *initialize* the router. The following is an overview of the initializing process:

1. Configure for routing.
2. Boot the router.
3. Set the date and time (optional).
4. Set passwords (optional, but recommended for system access security).

Configure for Routing

Configuring specifies the parameter values needed to conform router operation to the needs of your network. You can use Quick Configuration to create a minimal configuration or you can use the Configuration Editor to create a more extensive configuration.

Boot the Router

After you specify a configuration, you must implement it by "booting" the router. Booting replaces the former configuration parameters with the ones you have most recently saved, and restarts the router. Booting is a simple process that can be done either when you exit from the Quick Configuration screen or by executing the Boot command in the Network Command Language Interpreter (NCL).

Set the Date and Time

In the factory default configuration, the router starts its clock and calendar from a default setting. Setting the date and time ensures an accurate date and time display in the console screen and accurate dates and times in Event Log messages.

Set Passwords

When your router is operating without passwords, anyone who has access to your router through either the directly connected console or Telnet can freely act as the router operator or manager. To discourage unauthorized access, it is recommended that you set two levels of passwords:

- Manager password: Allows access to router management functions such as timesetting, changing the configuration, and rebooting.
- User password: Allows monitoring only of statistics, the event log, MIB variables, and configuration values. It does not allow execution of router management functions such as rebooting.

Verifying the Router Software

Verifying the router software means to evaluate the performance of the bridging and routing services that have been configured in the router to ensure that bridging and routing is operating properly. Verifying occurs after the router hardware has been installed and the software initialized, and involves using the console to inspect router-generated data from the following sources:

- Statistics screens
- Event log
- Bridging and routing tables
- Node accessability tests (ping, Atping)

The remainder of this chapter provides an overview of the console interface, which is the tool to use for initializing, verifying, and managing your router.

Overview of the Console Interface

The console interface is your tool for configuring and booting the router, gathering data on router performance, and managing router operation. Access to the console interface is via the Main menu, which displays the router's software management features. (You can access a router's console interface either by directly connecting your terminal to the router's console port or by using Telnet --page 7-10-- or a modem connection.)

```
                              DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -==============================
                                  Main Menu

         -->   1.  Statistics Screen Menu
               2.  Network Control Language Interpreter
               3.  Configuration Editor
               4.  Event Log
               5.  LOGOUT
               6.  Quick Configuration
               7.  Quick Remote









PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 1-1. The Main Menu

- Statistics Screen Menu: Provides ongoing data for analyzing circuit, bridge, routing service, and buffer usage. (Refer to chapter 6, "How To Use the Statistics Screens To Analyze Router Operation".)
- Network Control Language Interpreter: Referred to as "NCL", provides a command line to execute router management commands such as rebooting, password-setting, and access to bridging and routing tables. (Refer to chapter 7, "How To Use the Network Control Language (NCL) Commands To Manage a Router".)

- Configuration Editor: Used to create and modify extensive configurations. (Refer to the next section and to chapter 4, "How To Use the Configuration Editor To Create or Change a Configuration".)
- Event Log: Displays event messages generated by the router. (Refer to chapter 5, "How To Use the Event Log To Analyze Router Operation".)
- LOGOFF: Terminates a console session from a remote terminal. (Refer to "How To Disconnect Telnet Access to Another HP Router" on page 7-12.)
- Quick Configuration: Used to create and modify minimal configurations. (Refer to the next section and to chapter 3, "How To Use Quick Configuration To Create or Change a Minimal Configuration".)
- Quick Remote: Provides a tool for creating and holding minimal configurations for automatic downloading to remote HP routers over a WAN link. (Quick Remote does not affect the local router's configuration.) Refer to chapter 8, "How To Use Quick Remote To Configure a Remote Router".

Overview of Methods for Creating or Modifying a Configuration

This section describes tools that you can use to access the configuration in any HP Series 200, 400, or 600 router, using either a direct console connection to the router or Telnet access over the network.

The ports on a router must be configured for routing before they can actually perform routing functions. Also, once a routing configuration has been implemented, it may need adjustments to achieve optimum performance. In these cases it is necessary to use the configuration tools to create or modify a configuration.

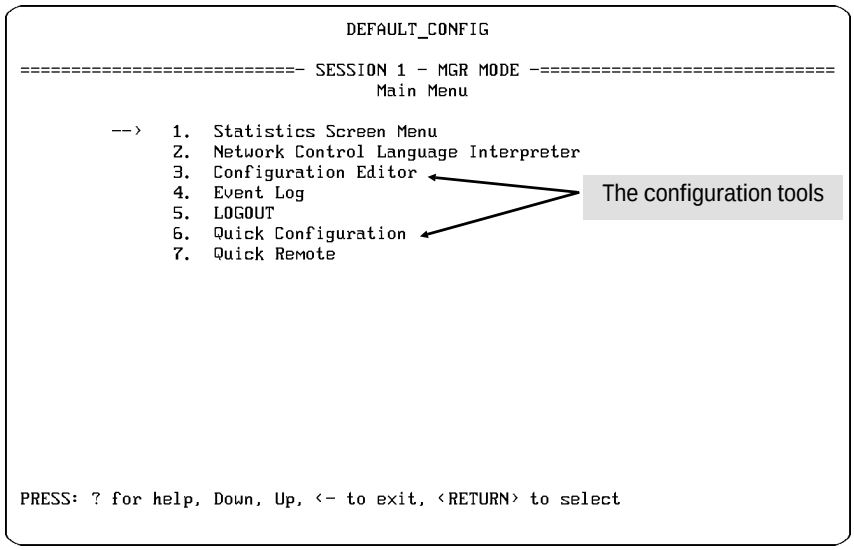

Figure 1-2. Methods for Configuring the Router

Configuration Tools in the Main Menu

- Quick Configuration: (Main Menu item number 6) queries you only for the configuration parameters most commonly required to get started. It provides help for each question and displays a table tracking your current settings, all on one screen. (If your network design requires that you customize parameters others than those in Quick Configuration, then you can use the full Configuration Editor.) To use Quick Configuration, refer to chapter 3, "How To Use Quick Configuration To Create or Change a Minimal Configuration".
- Configuration Editor: (Main Menu item number 3) uses a structured series of menus, screens, and prompts that lead logically through all the parameters you may customize for your HP router. The Configuration Editor gives you more flexibility and many more parameters than are available in Quick Configuration. Refer to chapter 4, "How To Use the Configuration Editor To Create or Change a Configuration".

Interaction Between the Configuration Tools

Quick Configuration accesses a group of parameters that forms a subset of the parameters accessed by the Configuration Editor.

That is, Quick Configuration and the Configuration Editor provide two different ways to access the same router configuration. Thus, if you change a parameter value such as an IP address in Quick Configuration, then reboot the router, the new IP address will automatically map to the Configuration Editor as well. Similarly, if you change any parameters in the Configuration Editor that are also accessed from Quick Configuration, then reboot the router, the changes will automatically map to Quick Configuration.

Network Management Tools

Network management tools provide another method of monitoring and configuring a router that is already installed in a network. For information on how to access and manage a router using a network management tool, refer to the documentation you received with your network management software.

2

How To Use the Main Menu

Introducing the Main Menu

The Main Menu is the highest level in the console interface, and provides operator access to the router. It lists each of the router's main user interface features, and includes Help information on each of these features.

How To Access the Main Menu

How to connect a console to your router is described in the installation guide for your router. The console is then used to verify that the router hardware is operating properly.

Once the terminal or terminal emulation is switched on, connected, and configured correctly and the router is plugged in and passes its self-test, you are ready to proceed.

Note

If you use a personal computer for a console, press the Enter key whenever this manual tells you to press the Return key.

If a line of text (such as `Waiting for speed sense`) appears, press Return. (You may have to pause and repeat Return two or three times to get a response.) Pressing Return allows the router to sense the speed of your terminal and respond accordingly. As soon as the router senses and matches the terminal's speed, the baud rate is displayed at the correct speed. You will then see one of the following screens:

```
                              DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
                                 Main Menu

          -->   1.  Statistics Screen Menu
                2.  Network Control Language Interpreter
                3.  Configuration Editor
                4.  Event Log
                5.  LOGOUT
                6.  Quick Configuration
                7.  Quick Remote









PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 2-1. The Main Menu

```
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Copyright (C) 1989, 1990, 1991 The University of Maryland, College Park,
Maryland.  All Rights Reserved.
FASTMAC Copyright (C) 1989-91 Madge Networks Ltd.  All Rights Reserved.

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 Computer Software clause at 52.227-7013.

         HEWLETT-PACKARD COMPANY, 3000 Hanover St., Palo Alto, CA 94303









Password:
```

Figure 2-2. Copyright and Password

Note

If your console is already displaying a screenful of other text, the "speed sense" text mentioned above may appear anywhere on the screen. When you see that a new line of text has appeared (garbled or not), press Return.

How To Access the Main Menu

- If the Copyright and Password screen (figure 2-2) appears first, then a password has been set. Type in the password and press Return again to display the Main menu. If you need to clear (remove) a password, refer to the installation guide you received with your router.
- If the Main menu (figure 2-1) appears first, then a password is not required.

The items listed in the Main menu include the following:

- Statistics Screen menu
- Network Control Language Interpreter (NCL)
- Configuration Editor
- Event Log
- Logout
- Quick Configuration
- Quick Remote (on most router models)

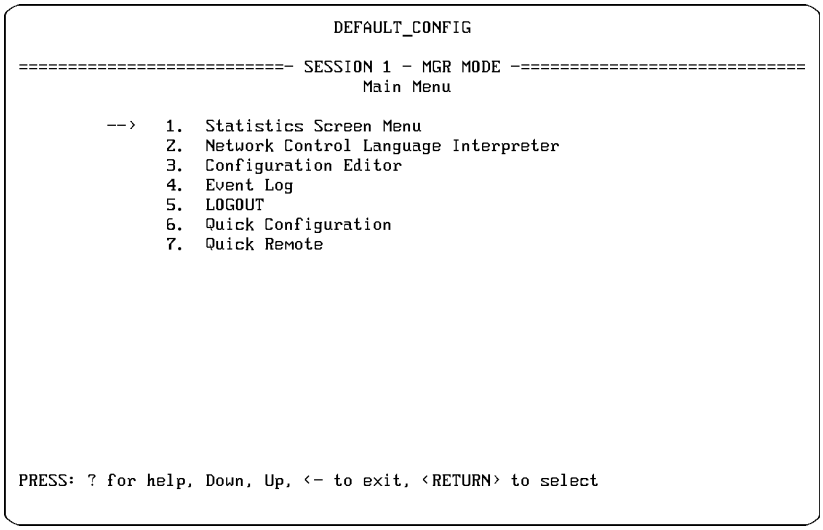


Figure 2-3. The Main Menu

Selecting an Option in the Main Menu

To select (start) a Main menu option, press the number of that option. For example, to display the Network Control Language Interpreter (NCL), press 2.

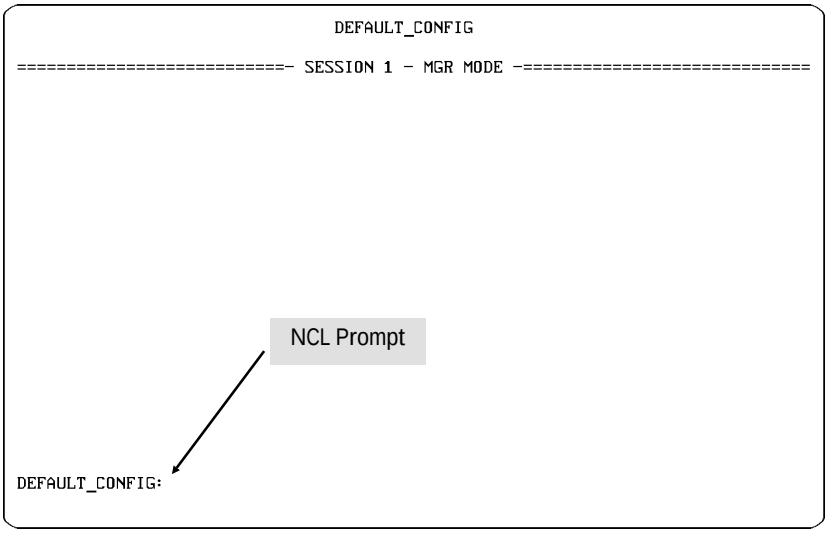


Figure 2-4. Pressing 2 in the Main Menu Displays the NCL Prompt

To exit from NCL, type `exit` and press Return.

Getting Help in the Main Menu

To display Help for an item listed in the Main Menu, use the ↑ or ↓ key to move the pointer to the item for which you want Help, then press Shift ?. For example, to display Help for NCL:

1. Move the pointer to item 2, "Network Control Language Interpreter" in the Main Menu:

```
                              DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -==============================
                                  Main Menu

              1.  Statistics Screen Menu
        -->   2.  Network Control Language Interpreter
              3.  Configuration Editor
              4.  Event Log
              5.  LOGOUT
              6.  Quick Configuration
              7.  Quick Remote









PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 2-5. Move the Pointer to Item 2

2. Press Shift ? to display the Help information.

```
                                DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
              Help Screen for Network Control Language Interpreter

The Network Control Language Interpreter (NCL) is an command line control
interface with commands that enable you to:

        *  Access the system's hierarchical database of detailed
           information about the router's operations

        *  Control specific entities within your router.

To access NCL from the Main menu, use the UP CURSOR or DOWN CURSOR key to
position the cursor at "Network Control Language Interpreter"; then press
RETURN.  Or type the menu number "2" instead.

To display a summary of all NCL commands, enter the HELP command when you are
in NCL.

See the Operator's Guide for a detailed description of all NCL commands.


