DEC WANrouter 90/250

User's Guide

Order Number: AA–Q7WPC–TE

This book shows how to install, configure, and load the DEC WANrouter software onto a suitable DECwanrouter 90, DECwanrouter 90EW or DECrouter 250 system.

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How to Use This Manual

Overview

The following pages will help you to get the most out of this book. They cover the following topics:

- A description of what this book contains and how to use it
- What you are expected to know to be able to use the book effectively
- A list of conventions used in this book

About This Book

The main aim of this book is to show you how to:

- Install the DEC™ WANrouter software
- Configure its behavior to suit local needs
- Load the software on to the DEC WANrouter hardware

In addition, the book shows you how to:

- Change the behavior of the software, should local needs change
- Deal with problems, should they arise

What You Need to Know

This book assumes that:

- You are familiar with the software installation procedure for your host operating system.

  Example: If you use an OpenVMS™ system, you are familiar with VMSINSTAL.

- You have a suitably privileged account available (this book always tells you what level of privilege you need).

  Example: On a DEC OSF/1® system, you need an account with superuser privileges.

- Someone has successfully installed the DEC WANrouter hardware and you have its documentation readily available.

  Example: You have put the hardware in its working position, attached all the cables, and carried out the installation verification procedures. Make sure that the hardware passes all tests successfully.

- You (or a local specialist) understand and have some experience of:
  - Local area networks (LANs)
  - Wide area networks (WANs)
  - Your load-host operating system
  - DECnet™/OSI® terminology
  - IP, NetWare® IPX, and DECnet/OSI routing concepts (as appropriate)
  - X.25 (if you are to use the X.25 features)

  These are needed to be able to set up the DEC WANrouter software.

Associated Documentation

Product Documentation

- *DEC WANrouter 90/250 Management*

  This manual describes how to manage the DEC WANrouter 90/250. It is intended for network managers.

- *DEC WANrouter 90/250 Release Notes*

  These contain release information about the software and/or the documentation. They are supplied on line.

Conventions

This book uses the following conventions:

Convention	Meaning
router	This is a shorthand term for the hardware that runs the DEC WANrouter software.
italic type	This indicates variable information that you replace with a locally relevant value. The appearance of this is always followed by guidance on what to enter. Example: *device–name* Replace *device–name* with the name of the device that holds the distribution medium.
`This type`	This indicates one of the following: • A command you are to use • A value that you are to enter • A choice you are to make from a menu Example: Choose `Exit from this procedure` and press Return.
OpenVMS	This term refers to both the OpenVMS for Alpha and OpenVMS for VAX™ platforms unless otherwise specified.

Returning Comments About This Documentation

We would like to know what you think about the DEC WANrouter 90/250 V1.3 documentation. If you have any comments or suggestions, please return them in any of the following ways:

- Send an electronic mail message to the Internet address books@reo.mts.dec.com
- Send an electronic mail address to the X.400 address S=IDC BOOKS; 0=digital; OU1=reo; P=digital; A=CWMail; C=gb
- Send a fax to (+44) 1734 206018

Please give details of the document you are referencing, including its title and order number, and specify the version of software you are using.

Part I

Installing and Configuring the Software

This part shows you how to install the WANrouter software, set up all the configuration information, and load software onto the router.

1
Introduction

1.1 Overview

This chapter describes the procedure for new WANrouter installations and WANrouter upgrades. It also provides background information on the configuration and loading process.

1.2 Procedure for New WANrouter Installations

If you are installing a new WANrouter, follow each chapter in turn:

Step	Action	See
1.	If you are unfamiliar with the configuration and loading process for the WANrouter, read the background information.	This chapter
2.	Install the software on a load host.	Chapter 2
3.	Configure the load host.	Chapter 3
4.	Configure the WANrouter software.	Chapter 4
5.	Load the WANrouter software.	Chapter 5

1.3 Procedure for WANrouter Upgrades

If you are upgrading the WANrouter software from V1.2, follow each chapter in turn as for new installations. The Overview section of each chapter directs you to any additional procedures you need to complete.

If you are upgrading the WANrouter software from V1.1, follow the procedures for new installations. Both V1.2 and V1.3 use configuration utilities that are not available with V1.1. This means that you cannot carry forward any configuration information or use upgrade facilities available for V1.2 hosts. You must install and configure the software as if it is a new installation.

1.4 The Configuration Process

After you have installed the WANrouter software, you configure the load host and the WANrouter with menu-based programs that are supplied with the software. These are:

- Load-host configurator
- WANrouter configurator

These are described in Sections 1.4.1 and 1.4.2.

1.4.1 The Load-Host Configurator

You use the load-host configurator to:

- Enter information for an MS-DOS®, OpenVMS, or DEC OSF/1 system so that it can load software and configuration files to the router, and receive dumps. Chapter 3 describes how to run the load-host configurator.
- List, update, modify, and delete loading information. These tasks are described in Chapter 6.

1.4.2 The WANrouter Configurator

You use the WANrouter configurator to enter information needed for the router to communicate with other systems.

Chapter 4 shows how to run the WANrouter configurator. Chapter 7 shows how to use the configurator to change the configuration of the WANrouter.

1.5 Configuration Files

When you have entered all of the necessary information, the WANrouter configurator:

1. Asks if you want to create an NCL (Network Control Language) script. This script is also known as the master NCL script; it is a file of NCL commands that set up the router according to your instructions.

   Network managers use NCL commands to manage and monitor nodes in the network. The *DEC WANrouter Management 90/250* manual describes the NCL commands that can be used to manage the WANrouter.

2. Creates three user NCL script files. You can edit these files to make changes to the configuration of your system and to set up facilities that the configurator may not cover. Section B.4 describes how to use the user NCL script files.

   Note that the WANrouter configurator creates these files only if they are not already present on your system.

3. Uses the master NCL script to create a management load file. The management load file contains the configuration information in a format that can be loaded and stored.

The WANrouter configurator may also combine the management load file with the software image. This depends on the protocol that is used for loading and dumping (see Section 1.6).

1.6 Protocols Used for Loading and Dumping

The load host uses BOOTP/TFTP or MOP as the protocol for loading and dumping the router:

- BOOTP/TFTP is a set of protocols defined in RFCs 783 and 951
- MOP is a Digital-specific protocol used for loading and dumping

The protocol you select depends on the type of router and load host you are using. The following table shows the protocol supported by each type of router:

Router	Protocol Supported
DECwanrouter 90EW	BOOTP/TFTP or MOP
DECwanrouter 90	MOP
DECrouter 250	BOOTP/TFTP or MOP

The following table shows the protocols available for each type of load host:

Load Host	Protocols Available
MS-DOS	BOOTP/TFTP or MOP
OpenVMS	MOP
DEC OSF/1	BOOTP/TFTP, MOP, or both

Note that on MS-DOS systems, the load-host configurator sets up BOOTP/TFTP by default. To use MOP:

- The MS-DOS system must be running either the Network Application Interface (NAI), which is supplied with the WANrouter software, or PATHWORKS™ for DOS Version 5.0 or later.
- You must complete some additional configuration procedures after you have run the configurators. These extra procedures are described in Chapter 5.

1.7 Combined Load File and System Image

If you configure the load host to use BOOTP/TFTP as the protocol for loading and dumping, the WANrouter configurator combines the management load file with the system image so that it can be loaded onto the router.

This applies even if you configure a DEC OSF/1 system to use both BOOTP/TFTP and MOP.

1.8 The Loading Process

The software and the management load file can be permanently stored on either of the following (depending on the model of router):

- The load host
- The router itself

Sections 1.8.1 and 1.8.2 describe how it is loaded from these sources.

1.8.1 Downline Loading from the Load Host

For downline loading, the router sends a message over the network asking for a host to load it. If a load host has been set up to load the router, it responds by sending the software image and management load file.

1.8.2 Loading from Flash Memory

Some models of router contain flash memory. This can be used to store the software image and management load file ready for loading on the router.

Loading directly from flash memory saves time and network traffic. When you configure the router to load from flash, it:

1. Takes the software image and management load file from the load host for the initial load and stores them in flash memory.
2. Uses the software image and management load file stored in flash memory for subsequent loads.

Note that if you are using MOP as the protocol for loading (see Section 1.6), you can decide whether just the software image is stored in flash memory, or both the software image and management load file are stored in flash memory. You specify what you want to load from flash during the load-host configuration.

1.8.3 Effects of Changing the Configuration Information

If you make changes to the configuration information, the router must take its next load from the load host (and not from flash memory). This ensures that your changes have effect.

To make sure that the next load is from the load host, you must use NCL HARDWARE NEXT LOAD commands. For more information, refer to the *DEC WANrouter 90/250 Management* manual.

2

Install the Software

2.1 Overview

The following pages show how to install the software on a load host. Use the section appropriate to the operating system used on your load host.

To install on this type of load host...	See Section...
MS-DOS	2.2
OpenVMS for Alpha	2.3
OpenVMS for VAX	2.4
DEC OSF/1	2.5

If possible, install the WANrouter software on at least 2 load hosts. In this way, a backup host is available should one fail.