PRESS any character to exit
```

Figure 2-6.The NCL Help Display

Press ↵ (or any character key) to exit from Help and return to the Main menu.

This completes the instructions on how to access the console interface and use the Main menu. The remainder of this manual describes how to operate the individual features listed in the Main menu.

3

How To Use Quick Configuration To Create or Change a Minimal Configuration

Introducing Quick Configuration

This chapter describes how to use the Quick Configuration utility to create a minimal configuration for IP, IPX, AppleTalk, and DECnet routing services. You can also use Quick Configuration to disable or enable bridging on each port of your router.

Why Use Quick Configuration? Your HP router provides two methods for configuring the router through the console port:

- The Quick Configuration utility — the short path to basic configurations
- The Configuration Editor — the detailed path to fully customized configurations (described in chapter 4)

Quick Configuration provides the following:

- A single-screen "worksheet" approach for basic configurations—you can combine several steps into one for a configuration process that is faster and easier than using the more detailed and extensive Configuration Editor.
- Access to a minimal set of IP, IPX, AppleTalk, and DECnet parameters, plus options for bridging and IP host-only operation.
- Access to X.25 (available on most HP routers) and other selected branches of the Configuration Editor, or to the entire Configuration Editor—you can use the "hotkeys" to choose either, without having to exit from Quick Configuration.
- Optional rebooting upon exit from Quick Configuration—when you've finished configuring, you can choose to reboot when you exit from Quick Configuration. This makes it faster and easier to get your router up and running after you've made configuration changes.

Note

Quick Configuration affects a small subset of the overall parameter set accessed through the Configuration Editor. For more on this topic, refer to "Interacting With the Configuration Editor" on page 3-29.

What are the basic steps to configuring a router?

The basic steps to configuring the router for minimal operation are:

1. Determine from your network map the minimal parameter values you need.
2. Start Quick Configuration.
3. Enter the parameter values that you determined in step 1.
4. Exit from Quick Configuration with the reboot option selected.
5. After the router finishes rebooting, verify proper operation.

Note

Because of port differences and routing service differences, the Quick Configuration screen differs among the various HP routers. Examples of Quick Configuration use are the following screens for an HP Router SR and an HP Router 650:

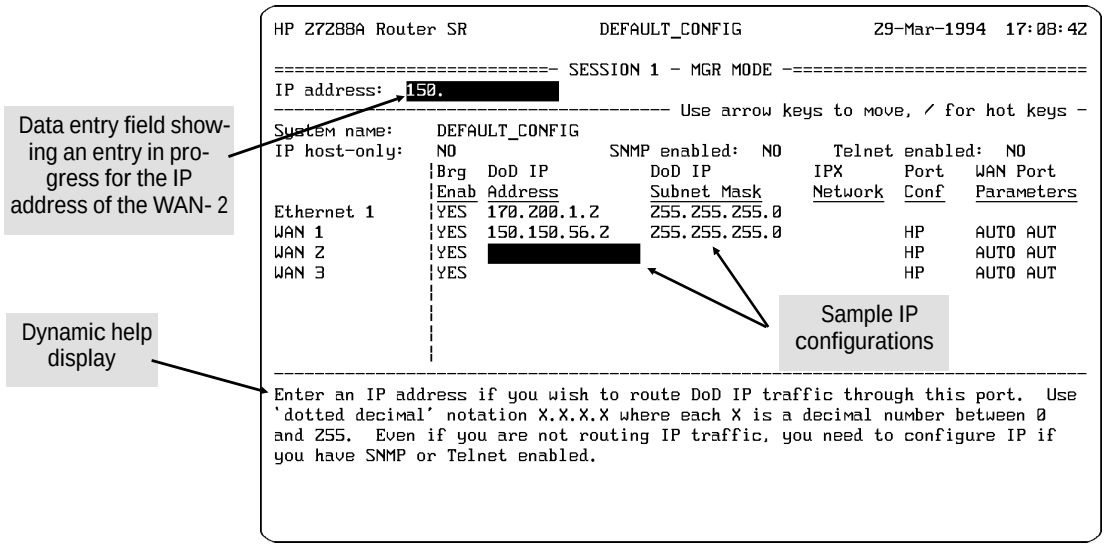


Figure 3-1. Quick Configuration Example (HP Router SR)

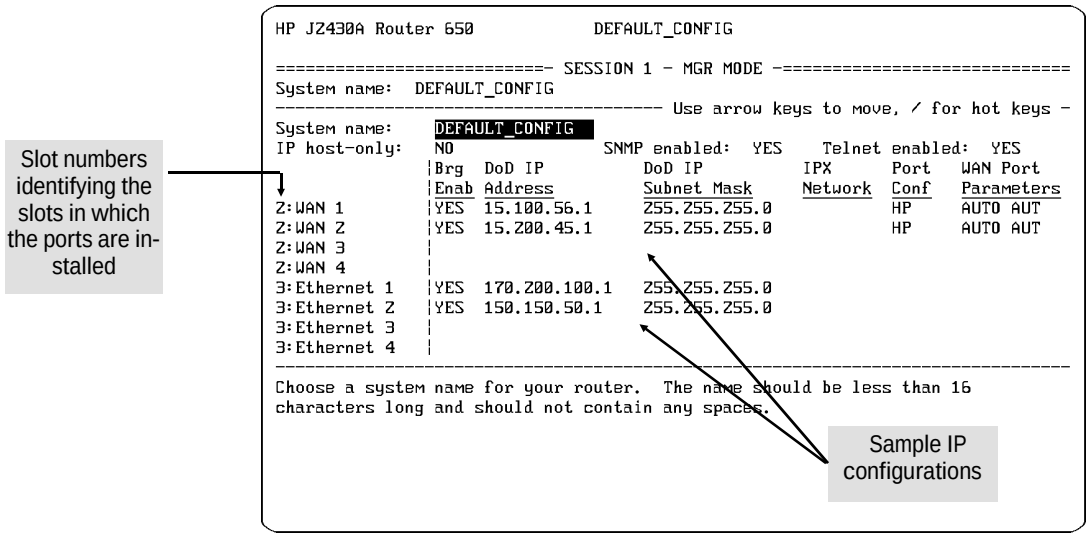


Figure 3-2.Quick Configuration Example (HP Router 650)

Quick Configuration also offers these other features:

- Displays dynamic online help for each field
- Automatically configures default lines, circuits, and circuit groups
- Displays error messages for some error types, such as subnet masking errors
- Lets you view (and change) what has been configured earlier
- Provides “hotkeys” for display control and direct access to the Configuration Editor
- Detects removal of a interface module and enables you to easily update the interface module configuration to reflect the change
- Detects replacement of one type of interface module with another and enables you to eliminate the resulting configuration conflict

How To Create a Configuration

To create a new configuration:
1. Start the Quick Configuration utility.
2. Enter a minimal set of configuration values.
3. Save the new configuration and reboot the router.

This section tells you how to do the above, as well as how to exit from Quick Configuration when you don't want to change the current configuration.

To start the Quick Configuration utility and enter a minimal configuration:

1. Plan the Quick Configuration parameters you will need.

2. Start the router (described in chapter 1 of the *Installation Guide*) and display the Main menu.

Quick Configuration option

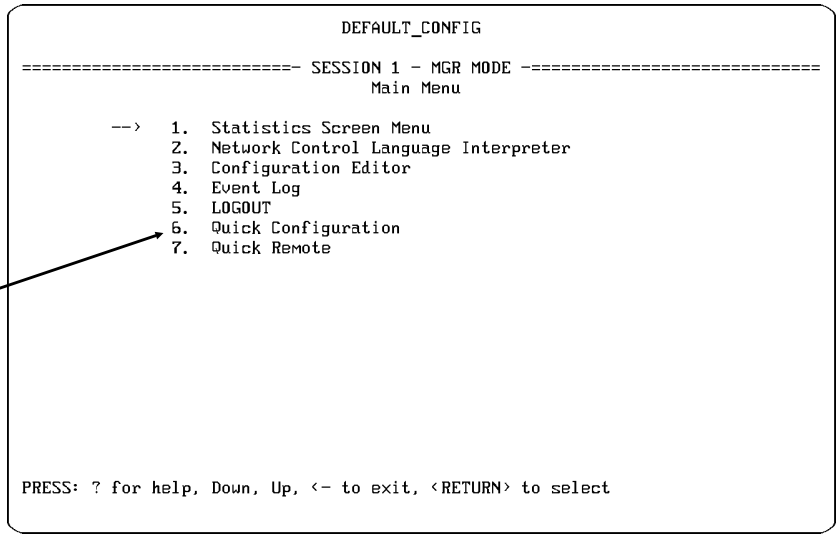


Figure 3-3. The Main Menu

3. Start a Quick Configuration session. (Press 6.)

   When the "Welcome..." screen appears, press Return. The console then displays the Quick Configuration screen. The ports shown will correspond to the router model you are configuring.

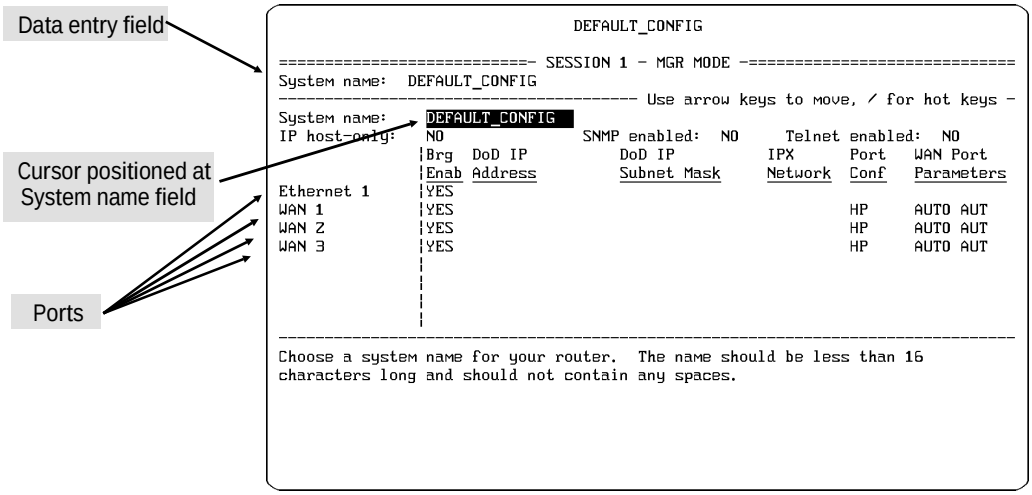


Figure 3-4. Example of a Quick Configuration Screen

There are nine fields for each port configuration:

Brg Enab	DoD IP Address	DoD IP Subnet Mask	IPX Network	Port Conf	WAN Port Parameters	AppleTalk Net Range	AppleTalk Zone Name	DECnet area.node
These fields appear in the initial Quick Configuration Screen						Use → to scroll to these fields or wrap to the first column, and ← to scroll back to the left or to wrap to the last column		

4. Type the system name and press Return. The new system name then appears in the "System name" field and the cursor moves to the next field.

   - If you don't want to change the data in the selected field, just press Return to move to the next field.
   - If you want to skip over several fields, you can do so by using the cursor keys (↑, ↓, ←, and →) or Tab to select the next field you want.

     Also, pressing ← when the cursor is in the first ("Brg Enab") column "wraps" the cursor to the last ("DECnet area.node") column in the preceeding row. Similarly, pressing → when the cursor is in the last ("DECnet area.node") column "wraps" the cursor to the first ("Brg Enab") column in the following row.

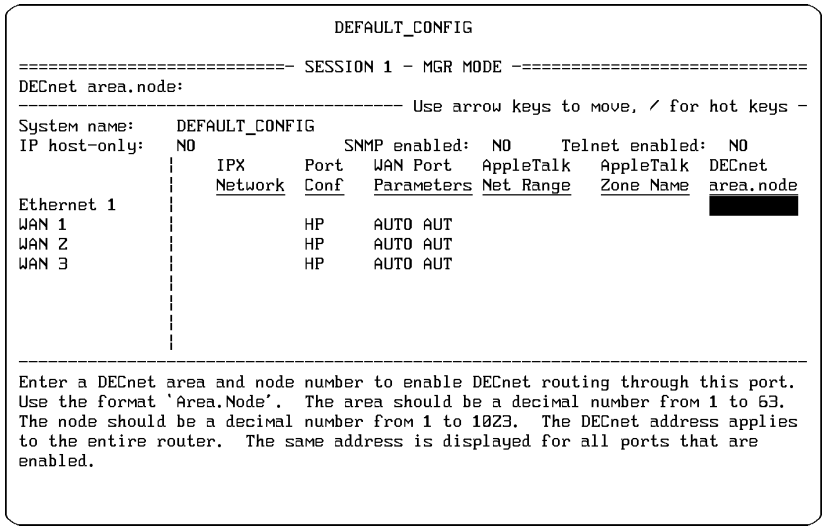


Figure 3-5. Use the → Key To Scroll the Display to Additional Parameters

5. Type the data for the next parameter, then press Return again. Repeat this step until you have entered data for all needed fields.

How to exit from Quick Configuration and reboot the router:

Use this procedure if you want to save and implement any configuration changes that you have made in the current Quick Configuration session.

1. Press the Ctrl C key combination and then type y to exit from the Quick Configuration utility. You will then see the "save and exit" prompt:

The "save and exit" prompt →

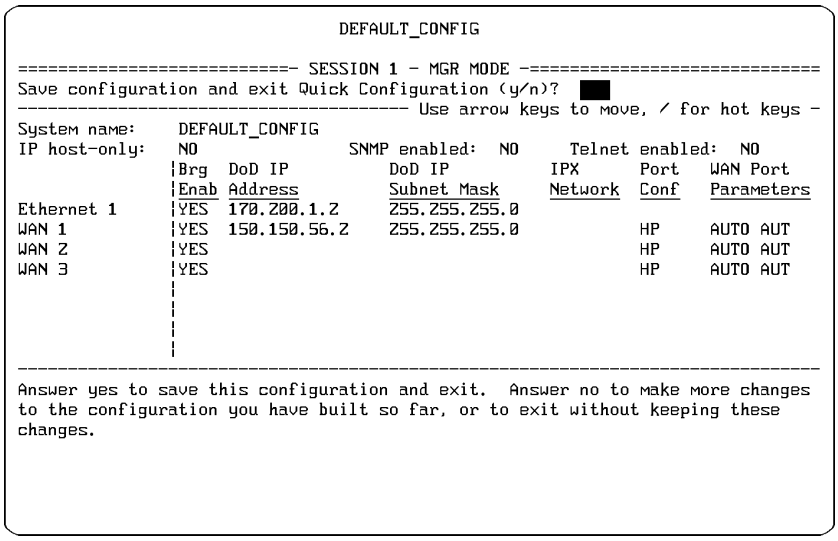


Figure 3-6.Example of "Save and Exit" Prompt

Note

If the cursor is located in the rightmost (DECnet area.node) cell of the last port listed in the Quick Configuration screen, you can exit and display the "Save and Exit" prompt by just pressing Return.

2. Type `y` and press Return. You will then see the reboot prompt:

The reboot prompt →

```
                                DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -==============================
Reboot now (y/n)?
----------------------------------------- Use arrow keys to move, / for hot keys -
System name:    DEFAULT_CONFIG
IP host-only:   NO              SNMP enabled:  NO     Telnet enabled:  NO
                |Brg  DoD IP          DoD IP          IPX      Port   WAN Port
                |Enab Address         Subnet Mask     Network  Conf   Parameters
Ethernet 1      |YES  170.200.1.2     255.255.255.0
WAN 1           |YES  150.150.56.2    255.255.255.0            HP     AUTO AUT
WAN 2           |YES                                           HP     AUTO AUT
WAN 3           |YES                                           HP     AUTO AUT
                |
                |
                |
                |
------------------------------------------------------------------------------
After saving the configuration changes, you must restart the router (reboot) to
make them take effect.
Answer yes to reboot immediately.
```

Figure 3-7.The Reboot Prompt

3. Type `y` again and press Return to reboot the router.

   While the router is rebooting, the console displays

   ```
   REBOOTING THE SYSTEM
   ```

   When you see the message

   ```
   Waiting for speed sense
   ```

   the router has finished rebooting. Any configuration changes you made prior to exiting and rebooting will be implemented in the router configuration.

Note

If you are configuring a remote router via Telnet or a modem, the link will be interrupted by the reboot, and the "Waiting for speed sense" message will not appear. In this case, you will have to re-establish the remote connection to return to the remote router's Main menu.

4. Press Return to return to the Main menu. (If a password has been previously set, you will see the Copyright and Password screen--page 2-3, with the password prompt. In this case, type the password and press Return again to return to the Main menu.)

How to exit from Quick Configuration *without* saving changes:

Use this procedure if you want to exit from Quick Configuration *without* saving any changes you have made during the current Quick Configuration session.

1. Press the Ctrl C key combination to exit from the Quick Configuration utility. You will then see the "save and exit" prompt (figure 3-6 on page 3-9).

2. Type n and then press Return. You will then see the "make changes" prompt:

The "make changes" prompt →

```
                                DEFAULT_CONFIG

============================= SESSION 1 - MGR MODE ==============================
Make more changes (y/n)?
------------------------------------- Use arrow keys to move, / for hot keys -
System name:    DEFAULT_CONFIG
IP host-only:   NO              SNMP enabled:  NO     Telnet enabled:  NO
                |Brg  DoD IP          DoD IP          IPX      Port   WAN Port
                |Enab Address         Subnet Mask     Network  Conf   Parameters
Ethernet 1      |YES  170.200.1.2     255.255.255.0
WAN 1           |YES  150.150.56.2    255.255.255.0            HP     AUTO AUT
WAN 2           |YES                                           HP     LLC1 DTE
WAN 3           |YES                                           HP     AUTO AUT
                |
                |
                |
                |
------------------------------------------------------------------------------
Answer yes to restart Quick Configuration with the changes you have made so
far.  Answer no to exit without keeping these changes.
```

Figure 3-8.The "Make Changes" Prompt

3. Type n again and press Return. The router exits from Quick Configuration and displays the Main menu (page 3-6).

How To Use the "Hotkeys"

The "hotkeys" give you additional configuration editing controls, and are in two groups:

- Display control keys (numeric; 1 through 5)
- Configuration Editor[1] access keys (alphabetical; Y, N, etc.)

To display the hotkey menu: Type the forward slash (/).

For example, if you start Quick Configuration, display the Quick Configuration screen and then type /, you will see a set of hotkey options similar to the following:

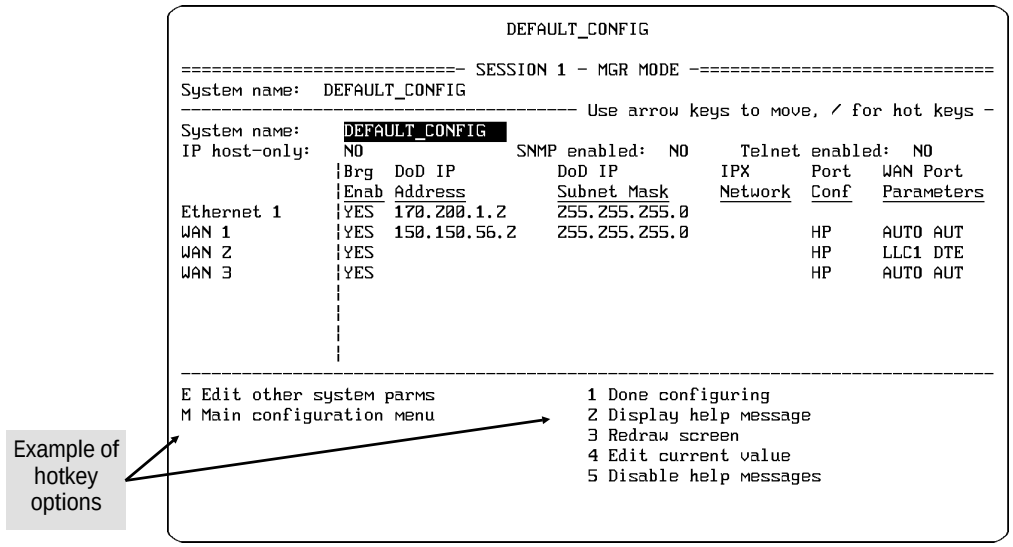


Figure 3-9. Example of Hotkey Display

Note

You can display the hotkey menu from any cursor position in the Quick Configuration screen except in cases where you have already begun to type a multiple-keystroke value, such as an IP address or subnet mask.

[1]For more information on the Configuration Editor itself, refer to chapter 4, "How To Use the Configuration Editor To Create or Change a Configuration".

The Numeric Hotkeys

These keys are the same for every cursor position in Quick Configuration. They let you control display features or exit from Quick Configuration.

1 Done configuring	Typing 1 displays the "save and exit" prompt (page 3-9), allowing you to exit from Quick Configuration. (Operation is the same as that for the Ctrl C key combination—step 1 on page 3-11.)
2 Display help message	When the Help display has previously been disabled, typing 2 displays the Help message for the currently highlighted field.
3 Redraw screen	Typing 3 redraws the current Quick Configuration screen.
4 Edit current value	Typing 4 lets you change one or more characters in a parameter value without having to retype the entire value.
5 Disable help messages `Enable help messages`	Typing 5 when Help messaging is enabled turns off Help messaging for all fields. Typing 5 when Help messaging is disabled turns on Help messaging for all fields.

The Alphabetical Hotkeys

These keys vary, depending on which parameter in the Quick Configuration screen is currently selected. They either change the setting of the currently highlighted parameter or take you to the indicated screen in the Configuration Editor, where you can configure parameters that are not available in the basic Quick Configuration screen. *In most cases (except for certain X.25 parameters on HP routers that have the X.25 service), you won't need these keys unless you must access parameters that are not displayed in Quick Configuration.*

For example, if you type / while the cursor is on the "System name" field in the Quick Configuration screen, you will see the following display.

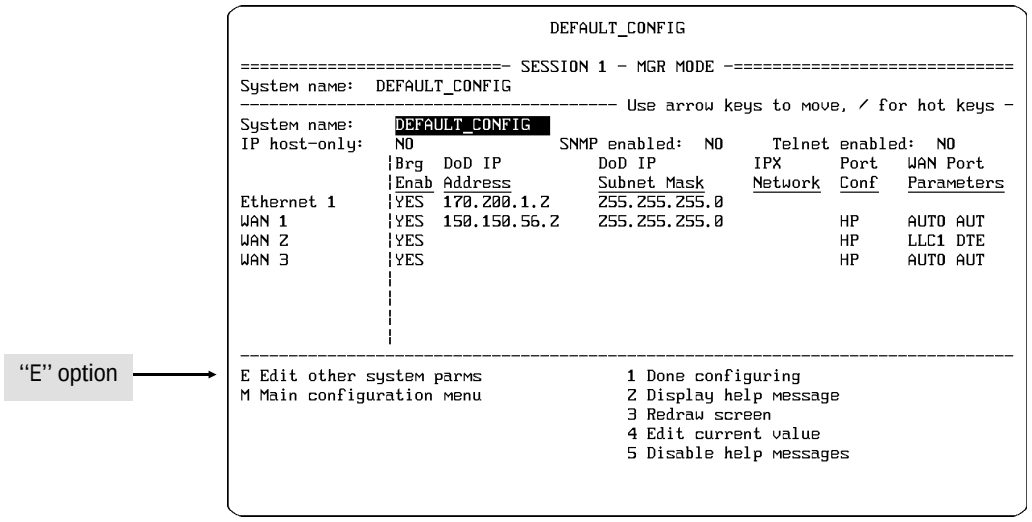


Figure 3-10. The Hotkey Menu

If you then type `E` (for "`Edit other system parms`"), you will then see the Configuration Editor screen associated with the "System name" parameter:

```
                                DEFAULT_CONFIG

============================= SESSION 1 - MGR MODE ==============================
Configuration Editor
System Name : DEFAULT_CONFIG_          Auto Enable : Yes
Automatic Reboot : Yes
Timezone : 0
Daylight Time Rule : None
System Contact :
System Location :
```

Figure 3-11. Example of Using "Edit Other..." Hotkey

From this screen you can access any lower-level system parameter screen in the "system" branch of the Configuration Editor. Similarly, typing `/ M` in figure 3-10 (for "`Main configuration menu`") takes you to the main configuration menu screen (figure 3-3 on page 3-6).

```
                                DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -==============================
Configuration Editor


1.  System (1)
2.  Software (2)
3.  Lines (4)
4.  Circuits (4)
5.  Circuit Groups (4)
6.  Bridge (1)
7.  DoD Internet Router (1)
8.  DECNET IV Routing Service (0)
9.  SNMP Sessions (0)
10. Xerox Routing Service (0)
11. IPX Routing Service (0)
12. AppleTalk Router (0)
13. X.25 Network Service (0)
14. V.25 bis Network Mapping (0)

Enter Selection (0 for Previous Menu) : ____
```

Figure 3-12. Example of using "Main..." Hotkey

Since the Main Configuration menu is at the "top" of the Configuration Editor screen hierarchy, you can access any level of any branch of the Configuration Editor from this screen.

Returning From the Configuration Editor to Quick Configuration. Pressing [Return] to exit from the screen at which you entered the Configuration Editor returns you to Quick Configuration. (That is, press [Return] as many times as is needed to go through all displayed fields, return to your entry point into the Configuration Editor, and, from there, to exit.)

For Further Examples. The next section, "How To Configure for X.25", includes examples of how to use the alphabetical hot keys to access Configuration Editor screens without exiting from Quick Configuration.

How To Configure for X.25

The X.25 routing service is available on most HP routers. In the factory default, most of the X.25 parameters are set to default values that may be acceptable for your application. For a minimal X.25 configuration, you will need to enter one of the following sets of values:

DDN	PDN	X.25 Point-to-Point (PTOP)*
None Default settings are provided for all values needed for minimal configuration	X.121 address of the local port IP address and X.121 address of each remote port	X.121 address of the local port X.121 address of the remote port The connection ID for the remote port
*You can specify only one PTOP circuit in Quick Configuration. If you want to specify additional circuits, you must use the Configuration Editor (which you can access from Quick Configuration by using the / M Hotkey combination).		

Note: The Configuration Editor provides appropriate default circuit names and circuit group names.

For descriptions of specific X.25 parameters, refer to the *Operator's Reference.*

To Configure Minimal X.25 service:

1. Configure the desired WAN port in the Quick Configuration screen. For example, WAN port 1 in the next figure is configured as follows:
   - Bridge enabled: Yes
   - IP address: 150.150.56.2
   - IP subnet mask: 255.255.255.0

("Port conf" and "WAN Port Parameters" are set to their default values.)

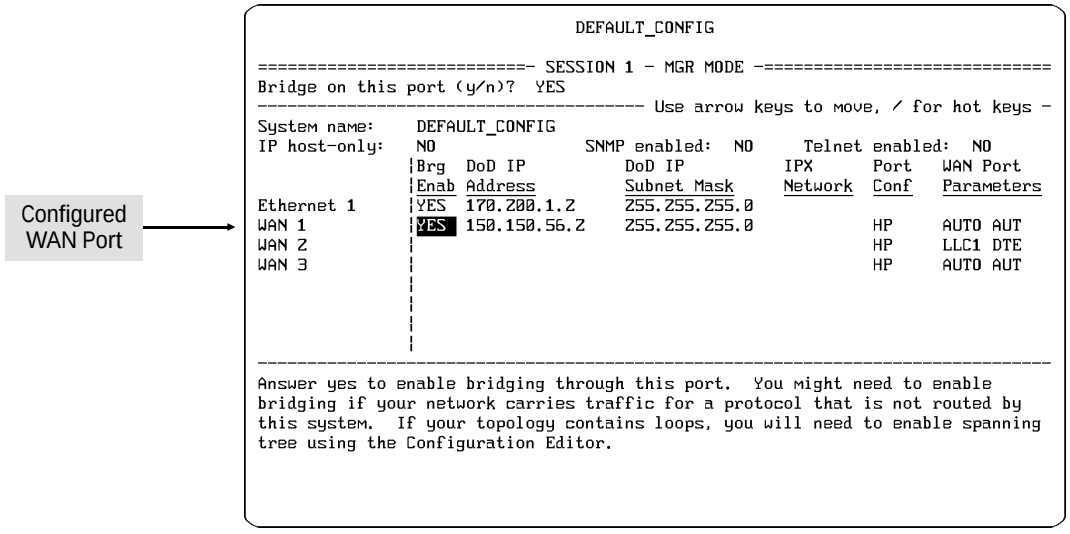


Figure 3-13. Example of Configured WAN Port

2. Type `lapb` in the "Port Conf" field and press Return.) The circuit type then changes to PTOP (Point-to-Point).

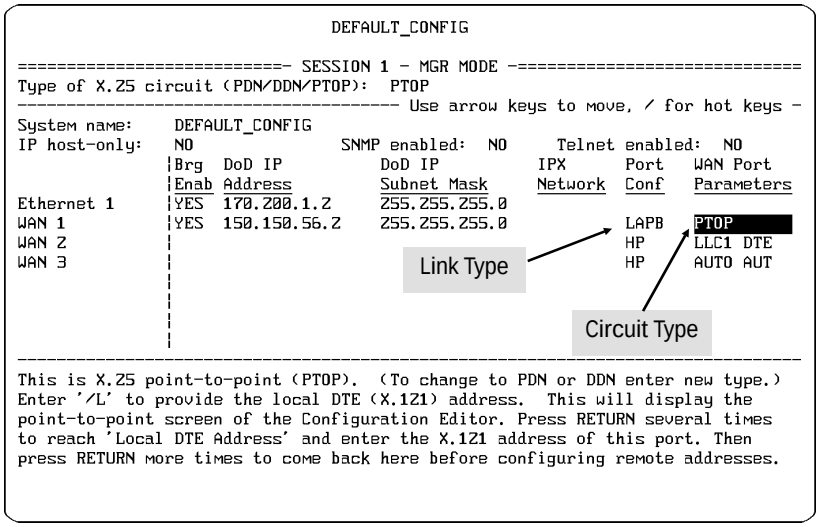


Figure 3-14. Specify LAPB as the Link Type

3. Specify the X.25 circuit type—DDN, PDN, or PTOP (the default). (If you don't want PTOP, type `ddn` or `pdn` for the type of X.25 circuit, then press Return.)

   - If you specified DDN for the circuit type, no more parameters are needed for the default configuration. Go to step 4 on page 3-22.
   - If you specified PDN, you will need to enter the local DTE address, the IP address, and the X.121 address, as follows:

Note Use the Return key to bypass fields that already contain default values.

     – **Local DTE address for PDN:** Type `/ l` (the / and L keys), enter the X.121 address of the local port at "Local DTE Address", and press Return as many times as needed to return to Quick Configuration. (Refer to figure 3-15 on page 3-21.)
     – **IP address and X.121 address for PDN:** Type `/ r`, enter the IP address and X.121 address of the remote port, and press the Return key as many times as needed to return to the Quick Configuration screen. (Refer to figure 3-16 on page 3-21.)

   - If you specified PTOP, you will need to enter the local DTE address, the remote DTE address, and the connection ID, as follows:
     – **Local DTE address:** Type `/ l` (the / and L keys), enter the X.121 address of the local port (at "Local DTE Address"), and press Return as many times as needed to return to the Quick Configuration screen. (Refer to figure 3-17 on page 3-22.)
     – **Remote DTE address and Connection ID:** Type `/ r`, enter the X.121 address (at "Remote DTE Addr") and the Connection ID of the remote port, then use Return to return to the Quick Configuration screen. (Refer to figure 3-18 on page 3-22.)

Note If you want to add *more* connection IDs, type `/ l` instead of `/ r`. Then use Return to step past Local DTE Address. When you see "`1. X.25 Virtual Circuits`", type 1 and press Return, then select the "Add" option. For more on how to use the Configuration Editor, refer to chapter 4.

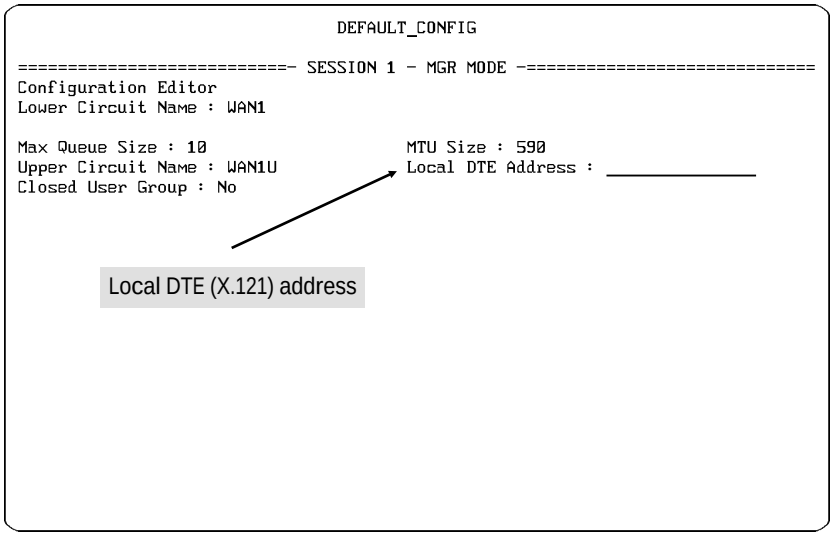


Figure 3-15. Local X.121 Address for PDN

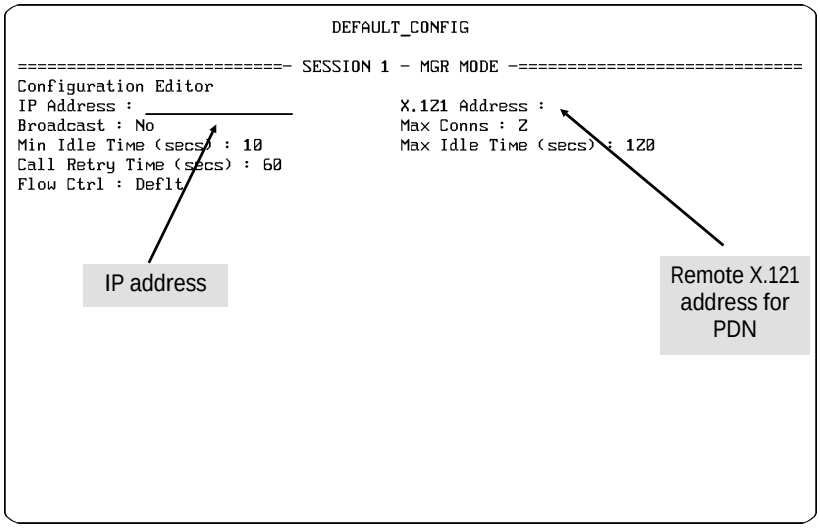


Figure 3-16. Remote IP and X.121 Addresses for PDN

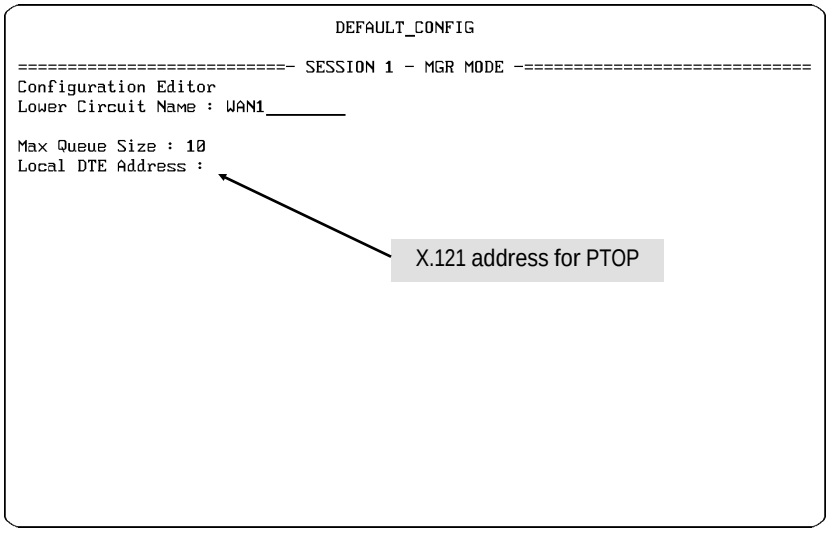


Figure 3-17. Local X.121 Address for Point-to-Point

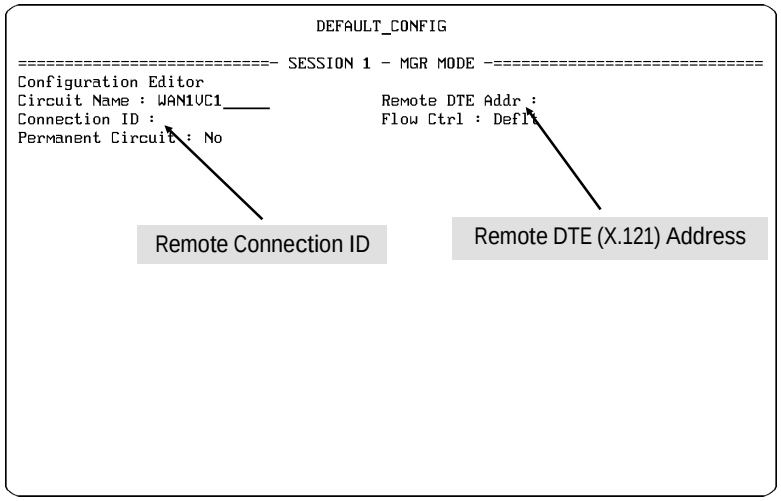


Figure 3-18.Remote X.121 and Connection ID

4. Press the Ctrl C key combination to display the “save and exit” prompt:

```
Save configuration and exit Quick Configuration
(y/n?)
```

5. Type `y` and press Return to display the "reboot" prompt

   ```
   Reboot now (y/n?)
   ```

6. Type `y` (for "yes") and press Return.

   While the router is rebooting, the console displays

   ```
   REBOOTING THE SYSTEM
   ```

   When you see the message

   ```
   Waiting for speed sense
   ```

   the router has finished rebooting. Any configuration changes you made prior to exiting and rebooting will be implemented in the router configuration.

7. Press Return to return to the Main menu.

To configure additional (non-minimal) X.25 parameters:

As you may have noticed in the procedure to configure for minimal X.25 operation (page 3-18), the "l" and "r" hotkeys give you access to several parameters other than those needed for minimal X.25 operation. Also, there are other hot keys that give you access to additional parameters that you may want to view and change. Thus, after you specify X.25 service and the circuit type (DDN, PDN, or PTOP), you can use the hotkeys to access, view, and change the current settings of all X.25 (or other) parameters if you find it necessary to do so.

1. Highlight the X.25 circuit type for the desired port. For example:

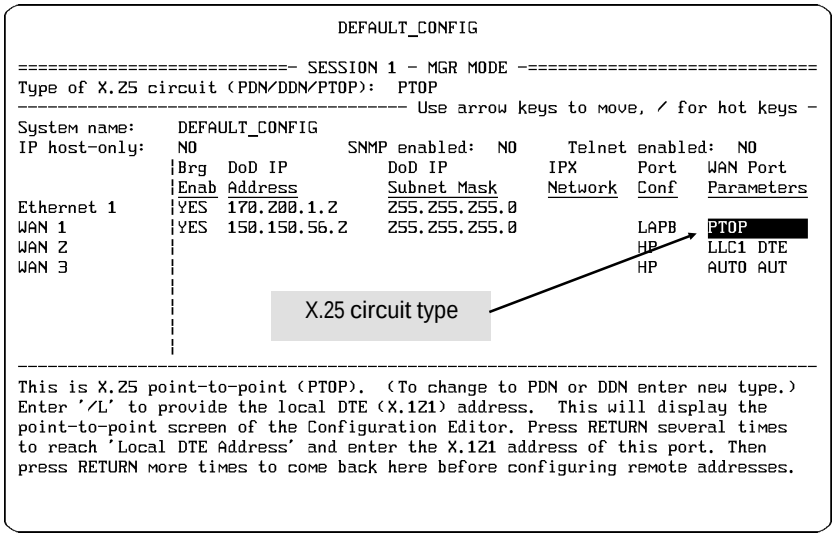


Figure 3-19. Highlight the X.25 Circuit Type

2. Type / . You will then see the hotkey menu. For example, with an X.25 circuit type of PDN, you will see the following menu:

```
                                DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
Type of X.25 circuit (PDN/DDN/PTOP):  PTOP
------------------------------------- Use arrow keys to move, / for hot keys -
System name:    DEFAULT_CONFIG
IP host-only:   NO               SNMP enabled:  NO     Telnet enabled:  NO
                |Brg  DoD IP          DoD IP          IPX      Port   WAN Port
                |Enab Address         Subnet Mask     Network  Conf   Parameters
Ethernet 1      |YES  170.200.1.2     255.255.255.0
WAN 1           |YES  150.150.56.2    255.255.255.0            LAPB   PTOP
WAN 2           |                                              HP     LLC1 DTE
WAN 3           |                                              HP     AUTO AUT
                |
                |
                |
                |
-------------------------------------------------------------------------------
L Enter local X.121 address             1 Done configuring
R Enter remote X.121 address            2 Display help message
X Edit other X.25 parms                 3 Redraw screen
C Edit circuit parms                    4 Edit current value
M Main configuration menu               5 Disable help messages
```

Figure 3-20. Hotkey Assignments

The “L” and “R” options access parameters you need to provide for minimal X.25 operation (described in the procedure to configure for minimal X.25 operation—page 3-18). The remaining options (listed below) give you access to default parameters you can change as required for non-minimal X.25 (and other) configurations:

- E Edit virtual circuit parms (DDN only)
- X Edit other X.25 parms
- C Edit circuit parms
- M Main configuration menu

3. Type the letter for the option you want. You will then see the corresponding Configuration Editor screen. After you have entered your changes, press Return as many times as necessary to return to the Quick Configuration screen.

4. Press the Ctrl C key combination to display the “save and exit” prompt:

```
Save configuration and exit Quick Configuration
(y/n?)
```

5. Type `y` and press Return to display the "Reboot now (y/n)?" prompt

   ```
   Reboot now (y/n?)
   ```

6. Type `y` (for "yes") and press Return.

   While the router is rebooting, the console displays

   ```
   REBOOTING THE SYSTEM
   ```

   When you see the message

   ```
   Waiting for speed sense
   ```

   the router has finished rebooting. Any configuration changes you made prior to exiting and rebooting will be implemented in the router configuration.

7. Press Return twice to return to the Main menu.

Operating Notes

Parameter List

Quick Configuration is set to the following default parameter values at the factory and whenever you use the Reset/Clear button combination to clear the router. (For more on clearing the router, refer to the installation guide.)

Parameter	Default
System name	DEFAULT_CONFIG
IP host-only	NO (leaves router in router/host mode)
SNMP enabled	NO
TELNET enabled	NO
Brg Enab	YES (enables bridging on indicated port)
DoD IP Address	—
DoD IP Subnet Mask	—
IPX Network	— (IPX network number)
Port Conf	
Ring interface (token ring)	16
Link type (WAN)	HP (Hewlett-Packard)
Bridge type (FDDI)	TR (Translating)
WAN Port Parameters	
Quality of service (WAN)	AUTO
Point-to-Point address (WAN)	AUTO
AppleTalk Net Range	—
AppleTalk Zone Name	—
DECnet area.node	—

Note that when you start the Quick Configuration utility, the cursor is always set to the “System name” field. (The default system name is DEFAULT_CONFIG.) Also, the Help messages are active unless you have previously used the / 5 hotkey combination to turn them off.

Data Entry

When you move the cursor from one field to another, the data entry field changes to prompt you for the new data. When you type the new data, it appears in the data entry field, but does not appear in the corresponding field until you press Return.

Saving vs. Saving and Rebooting

"Saving" a new configuration holds that configuration in memory and displays the new settings in the Quick Configuration display (and in the Configuration Editor displays). However, because the router always uses the configuration with which it was last booted, the new configuration does not replace the previous configuration until you reboot the router. Thus:

1. If you save a configuration (by typing `y` at the "save and exit" prompt—page 3-9). . .

2. . . . but then choose not to reboot the router (by typing `n` at the "Reboot now (y/n)?" prompt—page 3-10)

Then the configuration changes are saved in memory, but are not implemented in the current configuration, unless you subsequently reboot the router in one of the following ways:

- Re-enter the Quick Configuration utility, then exit as described under "To exit from the Quick Configuration utility and reboot the router" on page 3-9.
- Use the Network Control Language Interpreter (NCL) Boot command.
- Press the Reset button on the back of the router.
- Cycle the power.

When To Use the Configuration Editor

Hewlett-Packard recommends that in most configuring situations you use Quick Configuration first. Then, if necessary, use the Configuration Editor to enter any additional configuration changes needed to optimize the router for more efficient operation or to customize it for complex routing situations. For example, you will need to use the Configuration Editor for parameters in the following areas:

- OSPF
- V.25 bis
- XNS
- filters
- static routes
- adjacent hosts
- timers
- the internal clock (for WANs)

You can enter the Configuration Editor from the Main menu (page 3-6). But if you are already in Quick Configuration, you can save time by using the / m hotkey combination to enter the Configuration Editor, then reboot as you exit from Quick Configuration.

Interacting with the Configuration Editor. The Quick Configuration utility is a fast way to access a small subset of the complete parameter set you can access by using the Configuration Editor. Thus, you can use the Quick Configuration utility any time you want to add to or change the parameter settings it covers. (To simply display the contents of Quick Configuration, you can use the NCL Summary command —page 7-9.) When you change parameter values in Quick Configuration and then reboot the router, these changes overwrite any earlier configuring of the same values by the Configuration Editor. Similarly, when you change parameter values in the Configuration Editor that affect the parameter set accessed by Quick Configuration, and then reboot the router, these changes will overwrite any earlier configuring of the same values by Quick Configuration.

Troubleshooting a Quick Configuration

If the router fails to operate in your network after you have used the Quick Configuration utility, there are several areas to investigate for the source of the problem:

- Check the Quick Configuration display for errors or omissions in the data that you provided.
- Ensure that your network design allows for any Quick Configuration default settings that may remain after you entered your parameter values.
- Ensure that you save the configuration and then reboot (page 3-9).
- Ensure that all cable connections are firm and are routed properly.
- Check the LEDs on all connected routers to ensure that all ports are operating properly.
- Use the NCL Ping command to send an ICMP echo request message to each IP address connected to your router. (Refer to the "NCL Command Summary" on page 7-7 or to the *Operator's Reference.*)
- Determine whether there is any need for additional configuring, as indicated by unique or advanced configuration features used in the network(s) to which your router is connected. (Refer to "When To Use the Configuration Editor" on page 3-29.)
- Check the event log to ensure that configured services (such as IP) have started and are running properly. (Refer to the operator's guide for your router.)
- Check the statistics screens you can access from the Main menu for signs of impeded or failing operation.
- Check your current configuration against the configurations of adjacent routers to detect any settings that require reciprocal values (such as DTE and DCE for WAN ports). Also check for any simple configuration errors such as duplicate or incorrect IP addresses, or incorrect subnet masks. (Create a list of interdependent values in the other router(s) that dictate related or reciprocal settings in your router.)

The installation and operator's guides for your router provide additional help for investigating and analyzing router operation and failures.

The HP Router 650: How To Update the Interface Module Configuration After Removing or Replacing a Module

Interface modules in an HP 650 router can be inserted, removed, or replaced while the router is operating. However, when one of these actions results in either no replacement for a removed module or replacement with a module having a different set of ports, then the software configuration will not match the current hardware configuration. This subsection describes how Quick Configuration operates in these conditions and how to use Quick Configuration to update the interface module configuration after removing or replacing a module.

Note

Quick Configuration reacts to a change in interface modules only when the change takes place before you start Quick Configuration. That is, if a module change occurs while Quick Configuration is in use, the effects of the change will not appear in Quick Configuration until you exit from Quick Configuration and then restart it.

Rebooting the router causes the router to re-initialize itself by using the most recently saved configuration. Thus, after removing or replacing a interface module, rebooting the router does not update the interface module configuration unless you have also used Quick Configuration (or the Configuration Editor) to update and save the router's configuration.

Removing a Previously Configured Interface Module

Removing a previously configured interface module and subsequently starting Quick Configuration results in a modified display that indicates which port configurations are no longer valid. For example, the following screen illustrates an HP Router 650 with one WAN interface module and one Ethernet interface module installed and configured as shown:

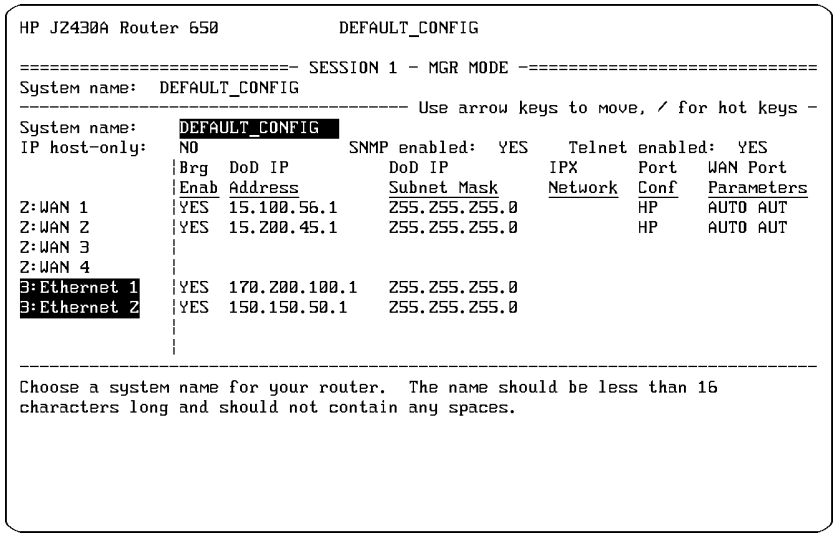
Installed Interface Module	Configuration
Four-Port Synchronous WAN Module	WAN ports 1 and 2 configured
Four-Port Ethernet Module	Ethernet ports 1 and 2 configured