2.2 MS-DOS

2.2.1 Preparation

Before carrying out the installation, make sure that you have everything listed in Table 2–1.

Table 2–1 Installation Requirements (MS-DOS)

Load Host Requirements	
Hardware	One of the following with at least 8 Mbytes of RAM and a VGA monitor: • 386-based PC • 486-based PC • Pentium™-based PC
Operating system	MS-DOS Version 5 (or later)
Disk space (installation)	10 Mbytes (maximum) during installation 14 Mbytes (maximum) after installation
Disk space (dump)	8 Mbytes (maximum) for each dump held on the system
Kit Contents	
WANrouter software	4 floppy disks
User documentation	• User's Guide • Management Guide
User Requirements	
Time to complete the installation	20 minutes

2.2.2 Installation

The WANrouter software is in two parts:

1. The DECROU software which supplies the facilities to load and configure the router from the PC
2. The WANrouter software which comprises the software image and profile information

You need to install both parts. Complete the procedures in Section 2.2.2.1 and Section 2.2.2.2.

2.2.2.1 Install DECROU

Follow the procedure in Table 2–2.

Table 2–2 DECROU Installation

Step	Action
1.	If you are running Microsoft® Windows™, exit Windows. You cannot install the software by running MS-DOS from Windows.
2.	Insert the first diskette into the drive.
3.	Enter the following command: `A:\INSTALL`
4.	The system asks for the name of the disk drive you want to use for the installation. Select the drive from the displayed menu.
5.	The system asks for the name of the subdirectory to hold the DECROU software. Enter the name of the directory that you want to use, or press Return to use the default of `\DECROU`.
6.	Insert each disk in turn when the system requests you to. Press Return after you insert each new disk.
7.	When the installation completion message appears, press Return.

Note that the DECROU software may have a different version number to the WANrouter software.

2.2.2.2 Install the WANrouter Software

Follow the procedure in Table 2–3.

Table 2–3 WANrouter Software Installation

Step	Action
1.	If you are running Microsoft Windows, exit Windows. You cannot install the software by running MS-DOS from Windows.
2.	Insert the first diskette into the drive.
3.	Enter the following command: `A:\INSTALL`
4.	The system asks for the name of the disk drive you want to use for the software installation. Select the drive you used for the DECROU installation (see step 4 of Table 2–2).
5.	The system asks for the name of the subdirectory you want to use for the software installation. Specify the subdirectory that holds the DECROU files (see step 5 of Table 2–2).
6.	Insert each disk in turn when the system requests you to. Press Return after you insert each new disk.
7.	When the installation completion message appears, press Enter.
8.	Read the Release Notes. These are in installed in the file \VR2\DOCS\VR2013.REL in the subdirectory you used for the installation. For example: `C:\DECROU\VR2\DOCS\VR2013.REL`

2.3 OpenVMS for Alpha

2.3.1 Preparation

Before carrying out the installation, make sure that you have everything listed in Table 2–4.

Table 2–4 Installation Requirements (OpenVMS for Alpha)

Load Host Requirements	
Hardware	Alpha system
Operating system	OpenVMS V6.0 or later
Network software	DECnet/OSI for OpenVMS V6.0 or later
Disk space (installation)	30,000 blocks (maximum) during installation 25,000 blocks (maximum) after installation
Disk space (dump)	16,384 blocks (maximum) for each dump held on the system
Kit Contents	
WANrouter software	1 CDROM
User documentation	• User's Guide • Management Guide
User Requirements	
Account privileges	Equivalent to the SYSTEM account
Time to complete the installation	5 minutes

2.3.2 Installation

Follow the procedure in Table 2–5.

Table 2–5 Installation Procedure (OpenVMS for Alpha)

Step	Action
1.	Log in to the privileged account.
2.	Back up the system.
3.	Mount the WANrouter software on a suitable device.
4.	Enter the following command: `$ @SYS$UPDATE:VMSINSTAL VR2ALP013 device–name OPTIONS N` Replace *device–name* with the name of the device used in step 3.
5.	Read the Release Notes. These are in the following file: `SYS$HELP:VR2ALP013.RELEASE_NOTES`

2.3.3 X.25 Profile Files

During the installation procedure, VMSINSTAL should install the following WANrouter X.25 profile files to `MOM$SYSTEM`:

Filename	Description
`FCNS$X25L2_PRF.DAT`	X.25 Level 2 profile
`FCNS$X25L3_PRF.DAT`	X.25 Level 3 profile
`FCNS$MCNM_PRF.DAT`	Modem Connect profile

However, VMSINSTAL does not install the WANrouter profile files if MOM$SYSTEM already contains X.25 profile files dated later than the WANrouter profile files. This is because different Digital products share the same X.25 profile files and the existing files may be used by another product.

If you want to configure the WANrouter to use X.25, check that VMSINSTAL has installed the WANrouter profile files (you can do this by checking the date of the files).

If the WANrouter files are not present, Digital recommends that you install them; the X.25 profile files that are already present on your system may be incompatible with the WANrouter software (for example, they may be reformatted to include additional PSDNs). Complete the following steps:

Step	Action
1.	Remove the WANrouter software: `@SYS$MANAGER:VR2$DEINSTALL.COM`.
2.	Rename (not copy) the profile files that already exist on your system. For example: `RENAME FCNS$X25L2_PRF.DAT FCNS$X25L2_PRF_OLD.DAT`

3.	Reinstall the WANrouter software. Follow the procedures in Section 2.4.2. VMSINSTAL now installs the X.25 profile files:
	`FCNS$X25L2_PRF.DAT`
	`FCNS$X25L3_PRF.DAT`
	`FCNS$MCNM_PRF.DAT`

4.	Rename the old profile files back to their original names. For example: `RENAME FCNS$X25L2_PRF_OLD.DAT FCNS$X25L2_PRF.DAT;2` **Do not** purge the files. This ensures that both sets of profile files (the X.25 profiles that already existed and the new WANrouter profile files) are installed.

By default, the WANrouter software uses the latest files (the X.25 profile files that already existed). However, if you encounter problems when you run the software with these profiles, follow the procedure in Section D.2 to enable the software to use the WANrouter profile files.

2.4 OpenVMS for VAX

2.4.1 Preparation

Before carrying out the installation, make sure that you have everything listed in Table 2–6.

Table 2–6 Installation Requirements (OpenVMS for VAX)

Load Host Requirements	
Hardware	One of the following: • A VAX-based system with a VT220™-compatible terminal • A VAXstation™ running DECwindows™
Operating system	OpenVMS V6.0 or later
Network software	DECnet/OSI for OpenVMS V5.8 or later
Disk space (installation)	35,000 blocks (maximum) during installation 30,000 blocks (maximum) after installation
Disk space (dump)	16,384 blocks (maximum) for each dump held on the system
Kit Contents	
WANrouter software	1 TK™50
User documentation	• User's Guide • Management Guide
User Requirements	
Account privileges	Equivalent to the SYSTEM account
Time to complete the installation	30 minutes

2.4.2 Installation

Follow the procedure in Table 2–7.

Table 2–7 Installation Procedure (OpenVMS for VAX)

Step	Action
1.	Log in to the privileged account.
2.	Back up the system.
3.	Mount the WANrouter software on a suitable device.
4.	Enter the following command: `$ @SYS$UPDATE:VMSINSTAL VR2013 device–name OPTIONS N` Replace *device–name* with the name of the device used in step 3.
5.	Read the Release Notes. These are in the following file: `SYS$HELP:VR2013.RELEASE_NOTES`

X.25 Profile Files

If you are configuring the WANrouter to use X.25, check that VMSINSTAL has installed the X.25 profile files provided as part of the kit. Follow the procedure in Section 2.3.3.

2.5 DEC OSF/1

2.5.1 Preparation

Before carrying out the installation, make sure that you have everything listed in Table 2–8.

Table 2–8 Installation Requirements (DEC OSF/1)

Load Host Requirements	
Hardware	Alpha system
Operating system	DECnet/OSI V3.0 or later
Network software	DECnet/OSI for DEC OSF/1 V3.0 or later
Disk space (installation)	9029 Kbytes (maximum) during installation 9004 Kbytes (maximum) after installation
Disk space (dump)	8192 Kbytes (maximum) for each dump held on the system
Kit Contents	
WANrouter software	1 CDROM
User documentation	• User's Guide • Management Guide
User Requirements	
Account privileges	Superuser
Time to complete the installation	5 minutes

2.5.2 Installation

Follow the procedure in Table 2–9.

Table 2–9 Installation Procedure (DEC OSF/1)

Step	Action
1.	Log in to the privileged account.
2.	Back up the system.
3.	Mount the WANrouter software on a suitable device.
4.	Enter the following commands: `# cd /` `# setld -l /dev/`*`device-name`* Replace *device–name* with the name of the device used in step 3.
5.	Read the Release Notes. These are in the following file: `/usr/lib/dnet/vr2013.release_notes`

3

Configure the Load Host

3.1 Overview

The following pages show you how to configure the load host so that it correctly responds to load requests from the router hardware. See Chapter 1 for more information about the loading process and the load-host configurator.