```
HP J2430A Router 650            DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
System name:  DEFAULT_CONFIG
---------------------------------------- Use arrow keys to move, / for hot keys -
System name:     DEFAULT_CONFIG
IP host-only:    NO                SNMP enabled:  YES    Telnet enabled:  YES
                |Brg  DoD IP          DoD IP          IPX      Port   WAN Port
                |Enab Address         Subnet Mask     Network  Conf   Parameters
2:WAN 1         |YES  15.100.56.1     255.255.255.0            HP     AUTO AUT
2:WAN 2         |YES  15.200.45.1     255.255.255.0            HP     AUTO AUT
2:WAN 3         |
2:WAN 4         |
3:Ethernet 1    |YES  170.200.100.1   255.255.255.0
3:Ethernet 2    |YES  150.150.50.1    255.255.255.0
3:Ethernet 3    |
3:Ethernet 4    |
------------------------------------------------------------------------------
Choose a system name for your router.  The name should be less than 16
characters long and should not contain any spaces.
```

Figure 3-21. Two Interface Modules Installed and Configured

If the Ethernet interface module is removed and Quick Configuration is subsequently restarted, the labels for the ports on the removed module will be highlighted to indicate that they are still configured in the router, even though they are no longer installed.



Highlighted port labels indicate previously configured ports on a interface module that has been removed from the router

Figure 3-22. Identifying Nonexistent Ports in the HP Router 650 Configuration

You can then do one of the following:

- Delete the non-existent ports from the configuration. This is the recommended action if you will not be installing another interface module in the same slot as the module you just removed. (Refer to "To use Quick Configuration to delete the non-existent ports from the configuration" on the next page.)
- Edit the configuration (including the parameters for the removed interface module), then reboot the router. You would do this if you wanted to install a new interface module in the slot from which have just removed the original interface module. To edit the configuration, refer to the earlier sections of this chapter.

To Use Quick Configuration To Delete the Non-Existent Ports from the Configuration:

1. Move the cursor to any row occupied by one of these ports. The Help window will then display the messages indicated below:

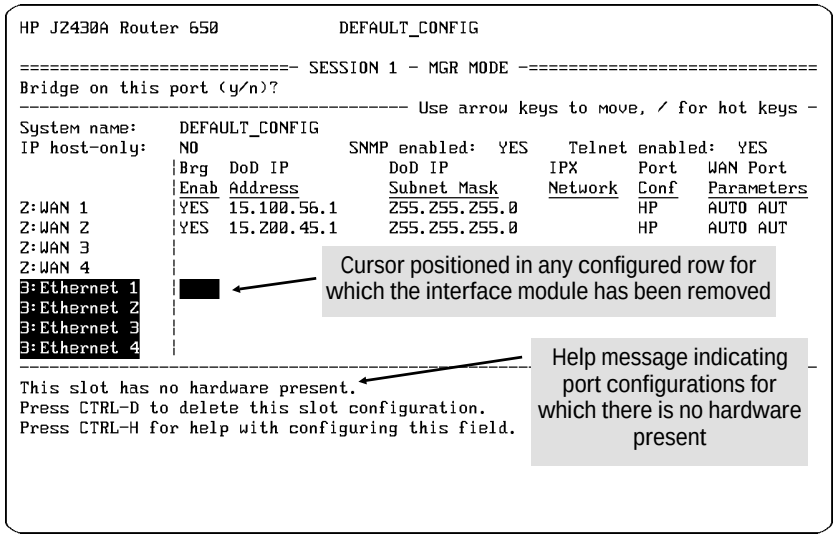


Figure 3-23. Removed Ports for which a Configuration Exists

2. Press the Ctrl D key combination to delete the configuration for the nonexistent interface module. You will then be prompted with the message

   ```
   Are you sure you want to delete the old configura-
   tions for this empty slot?
   ```

3. Type `y` and press Return to delete the configuration for the empty slot.

Notice that the highlighted port labels for the deleted ports will remain in the Quick Configuration screen until you save the new configuration and exit from the Quick Configuration utility (described in the following steps).

4. Reboot the router by doing the following:

5. Press the Ctrl C key combination.

6. When you see the “save and exit” prompt:

```
Save configuration and exit Quick Configuration
(y/n)?
```

7. type y and press Return.

8. When you see the reboot prompt:

```
Reboot now (y/n)?
```

9. Type y again and press Return to reboot the router.

10. While the router is rebooting, the console displays

```
REBOOTING THE SYSTEM
```

11. When you see the message

```
Waiting for speed sense
```

12. the router has finished rebooting. Any configuration changes you made prior to exiting and rebooting will be iimplemented in the router configuration.

Replacing One Type of Interface Module with Another Type

Replacing a previously configured interface module with another module having a different set of ports, and subsequently starting Quick Configuration results in a “Configuration Conflict Alert”. For example, the following screen illustrates an HP Router 650 with one configured WAN interface module.

```
HP J2430A Router 650            DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
System name:  DEFAULT_CONFIG
------------------------------------- Use arrow keys to move, / for hot keys -
System name:     DEFAULT_CONFIG
IP host-only:    NO                 SNMP enabled:  YES    Telnet enabled:  YES
                |Brg  DoD IP           DoD IP          IPX      Port   WAN Port
                |Enab Address          Subnet Mask     Network  Conf   Parameters
2:WAN 1         |YES  15.100.56.1      255.255.255.0            HP     AUTO AUT
2:WAN 2         |YES  15.200.45.1      255.255.255.0            HP     AUTO AUT
2:WAN 3         |
2:WAN 4         |
                |
                |
                |
                |
--------------------------------------------------------------------------------
Choose a system name for your router.  The name should be less than 16
characters long and should not contain any spaces.
```

Figure 3-24. One WAN Interface Module Installed and Configured

Moving the WAN interface module indicated above to slot 4 and installing an Ethernet interface module in its place (slot 2) creates a configuration conflict. If Quick Configuration is subsequently started, a warning screen similar to the one shown in figure 3-25 appears.

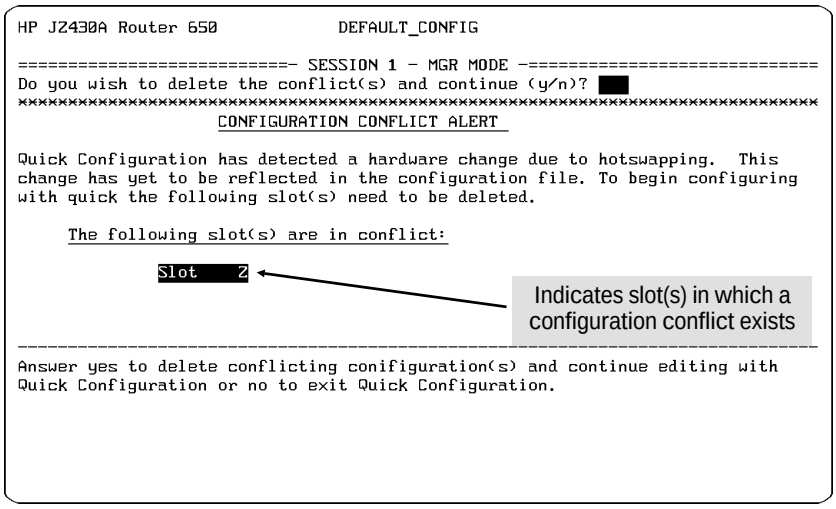


Figure 3-25. The "Configuration Conflict" Screen

1. In the above case:

   a. If you don't want to continue in Quick Configuration, type `n` and press Return to return to the Main Menu.

Note

If you type `n` and return to the Main menu, the configuration conflict remains in the router and the above screen will re-appear the next time you start Quick Configuration.

   b. If you want to eliminate the conflict and continue with Quick Configuration, type `y` and press Return.

You will then see the following prompt:

```
Are you sure you want to delete all conflicting
configurations (y/n)?
```

2. Type `y` and press Return again to confirm conflict deletion and to start Quick Configuration.

3. Continuing from the above example, the Quick Configuration screen would show the WAN interface module moved to slot 4 and the Ethernet interface module installed in slot 2.

```
HP J2430A Router 650            DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -==============================
System name:  DEFAULT_CONFIG
------------------------------------- Use arrow keys to move, / for hot keys -
System name:     DEFAULT_CONFIG
IP host-only:    NO                SNMP enabled:  YES    Telnet enabled:  YES
                 |Brg  DoD IP          DoD IP          IPX      Port   WAN Port
                 |Enab Address         Subnet Mask     Network  Conf   Parameters
2:Ethernet 1     |
2:Ethernet 2     |
2:Ethernet 3     |
2:Ethernet 4     |
4:WAN 1          |
4:WAN 2          |
4:WAN 3          |
4:WAN 4          |
-------------------------------------------------------------------------------
Choose a system name for your router.  The name should be less than 16
characters long and should not contain any spaces.
```

Figure 3-26. Quick Configuration Showing Unconfigured Interface Modules

Neither module is configured because:

- The WAN interface module configuration that was in slot 2 was in conflict with the Ethernet interface module and was therefore deleted (step 1b), leaving slot 2 without any interface module configuration.
- Slot 4 had no interface module configuration, and was therefore unaffected by moving the WAN interface module to that slot.

4. In this example, to resume routing operations, it is necessary to configure one or more ports on either module and reboot the router.

4

How To Use the Configuration Editor To Create or Change a Configuration

Introducing the Configuration Editor

The Configuration Editor accesses a hierarchy of menus and screens that include any parameters you need for customizing the router beyond the “getting started”, or factory default level. Using this editor, you can customize all parameters needed to integrate the router into your system (including the subset of parameters you can access through Quick Configuration).

Generally, when you first create a configuration, it is easiest to begin by using Quick Configuration to establish a minimal version of the configuration to use in establishing functioning network connections. However, when you are ready to use parameters that are not available in the Quick Configuration screen, it is time to move on to the Configuration Editor. You can do so either by starting the Configuration Editor from the Main Menu or starting it from within Quick Configuration by using the hotkeys. (Refer to “How To Use the Hotkeys” on page 3-12.)

You can use the Configuration Editor to create a configuration in a router through either a directly connected terminal or a terminal connected to the router via Telnet. (For information on Telnet, refer to “Telnet: How To Establish a Virtual Terminal Connection to a Remote Node” on page 7-10.) You can also move an existing configuration between routers or between a router and a host on the network. (Refer to “Using TFTP To Transfer Operating Code, Configuration, and NCL Display” on page 7-30, and “Using PC Modem Access To Transfer Configuration and NCL Display on page 7–32.)

The Configuration Editor Process

The configuration process consists of four major steps, described below.

Step 1: Define Global and Session Parameters Global parameters specify which routing service applications are enabled on your router, and also define local and remote session modes. The specific session parameters specify the interface between the router and various I/O devices—console, modem, and Telnet—for the session modes. The "System" and "Software" items access these parameters.

Step 2: Establish Communication Channels Communication channels define both the physical and logical connections between the router and various network devices. The "Lines" item accesses the physical connection parameters for each router interface (port). The "Circuits", "Circuit Groups", and "V.25 bis Network Mapping" items access circuit-related parameters for individual ports. The circuit and circuit group parameters are regularly used in all routing configurations. V.25 bis network mapping is used only when V.25 bis circuits form part of a network.

Step 3: Customize Protocol Application Modules The protocols require network-specific data in order to provide bridging, routing, and/or network-management services. The remaining items in the Configuration Menu access these parameters. You need to use only those items that correspond to the routing service modules you enable in step 1, above (under the "Software" item).

Step 4: Implement the Configuration After you customize the protocol applications, complete the configuration process by (1) saving the configuration and then (2) implementing it by rebooting the router.

For further configuration information, refer to:

- For tutorial information on the use and operation of the various routing services, refer to *HP Routing Services and Applications*
- For descriptions of the individual parameters used in the Configuration Editor, refer to the *Operator's Reference.*

For a guide to finding parameters in the Configuration Editor, refer to the "Parameter Locator" in the appendix to the *Operator's Reference.*

How To Enter the Configuration Editor

To enter from the Main Menu, type 3

```
                              DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -==============================
                                  Main Menu

          -->   1.  Statistics Screen Menu
                2.  Network Control Language Interpreter
                3.  Configuration Editor
                4.  Event Log
                5.  LOGOUT
                6.  Quick Configuration
                7.  Quick Remote









PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 4-1. The Main Menu

You can enter the Configuration Editor from either the Main Menu or from the Quick Configuration screen.

- To enter from the Main menu, just type 3, which is the list number for the Configuration Editor.
- To enter from the Quick Configuration screen (described in chapter 3), type / m. (For more information on using the Configuration Editor while in Quick Configuration, refer to “How To Use the Hotkeys” on page 3-12.)

When you start the Configuration Editor, the configuration menu appears:

Note

The actual configuration menu displayed on your console reflects the configuration features available in your router. This manual uses examples depicting the full feature set, which is available in most HP routers. For a listing of the features available in your router, refer to the release notes you received with the router or with your most recent software update.

```
                                DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
Configuration Editor


1.  System (1)
2.  Software (1)
3.  Lines (4)
4.  Circuits (4)
5.  Circuit Groups (4)
6.  Bridge (1)
7.  DoD Internet Router (0)
8.  DECNET IV Routing Service (0)
9.  SNMP Sessions (0)
10. Xerox Routing Service (0)
11. IPX Routing Service (0)
12. AppleTalk Router (0)
13. X.25 Network Service (0)
14. V.25 bis Network Mapping (0)

Enter Selection (0 for Previous Menu) : 3___
```

Figure 4-2. The Configuration Menu

How To Exit From the Configuration Menu

If you enter the Configuration Editor from the Main menu, do the following to exit:

1. Press Return as many times as you need to return to the Configuration menu (figure 4-2).

2. Press Return once again to display

   ```
   Back to menu ?
   ```

3. Then do one of the following:

   - If you want to exit from the Configuration Editor without saving any changes you made, press ← to display

     ```
     Exit without saving  ?
     ```

     Then press Return again to exit from the Configuration Editor without saving any changes you made.

   - If you want to exit from the Configuration Editor and save any changes you made, press → twice to display

     ```
     Save and exit ?
     ```

     Then press Return again to exit and save any changes you made.

Note

"Saving" a new configuration retains it in memory, but does not delete the "old" configuration nor re-initialize the router with the new configuration. To re-initialize the router with a new configuration that you have just saved, reboot the router (or turn the power off, then on again). To reboot the router, use the boot command (page 7-8 in this manual; refer also to the description of the boot command in the *Operator's Reference*".

If you enter the Configuration Editor from Quick Configuration, do one of the following to exit:

- To exit and reboot the router, refer to "How to exit from Quick Configuration and reboot the router" on page 3-9.
- To exit without rebooting, refer to "How to exit from Quick Configuration without saving changes" on page 3-11.

How To Operate the Configuration Editor

In the Main menu (figure 1-1 on page 1-6), type 3 to select the Configuration Editor and display the Configuration Menu.

Note

Most HP routers have all of the configuration features described in this chapter. However, some features are not available in certain basic router models. To determine the feature set in your router, refer to the release notes you received with the router or with your latest software update.

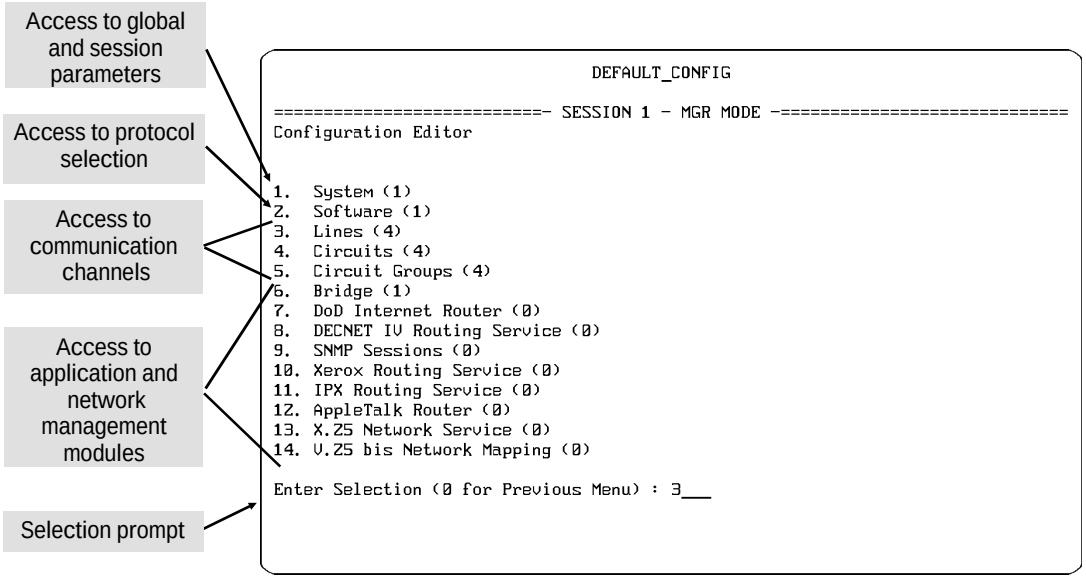


Figure 4-3. Example of the Configuration Menu

Configuration Categories

The configuration categories include the available routing applications and some general items. The number in parentheses to the right of each item indicates the number of entries currently configured in the category. A 0 (zero) indicates that nothing is configured for that category. For example, in the preceding screen, item 7 is not configured:

```
7. DoD Internet Router (0)
```

Note

In figure 4-3, the DEFAULT_CONFIG label appears when you have not yet assigned another name to the router. HP recommends that you assign a more specific name to this router later in the configuration process. When you do, that name appears instead of DEFAULT_CONFIG.

Each item listed in figure 4-3 is briefly described below. For information on the parameters accessed by these items, refer to the *Operator's Reference*.

1. System Names the router, specifies how the router initializes software services during a power-up or boot situation, and assigns values to global and session parameters.

2. Software Loads the application software supplied with your router.

3. Lines Specifies the physical connections between the router and the LANs and/or long-haul transmission facilities with which the router interfaces.

4. Circuits Specifies the logical connections between the router and the LANs and/or long-haul transmission facilities with which the router interfaces.

5. Circuit Groups Balances traffic across circuits.

6. Bridge Configures the Bridge application to your specific requirements.

The remaining items (including some that are not available on all models) provide tools for adjusting application or network management software modules to your requirements. Access only the items corresponding to the application or network management software modules you want to enable.