3.1.1 Procedure for New WANrouter Installations

To configure the load host, complete the following steps:

Step	Action	See Section
1.	Gather the information you need.	3.2
2.	Start the load host configurator.	3.3
3.	Enter information into the configurator.	3.4

3.1.2 Procedure for WANrouter Upgrades

To upgrade from V1.2, you must update the load-host configuration entry for each router. Complete the following steps:

Step	Action	See Section
1.	Start the load host configurator.	3.3
2.	Enter update information into the configurator.	3.5

Alternatively, if your load host loads a number of routers and you are updating the entries for **all** of these routers, you can use the Update utility to configure them all at the same time. See Section 3.7.

Note that you cannot configure a load host to load both V1.3 software and a previous version of WANrouter software. The V1.3 configurator cannot operate on the same host as a V1.1 or V1.2 configurator.

3.2 Preparation

First gather the general loading information using one of the following sections as appropriate:

IF the load host uses...	THEN see Section...
MS-DOS	3.2.1
OpenVMS	3.2.2
DEC OSF/1	3.2.3

3.2.1 MS-DOS

Gather the information listed in Table 3–1.

Table 3–1 Load Host Information (MS-DOS)

Item	Description	Your Value
Router hardware	The name of the router hardware. Example: DECwanrouter 90EW	
Load client name	A name to identify the router during downline loading. Choose a name that is unique to this router and has no more than 6 characters. Example: Gate	
Hardware address	The hardware address of the router. You find this on the hardware unit. Example: 08-00-2B-99-5E-A0	
IP address[1]	The IP address of the router to use for loading. Example: 24.45.21.8	
Phase IV address	The DECnet Phase IV node address of the router. Example: 2.16	
Type of loading	Some routers can load from their own flash memory (see Section 1.8.2). If this applies to your router, decide whether: • The software and management load file load from flash memory. • Only the software loads from flash memory; the management load file is loaded from the load host. This option is supported only if you configure the PC to use MOP (see Section 1.6). • The software and management load file load from the load host.	
Dump file	Decide whether you want the load host to receive dump files from the WANrouter.	

[1] An IP address is required to set up BOOTP/TFTP. Even if you configure the PC to use MOP (see Section 1.6) and you do not have an IP network, you must still supply a value. In this case, use the example address for your value. However, note that you can use the example address for one router only; each router must have a unique IP address. For additional routers, use different digits in the same format.

3.2.2 OpenVMS

Gather the information listed in Table 3–2. If your installation uses a naming service (for example, DECdns), complete Section 3.2.4 also.

Table 3–2 Load Host Information (DECnet/OSI for OpenVMS)

Item	Description	Your Value
Router hardware	The name of the router hardware. Example: DECwanrouter 90EW	
Load client name	A name to identify the router during downline loading. Choose a name that is unique to this router and has less than 32 characters. Example: Gate	
Hardware address	The hardware address of the router. You find this on the hardware unit. Example: 08-00-2B-99-5E-A0	
MOP circuit	The MOP circuit on the load host that is used to load the router. Example: CSMACD–0	
Phase IV address	The Phase IV node address of the WANrouter. Use this only if the WANrouter is to communicate with Phase IV systems. Example: 2.16	
Type of loading	Some routers can load from their own flash memory (see Section 1.8.2). If this applies to your router, decide whether: • The software and management load file load from flash memory • Only the software loads from flash memory; the management load file is loaded from the load host • Both the software and management load file load from the load host	
Dump file	Decide whether you want the load host to receive dump files from the WANrouter.	

3.2.3 DEC OSF/1

Gather the information listed in Table 3–3. If your installation uses a naming service (for example, DECdns), complete Section 3.2.4 also.

Table 3–3 Load Host Information (DEC OSF/1)

Item	Description	Your Value
Load method	The method used to load the router. Choose from `MOP`, `BOOTP`, or `Both MOP and BOOTP`.	
Router hardware	The name of the router hardware. Example: DECwanrouter 90EW	
Load client name	A name to identify the router during downline loading. Choose a name that is unique to this router and has no more than 32 characters. Example: Gate	
Hardware address	The hardware address of the router. You find this on the hardware unit. Example: 08-00-2B-99-5E-A0	
Phase IV address	The Phase IV node address of the WANrouter. Use this only if the WANrouter is to communicate with Phase IV systems. Example: 2.16	
MOP circuit	The MOP circuit on the load host that is used to load the router. Required only if MOP is a load method. Example: Circuit–1	
IP address	The IP address of the router to use for loading. Required only if BOOTP is a load method. Example: 24.45.21.8	
Type of loading	Some routers can load from their own flash memory (see Section 1.8.2). If this applies to your router, decide whether: • The software and the configuration information loads from flash memory • Only the software loads from flash memory; configuration information is loaded from the load host (only if MOP is a load method) • All software and configuration information loads from the load host	
Dump file	Decide whether you want the load host to receive dump files from the WANrouter.	

3.2.4 Naming Service Information

If your installation uses DECdns or the Local naming service, gather the information listed in Table 3–4 (OpenVMS and DEC OSF/1 systems only).

Table 3–4 Naming Service Information

Item	Description	Your Value
Node name	The node name of the router. Example: Comp:.Open.Gate	
Node synonym	A synonym for the full DECdns or Local node name. Choose a name that has no more than 6 characters. This is an optional item. Example: Gate	

3.3 Start the Configurator

To start the configurator, use the appropriate section of Table 3–5.

Table 3–5 Starting the Load Host Configurator

MS-DOS

1. Change directories to the installation directory for DECROU. For example:
   ```
   C:\> cd DECROU
   ```
2. Enter the following command:
   ```
   DECROU
   ```
3. Select `WR90/250 Host` from the Router Management menu.

OpenVMS

1. Log in to the SYSTEM account, or one with equivalent privileges.
2. Enter the following command:
   ```
   $ @SYS$MANAGER:DECROU$HOST_CONFIG
   ```

DEC OSF/1

1. Log in as a superuser.
2. Enter the following command:
   ```
   # /usr/lib/dnet/decrou_host_config
   ```

The configurator displays a screen of copyright information. Press Return *once* and an introductory screen is displayed. Press Return *once* again and the Main Menu is displayed.

3.4 Enter Load Host Information for New Installations

Follow the procedure in Table 3–6 to enter the load host information you have gathered. For information on how to select options and enter information, see Section 3.6.

Table 3–6 Entering Load Host Information for New Installations

Step	Action	Result
1.	Choose `Add a router`.	**MS-DOS** and **OpenVMS:** The hardware menu appears (Go to step 3). **DEC OSF/1:** The load method menu appears (Go to step 2).
2.	Select the load method you chose in Section 3.2.3.	The hardware menu appears.
3.	Select the router hardware you are using. The configurator continues to prompt you for the information you have gathered.	When you have entered information on all of the screens, the Status screen is displayed.
4.	Press Return.	The Main Menu appears.
5.	Choose `Exit this program`.	The operating system command prompt appears.

Now follow the procedure in Section 4.1.1 to run the WANrouter configurator and create a management load file.

3.5 Enter Load Host Information for WANrouter Upgrades

To upgrade the software from V1.2, follow the procedure in Table 3–7. For information on how to select options and enter information, see Section 3.6.

Table 3–7 Entering Load Host Information for WANrouter Upgrades

Step	Action	Result
1.	Choose `Update a router`.	The configurator displays a list of routers.
2.	Select the router you want to upgrade.	If your router supports flash loading, the configurator asks how you want to load the router. Go to step 3. If your router does **not** support flash loading, the configurator displays the load client name and system image file for the router. Go to step 4.
3.	Select the type of loading that you require.	The configurator displays the load client name and system image file for the router.
4.	If the router's load client name and system image file are correct, choose `Yes`.	The load host configurator updates the entry for the router and then displays the Main Menu.
5.	Choose `Exit this program`.	The operating system command prompt appears.

Now follow the procedure in Section 4.1.2 to run the WANrouter configurator and create a management load file.

3.6 Using the Load-Host Configurator

The configurator contains Help information that shows you how to use the menus, enter information, and what to enter in each field. To obtain this information, press the Help key.

However, the following sections give a quick summary of how you use the load-host configurator.

3.6.1 Choosing Menu Options

Some screens ask you to choose an option from a menu. There are two types of menu: vertical and horizontal. The following tables show how to select options from these menus:

Choosing Options from a Vertical Menu

Step	Action
1.	Highlight the option you want using the up arrow and down arrow keys.
2.	Press Return.

Choosing Options from a Horizontal Menu

Step	Action
1.	Highlight the option you want using the left arrow and right arrow keys.
2.	Press Return.

3.6.2 Entering Values

Some screens ask you to enter information about the router. To enter a value:

Step	Action
1.	Position the cursor in the appropriate field using the up arrow and down arrow keys.
2.	Type in the value for that field.
3.	Press Return.

Note that if the value you type is too long for a field, set the editing mode to insert:

- On an MS-DOS system, press Insert/Ovrstke
- On an OpenVMS or DEC OSF/1 system, press Ctrl/A

3.7 Updating All Router Entries

If you are upgrading the software from V1.2, you can use the Update utility to update existing entries for all routers loaded by your load host. This can save you time if your load host loads a number of routers.

Using Update, you can also specify the type of loading to be used (depending on whether your router supports flash loading). For example, you can specify that the software and management load file are loaded from flash memory on all routers.

Follow the procedure in the appropriate section:

IF the load host uses...	THEN see Section...
MS-DOS	3.7.1
OpenVMS	3.7.2
DEC OSF/1	3.7.3

3.7.1 MS-DOS

Complete the procedure in the following table:

Step	Action
1.	Change directories to the installation directory. For example: `C:\> cd DECROU`

2.	Enter one of the following commands:
	• To update all router entries and specify that the software and management load file are loaded from flash memory, enter:
	`HOST_CFG/UPDATE=FLASH_FULL`
	• To update all router entries and specify that the software and the management load file loads from the load host, enter:
	`HOST_CFG/UPDATE=NETWORK`

Now follow the procedure in Section 4.1.2 to run the WANrouter configurator and create a management load file.

Note that if you are using MOP as the load protocol, the Update procedure does not update the MOP client database. Before you load the router, you must define MOP client database information for V1.3 (see Section 5.2.2.3).

If you use BOOTP/TFTP as the load protocol, you do not need to edit the BOOTP.TAB file installed on your system: the Update procedure updates this file.

3.7.2 OpenVMS

Complete the procedure in the following table:

Step	Action
1.	Set default to SYS$MANAGER.

2.	Enter one of the following commands:
	• To update all router entries and specify that the software and management load file are loaded from flash memory, enter:
	`$ @DECROU$HOST_CONFIG UPDATE FLASH_FULL`
	• To update all router entries and specify that the software loads from flash memory and the management load file loads from the load host, enter:
	`$ @DECROU$HOST_CONFIG UPDATE FLASH_PART`
	• To update all router entries and specify that the software and the management load file load from the load host, enter:
	`$ @DECROU$HOST_CONFIG UPDATE NETWORK`

Now follow the procedure in Section 4.1.2 to run the WANrouter configurator and create a management load file.

3.7.3 DEC OSF/1

You can use the Update facility on a DEC OSF/1 system to update a V1.2 configuration copied from an ULTRIX™ load host. Complete the procedure in the following table:

Step	Action

1.	Copy the following files from your ULTRIX system to the same directory on your DEC OSF/1 system:
	`/usr/lib/dnet/decrou_host_config.dat`
	`/usr/lib/dnet/`*`load-client-name`*`.dat`
	where *load-client-name* is the load client name for the router. Copy over the *load-client-name*.dat file for each router that will be loaded by the DEC OSF/1 load host.

2.	Enter one of the following commands:
	• To update all router entries and specify that the software and management load file are loaded from flash memory, enter:
	`# decrou_host_config –u flash_full`
	• To update all router entries and specify that the software loads from flash memory and the management load file loads from the load host, enter:
	`# decrou_host_config –u flash_part`
	Note that this option does not apply if you configure your system to use BOOTP/TFTP as the protocol for loading and dumping. If you enter this command and the load-host uses BOOTP/TFTP, Update sets the type of loading to the setting defined for V1.2.
	• To update all router entries and specify that the software and the management load file load from the load host, enter:
	`# decrou_host_config –u network`

3.	Copy over the following NCL script files from the ULTRIX system to the same directory on your DEC OSF/1 load host:
	`/usr/lib/dnet/vr2_`*`load-client-name`*`_extra_create.ncl`
	`/usr/lib/dnet/vr2_`*`load-client-name`*`_extra_set.ncl`
	`/usr/lib/dnet/vr2_`*`load-client-name`*`_extra_enable.ncl`
	where *load-client-name* is the load client name for the router. Copy over the files for each router to be loaded by the DEC OSF/1 load host.

Note that the Update procedure updates information in both the bootptab client database (see Section E.4.1) and MOP client database.

Now follow the procedure in Section 4.1.2 to run the WANrouter configurator and create a management load file.

4

Configure the WANrouter

4.1 Overview

The following pages show how you configure the WANrouter software.

4.1.1 Procedure for New WANrouter Installations

Complete the following steps:

Step	Action	See Section
1.	Gather all the information on how the WANrouter is to behave. For example, line protocols, routing methods, and addresses.	4.2
2.	Run the WANrouter configurator.	4.3
3.	Enter the information.	4.4
4.	Create the load file.	4.6

4.1.2 Procedure for WANrouter Upgrades

If you are upgrading the WANrouter software from V1.2, complete the following steps:

Step	Action	See Section
1.	Run the WANrouter configurator.	4.3
2.	Enter the information.	4.5
3.	Create the load file.	4.6

4.2 Preparation

First, gather all the information on how the WANrouter software is to operate:

1. Use the tables in Appendix A to decide which functions your WANrouter is to use.
2. Gather any additional information relating to the communications lines that is available from the supplier of that service.

   Example: DTE addresses for X.25 links are available from the provider of the X.25 service.
3. Record the information you have gathered in Appendix A.

4.3 Start the WANrouter Configurator

To start the WANrouter configurator, use the appropriate section of Table 4–1.

Table 4–1 Starting the WANrouter Configurator

MS-DOS

1. Change directories to the installation directory. For example:
   ```
   C:\> cd DECROU
   ```
2. Enter the following at the command prompt:
   ```
   DECROU
   ```
3. Select `WR90/250 Config` from the Router Management menu.

OpenVMS

1. Log in to the SYSTEM account, or one with equivalent privileges.
2. Enter the following command:
   ```
   $ @SYS$MANAGER:VR2$ROUTER_CONFIG
   ```

DEC OSF/1

1. Log in as a superuser.
2. Enter the following command:
   ```
   # usr/lib/dnet/vr2_router_config
   ```

The configurator displays a copyright screen. Press Return *once* and an introductory screen is displayed. Press Return *once* again and the Main Menu appears:

```
                    Main Menu

          Create a new configuration
          Modify an existing configuration
          Exit from this procedure
```

4.4 Enter Information for New Installations

Follow the procedure in Table 4–2 to enter configuration information.

Section 4.7 contains information on how to use the WANrouter configurator. If you are not familiar with the configurator, read this section first.

Table 4–2 Entering WANrouter Information for New Installations

Step	Action	Result
1.	Choose `Create a new configuration`.	The create introductory screen appears.
2.	After you have read the screen, press Return.	The introductory screen for the first section appears.
3.	After you have read the screen, press Return.	The load client menu appears.
4.	Choose the load client name of the router.	The router information screen appears.
5.	Press Return.	The Options menu appears.
6.	Choose `Continue to new section`.	The first screen for the next section appears.
7.	Enter values on all screens in that section using the information recorded in Appendix A.	The Options menu appears.
8.	Repeat steps 6 and 7 for all other tables in Appendix A.	The Create NCL Script menu appears.
9.	Choose `Create an NCL script`.	The configurator creates the NCL script. The load file menu appears.
10.	Go to Section 4.6.	—

4.5 Enter Information for WANrouter Upgrades

Follow the procedure in Table 4–3 to enter configuration information.

Table 4–3 Entering WANrouter Information for WANrouter Upgrades

Step	Action	Result
1.	Choose `Modify an existing configuration`.	A list of load client names is displayed.
2.	Select the WANrouter you are upgrading.	The Create NCL Script menu appears.
3.	Choose `Create an NCL script`.	The configurator creates the NCL script. The load file menu appears.
4.	Go to Section 4.6.	—

4.6 Create the Management Load File

Follow the procedure in Table 4–4 to create the load file.

Table 4–4 Creating the Load File

Step	Action	Result
1.	Select `Create a management load file from the NCL script`.	The load file is created.
2.	Press Return.	The Main Menu appears.
3.	Choose `Exit the configurator`.	The operating system prompt appears.

If the configurator detects any errors while creating the load file or errors in the configuration information entered, it stores these in log files. Table 4–5 shows the location and name of the log files. Note that the configurator creates either or both of the files only if errors occur.

Table 4–5 Log Files: Locations and Names

Descripton	Location and Filename
MS-DOS	
Errors during creation of the load file	**Location:** *d:**install-dir*\CLIENTS*load-client-name*\ **Filename**: NCLSCRPT.LOG
Errors during entering the configuration information	**Location:** *d:**install-dir*\TEMP\ **Filename**: *error*.LOG
OpenVMS:	
Errors during creation of the load file	**Location:** SYS$COMMON:[MOM$SYSTEM] **Filename:** VR2_*load-client-name*.LOG
Errors during entering the configuration information	**Location:** SYS$COMMON:[MOM$SYSTEM] **Filename:** *error*.LOG
DEC OSF/1:	
Errors during creation of the load file	**Location:** /usr/lib/dnet/ **Filename**: vr2_*load-client-name*.log
Errors during entering the configuration information	**Location:** /usr/lib/dnet/ **Filename:** *error*.log

In Table 4–5:

d:	is the disk drive containing the DECROU software.
install-dir	is the directory containing the DECROU software.
load-client-name	is the load client name of the router for which errors were detected.
error	indicates the type of error that occurred. For example, DEC_MOP.LOG indicates that a MOP error occurred.