7. DoD Internet Router

8. DECNET IV Routing Service

9. SNMP Sessions

10. Xerox Routing Service

11. IPX Routing Service

12. AppleTalk Router

13. X.25 Network Service

14. V.25 bis Network Mapping

Moving From One Screen to Another

At the bottom of the Configuration Menu screen (figure 4-3) and many other screens is the prompt:

```
Enter selection (0 for previous menu): _____
```

Whenever this prompt occurs, it is preceeded by a numbered list of items you can select. If you don't want to access any of the listed items, just press Enter to return to the preceding screen or action item. But if you want to access one of the listed items, type the number for that item and press Enter. Then:

- If the item you select contains no entries (indicated by "(0)" at the end of the item) such as:

  ```
  DoD Internet Router (0)
  ```

  you will be prompted by the message

  ```
  Do you wish to add ...?  Yes
  ```

Press Return to select the `Yes` option. The parameters you want to add will then appear. Follow the prompts to enter the values for the desired parameters.

For example, with the configuration menu displayed, if the DoD Internet Router (IP) Service was not configured and you wanted to access it, you would type 7 and press Return to display the following:

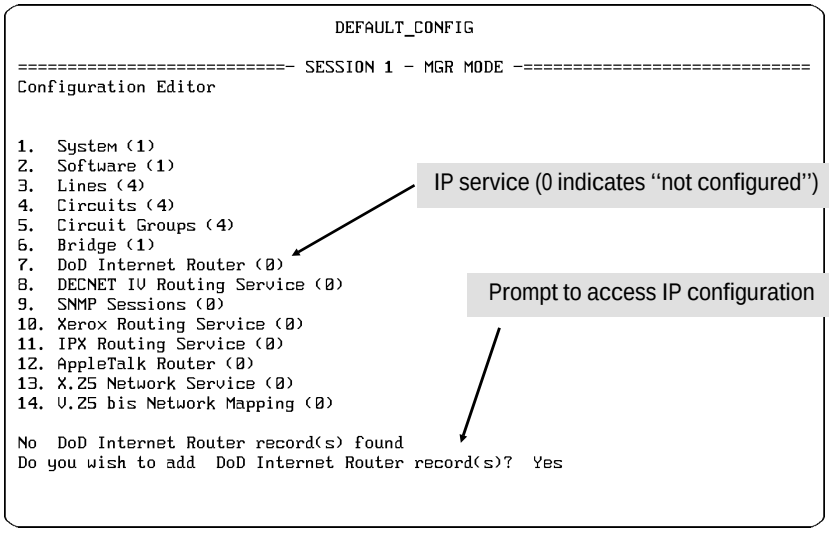


Figure 4-4. Example of Accessing an Item That Is Not Currently Configured

- Continuing from page 4-10, if the item you select contains one or more entries (indicated by a "`(1)`", "`(2)`", or other number at the end of the item) such as:

  ```
  Circuits (2)
  ```

  the entries will appear as a numbered list and you will be prompted with

  ```
  Action (->> for selections) : Previous Display
  ```

  For example, with the configuration menu displayed, if one Ethernet port and one WAN port were configured and you wanted to add another port configuration, you would type 4 and press Return to see a screen similar to the following:

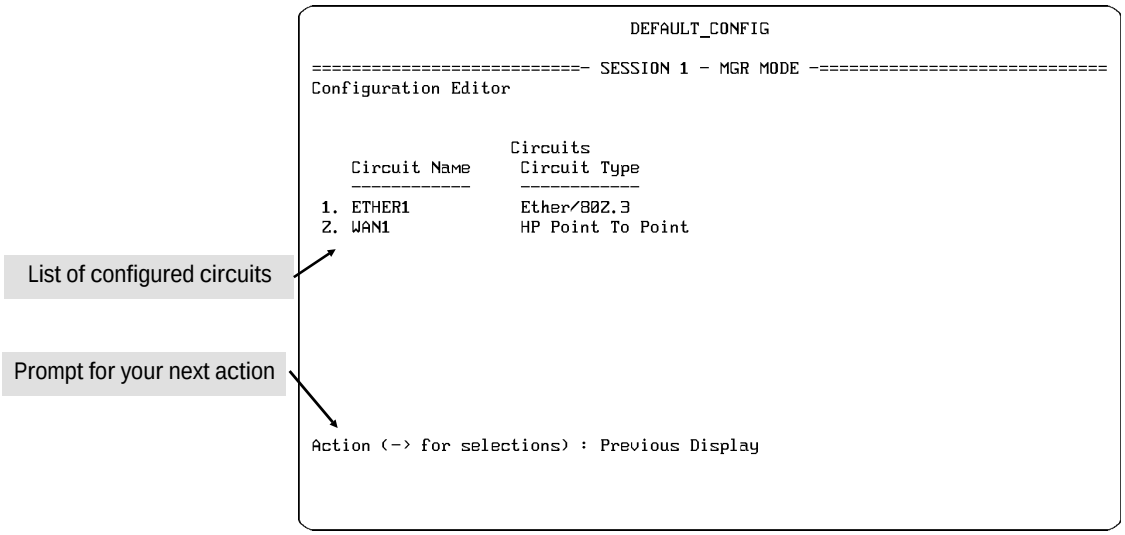


Figure 4-5. Example of Access to Previously Configured Elements

Note

The examples of default circuit names in figure 4-5, above, appear in HP Series 200 and 400 routers. Default circuit names in HP Series 600 routers include the slot number in which the port is installed. For example, if a four-port Ethernet interface module is installed in slot 2 of the HP Router 650, the circuit name of the first port on that module would be ETHER21. Similarly, if a WAN module was installed in slot 3, then the circuit name of the first port on that module would be WAN31. To help simplify circuit configurations on an HP Router 650, it is recommended that you use this method for identifying the slot and port locations for all circuits.

You then have five actions from which to choose:

- **Previous Screen:** To back up to the previous screen, choose `Previous Display` by simply pressing Return.
- **Delete:** To delete an entry, use ← to choose `Delete`, then press Return. If you are then prompted for the number of a listed entry, type the number of the entry to delete and press Return again. When you are prompted with

  ```
  You are sure you want to delete ? No
  ```

  use ← to select `Yes`, then press Return.
- **Add:** To add an entry, use ← to choose `Add.` Then press Return and follow the prompts to enter the desired parameter values.

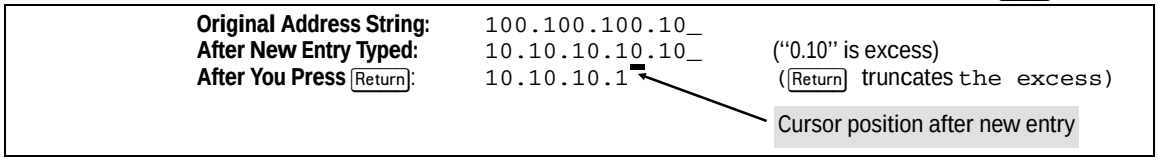
- **Modify:** To modify the configuration for an entry, use ← to choose `Modify`, then press Return. If you are then prompted for the number of a listed entry, type the number of the entry to delete and press Return again. Then follow the prompts to modify the desired parameters.
- **Browse:** To view the current settings for an entry without changing them, use ← to choose `Browse`. If you are then prompted for the number of a listed entry, type the number of the entry to delete and press Return again.

Entering or Changing Parameter Values in Configuration Screens

Throughout the configuration screens, there are "type-in" and "select an option" parameter data fields. For example:

- `Circuit Name : ETHER1_______`

  This is a "type-in" field in which you provide a value. Type-In fields are always underlined. Fill in a blank underlined field or type over the existing entry. Any underlines you see at the end of existing text indicate how long the entry may be. To correct a mistake, use the backspace key (not the Delete key) to reposition the cursor, and then retype. When you finish typing an entry, press Return to terminate it and move on to the next field or option. Notice that if you are typing over one entry with another, shorter entry, you should not try to delete the extra characters; just press Return after typing the last valid character in the string. Any characters remaining from the old string will be truncated. For example, if you were to replace an internet address of 100.100.100.10 in the IP Network Interface Definitions screen with another address of 10.10.10.1, you would just type the second address over the first and press Enter. (The remaining "0.10" from the first address would be truncated when you pressed Enter.)



- `Auto Enable : Yes`

  This is a "Select an Option" field, which always displays a current setting that is one of a number of preprogrammed options. Use the → or ← key to move through the supplied options. When the option you choose is displayed, press Return to enter it. This also moves the cursor to the next menu, screen, or prompt.

To exit from the Configuration Editor, return to the Configuration Menu screen (figure 4-3). At the `Enter selection` prompt, press Return. At the option

```
Back To Menu ?
```

use the → or ← key to select either `Save and Exit ?` (if you want to save any changes you have made) or `Exit without Saving ?` (if you don't want to save any changes you have made) Pressing Return for either one then returns you to the Main menu.

- To implement the changes you make in a Configuration Editor session, do the following:

  a. Choose `Save and Exit`.

  b. Boot the router (by using the NCL Boot command--refer to page 7-8).

- To abandon the changes made in this Configuration Editor session and keep the previous configuration, choose

  ```
  Exit without Saving
  ```

  and press Return.

5

How To Use the Event Log To Analyze Router Operation

Introducing the Event Log

This chapter describes the event messages generated by the router and stored in the event log, how to access the event log from the Main menu, and how to navigate through the log.

The event log is a first-in, first-out buffer in RAM. (See figure 5-1 for some sample entries.) Each entry is a line composed of five fields:

severity is one of the following codes:

- D (debug) indicates installation and diagnostic information.
- I (information) indicates routine events.
- W (warning) indicates that a service has behaved unexpectedly.
- P (performance) indicates that a current service has degraded or upgraded.
- M (major) indicates a service appearance/disappearance.

date is the date, in *mm/dd/yy* format, that the entry was placed in the log.

time is the time, in *hh:mm:ss* format, that the entry was placed in the log.

object is the system variable (such as "cct." for "circuit event messages") that generated the log entry.

event message (within quotes) is the event message.

For information about the event messages you find in your router's event log, refer to the *Operator's Reference.* Each listed message is accompanied by an explanation and a recommended action (if any is required and/or available). The messages are grouped by the system variables (objects) that generate them and are listed alphabetically. More information about variables and their structure in the management information base is also included in the *HP Routing Services and Applications.*

Entering and Navigating in the Event Log Display

You can enter the event log in either of the following two ways:

- In the Main menu (figure 1-1 on page 1-6), press [4] to display the Event Log.
- In the NCL interpreter, execute the Logi command.


```
HP 27288A Router SR              BOOT_CONFIG              29-Mar-1994  16:00:31

--------------------------- SESSION 2 - MGR MODE -------------------------------
I 03/29/94 15:56:51 dls.wan1: 'Enable requested'
I 03/29/94 15:56:51 mgr.auto_enable: 'auto-enabling `ip`'
I 03/29/94 15:56:51 cct.wan1: 'Latency cap 6925 bytes (1000ms,55400bps)'
I 03/29/94 15:56:51 mgr.auto_enable: 'auto-enabling `tcp`'
I 03/29/94 15:56:52 dls.wan1: 'Circuit auto-configuring'
I 03/29/94 15:56:52 ip: 'entity enabled'
I 03/29/94 15:56:53 tcp: 'entity enabled'
I 03/29/94 15:56:53 mgr.auto_enable: 'auto-enabling `telnet`'
I 03/29/94 15:56:54 telnet: 'entity enabled'
I 03/29/94 15:56:54 rok[1].console: 'connection established'
I 03/29/94 15:56:54 mgr.auto_enable: 'auto-enabling `tftp`'
I 03/29/94 15:56:55 tftp: 'entity enabled'
I 03/29/94 15:56:55 mgr.auto_enable: 'auto-enabling `snmp`'
I 03/29/94 15:56:55 snmp: 'entity enabled'
I 03/29/94 15:56:55 rok[1]: 'System booted'
I 03/29/94 15:56:55 dls.wan1: 'QOS = LLC1, addr = DTE, Compression = NO'
I 03/29/94 15:56:56 dls.wan1: 'Providing LLC1 service'
I 03/29/94 15:56:56 ip.ip_interface: 'network enabled on 100.150.50.2'
W 03/29/94 15:56:56 mgr: 'SME Session 2 - MGR Mode - BOOT_CONFIG - Established'

---- Log events on screen 68-86, in memory 1-86.  Press '?' for help.
```

Figure 5-1. Example of an Event Log Display

Note

Event log messages in the HP Series 600 routers include, where appropriate, the slot number associated with the source of a displayed event. Event log messages in HP Series 200 and 400 routers do not use slot numbers. For example:

S 600: `I 07/04/94 16:17:44 mgr.auto_enable: 'auto-enabling 'cct.WAN21''`
S 200/400: `I 07/04/94 16:17:44 mgr.auto_enable: 'auto-enabling 'cct.WAN1''`

When you first display the event log, the first event of the most recent reboot is positioned at the top of the display. (See the first two lines of

the event display in figure 5-1.) To display other portions of the log —preceding or following the currently visible portion—use the keys described in the following table.

Event Log Control Keys

Key	Action
[Return] or [N] or [SPACE]	Advance display by one page (next page)
[P]	Roll back display by one page (previous page)
[↓] or [D]	Advance display by one event (down a line)
[↑] or [U]	Roll back display by one event (up a line)
[→] or [B] or [E]	Display last, newest page (bottom of log) (end of log)
[T]	Display the first, oldest page (top of log)
[C]	Display the first page for current boot
[?] or [Shift]-[?] or [H]	Display help for event log
[←] or [Q] or [X]	Exit from event log back to Main menu (quit)

This first event displayed at entry is not necessarily the first event in the log. The log may contain entries that occurred prior to the most recent reboot.

The event log holds up to 1,000 lines in chronological order, from the oldest to the newest. Each line consists of one complete event message. Once the log has received 1000 entries, it discards the current oldest line

each time a new line is received. The event log window contains 20 lines and can be positioned to any location in the log.

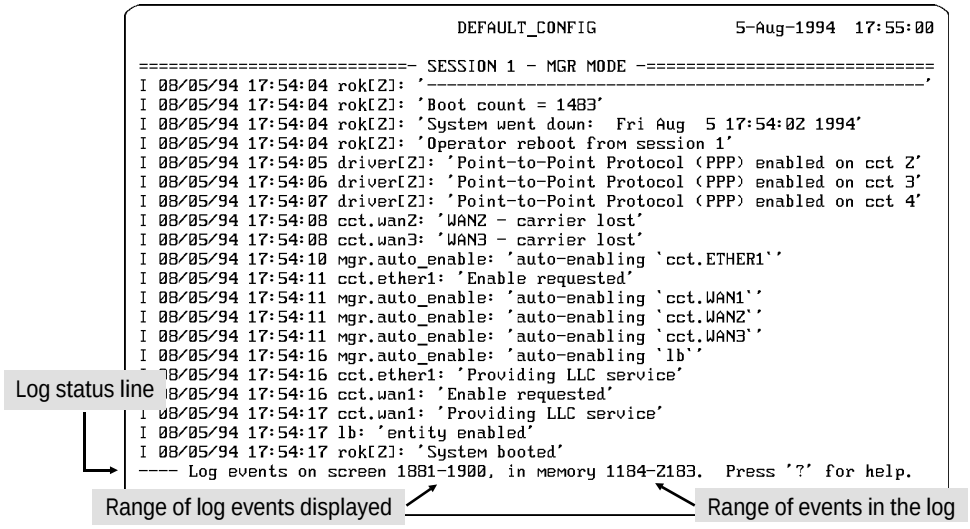


Figure 5-2. The Event Log Status Line

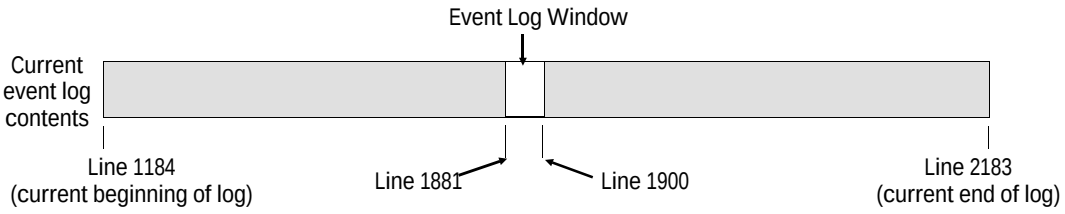


Figure 5-3.The Event Log Display Window

The log status line at the bottom of the display identifies where in the sequence of event messages the display is currently positioned. Figures 5-2 and 5-3 show an event log window, a log status line, and the location of the window within the complete event log. In this example, events 1881-1900 are displayed and there are 1000 events currently in the log.

The line numbers appearing in the status line continue consecutively. However, as indicated earlier, the log never contains more than 1,000 consecutive lines. For example, if the status line reads

```
Log events on screen 3378–3397,in memory 2845–3844. Press '?' for help."
```

then there are 1,000 lines in the log (it is full) and line 3378 (the 534th line in the current log contents) is at the top of the display.

The router maintains the event log in a reserved area of memory that is not affected by software reboots. This means that any reboot under software control (the Boot command, TFTP updates, and "fatal exceptions") preserves previous log entries. New entries are simply appended to the existing list and old entries over the 1,000-line limit are dropped.

However, the event log will be erased if either of the following occurs:

- The router is cleared or reset using the Clear and/or Reset buttons.
- A fatal exception occurs while the Automatic Reboot parameter is set to No.
- Power to the router is interrupted.

Note

If a fatal exception occurs, the event log will be maintained only if the Automatic Reboot parameter in the Global Parameters screen is set to Yes (the default). (If this parameter is set to "No", then it is necessary to reboot the router by using the Reset button, which clears the event log. To locate Automatic Reboot in the parameter hierarchy, refer to the "Parameter Locator" in the appendix to the *Operator's Reference*. To learn more about Automatic Reboot, refer also to the *Operator's Reference*.

Note

When the router goes down under software control, it enters this event and the reason for it in the event log. It repeats this entry when the router reboots, giving you information about the event in cases where the existing log is lost after the router goes down. This happens in instances where the router was cleared or reset as described above after going down under software control.

6

How To Use the Statistics Screens To Analyze Router Operation

Introducing the Statistics Screens

This chapter describes how to use the statistics recorded by the router during network operation. It tells you how to access the Statistics Screens menu, how to display specific statistics screens on the console, and how to interpret statistical displays.

```
                                DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -==============================
                              Circuit Statistics

          NAME          RX:  Bytes    Frames   Err  TX:  Bytes    Frames   Err
      ----------------       -----    ------   ---       -----    ------   ---
--> 1. ether1                192356      3000     1     1653516      3004     0
    2. wan1                       0         0     0           0         0     0
    3. wan2                       0         0     0           0         0     0
    4. wan3                       0         0     0           0         0     0
      ----------------       -----    ------   ---       -----    ------   ---
         TOTAL                192356      3000     1     1653516      3004     0









PRESS: 'r' for reset, Down, Up, <- to exit
```

Figure 6-1. Example of a Statistics Screen

The functions of the statistics screens are to provide the following:

Circuits Statistics**:** Provide summary data for each individual circuit, including how many bytes and frames were received and transmitted and how many frames contained errors.

Per Second Statistics**:** Provide summary data on traffic volume for a per-second basis for each circuit on the router.

Bridge Statistics**:** Provide summary data for each bridging circuit group, including how many frames received, forwarded, flooded, and dropped.

DECnet Router Statistics**:** Provide summary data for each IP router network interface, including how many frames received, forwarded, and dropped.

DoD IP Router Statistics**:** Provide summary data for each IP router network interface, including how many datagrams received, forwarded, handled within the router, and dropped.

XNS Router Statistics**:** Provide summary data for each XNS network interface, including how many datagrams received, forwarded, handled within the router, and dropped.

IPX Router Statistics**:** Provide summary data for each IPX network interface, including how many datagrams received, forwarded, handled within the router, and dropped.

AppleTalk Router Statistics**:** Provide summary data for each Apple-Talk router circuit group, including how many packets received, forwarded, and dropped.

Buffers Usage Statistics**:** Provide information on buffer allocation and use.

For an example of each statistics screen type, along with a description of each statistics data category, refer to the *Operator's Reference.*

How To Access the Statistics Screen Menu

With the Main menu (figure 1-1) displayed, press 1 to display the Statistics Screen menu.

Note

The actual Statistics Screen menu displayed on your console reflects the lines, circuits, and routing services you have already configured. You may have fewer than the example shown below. The Circuits, Per Second, and Buffers Usage Statistics items are always listed.

```
                              DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
                            Statistics Screen Menu

         -->   1.  Circuit Statistics
               2.  Per Second Statistics
               3.  Bridge Statistics
               4.  DoD IP Router Statistics
               5.  Buffers Usage Statistics
               6.  Return to Previous Menu









PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 6-2. Example of the Statistics Screen Menu

At the bottom of the Statistics Screens menu screen is the prompt:

```
PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

You can choose from:

- To display help text for any statistics screen**:** Use ↓ or ↑ to position the pointer to the menu item about which you want help. Then use the Shift ? key combination to display the help. To return to the Statistics Screen menu, press ←. For example, to display help for the buffers usage statistics item in figure 6-3, below, you would use the ↓ key to move the pointer to the Buffers Usage Statistics line, then press the Shift ? key combination.
- **To choose a statistics screen for display:** Type the menu item number to display the statistics screen for that item. Using the example of figure 6-3 below, you would type 5 to display the buffers usage statistics. (You can also display a statistics screen by using ↓ or ↑ to position the pointer at the desired menu item, then pressing Return.
- To exit from the Statistics Screen menu**:** Press ← to return to the Main menu.

Buffers menu item

```
                              DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
                             Statistics Screen Menu

                    1.  Circuit Statistics
                    2.  Per Second Statistics
                    3.  Bridge Statistics
                    4.  DoD IP Router Statistics
                -->  5.  Buffers Usage Statistics
                    6.  Return to Previous Menu









PRESS: ? for help, Down, Up, <- to exit, <RETURN> to select
```

Figure 6-3. Getting Help and Choosing a Screen to Display

How To Manage the Statistics Screens

The statistics displayed on any of the statistics screens are cumulative values gathered since the router last booted. You can reset the values to zero at any time, by using a command on the individual statistics screen (see below) or by using the Network Control Language (NCL) Interpreter's Reset command. (Refer to page 7-21.)

All statistics are dynamic and are updated periodically. The update period is configurable using the Screen Refresh Rate parameter in the Configuration Editor. The default rate is three seconds.

At the bottom of a statistics screen is the prompt:

```
PRESS: 'r' for reset, Down, Up, <- to exit
```

You have the following choices:

- To reset a displayed value to zero, use the ↓ or ↑ key to position the pointer on the line containing the value to be reset, then press R. Resetting a value also resets all other values displayed on the same horizontal line. (Values displayed on the same horizontal line refer to the same circuit, circuit group, or network interface.)

  Occasionally a screen may display a number prefixed with an asterisk (for example, `*234345677`). The asterisk indicates that the number is too large to display, and that the number's most significant digits are truncated. This is when you may wish to reset the value.

- To exit a statistics screen at any time, press the ← key. The console then returns to the Statistics Screen menu. (Refer to figure 6-2.)

For an example of each statistics screen type, along with a description of each statistics data category, refer to the *Operator's Reference.*

7

How To Use the Network Control Language (NCL) Commands To Manage a Router

Introducing NCL

This chapter describes how to use the Network Control Language Interpreter (NCL). NCL is an easy-to-access command-line control interface with capabilities such as the following.

- Restart (“boot”) the router.
- Set two levels of passwords to control access to the router through the console and via Telnet.
- Set the date and time kept by the router.
- Perform link-layer and network-layer tests of remote nodes on the extended network.
- Use an upper-layer IP router service to make a virtual terminal connection to a remote node on the extended network.
- Enable or disable specific software entities and services within the router, such as routing services, and logical network connections, such as circuits.
- Use the IP router and the SNMP agent to access application-specific bridging and routing tables from a local or remote router.
- Access the router’s management information base (MIB) for detailed information about router operations. Reset MIB variables.
- Use the IP router and the Simple Network Management Protocol (SNMP) agent to access either the standard Internet MIB (as defined in Internet RFC 1156) or the vendor-specific MIB of any remote node with a standard SNMP/MIB implementation.
- Download the router’s configuration or operating code from a remote computer or router, or store its configuration or operating code on a remote computer or router.
- Display the router’s current configuration.
- Direct the output of any display command to a printer or a file rather than to the console. This file can be on the local PC used as the console, or on a remote computer or router.
- Access the configuration editor, the event log, statistics screens, or quick configuration without returning to the Main menu.
- Display help for NCL commands.

How To Start NCL

From the Main menu, press 2 to display the NCL screen.

Press 2 to start NCL

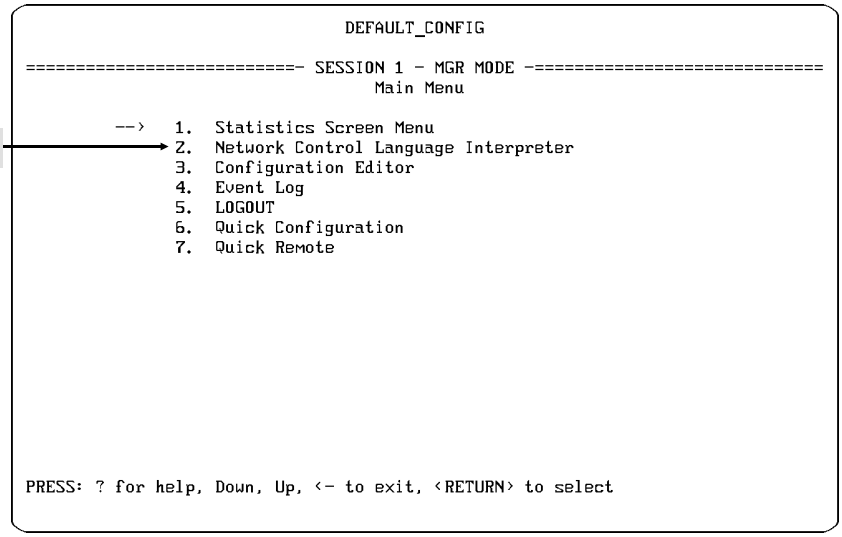


Figure 7-1. Starting NCL from the Main Menu

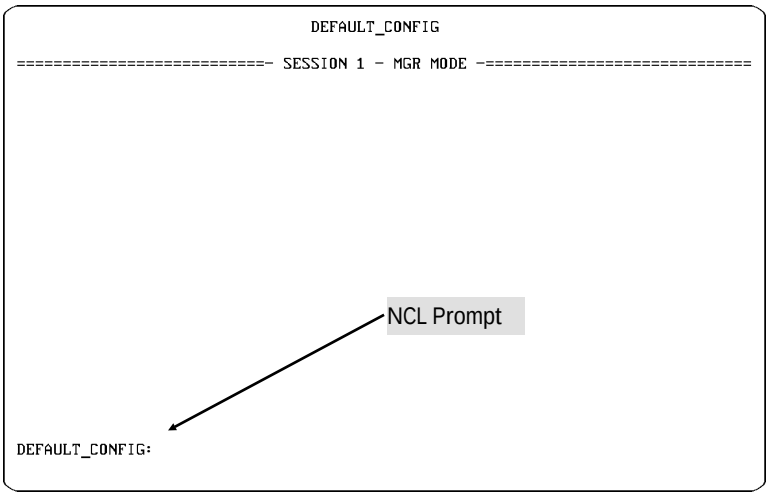


Figure 7-2. Example of the NCL Screen

The NCL command prompt, near the bottom of the screen, always appears (followed by a colon) as the current system name of your router, followed by a colon. In the above figure, the NCL prompt appears as `DEFAULT_CONFIG:`, which is the factory default. (You can use Quick Configuration or the Configuration Editor to change the system name.)

How To Exit From NCL

At the NCL prompt, type

```
exit
```

and press Return to return to the Main menu.

NCL Command Operation

Some NCL commands like Ping (which tests your access to a specific IP address), require you to type an argument after the command. Others, like Boot (which reboots the router) do not. Some "expandable" commands, like Time (which displays the time and date and can also be used to reset the time and date), give you the option of differing responses, depending on whether you want the minimal or expanded functionality of the command. Also, some commands invoke responses that can be displayed in a single screen. Others require scrolling through one or more additional screens.

How To Execute an NCL Command

To execute an NCL command:

1. Type the command name.
2. Type the required argument, if any, and any optional arguments you want to use.
3. Press Return.

For example, to change the current time in the router to 12:00, you would type

```
time 12:00:00
```

and press Return.

More: Continuing the Display

When more than twenty lines are required to display all data from an NCL command, you will see "—MORE—" at the bottom of the display area. For example, if you execute the NCL Help All command, you will see a screen similar to this one:

"More" indicates that there is another screen of data

```
                                DEFAULT_CONFIG

============================- SESSION 1 - MGR MODE -=============================
Enable  <mo>   -  enable managed object      |  <mo> is managed object ID:
DISable <mo>   -  disable managed object     |       <name>
Get     <mo>   -  show managed object value  |       <name>[<number>]
RESet   <mo>   -  reset managed object       |       <name>.<mo>
List    <mo>   -  list managed objects       |       <name>.(<mo> ...)
! [<rep #>]    -  repeat last command # times|       <mo>.*
REPeat         -  repeat the last command until a key is pressed
BOOT           -  reboot the router
CONfig         -  display the machine-readable configuration file
CRASH          -  display router shutdown history
EXIT           -  terminate NCL session and return to the Main menu
Help [<type>]  -  show command list; <type> is All/Other/Rget/Ospf/Zmodem
LOG [<-a>]     -  display the current log, use -a for entire internal event log
LOG Filter     -  display only Warning, Performance, and Major events in log
PASSWORD       -  set, change, or remove a manager or operator password
PING <ipaddr>  -  ping<ipaddr>[count][wait];send ICMP echo request;wait in secs
STAMP          -  display core image stamp
SUMmary        -  display a screen summary of the configuration file
TELNET <ipaddr>-  initiate a Telnet session to the IP address specified
TIME           -  display router's date & time; optionally set MM/dd/yy hh:mm:ss
-- MORE --
```

Figure 7-3. Example of an NCL Command Using a Continued Display

Your choices are:

- Press the Space bar to display an additional screen of data.
- Press Return to display one more line of data.
- Type a number from 1 through 9 to display that number of additional lines.
- Press ← or Q to stop the display and return to the NCL prompt.

General NCL Command Summary

This section lists the NCL commands for general router management, together with their syntax and functions. Later sections in this chapter describe:

- Additional NCL commands used for virtual terminal operation (page 7-10)
- Accessing management information bases (MIBs) (page 7-13, 7-22, 7-23, and 7-24)
- Accessing bridging and routing tables (page 7-25)
- Managing OSPF protocol (page 7-27)
- Managing STE frames (page 7-28)
- Controlling V.25 bis circuits (page 7-29)
- Moving configurations, operating code, and display output (page 7-30)

If you need a more detailed description of any of these commands, refer to the *Operator's Reference*.

Command Syntax The following example of the Ping command demonstrates the conventions used in this table:

```
ping x.x.x.x [count] [wait]
```

where:

`ping` is the command name

`x.x.x.x` is a required value that you provide

`[count]` and *`[wait]`* are optional values that you provide

General NCL Command Summary

Command	Function
`! [repetitions]`	Repeats the preceeding NCL command once or a number of times
`atping X.X [wait]`	Send an AppleTalk Echo Protocol request to another AppleTalk node.
`boot`	Reboot the router.
`browse`	Display the entire current configuration in Configuration Editor format.
`config`	Display the entire current configuration, in machine-readable format.
`crash`	Display the router's shutdown history.
`date [mm/dd/yy] [hh:mm:ss]`	Set or display the router's current date and time.
`disable [identifier]`	Disable a protocol, service, circuit, or other configuration entity.
`edit`	Invoke the Configuration Editor without leaving NCL.
`enable [identifier]`	Enable a protocol, service, circuit, or other configuration entity.
`exit`	Leave NCL and return to the Main menu.
`help [type]`	Get help for NCL commands (`rget`, `zmodem`, `ospf`, `other, all`).
`log` `log filter`	Examine, and optionally filter, the internal event log.
`logi`	Invoke the automatically updating Event Log without leaving NCL.
`page`	Disable and re-enable display-paging mode for the console.
`password`	Assign, change, or remove password protection on the router.
`ping X.X.X.X [count] [wait]`	Send an Internet Control Message Protocol echo request to another node.
`print`	Direct NCL display command output to a printer or file.
`quick`	Invoke Quick Configuration without leaving NCL.
`quickr`	Invoke Quick Remote without leaving NCL.
`repeat`	Continually repeat the last NCL command until another key is pressed.

Command	Function
`stamp`	Display software version information.
`stats`	Invoke the Statistics Screens menu without leaving NCL.
`summary`	Display the Quick Configuration summary without leaving NCL.
`telnet` *`X.X.X.X`*	Establish an IP virtual terminal connection to another node. **Note:** To use Telnet, it must first be enabled. (Refer to page 7-10.)
`Test mac_addr` *`[count] [delay]`*	Send an 802.2 Test packet to another node.
`Time` *`[mm/dd/yy] [hh:mm:ss]`*	Set or display the router's current date and time.

How To Use Telnet To Establish a Virtual Terminal Connection to a Remote Node

Telnet uses the Transmission Control Protocol (TCP) to enable you to use the terminal connection to your local router as a virtual terminal connection to a remote node, such as another router. This generally gives you the ability to access and control the remote node in the same way that you would if your terminal was directly connected to that node. If the remote node is another HP router, you can use Telnet access to operate the remote router's statistics, NCL, configuration, and event log in the same way that you can operate these same features in a local (direct terminal connection) HP router. You can have up to two simultaneous TCP connections; one inbound and one outbound.

Prerequisites for Telnet Operation

Telnet requires the following:

- The remote node must have Telnet service operating
- The following must be configured in your local router:
  - System parameters
  - Software Protocol parameter configured to "DoD IP Router"
  - The appropriate Lines parameters
  - The appropriate Circuit and Circuit Group parameters
  - IP (the DoD Internet Router)
  - A Telnet session

Note

Use of Telnet for outbound access from a local router to other devices is automatically enabled if DoD Internet Router (IP) is configured. However, for inbound access to a router from other devices, Telnet must be specifically enabled on that router.

How To Enable Telnet

You can enable Telnet in either of the following ways:

- In the Quick Configuration screen, set the "Telnet enabled" parameter to "yes" and reboot the router.
- In the Configuration Editor, set the Session Mode parameter to "Telnet" and reboot the router. (Session Mode is in the System/System Session menu.)

How To Use Telnet

Syntax

```
telnet X.X.X.X
```

where *X.X.X.X* is the IP address of the remote node in dotted decimal notation.

Example

```
telnet 15.3.0.97
```

Once a connection is established, Telnet passes keystrokes from your router to the remote node and displays the remote node's control screen in the same way that it would be displayed if your console was directly connected to the remote node.

Telnet Access to Another HP Router

If the remote system is another HP router, you will see the Main menu of the remote router with the remote system name at the top of the screen. You can then operate the remote router in the same way that you operate the router to which you are directly connected.

How To Disconnect Telnet Access to Another HP Router

To disconnect from a remote HP router, return to the Main menu in the remote router and select "Logout" from the Main menu. When you see the following prompt:

```
Do you want to disconnect? [Y/N:]
```

press Y for "yes". You will then see:

```
Hit <Return>
```

Press Return. The remote node and Telnet are disconnected, and you will see your own system name on the the display.

If the remote system is *not* another HP router, then type the appropriate commands to interact with that system. Disconnect Telnet when you are finished. When Telnet is disconnected, you will see your own system name on the display.

Accessing the Management Information Base

The router's management information base (MIB) is the repository of all variables gathered and used by the router, as well as accessible to the router's console and to other devices in the network using SNMP. The MIB is in the form of hierarchical structure composed of managed objects and underlying variables. This structure can be represented as an inverted tree, such as the one shown below for the "buffers" information base structure.

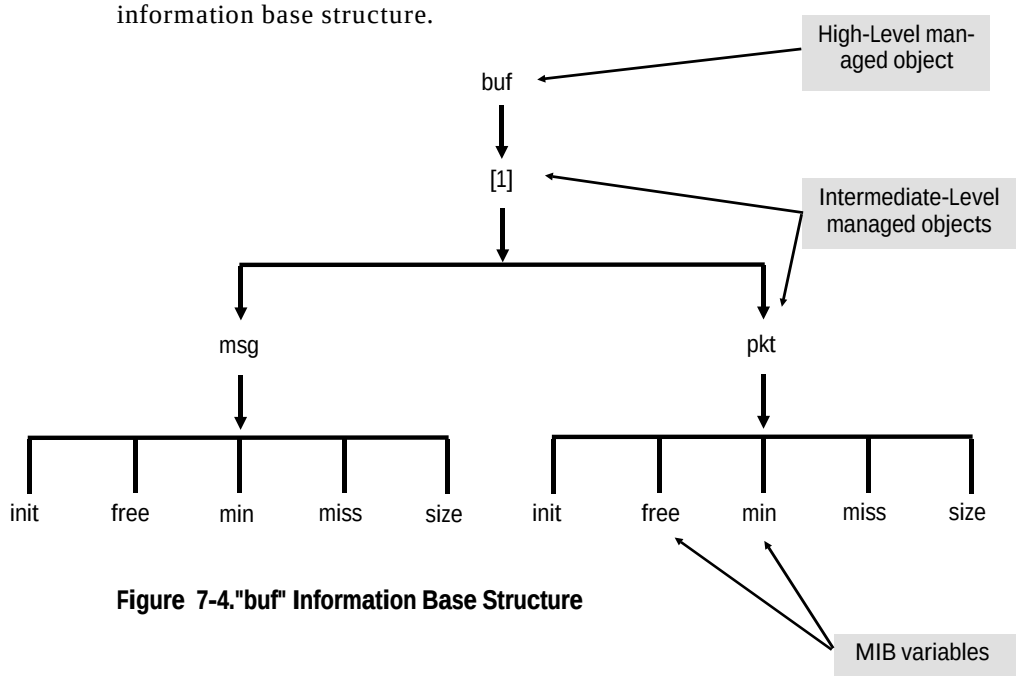


Figure 7-4."buf" Information Base Structure

Slot Numbers

Slot numbers are intermediate-level managed objects that appear in the MIB structure of some objects, such as the "[1]" in the "buf" structure shown above. For HP Series 200 and 400 routers, the slot number is always "1". For HP Series 600 routers, such as the HP Router 650, the

slot number depends on which slot contains the desired MIB activity information.

Managed Objects

"Managed objects", such as "buf" describe varioius resources in the router. Which managed objects currently reside in the router depends on which protocols and services are enabled. The names of the highest-level objects accessible through the router's console using NCL are listed in the "Managed Objects Table", below. These are the heads of branches, leading in some number of levels to single MIB variables.

Note

Most of the objects listed in the following table are available in all HP routers. Certain objects are not available in all models. Some objects are active only when the service to which they apply has been configured in the router. For example, the "at" object for the AppleTalk routing service is active only if AppleTalk has been configured.

Managed Objects Table

Managed Object	Name
Alarms (uses slot #)	alarm
AppleTalk router	at
AppleTalk router MIB	atmib
Bridge	lb
Bridge address table	lbmib
Buffers (uses slot #)	buf
Chassis information base	chassis
Circuits	cct
Configuration	config
Data link services	dls
DECnet router	drs
DECnet routing table	decnet
Device drivers (uses slot #)	driver
Event log information base	log
Experimental MIB (for future use)	exmib

Managed Objects Table

Managed Object	Name
Exterior Gateway Protocol	egp
Hardware (uses slot #)	hw
HP network management	hpnm
IP router	ip
IP (Internet) standard MIB	mib
IPX router	ipx
Key	key
Memory (uses slot #)	mem
Name server (uses slot #)	name
OSPF	ospf
Port module manager	pm
Router operating kernel	rok
Simple Network Management Protocol	snmp
System Manager	mgr
System services (SVC) (uses slot #)	svc
Telnet	telnet
Time Protocol	timep
Timers (use slot #)	timer
Transmission Control Protocol	tcp
TCP echo service	echo
Trivial File Transfer Protocol	tftp
V.25 bis	isdn
XNS router	xrx
X.25	x25

The levels within a MIB branch that lead to a single variable form a *pathname* that is used by the following three commands to access the variable:

Command	Function
Get	Display on the console the value of a MIB variable (page 7-20).
List	Display on the console a variable or part of the MIB structure [page 7-17).
Reset	Reset the value of a MIB variable (to 0) (page 7-21).

Example of a Pathname to a Mib Variable

The "buf" variables shown on page 7-13 describe the router's use of global memory buffers. Of the four levels in this branch, the highest level specifies the managed object, "buf". The next lower level has only one branch for this router, "[1]" (which, in this case, happens to be the slot number). The next lower level distinguishes two buffer types, "msg" or "pkt". Multiple branches descend from each one of those buffer types for the specific variables.

The names of the objects at each level make up a pathname for the variable. For example, the pathname for the message buffer size variable shown in figure 7-4 is

```
buf.1.msg.size
```

Note For a listing and description of all variables contained in the enterprise-specific MIB on your router, refer to the *Operator's Reference.*

The highest-level objects, such as "buf", in the "Managed Objects Table" on page 7-14 are the first names in the pathnames used in NCL commands. They are also branches (groups) within the Wellfleet private enterprise branch of the standard MIB, accessible from outside the router using SNMP functions.