4.7 Using the WANrouter Configurator

The configurator contains extensive help information on how to use the menus, how to enter information, and what to enter in each field. To access this information, press F1 on an MS-DOS system or press Help on an OpenVMS or DEC OSF/1 system.

The following sections, however, give a quick overview of how you use the configurator.

4.7.1 Overview of the Configurator

The configurator consists of a number of sections. Each of these corresponds to a section in Appendix A.

Each section contains one or more screens that you use to either:

- Choose from a menu of options

  Example: Choose whether the WANrouter is a Level 1 or Level 2 router

- Enter a value

  Example: The name of an Ethernet circuit

The configurator allows you to move backwards and forwards through the screens of a section. However, you cannot move forward from a screen until you have supplied all of its required values.

At the end of each section, the Options menu appears. Use this menu to move to the next section.

The following sections contain more information on choosing options, entering values, moving between screens, and the Options menu.

4.7.2 Choosing Menu Options

There are two types of menu: vertical and horizontal. The following tables show how to select items from these menus:

Vertical Menu

Step	Action
1.	Highlight the option you want using the up arrow and down arrow keys.
2.	Press Return.

Horizontal Menu

Step	Action
1.	Highlight the option you want using the left arrow and right arrow keys.
2.	Press Return.

4.7.3 Entering Values

Some screens ask you to supply information about the WANrouter. To enter a value:

Step	Action
1.	Position the cursor in the appropriate field using the up arrow and down arrow keys.
2.	Type in the value for that field.

Note that if the value you type is too long for a field, set the editing mode to insert:

- On an MS-DOS system, press Insert/Ovrstke
- On an OpenVMS or DEC OSF/1 system, press Ctrl/A

4.7.4 Moving Between Screens in a Section

To move between screens in a section, use the keys shown in the following table:

To ...	On MS-DOS press...	On OpenVMS and DEC OSF/1 press...
Move to the next screen in the section	Return or Page Down	Return or Next Screen
Move to the previous screen in the section	Page Up	Prev Screen

4.7.5 Using Options Menus

At the end of each section, an options menu appears. Table 4–6 lists the choices on this menu and explains what each one does.

Table 4–6 Choices on the Options Menu

Choice	Description
Continue to new section	Moves to the next uncompleted or unseen section. Choose this when you have completed a section.
Go to Sections Menu	Moves to the Sections menu so that you can access a previously completed section, or an optional section that you chose to skip. Choose the appropriate section from the Sections menu.
Add an item	Creates another item of the same type. Example: To enter information about a number of communications lines: 1. Complete the appropriate section for the first line. 2. Choose `Add`. 3. Complete the section for the next line. 4. Repeat steps 2 and 3 for all other lines. 5. Choose `Continue to next section`.
Modify an item	Allows you to change information that you have entered in this section.
Delete an item	Removes an item. Example: If you have entered information for more lines than will be in use, choose `Delete` to remove the surplus information.
Save current configuration	See Appendix B for information on this option.
Save current configuration and EXIT	See Appendix B for information on this option.

4.7.6 Getting Help

You can get help on the values, menu choices, and on individual sections. There is also information on the configurator itself.

Values, Menu Choices, and Sections

To get this type of help...	Do this...
A summary of what to enter for a value	1. Position the cursor on the appropriate value. 2. Press F1 on MS-DOS systems, press Help on all other systems.
A summary of what a menu choice does	1. Highlight the menu option. 2. Press F1 on MS-DOS systems, press Help on all other systems.
Detailed information on a value	1. Display the summary help information. 2. Press F1 on MS-DOS systems, press Help on all other systems.
Detailed information on a menu choice	1. Display the summary help information. 2. Press F1 on MS-DOS systems, press Help on all other systems.
Information on a configurator section	1. Display the section's introductory screen. 2. Press F1 on MS-DOS systems, press Help on all other systems.

Configurator Help

To get help on the configurator itself:

1. Display any of the following pieces of help information:
   - Detailed information on a value
   - Detailed information on a menu choice
   - Information on a configurator section
2. Press F1 on MS-DOS systems, press Help on all other systems.

Leaving Help

To return to the current configurator screen, press F10.

5

Load the Router

5.1 Overview

The following pages show how to load the router with the WANrouter software and its configuration information. Use the section appropriate to the operating system used on your load host.

To load from this type of host...	See Section...
MS-DOS	5.2
OpenVMS	5.3
DEC OSF/1	5.3

5.2 MS-DOS

Complete the following steps to load the router:

Step	Action	See Section
1.	Make sure that all installation and configuration tasks are complete.	5.2.1
2.	Start the BOOTP/TFTP server or MOP.	5.2.2
3.	Switch on the router hardware.	5.2.3
4.	Make sure that the software loads correctly.	5.2.4

5.2.1 Preparation

Before loading, make sure that:

1. The router is installed.
2. All communications cables are connected to the router.
3. Electrical power is available to the router.
4. The software installation completed successfully.
5. The load host information is correct.
6. The WANrouter configuration information is correct.
7. The MS-DOS system is running and connected to the router through the appropriate network.
8. If you intend to use BOOTP/TFTP as the load protocol, the router is configured for BOOTP/TFTP loading.

   For example, a DECwanrouter 90EW is configured to use MOP loading by default. To configure the router for BOOTP/TFTP loading, you use the Bootline Configuration Program (BCP).

   For more information, refer to your router's hardware documentation.

5.2.2 Start the BOOTP/TFTP Server or MOP

For your PC to load the router, either the BOOTP/TFTP server software or MOP software must be running when you switch on the router.

The procedure that you use to start this software depends on:

- The protocol that you select, BOOTP/TFTP or MOP. By default, the configuration procedure enables you to use BOOTP/TFTP. However, you can somplete some extra configuration procedures to set up and start MOP instead.
- The software the PC is running: PATHWORKS for DOS or the Network Applications Interface (See Section C.3). One of these (**not both**) must be running before you start the BOOTP/TFTP server or MOP.

Decide which protocol the PC will use and then refer to the following table:

If the load-host protocol is...	And your PC is running..	Then go to Section...
BOOTP/TFTP	PATHWORKS for DOS Version 5.0 or later	5.2.2.1
BOOTP/TFTP	The NAI (see Section C.3)	5.2.2.2
MOP	PATHWORKS for DOS Version 5.0 or later	5.2.2.3
MOP	The NAI (see Section C.3)	5.2.2.3

5.2.2.1 Preparing to Start the BOOTP/TFTP Server on a PC Running PATHWORKS

Before you start the BOOTP/TFTP server, there are some preliminary steps you must complete to work around a problem with PATHWORKS for DOS.

The problem prevents the BOOTP/TFTP server from finding the PC's IP address entered during the PATHWORKS configuration. BOOTP/TFTP needs this address to load the router.

To work around this problem, complete the steps in the following table:

Step	Action
1.	Enter the following command to stop PATHWORKS: `STOPNET` This procedure does not completely remove the PATHWORKS configuration from the system. So, if your system is running: • PATHWORKS V5.0 or later, go to step 2 • PATHWORKS V4.1, go to step 3
2.	The STOPNET procedure does not remove the DECnet environment variable for PATHWORKS V5.0 or later. To overcome this, enter the following command: `SET DECNET=` Then continue at step 4.
3.	The STOPNET procedure does not remove all components from memory for PATHWORKS V4.1. To overcome this: 1. Remove the commands that start PATHWORKS V4.1 in: C:\AUTOEXEC.BAT C:\CONFIG.SYS 2. Reboot the PC. 3. Continue at step 4.
4.	Set up the NAI. Follow the procedures in Section C.3.1.
5.	When you have supplied all of the necessary information, press Ctrl–Enter. This enters the information.
6.	Exit NETSET.
7.	Start PATHWORKS again by running the PATHWORKS version of STARTNET.BAT. For example: `C:\PW\STARTNET`

Loading A Number of Routers

If you are running PATHWORKS and you are loading more than one router, make sure that the number of supported UDP sockets is sufficient. BOOTP/TFTP can use up to 12 sockets.

5.2.2.2 Starting the BOOTP/TFTP Server

Complete the following steps:

Step	Action
1.	Change directory to the installation directory for DECROU. For example: `C:\> cd DECROU`
2.	Decide whether you want to run the server in the foreground or background: • If you run the server in foreground mode, you cannot run any other application while BOOTP/TFTP is running. • If you run the server in background mode, you can run other applications while BOOTP/TFTP is running. However, if you experience problems, you should switch to running the server in foreground mode.
3.	Start the BOOTP/TFTP server: • To start the server in foreground mode: 1. Enter `DECROU` to display the Router Management Menu. 2. Select `BOOTP`. • To start the server in background mode: 1. Enter `RBOOT` at the `C:\DECROU>` prompt. 2. Press the Alt Function, Shift, and B keys at the same time.