The number of levels and intermediate branches is different for different branches.

How To Use the List Command

Use the List command to discover and display all or any part of the structure of the router's management information base (MIB). List displays the specific variables for the part of the MIB that you are examining, including pathnames (which are listed as *codes* in the List display).

Syntax

`list` *`[branch identifier]`*

`list` *`[branch identifier]`* `*`

where:

`branch identifier` is a pathname identifying any MIB branch. The identifier can have a single name or a hierarchy of names.

`*` is a "wild card" specifying all in the branch beyond the object immediately preceding the `*`.

Examples:

`list` displays a list of router-resident managed objects

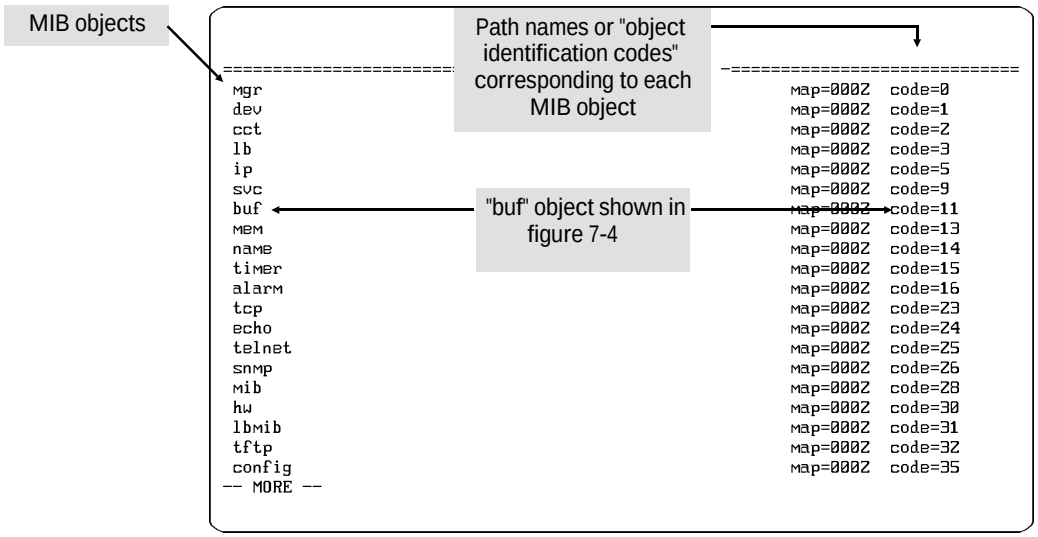


Figure 7-5.Example of List Display

`list buf`	Lists the next intermediate-level managed object ([1]), with its code (1).
`list buf.1`	Lists the next intermediate-level managed objects below [1] (msg and pkt), with their codes (0, 1).
`list buf.1.msg`	Lists the MIB variables below msg (free, init, min, miss, and size), with their codes (1, 2, 3, 4, 5).
`list buf.*`	Lists all of the output for the above three commands.

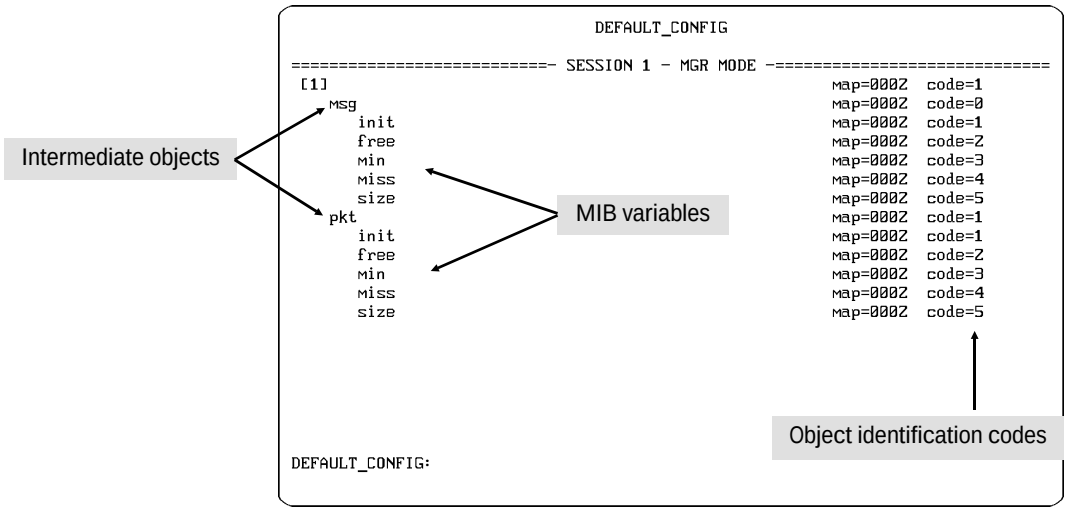


Figure 7-6.Example of List Command Showing Output for "list buf.*

Using Codes To Specify Path Names

You can use the object identification codes instead of object names when you specify a path name. Here are the preceding List command examples repeated with their equivalent object identification codes:

```
list buf          list 11
list buf.1        list 11.1
list buf.1.msg    list 11.1.0
list buf.*        list 11.*
```

For more on the List command, refer to the *Operator's Reference.*

How To Use the Get Command

Use the NCL Get command to display the value of MIB variables on the router. You can obtain the pathname by using the List command (page 7-17).

Syntax

```
get MIB identifier
get MIB identifier [*]
```

where:

MIB identifier is a pathname identifying a specific MIB variable. The identifier must be a pathname from one the router's highest-level objects, such as "buf". (Refer to the "Managed Objects Table" on page 7-14.)

***** is a "wild card" specifying all in the branch beyond the object immediately preceding the *****.

Examples

To get the value for all MIB variables in a branch, use Get with the high-level managed object name for that branch.

`get buf.*`	Displays all MIB variable values for buffers

To get the value for all MIB variables in an intermediate branch, use Get with an intermediate-level managed object name. For example:

`get buf.msg.*` `get 11.1.0.*`	Either command displays the values for the message variables under buffers

To get the value for a single MIB variable, use Get with the complete pathname to the variable. For example:

`get buf.1.msg.size` `get 11.1.0.5`	Either command displays the value for the message size buffer

For more information on the Get command, refer to the *Operator's Reference.*

How To Use the Reset Command

Use NCL's Reset command to set the value of one or more MIB variables to zero. You can obtain the pathname by using the List command (page 7-17).

Syntax

```
reset MIB identifier

reset MIB identifier [*]
```

where:

`MIB identifier` is a pathname identifying a specific MIB variable. The identifier must be a pathname from one the router's highest-level objects, such as "buf". (Refer to "Managed Objects Table" on page 7-14.)

`*` is a "wild card" specifying all in the branch beyond the object immediately preceding the `*`.

Examples

`reset buf.*` `reset 11.*`	Either command resets all MIB variable values for buffers
`reset buf.1.msg.*` `reset 11.1.0.*`	Either command resets the message variables under buffers
`reset buf.1.msg.min` `reset 11.1.0.3`	Either command resets the value for message minimum value under buffers

For more information on the Reset command, refer to the *Operator's Reference.*

Accessing the Internet Management Information Base

Use these commands to examine the MIB of any local or remote network node that provides a standard SNMP/MIB implementation.

For More Information This section lists the Internet MIB commands together with their syntax and functions. For a more detailed description of these commands, refer to the *Operator's Reference*.

Command Syntax The following example of the Rgets command demonstrates the conventions used in this table:

`rgets` *`identifier [x.x.x.x] [community]`*

where:

`rgets is the command name`

`identifier` is a required value that you provide

[x.x.x.x] and *[community]* are optional values that you provide

Command	Function
rgeta *[x.x.x.x] [community]*	Display the `MIB IP address translation table.`
`rgeti [x.x.x.x] [community]`	Display the MIB *`IP address table.`*
`rgetms` *`identifier [x.x.x.x] [community]`*	Display the value of a branch of Internet standard MIB variables.
`rgetr [x.x.x.x] [community]`	Display the *`MIB IP routing table.`*
`rgets` *`identifier [x.x.x.x] [community]`*	Display the value of an individual Internet standard MIB variable.

These commands display their output on the console screen. To output the display to a printer or file instead of the console screen, place the command syntax within the Print or Zput command. For detailed information on the Print command, refer to the *Operator's Reference*.

Accessing a Remote Management Information Base

Use these commands to examine the MIB of any remote network node that provides a standard SNMP/MIB implementation.

For More Information This section lists the remote MIB commands together with their syntax and functions. For a more detailed description of these commands, refer to the *Operator's Reference.*

Command Syntax The following example of the Rgetw command demonstrates the conventions used in this table:

`rgetw` *`identifier [x.x.x.x] [community]`*

where:

`rgets is the command name`

`identifier` is a required value that you provide

[x.x.x.x] and *[community]* are optional values that you provide

Command	Function
`rgetmw` *`identifier [x.x.x.x] [community]`*	Display the value of a branch of MIB variables from a remote HP or Wellfleet router.
`rgetw` *`identifier [x.x.x.x] [community]`*	Display the value of an individual MIB variable from a remote HP or Wellfleet router.

These commands display their output on the console screen. To output the display to a printer or file instead of the console screen, place the command syntax within the Print command. For detailed information on the Print command, refer to the *Operator's Reference.*

Accessing a Foreign Management Information Base

Use these two commands in conjunction with the SNMP agent and the IP routing application to provide access to the enterprise-specific section of the MIB of any remote node—other than an HP or Wellfleet router—that provides a standard SNMP/MIB implementation. You must use a complete MIB pathname with these commands.

For More Information This section lists the remote MIB commands together with their syntax and functions. For a more detailed description of these commands, refer to the *HP Router Operator's Reference.*

Command Syntax The following example of the Rget command demonstrates the conventions used in this table:

`rget` *`identifier [x.x.x.x] [community]`*

where:

`rgetw is the command name`

`identifier` is a required value that you provide

[x.x.x.x] and *[community]* are optional values that you provide

Command	Function
`rget` *`identifier [x.x.x.x] [community]`*	Display the value of an individual MIB variable from a remote foreign node.
`Rgetm` *`identifier [x.x.x.x] [community]`*	Display the value of a branch of MIB variables from a remote foreign node.

These commands display their output on the console screen. To output the display to a printer or file instead of the console screen, place the command syntax within the Print command. For detailed information on the Print command, refer to the *Operator's Reference.*

Accessing Bridging and Routing Tables

These NCL commands work with the SNMP agent and the IP routing application to provide access to application- specific bridging, routing, and configuration tables maintained by local or remote HP or Wellfleet routers. Some of these commands are repeated from other sections of this chapter because they belong in more than one category.

ForMore Information This section lists the commands accessing bridging and routing tables, together with their syntax and functions. For a more detailed description of these commands, refer to the *Operator's Reference.*

Command Syntax The following example of the Rgeta command demonstrates the conventions used in this table:

`rgeta` *`[x.x.x.x] [community]`*

where:

`rgeta` is the command name

`identifier` is a required value that you provide

[x.x.x.x] and *[community]* are optional values that you provide

Command	Function
`ospf rtab`	Display the OSPF routing table.
`rgeta` *`[x.x.x.x] [community]`*	Display the IP address translation table.
`rgetat` *`[x.x.x.x] [community]`*	Display the AppleTalk configuration table.
`rgetata` *`[x.x.x.x] [community]`*	Display the AppleTalk Address Resolution Protocol (AARP) table.
`rgetatr` *`[x.x.x.x] [community]`*	Display the AppleTalk routing table.
`rgetb` *`[x.x.x.x] [community]`*	Display the bridge forwarding and filtering table.
`rgetd` *`[x.x.x.x] [community]`*	Display the DECnet configuration table.
`rgetda` *`[x.x.x.x] [community]`*	Display the DECnet Level 2 routing table (area routes).

`rgetdn` *`[x.x.x.x] [community]`*	Display the DECnet Level 1 routing table (node routes).
`rgeti` *`[x.x.x.x] [community]`*	Display the IP address table.
`rgetr` *`[x.x.x.x] [community]`*	Display the IP routing table.
`rgetxr` *`[x.x.x.x] [community]`*	Display the XNS routing table.
`rgetir` *`[x.x.x.x] [community]`*	Display the IPX routing table.
`rgetis` *`[x.x.x.x] [community]`*	Display the IPX Service Advertising Protocol (SAP) table.
`rgetrif` *`[x.x.x.x] [community]`*	Display the source routing Routing Information Field (RIF) cache.

These commands display their output on the console screen. To output the display to a printer or file instead of the console screen, place the command syntax within the Print command. For detailed information on the Print command, refer to the *Router Console Reference Guide.*

Managing the Open Shortest Path First Protocol

OSPF is an IP internal gateway routing protocol that has an openly available protocol specification that is not proprietary to any single vendor. You can display the status of various OSPF elements on this router using the NCL commands in this section. You must use a complete MIB pathway with each of these commands.

Command	Function
`ospf errs`	Display OSPF error counts.
`ospf intf`	Display the status of the OSPF interfaces.
`ospf lsdb`	Display the OSPF link state database.
`ospf nbrs`	Display the status of the OSPF neighbors.
`ospf rtab`	Display the OSPF routing table.
`ospf tq`	Display the timer queue.

These commands display their output on the console screen. To output the display to a printer or file instead of the console screen, place the command syntax within the Print command. For detailed information on the Print command, refer to the *Operator's Reference.*

Blocking and Unblocking Spanning Tree Explorer Frames

Because the spanning tree does not operate automatically on source-route bridging circuits, it is necessary to "manually" build the spanning tree in these circuits. Blockste and Unblockste allow you to block and unblock the forwarding of spanning tree explorer frames on source-route bridging circuit groups. This is an alternative to changing the Block STE configuration parameter in the Configuration Editor and booting the router to put the change into effect. (Refer to the *HP Router Operator's Reference.*) These commands override the current setting of the Block STE parameter.

Command Syntax The following example of the Blockste command demonstrates the conventions used in this table:

`blockste` *`circut group`*

where:

`blockste` is the command name

`circuit group` is a required value that you provide

Command	Function
`Blockste all`	Block spanning tree explorer frames on all circuit groups in the router.
`blockste` *`circuit group`*	Block spanning tree explorer frames on the specified circuit group.
`Unblockste all`	Unblock spanning tree explorer frames on all circuit groups in the router.
`unblockste` *`circuit group`*	Unblock spanning tree explorer frames on the specified circuit group.

Controlling IP-Mapped Circuits for V.25 bis

Mapped data is IP data from an IP switched virtual circuit, which is configured by defining an IP static route and a phone number to IP to V.25 bis map entry. Individual map entries can be disabled while leaving others enabled. Three NCL commands are provided for disabling, enabling, and checking the status of virtual IP maps.

For More Information This section lists the commands accessing bridging and routing tables, together with their syntax and functions. For a more detailed description of these commands, refer to the *HP Router Operator's Reference*.

Command Syntax The following examples demonstrate the conventions used in this table:

```
ipmap [x.x.x.x]
disipmap x.x.x.x
```

where:

`ipmap` and `disipmap` are command names

`[x.x.x.x]` is an optional next-hop IP address that you provide.

`x.x.x.x` is a required next-hop IP address that you provide

Command	Function
`disipmap` *`x.x.x.x`*	Disable an IP map.
`enipmap` *`x.x.x.x`*	Enable an IP map that was disabled earlier by Disipmap.
ipmap *`[x.x.x.x]`*	Show the current state of an IP map.

Using TFTP To Transfer Operating Code, Configuration, and NCL Display

The NCL Fget command and the workstation-generated TFTP Put command provide two ways to load the router's operating system or configuration. That is, these two commands can be used to copy the operating system or configuration to a host for storage and later downloading to the router. Also, you can use the NCL Fput command to redirect the output of any NCL command that displays data on the console screen to a file on another host or to an HP Router CR. These network transfers operate over any of the router's network interfaces.

ForMore Information This section lists the commands for using TFTP, together with their syntax and functions. For a more detailed description of these commands, including TFTP security features, refer to the *Operator's Reference*.

Command Syntax The following examples demonstrate the conventions used for these commands:

NCL command syntax

```
fget x.x.x.x operator filename
fput x.x.x.x NCL-command filename
```

Workstation command syntax

```
tftp x.x.x.x
put filename operator
quit
```

where:

`fget`, `fput`, `tftp`, `put`, and `quit` are command names.

`operator` is either `os` (for operating system) or `config` (for configuration).

`NCL-command` is an NCL display command, and is used to redirect displayed NCL command output t a file on another host or to an HP Router CR. (*`NCL-command`* can be used only with Fput and must be for a command that is available on your router.) If the NCL command

has parameters and thus includes a space, then enclose the command string in double quotes.

filename is the name of the configuration or operating code file on the remote host. On an HP Router CR, it can also be the name of the configuration file.

x.x.x.x is the IP address of the remote host.

Command	Function
`fget` *X.X.X.X operator filename*	Initiate a TFTP read request from a specific host or router for the configuration or operating system. **Note:** Fget does *not* use *NCL-command*.
`fput` *X.X.X.X NCL-command filename*	Initiate a TFTP write request to a specific host or to an HP Router CR for the configuration or operating system or display command output.

Using PC Modem Access to Transfer Configuration and NCL Display

With an IBM-compatible personal computer (PC host) connected to the router's console port, you can use the Zmodem protocol with two NCL commands, Zput and Zget, to do the following:

- Copy a router configuration to the PC host for storage.
- Copy a router configuration from the PC host to the original router or to other routers.
- Copy the displayed output of certain NCL commands into a PC host file.

The PC must be emulating a VT100 or ANSI terminal, and can be connected either directly or using a modem to the router's console port. Also, the PC must be running a Zmodem-compatible terminal emulation program such as PROCOMM PLUS*. This section describes the use of NCL commands with the PROCOMM PLUS terminal emulation program (version 2.01).

Note

You can use other PC host versons of Zmodem. However, the exact procedure for invoking them depends on how each is implemented, and is likely to differ from the procedures shown on the following pages.

The commands available in this category are the following:

- **Zput:** Copies NCL command output or the router configuration from the router to a file on the console PC. Refer to page 7-33.
- **Zget:** Copies a router configuration from a file on the console PC to the router. Refer to page 7-36.

Note

Recommended Hardware Connections:
For direct and modem hardware connections between the PC host and the router, refer to the "HP Cables" and "Other Standard Cables" sections in appendix A of the *Installation Guide* for the correct cables.

* PROCOMM PLUS is a product of Datastorm Technologies, Inc.

How To Use Zput To Store the Configuration or NCL Command Output to a PC Host File

Use NCL's Zput command to download the router configuration or NCL command output to a file on a PC connected to the router as a console.

Note

This procedure describes the use of Zput with PROCOMM PLUS. The procedure is different when used with other terminal emulators.

Preparation:

1. Start PROCOMM PLUS .
2. Ensure that the PROCOMM PLUS "Auto downloading" feature for the Zmodem protocol is set to "on".
3. Press Alt-S to display the "PROCOMM PLUS SETUP UTILITY" screen.
4. Select "PROTOCOL OPTIONS".
5. Select "ZMODEM PROTOCOL OPTIONS". In the resulting "PROCOMM PLUS SETUP UTILITY", verify that item C, "Auto downloading", is set to "on". (If it is set to "off", follow the instructions in the screen to change the setting.)
6. Press Esc three times to return to the router's Main menu (see figure 1-1).
7. Select the "Network Control Language Interpreter" in the router's Main menu.

The procedure to download the configuration or NCL command display to a PC host file (at the NCL prompt) is shown by the syntax and examples on the following pages.

Syntax

`zput config` *`filename [append][format]`* — transfer router configuration

`zput` *`NCL-command filename[append][format]`* — store display command output

where:

`filename` is the name of a file on the remote PC host to store the output from this router.

`NCL-command` is an NCL display command string on this router. Possible commands are listed above and described earlier in this chapter. If the command has parameters and thus includes a space, then enclose the command string in double quotes.

`[append]` (optional) specifies whether to append any existing file of the same name as filename, either of the following:

`0` (the default) prevents appending.

`1` allows appending.

`[format]` (optional) selects the file formatting required by the host, either:

`0` (the default) ends lines with carriage returns and line feeds (CR LF), as needed by most PCs.

`1` ends lines with line feeds only (LF).

Examples

```
zput config inter1.cfg
```

```
zput "rgetr 10.1.2.1 public" pr1table.txt
```

In response, a status window temporarily appears to monitor transfer data and progress.