The procedure starts the BOOTP/TFTP server and displays the server window.

Now, to load the router, turn to Section 5.2.3. For more information about the BOOTP/TFTP server and the server menu, refer to Section C.6.

5.2.2.3 Preparing to Start the MOP Server

Before you start the MOP server, you need to add details of the WANrouter to the MOP client database. Complete the steps in the following table.

Note

The procedures in the following table include NCP DEFINE NODE commands. When you enter these commands, NCP may return the error message, `User command error`, even if the commands are correct. This is caused by a problem with NCP. Step 8 in the following table shows how to check that the information you have entered is correct.

Step	Action
1.	Make sure that your network is running, and that the MOP utility is installed. If your PC is running PATHWORKS for DOS Version 5.0 or later, MOP should be installed when the PATHWORKS installation utility is run. MOP is a component under the DECnet and Utilities entry. For more information about setting up MOP, refer to your PATHWORKS for DOS network management documentation.
2.	Run NCP. For example: `C:\> DECROU\NET\NCP`
3.	Define the node name of the WANrouter: `NCP> DEFINE NODE` *`decnet-address`* `NAME` *`load-client-name`* where *`decnet-address`* is the DECnet Phase IV address of the WANrouter.
4.	Enter the hardware address of the WANrouter: `NCP> DEFINE NODE` *`load-client-name`* `HARDWARE-ADDRESS` *`hardware-address`*
5.	Specify the software image for your WANrouter: `NCP> DEFINE NODE` *`load-client-name`* `LOAD-FILE` *`d:\install-dir`*`\COMMON\VR2013\`*`software-image`* where *`d:\install-dir`* is the disk drive and directory used for the DECROU installation and *`software-image`* is a filename. This depends on your router: DECwanrouter 90: `VR29013.SYS` DECwanrouter 90EW: `VR29F013.SYS` DECrouter 250: `VR22013.SYS`
6.	Specify the management load file for your WANrouter: `NCP> DEFINE NODE` *`load-client-name`* `MANAGEMENT-FILE` *`d:\install-dir`*`\CLIENTS\`*`load-client-name`*`\SCRIPT`

7. Define a WANrouter dump file:

```
NCP> DEFINE NODE load-client-name DUMP-FILE
     d:\install-dir\CLIENTS\load-client-name\dump-file
```

where *dump-file* depends on the router you are using. Specify:

- WR90_080.DUM for a DECwanrouter 90.
- WR90EW_0.DUM for a DECwanrouter 90EW.
- DR250_08.DUM for a DEC WANrouter 250.

8. Check the NCP characteristics you defined:

```
NCP> LIST NODE load-client-name CHARACTERISTICS
```

9. Exit NCP:

```
NCP> EXIT
```

5.2.2.4 Starting the MOP Server

Complete one of the following:

- From the Router Management Menu, select MOP.
- Enter the following command:

```
C:\PW> MOP
```

MOP will now wait until you switch on the router and it requests a load (see Section 5.2.3).

5.2.3 Switch on the Router

Switch on the router. Refer to the hardware documentation for instructions on how to do this.

The new software and/or management load file is sent to the router.

5.2.4 Monitor the LED Display

The router may include a display that indicates the progress of the load. The hardware documentation for the router tells you how the display is used and what each pattern means. Use the router documentation to make sure that the WANrouter software loads correctly.

5.2.5 What to Do Next

If the software loads successfully, the installation and configuration of the WANrouter is complete. The router is now ready for use. You can now exit the BOOTP/TFTP server or MOP:

- To stop a BOOTP/TFTP server running in the foreground, press the X key (if the BOOTP/TFTP server is running in the background, see Section C.6.3).
- To stop MOP, press Ctrl/C or the ESC key.

If the software has not loaded correctly, refer to Part III of this manual.

5.2.6 Future Reboots

Usually, the router loads from the source you specified during the load-host configuration. However, the first time that you boot the router after completing any of the following tasks, the router takes its load from the MS-DOS system:

- Install a new version of the WANrouter software
- Add a new router using the load-host configurator
- Change the configuration of an existing router

In these cases, follow the procedure in Sections 5.2.1 to 5.2.5.

Note

Make sure that you start the BOOTP/TFTP server or MOP before you reboot the router so that the software and management load file can load from the MS-DOS load host.

Note that if there are communication problems between the router and the load host, it could cause load problems. Refer to Section 5.4.

5.3 OpenVMS and DEC OSF/1

Complete the following procedure to load the router:

Step	Action	See Section
1.	Make sure that all installation and configuration tasks are complete	5.3.1
2.	Switch on the router hardware	5.3.2
3.	Make sure that the software loads correctly	5.3.3

5.3.1 Preparation

Before loading, make sure that:

1. The router is installed.
2. All communications cables are connected to the router.
3. Electrical power is available to the router.
4. The software installation completed successfully.
5. The load host information is correct.
6. The WANrouter configuration information is correct.
7. The load host is running and connected to the router through the appropriate network.
8. On an OpenVMS system, MOP should be available and running. For more information, refer to the manual, *DECnet/OSI Network Management*.
9. On a DEC OSF/1 system, if you selected `MOP` as the load protocol, it should be available and running on your network. For more information, refer to your network management documentation.
10. On a DEC OSF/1 system, if you selected `BOOTP` or `BOOTP and MOP` as the protocol for loading the router, complete the following:
    i. Configure the router for BOOTP/TFTP loading. For example, for the DECwanrouter 90EW, you use the Bootline Configuration Program (BCP) to select the load protocol. For more information, refer to your router's hardware documentation.
    ii. Start the BOOTP server. Follow the procedure in Appendix E.

5.3.2 Switch on the Router

Switch on the router. Refer to the hardware documentation for instructions on how to do this.

The new software and/or configuration information is sent to the router.

5.3.3 Monitor the LED Display

The router may include a display that indicates the progress of the load. The hardware documentation for the router tells you how the display is used and what each pattern means. Use that documentation to make sure that the WANrouter software loads correctly.

5.3.4 What to Do Next

If the software loads successfully, the installation and configuration of the WANrouter is complete. The router is now ready for use.

If the software has not loaded correctly, refer to Part III of this manual.

5.3.5 Future Reboots

Usually, the router loads from the source that you chose when using the load-host configurator.

However, the first time that you boot the router after carrying out any of the following tasks, it loads from the load host:

- Install a new version of the WANrouter software
- Add a new router using the load-host configurator
- Change the configuration of an existing router

5.4 Load Problems

If you are reconfiguring a WANrouter or if there are communication problems between the router and the load host, the configurator will not be able to instruct the router to use the load host for its next load.

Depending on the type of router you are using, you can manually instruct the router to load from the load host by using:

- NCL. Refer to the *DEC WANrouter 90/250 Management* guide for information on controlling how the WANrouter loads.
- Bootline Configuration Program (BCP), if this is available on your router. Refer to the hardware documentation for your router for more information.

Part II

Modifying a Configuration

This part shows you how to modify an existing WANrouter software configuration.

You can change either or both of the following:

- Load host characteristics
- WANrouter communications characteristics

6

Modifying the Load Host

6.1 Tasks

This chapter shows how to complete the following tasks on the load host:

If you want to...	See Section...
List router entries	6.2
Add a router entry	6.3
Remove a router entry	6.4
Modify a router entry	6.5
Restore a router entry	6.6

Before you start any of these tasks, make sure that you are familiar with the information in Section 3.6.

6.2 Listing Entries

Follow the procedure in Table 6–1 to examine the load-host information for a router.

Table 6–1 Viewing Router Information on a Load Host

Step	Action	Result
1.	Start the load-host configurator (see Section 3.3).	The Main Menu appears.
2.	Choose `List a router`.	The load client menu appears.
3.	Choose the load client name of the router.	The router information screen appears.
4.	When you have finished reading the screen, press Return.	The Main Menu appears.
5.	If you have no further tasks to carry out with the configurator, choose `Exit this program`.	The operating system command prompt appears.

6.3 Adding a Router Entry

Follow the procedure in Table 6–2 to add a router to a load host.

Table 6–2 Adding a Router Entry to a Load Host

Step	Action	Result
1.	Follow the instructions in Chapter 3.	The router is added to the load host.
2.	Follow the instructions in Chapter 5.	The router loads.

6.4 Deleting a Router Entry

Follow the procedure in Table 6–3 to delete the load-host information for a router.