When the download is completed, a flashing "COMPLETED" message appears briefly in the status window. Then the window closes and control returns to the NCL prompt.

If the PC host does not respond within approximately 60 seconds after you execute Zput, the command times out and control returns to the NCL prompt.

Note

If the "Auto downloading" parameter described under "Preparation" above has not been set to "on", then to complete the download you must press the Pg Dn key and follow the instructions in the resulting window. For more information, refer to the *PROCOMM PLUS User Manual.*

For information on Zput event messages, refer to the Zmodem event messages in the *Operator's Reference.*

How To Use Zget To Load the Configuration to a Router

Use NCL's Zget command to upload the router configuration previously stored as a file on the PC connected to the router as a console.

Note

Zget overwrites the router's current configuration with the uploaded configuration.

This procedure describes the use of Zput with PROCOMM PLUS. The procedure is different when used with other terminal emulators.

Preparation

You must have either acquired the configuration from another source or used Zput earlier to download the configuration to the PC host (see page 7-33). Run the PROCOMM PLUS terminal emulation program. Start a router console session with the manager password.

To upload the configuration to the router:

1. Enter the Zget command:
   `zget` Enter
2. Press Pg Up to display the "Upload Protocols" window.
3. Type `z` to select the "ZMODEM" option and to display the "Send ZMODEM" window.
4. Enter the name of the file containing the configuration you want to upload. End with Enter to begin uploading.

For information on Zget event messages, refer to the Zmodem event messages in the *Operator's Reference*.

Notes

If the PC host does not respond within approximately 70 seconds after you execute step 4, the command times out and control returns to the NCL prompt. Also, if Zget is in use and the PC host is left in terminal emulation mode, you may see Zmodem protocol packets displayed as a series of character strings before the command times out.

You can use other host versions of Zmodem. However, the exact procedure for invoking them depends on how each is implemented.

8

How To Use Quick Remote To Configure A Remote Router

Introducing Quick Remote

Quick Remote is a component of SmartBoot that enables a central site to manage a remote router without specially trained personnel at the remote site. This means that, with the proper network preparation, a remote router can be installed and configured by simply removing it from its shipping carton, mounting it properly, attaching the necessary network cable(s), and connecting the power. Minimal configuration is automatic! (This operation also applies to a previously installed remote router that has been cleared to the factory default by using the Clear/Reset button combination.)

Quick Remote appears in the Main menu of most HP routers. It is used in a central router to enable any remote, series 200 or 400 HP router that has a WAN port to automatically download a minimal IP or IPX configuration over a WAN link from the central router.

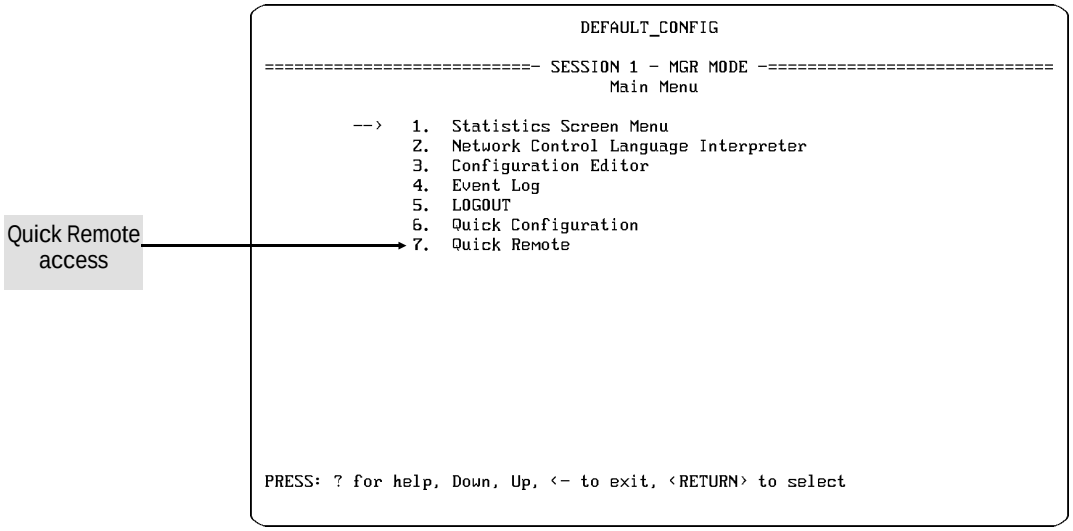


Figure 8-1. Locating Quick Remote in the Main Menu

After a remote router has received a minimal configuration from a Quick Remote configuration in a central router, it reboots itself and begins IP and/or IPX routing. The remote router can then be more extensively configured, if necessary, by TFTP (Fput) or Telnet from another site. (The Quick Remote configuration also enables or disables bridging on the remote router.)

What Can Quick Remote Configure?

A Quick Remote configuration can include the following:

- A minimal IP or IPX configuration for the first WAN port and/or the first LAN port of an HP Series 200 or 400 router that has at least one WAN port
- Bridging enabled or disabled on the first WAN port and first LAN port of the remote router
- The IP address from which the remote router will accept a TFTP Put of a configuration file from a remote device.

Note

It is recommended that you always include IP in any Quick Remote configuration in order to enable remote management of the router.

Other Quick Remote Features

- Displays dynamic online help for each field
- Performs error checking and displays error messages for errors in some areas, such as subnet masking
- Lets you view (and change) what has been configured earlier
- Provides “hotkeys” for display control

Set-Up Requirements for Quick Remote

The following is needed to enable Quick Remote operation:

- The central router on which you are going to create the Quick Remote configuration(s) must already be configured for HP Point-to-Point routing on the WAN ports that you will use for Quick Remote access from remote routers. (The Quick Remote configurations that you create are *assigned* to these WAN ports on the central router for downloading to remote routers, but do not affect the configuration of these ports.)
- An active HP Point-to-Point WAN link must exist between a WAN port on a remote router and a WAN port on a central HP router.
- A minimal IP and/or IPX configuration must be stored in Quick Remote on the central router for the WAN port linked to a WAN port on the remote router
- The remote HP router must be configured to the *factory default* prior to power-up or rebooting

Note

"Factory default" is the state of the router configuration either when the router is shipped from the factory or when you use the Clear/Reset button combination (described in the installation manual) to clear the configuration and reboot the router.

Quick Remote Operation

Quick Remote maintains in the central router one or more minimal router configurations that are accessed through the router's WAN port(s). That is:

1. In the central router, an operator uses Quick Remote to create a minimal configuration that will be available via a WAN port on that router.

2. When a WAN port on a remote router is connected to the same point-to-point link as the WAN port on the central router, and powered up, the remote router downloads the configuration from step 1, above, boots itself, and begins routing. (The remote router *must* be in the factory default configuration at power-up.)

Thus, in the following illustration, to configure remote router X, you would assign configuration A to WAN port 1, which is linked by an active HP Point-to-Point WAN connection to router X.

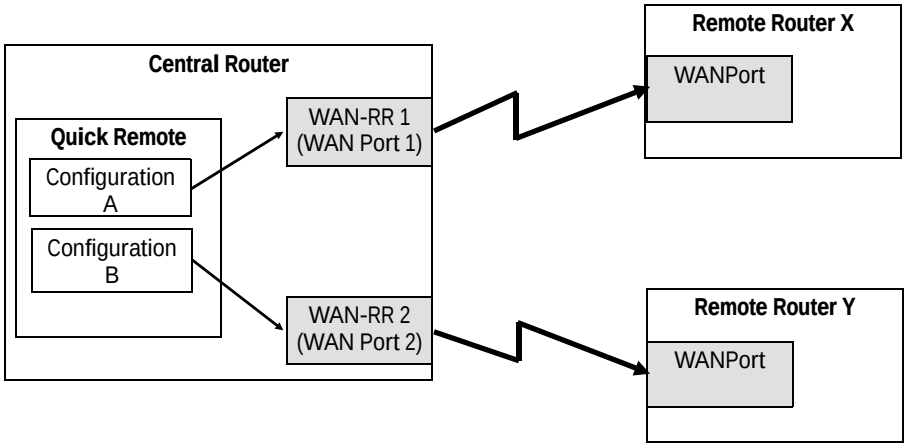


Figure 8-2. Example of Quick Remote Operation

Similarly, you would make configuration B available to router Y by assigning configuration B to WAN port 2, which is linked to router Y.

When remote router A is in the factory default and boots itself:

1. Remote router X sends a Bootp request message over the WAN link to WAN port 1 on the central router.

2. The central router responds by transmitting a Bootp reply message (containing the configuration assigned to port 1) across the WAN link to remote router X.

3. Remote router X then reboots itself with the new configuration that it just received from the central router, and begins routing and/or bridging operations.

When remote router Y boots from the factory default, it receives configuration B from WAN port 2, reboots itself, and begins routing and/or bridging operations.

The Basic Steps to Setting Up Quick Remote

The basic steps to configuring the router for minimal operation are:
1. Determine the parameter values you want to provide at each WAN link on the router.
2. Start Quick Configuration.
3. Enter the parameter values that you determined in step 1.
4. Save the configuration and exit from Quick Remote.

The Quick Remote Screen: Features and Control

The number of WAN ports appearing in the Quick Remote screen correspond to the number of WAN ports in the router. An example of a Quick Remote screen is the following for an HP Router SR, which has three WAN ports:

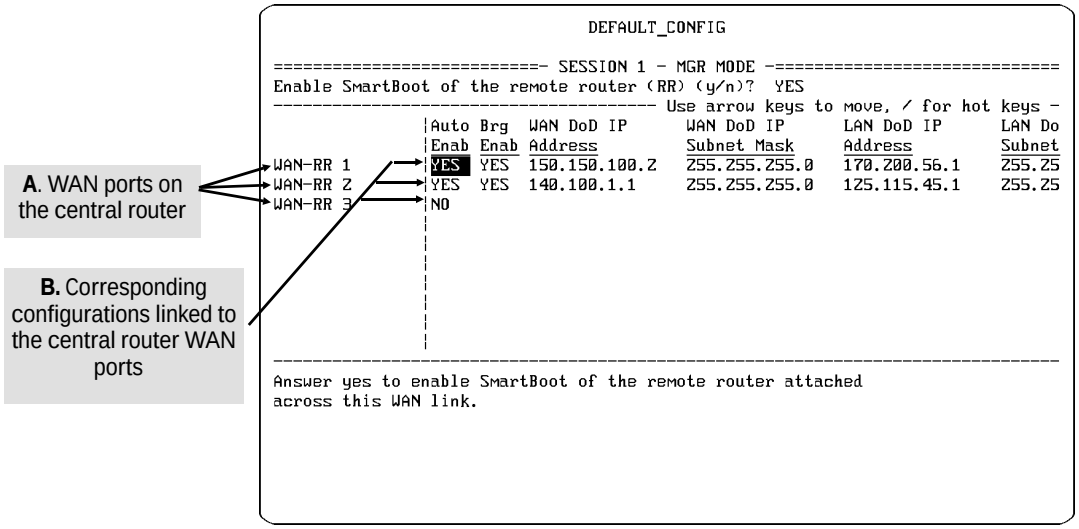


Figure 8-3. Example of Quick Remote Screen

There are eleven data fields for each configuration:

Auto Enab	Brg Enab	WAN DoD IP Address	WAN DoD IP Subnet Mask	LAN DoD IP Address	LAN DoD IP Subnet Mask	WAN IPX Network	WAN IPX Encap.	LAN IPX Network	LAN IPX Encap.	TFTP Security IP Address
These Fields appear in the initial Quick Remote Screen					Use → to scroll to these fields, and ← to scroll back to the left					

The initial Quick Remote screen displays the first five fields. Use the → and ← keys to scroll right or left to access the fields at opposite ends of the row.

To move horizontally or vertically from one field to another, use the →, ←, ↑, and ↓ keys.

To enter a value in a field, move the cursor to that field and type the value, then press Return. The cursor then moves to the next field.

How To Exit From Quick Remote

To exit from Quick Remote, press the Ctrl C key combination. You will then be prompted with:

```
Save configuration and exit Quick Remote  (y/n)?
```

If you want to save the configuration and exit, type `y`. Quick Remote then saves the currently displayed configurations and returns you to the Main menu.

If you don't want to save the configuration (or if you decide not to exit), type `n`. You will then be prompted with

```
Make more changes  (y/n)?
```

- To remain in Quick Remote, type `y` and press Return.
- To exit from Quick Remote without saving any changes, type `n` and press Return. Quick Remote then returns you to the Main Menu.

The remaining sections of this chapter describe how to set up Quick Remote to create a minimal configuration for IP and IPX routing services and to enable or disable bridging on the first WAN and LAN port of the remote router.

How To Create and Save a Quick Remote Configuration

The main steps to creating and storing a configuration in Quick Remote for use by an remote router are:

1. Start Quick Remote on the central router.
2. Select the WAN port through which you want to make the configuration available to a remote HP router.
3. Enable or disable bridging and enter a minimal set of IP and/or IPX configuration values.
4. Save the new configuration and exit from Quick Remote.

To start Quick Remote and enter a minimal configuration:

1. Plan the Quick Remote parameters for the remote router(s).
2. Display the Main menu on the central router.
3. Start a Quick Remote session. (Press [7].) When the "Welcome" screen appears, press [Return]. The console then displays the Quick Remote screen.

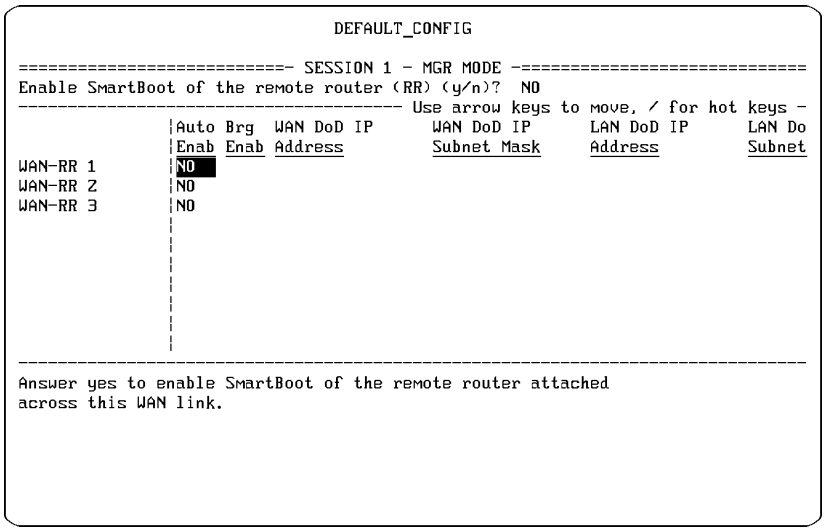


Figure 8-4. Example of a Quick Remote Screen (HP Router SR)

(The WAN ports listed will correspond to the central router's WAN ports.)

4. Use the ↓ key, if necessary, to move the cursor to the row for the port at which you want the new configuration to be made available for a remote router, then go on to the next step.

5. In the "Auto Enab" (Auto Enable) column of the desired WAN port, type `y` and press Return to enable Quick Remote for that port. "Yes" then appears in the Auto Enable field, indicating that Quick Remote is enabled for that port.

   The cursor then moves to the "Brg Enab" (Bridge Enable) field.

6. Enable or disable bridging on the first WAN and LAN ports of the remote router.

   - If you don't want to change the setting in this field, just press Return to move to the next field.
   - If you want to change the bridge setting, type `y` (for "Yes") and press Return to disable bridging or (if the current setting is "Yes"), type `n` (for "No") and press Return to disable bridging.

7. To configure IP for the first WAN port of a remote router:
   - Enter an IP address in the WAN DoD IP Address field.
   - Enter an IP subnet mask in the WAN DoD IP Subnet Mask field.

Note This IP address must be for the same subnet as the central router WAN port through which the Quick Remote configuration will be sent to the remote router. For example, if the IP address for the WAN port on the central router was 15.1.1.1, then the IP address for the corresponding WAN port on the remote router could be 15.1.1.2.

   If you don't need IP WAN operation, use → to bypass these fields.

8. To configure IP for the first LAN port of a remote router:
   - Enter an IP address in the LAN DoD IP Address field.
   - Enter an IP subnet mask in the LAN DoD IP Address field.

Note This IP address must be for a LAN port in another subnet.

   If you don't need IP LAN operation, use → to bypass these fields.

9. To configure IPX for the first WAN port of a remote router:
   - Enter an IPX network number in the WAN IPX Network field.
   - Enter an IPX encapsulation type in the WAN IPX Encap. field

   If you don't need IPX WAN operation, use → to bypass these fields.

10. To configure IPX for the first LAN port of a remote router:
    - Enter an IPX network number in the LAN IPX Network field.
    - Enter an IPX encapsulation type in the LAN IPX Encap. field

    If you don't need IPX LAN operation, use → to bypass these fields.

11. To configure the remote router to accept a TFTP Put of a configuration file from a remote device, enter the IP address of the remote device. Otherwise, leave this field blank. (Refer to "TFTP Access" on page 8-14.)

12. Do one of the following:

- To create another minimal configuration on another WAN port in the central router, use the cursor keys (→, ←, ↑, and ↓) to move the cursor to the Auto Enab field for the desired WAN port, then repeat steps 5 through 11..
- To save the current Quick Remote configuration(s), press the Ctrl C key combination. You will then be prompted with:

  ```
  Save configuration and exit Quick Remote
  (y/n)?
  ```

  Type `y` (for "yes"). Quick Remote then saves the currently displayed configurations and returns you to the Main Menu.

How to Delete a Quick Remote Assignment

To delete a Quick Remote Assignment:

13. Move the cursor to the Auto Enab (Auto Enable) field for the WAN port on which you do not want Quick Remote enabled.

14. Type `n` (for "No"), and press Return. This disables Quick Remote for the correspoinding WAN port.

15. Press the Ctrl C key combination. You will then be prompted with:

```
Save configuration and exit Quick Remote  (y/n)?
```

16. Type `y` (for "yes"). Quick Remote then saves the currently displayed configuration and returns you to the Main menu.

Operating Notes

TFTP Access

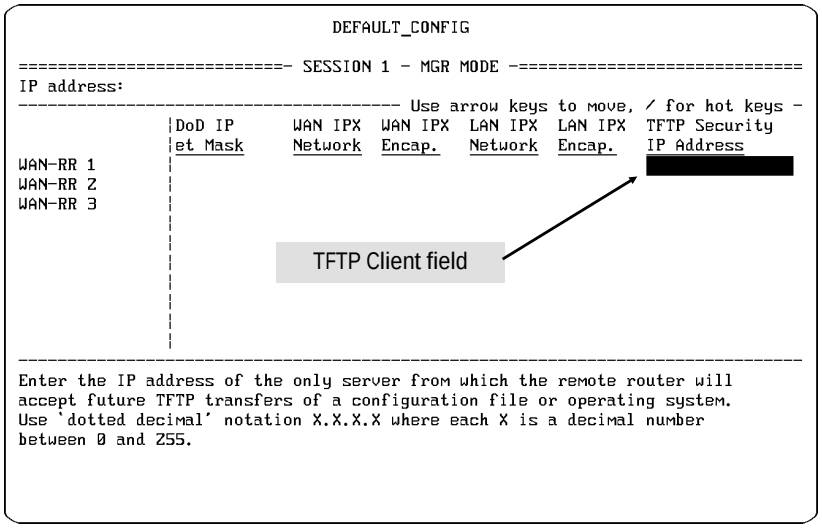


Figure 8-5. Example of a Quick Remote Screen With TFTP Client Field

TFTP access enables you to automatically configure a remote router to accept a configuration file via TFTP PUT from a specific IP address. That is, if the "TFTP Client IP Address" field contains an address, then the remote router that downloads the Quick Remote configuration containing that address will subsequently accept a TFTP PUT of a configuration file from that address. But if no address is provided in a Quick Remote configuration, then the remote router that downloads that configuration will not accept a TFTP PUT request.

How To Use the "Hotkeys"

The hotkeys in Quick Remote let you control display features or exit from Quick Remote, and operate in the same way as the numeric hotkeys described in chapter 3, "How To Use Quick Configuration".

For further information, refer to "The Numeric Hotkeys" on page 3-13.

To display the hotkey menu: Type the forward slash (/).

For further information, refer to “The Numeric Hotkeys” on page 3-13.

SNMP Default Settings

If the minimal configuration a remote router receives from Quick Remote in a central router includes the DoD Internet Router (IP) service, then SNMP will be enabled in the remote router as follows:

- Community Name: Public
- Session Mode: Read (read-only access)
- Session Type: Regular
- Node Address: 0.0.0.0 (permits any network entity using Community Name to query the agent)

For more on SNMP parameters, refer to the *Operator’s Reference*.

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