Table 6–3 Deleting a Router Entry from a Load Host

Step	Action	Result
1.	Start the load-host configurator (see Section 3.3).	The Main Menu appears.
2.	Choose `Delete a router`.	The load client menu appears.
3.	Choose the load client name of the router.	The Delete Confirmation screen appears.
4.	To delete the entry, choose `Yes`. Otherwise, choose `No`.	If you answer `Yes`: The Status screen appears (Go to step 5). If you answer `No`: The Main Menu appears (Go to step 6).
5.	If you have finished deleting load-host information, press Return.	The Main Menu appears.
6.	If you have no further tasks to carry out with the configurator, choose `Exit this program`.	The operating system command prompt appears.

6.5 Changing a Router Entry

Follow the instructions in Sections 6.5.1 and 6.5.2.

6.5.1 Change the Entry in the Load-Host Configurator

Follow the procedure in Table 6–4 to change the load-host information for a router.

Table 6–4 Changing Router Information on a Load Host

Step	Action	Result
1.	Run the load-host configurator (see Section 3.3).	The Main Menu appears.
2.	Choose `Modify a router`.	The load client menu appears.
3.	Choose the load client name of the router.	The first screen appears.
4.	Choose `Exit this program`.	The operating system command prompt appears.

Note

You cannot change the load client name of the router.

6.5.2 Update the WANrouter Software Configuration

Follow the instructions in Table 6–5 to bring the WANrouter software configuration up to date with the new load-host information.

Table 6–5 Updating the WANrouter Software Configuration

Step	Action
1.	Determine the sections that need to be revised (see Table 6–6).
2.	Run the WANrouter configurator (see Section 4.3).
3.	Choose `Modify an existing configuration` from the Main Menu.
4.	Choose the load client name for the WANrouter from the list displayed.
5.	Choose any of the sections listed on the screen.
6.	From the displayed Options menu, choose `Continue to new section`. If information does not need to be reentered, the Create NCL Script section appears. Go to step 10. Otherwise, go to step 7.
7.	**Routing section:** Choose `Modify` **All other sections:** Choose `Add`
8.	Enter the required information, and then choose `Continue to new section`.
9.	Repeat steps 7 and 8 until the Create NCL Script section appears.
10.	Follow the instructions on the screen and create a new load file (see Section 4.6).

Table 6–6 Effects of Modifying the Load Host Information

IF you use the load-host configurator to...	THEN do this in the WANrouter configurator...
Change the hardware address and/or Phase IV address	Create a new NCL script.
Delete the Phase IV address	Reenter the information in the Routing section.
Enter a Phase IV address (where there was none previously)	Reenter the information in the Routing section.
Change the IP address	Create a new NCL Script.
Change the loading mechanism to MOP only (from BOOTP)	Reenter the MOP circuit name and the new IP address in the Routing section.
Change the loading mechanism to BOOTP only (from MOP)	Enter a valid IP address in the Routing section and create a new NCL script.
Change between the use of DNS and nonuse of DNS	Reenter information on the event logging section.
Change the DNS node name	Create a new NCL script.

6.6 Restoring a Router Entry

Some large networks store the DECnet database at a central node. When any other node in the network starts, the latest copy of the database is copied from the central node to the startup node. This overwrites the startup node's existing database. However, router entries are not held in such a central database — they exist on the load host only.

If your load host is part of such a network, you need to restore its router entries each time it is rebooted.

After the reception of a new network database, follow the procedure in Table 6–7 for each router that the load host manages.

Table 6–7 Restoring Router Information on a Load Host

Step	Action	Result
1.	Run the load-host configurator (see Section 3.3).	The Main Menu appears.
2.	Choose `Restore a router`.	The load client menu appears.
3.	Choose the load client name of the router.	The Restore Confirmation screen appears.
4.	Choose `Yes` if you want to restore this entry. Otherwise, choose `No`.	If you answer `Yes`: The Status screen appears (Go to step 5). If you answer `No`: The Main Menu appears (Go to step 6).
5.	Press Return.	The Main Menu appears.
6.	If you have no further tasks to carry out with the configurator, choose `Exit this program`.	The operating system command prompt appears.

Note that this procedure restores information in the MOP database and/or BOOTP.TAB (MS-DOS) or bootptab (DEC OSF/1) file.

7

Changing the WANrouter

7.1 Overview

From time to time, it may be necessary to change the configuration of the WANrouter. For example, there may be a new communications service that you want to use.

To change the configuration, complete the following steps:

Step	Action	See Section
1.	Gather the revised information.	7.2
2.	Enter this information into the configurator and reload the WANrouter.	7.3

7.2 Preparation

Using the tables in Appendix A, determine all the new or additional values that are required.

If you are changing information that you have previously set up, that change may affect other parts of the configurator. Check Sections 7.2.1 to 7.2.3 to see if your change has such an effect. If it does, be prepared to reenter all the necessary information.

7.2.1 Configuration Options Section

Table 7–1 shows the side effects of changes to the Configuration Options.

Table 7–1 Effects of Changing Configuration Options

If you change...	The following occurs...
Using IP protocol to not using IP protocol	*Routing*: deletes all RIP, EGP, IS–IS, and IP propagation information. *Lines*: deletes all IP and IPX information.
Using IPX to not using IPX	*Lines*: deletes all IPX information for the CSMA–CD line. *Tunnel Circuits*: deletes all tunnel circuit information.

7.2.2 Routing Section

Table 7–2 shows the side effects of changes in the Routing Section.

Table 7–2 Effects of Changing Routing Information

If you change...	The following occurs...
Routing from Level 1 to Level 2	*Routing*: deletes all IP routing propagation information. *Lines*, *X.25 Circuits*, and *OSI Reachable Addresses*: you may need to add more information.
Routing from Level 2 to Level 1	*Routing*: deletes all IP propagation information, and information specific to Level 2 routing. *Lines*: deletes all information specific to Level 2 routing. *X.25 Circuits*: deletes all DA circuits. *OSI Reachable Addresses*: deletes all information. *IP Reachable Addresses*: deletes all reachable addresses for DA circuits.
The Routing algorithm	*Routing*: deletes routing propagation information. If the change is from Phase V only to Phase IV only, deletes the Phase V area addresses. *Lines*: if the change is from Level 2 Phase V to Level 2 Phase IV, deletes all interphase links.

7.2.3 Lines Section

Table 7–3 shows the side effects of changes in the Lines section.

Table 7–3 Effects of Changing Configuration Information

If you...	The following occurs...
Change a line from X.25 to another line protocol	*Lines*: deletes the DTEs and DTE classes for that line. *X.25 Circuits*: deletes the X.25 routing circuits for the line. *Reachable Addresses* (OSI and IP): deletes reachable addresses for circuits using the line.
Change a line to X.25 from another line protocol	*Lines*: deletes all HDLC circuit information. *Reachable addresses* (OSI and IP): deletes reachable addresses for circuits using the line.
Delete an X.25 line	*Lines*: deletes all DTEs and DTE classes for the line. *X.25 Circuits*: deletes X.25 routing circuits using the line. *Reachable addresses* (OSI and IP): deletes reachable addresses for circuits using the line.
Delete any other type of line	*Reachable addresses* (OSI and IP): deletes all reachable addresses for the circuit using the line.

7.3 Enter the Configuration Information

Follow the procedure in Table 7–4 to modify the WANrouter configuration.

Table 7–4 Changing a WANrouter Configuration

Step	Action	Result
1.	Run the WANrouter configurator (see Section 4.3).	The Main Menu appears.
2.	Choose `Modify an existing configuration`.	The load client menu appears.
3.	Choose the load client name of the WANrouter.	The Sections menu appears.
4.	Choose a section that you want to change.	The Options menu for the section appears.
5.	Use the `Add`, `Delete`, and `Modify` choices as necessary.	Section screens appear.
6.	After carrying out all changes on the section, choose `continue to new Section` from the Options Menu.	The next incomplete section appears (go to step 5). or The Create NCL Script menu appears (go to step 7).
7.	Choose `Create an NCL Script`.	The configurator creates the NCL script. The load file menu appears.
8.	Create the load file (see Section 4.6).	—
9.	Reboot the WANrouter (see Chapter 5).	The WANrouter loads and uses the new configuration.

Part III

Problem Solving

This part provides help when the WANrouter software or the router does not operate correctly or will not start. The part has two chapters:

- **Basics** – provides basic problem solving information. Follow these procedures before calling for specialized help.
- **Getting Assistance** – shows how to get specialized assistance if the system still does not work correctly.

8

Basics

8.1 Overview

If the WANrouter system appears to be broken, unreachable, or does not operate as you expect, follow this procedure:

Step	Action	See Section
1.	Check the router hardware.	8.2
2.	Check the load host.	8.3
3.	Check the WANrouter configuration.	8.4

8.2 Check the Router Hardware

Check the following:

- The router is switched on
- All communications cables are properly connected
- The system that fails to communicate with the router is:
  - Connected to the network
  - Switched on
  - Operating normally
- All other communications equipment is attached and is switched on

  Example: Make sure that all modems are connected to a communications line, connected to the router, and are switched on.
- The WANrouter software has loaded successfully and the router showing its running display

Refer to the hardware documentation for your router for information on:

- The LED display
- Attachment of communications cables
- Instructions on switching on the system

8.3 Check the Load Host(s)

Check the following on each load host:

- Make sure that the load host is switched on, running, and is connected to the correct network.
- Make sure that the disk containing the WANrouter image and its configuration files is available.
- Check the entry for the WANrouter in the load-host configurator:
  1. List the entry for the WANrouter (see Section 6.2) and make sure that all information is correct.
  2. Correct any errors (see Section 6.5).

     If there is no entry for the router, refer to Chapters 3 and 4.
  3. If you corrected any information, reboot the router (see Chapter 5).
- Make sure that the BOOTP/TFTP server or MOP is running.

8.4 Check the WANrouter Configuration

Check the following on each load host:

- All items supplied by others are correct

  Example: For an X.25 circuit, make sure that you have the correct DTE address.

- All values supplied to the WANrouter configurator are correct:

  1. Start the WANrouter configurator (see Section 4.3).
  2. Choose `Modify an existing configuration.`
  3. Check each section in turn, making sure that all values are correct and that all sections have been completed.

If any items are incorrect, change the WANrouter configuration (see Chapter 7).

8.5 What to Do Next

If Sections 8.2 to 8.4 fail to uncover the cause of the problem, get expert help. Follow the instructions in Chapter 9.

9

Getting Assistance

9.1 Overview

If you need further help to solve a problem, the following resources can provide assistance:

1. Local technical support staff
2. Digital

The following pages show you how to use these resources and how to report problems to them.

9.2 Local Assistance

If you have technical support available, use that first. Examples of local support are:

- A specialist team in your organization
- The supplier of your communications service
- The dealer who supplies your networking equipment

If you have a maintenance agreement with any of these teams, contact them in the order shown.

When you contact them, make sure that you have the following information:

1. A description of the problem.

   Make this as detailed as you can, citing specific systems, dates, times, and circumstances that cause the failure.

2. Details of the severity of the problem.

   Examples:

   - Whether the problem is reproducible, and if so how to reproduce the problem
   - The level of impact the problem causes: total loss of service or intermittent loss of service
   - Whether the problem occurs only at certain times such as when the router is heavily used

3. The structure of your system.

   Examples:

   - The name of the router
   - The name of the load host
   - What the router is connected to
   - The link between the router and the load host

In addition, be prepared to grant them access to your systems so that they can diagnose the problem. This access includes the load-host configuration information, the WANrouter configuration information, and an ability to examine the router operation (using tools such as NCL and memory dumps).

9.3 Digital Support

Digital specialists are available to analyze and diagnose any problems you may have using a WANrouter system. This support is available through service options that you can purchase in addition to the WANrouter system.

Your local support facility (if any) may already have bought such an option from Digital. In this case, they will handle the use of that service on your behalf. There should be no need for you to do anything other than hand the problem to your local support staff. However, follow the guidance that they give you in this matter. Local policies may differ.

For information on the support options available, contact your Digital sales representative.

9.4 Reporting Problems to Digital

If you need to take advantage of the Digital service facilities, use the guidelines in the following sections.

9.4.1 Preparation

Before contacting the Digital support organization, make sure that you:

1. Have completed the suggested actions in Chapter 8.
2. Collect as much information about the problem and its circumstances as you can:
   - The application that causes the WANrouter system to fail
   - The length of time that the problem has been noticeable
   - What was happening when the problem occurred
   - The steps necessary to reproduce the problem
   - What was expected to happen but did not happen
   - Any event messages you received
   - When the WANrouter last ran correctly
   - What changes were made to the router, the WANrouter software, or the network environment since the last successful use of the system
   - Whether the router fails completely (crashes) and tries to create a dump file (see Section 9.4.3)
3. Know the severity of the problem.

   Examples:

   - Whether the problem is reproducible, and if so how to reproduce the problem
   - The level of impact the problem causes: total loss of service or intermittent loss of service
   - Whether the problem occurs only at certain times such as when the router is heavily used
4. Know the structure of your system.

   Examples:

   - The name of the router
   - The name of the load host

- What the router is connected to
- The link between the router and the load host

Be prepared to grant the Digital support staff access to your systems so that they can diagnose the problem. This includes access to the load-host configuration information, access to the WANrouter configuration information, and an ability to examine the WANrouter operation (using tools such as NCL and memory dumps). In addition, be prepared to force a dump to occur, if necessary (see Section 9.4.3.3).

9.4.2 Submitting an SPR

In the event of a total system failure, the Digital support staff will ask you to submit an SPR. When doing this, please use the following guidelines:

- Report only one problem on each SPR.
- Include all the information you have gathered in Section 9.4.1.
- Indicate the priority of the problem, following the instructions on the SPR form.
- Include a dump file (if one is available) from the time that the system failed.
- Include the contents of the configuration files (see Appendix B).
- Include the NCL script files.
- Include the event log (if one is available).
- Include a statement of the display shown on the router hardware at the time of the failure.

Be sure to include any additional information that the support staff ask for.

9.4.3 Dump Files

If the WANrouter system fails, it creates a record of its state when the failure occurred. This includes the contents of all memory locations within the system. This is called a *dump file* which the router stores on the load host.

The following sections show:

- What causes a dump to occur
- Where the dump file is located on the load host
- How to force a dump

9.4.3.1 Causes of a Dump

The router creates a dump file only in exceptional circumstances:

- When the WANrouter software detects an internal failure
- When the router hardware detects an internal failure
- When the user forces a dump to occur

9.4.3.2 Location of the Dump File

The router has no permanent storage of its own and so it uses the load host to receive and hold the dump file. Table 9–1 shows the location of the dump file for each type of load host.

Table 9–1 Location of the WANrouter Dump File

Item	Details
MS-DOS	
Location:	*d:**install-dir*\CLIENTS*load-client-name*\
Filename: DECwanrouter 90: DECwanrouter 90EW: DEC WANrouter 250:	 WR90_080.DUM WR90EW_0.DUM DR250_08.DUM
Maximum File Size:	8 Mbytes
OpenVMS	
Location:	SYS$COMMON:[MOM$SYSTEM]
Filename:	VR2_*load-client-name*.DMP
Maximum File Size:	16,384 blocks
DEC OSF/1	
Location:	/usr/lib/mop/
Filename:	vr2_*load-client-name*.dmp
Maximum File Size:	8 Mbytes

In Table 9–1:

d:	is the disk drive containing the DECROU software.
install-dir	is the directory containing the DECROU software.
load-client-name	is the load client name of the router.

9.4.3.3 Creating a Dump File

In some problem solving situations, you may need to force the router to create a dump file. On most routers, there is a button you can press to cause the system to dump. Refer to the hardware manual for your router for more information.

Note

Before you force the router to dump:

- Make sure you selected the dump file option in the load-host configurator for the appropriate router.
- Make sure that the BOOTP/TFTP server or MOP is running:

MS-DOS load hosts:	See Section 5.2.2
OpenVMS load hosts:	See Section 5.3.1
DEC OSF/1 load hosts:	See Section 5.3.1

On completing the dump, the router tries to reboot. Monitor the progress of this operation to see if it is successful. This may provide valuable clues on the source of the problem.

Part IV

Reference Information

This part contains reference material to back up the tasks in other parts. It contains the following appendixes:

A. The reference tables of communications options that you use when configuring the WANrouter software

B. Advanced user tasks

C. Additional information for MS-DOS load hosts

D. Additional information for OpenVMS load hosts

E. Additional information for DEC OSF/1 load hosts

A

Communications Options

A.1 How to Use This Appendix

A.1.1 General

Use this appendix when planning the configuration of your WANrouter. In this appendix, you will find details of the information you need to set up and configure the WANrouter.

A.1.2 Where to Start

Start at Section A.2, and work through the remaining sections. You must complete some information in Sections A.2 to A.4. Complete other sections as necessary.

The majority of configurations use only a limited number of functions, and so some sections are irrelevant. Complete only those that deal with features you need to use, and leave the remainder blank.

Example: complete the tables for IP Reachable Addresses only if the router uses IP routing.

If you need to configure a function and it is **not** covered by the sections in this appendix, see Section A.1.6.

A.1.3 Required and Optional Items

Depending on your choices, you must provide values for all items within a section, unless otherwise indicated. Where appropriate, the sections tell you what decisions are made when not setting values for the optional items.

A.1.4 Format of Items

Section A.9 describes the format of each item as required by the configurator. Use this section if you need more information about the value you provide.

Example: in Section A.2, the format of the time zone differential is **utc differ**. For more information, look up **utc differ** in Section A.9. This section describes all item formats in alphabetical order.

A.1.5 Defaults

The *Default* column shows the default value of the item, if there is one. The default value is used if you do not provide a value for the item.

A dash (—) appears in the column if an item does not have a default value. If this is also a Required item, you must enter or select a value. For Optional items, the item remains undefined.

A.1.6 Features Not Covered by the WANrouter Configurator

The WANrouter configurator does not cover every possible feature supported by V1.3 of the software. Generally, excluded features are limited to those required for fine-tuning particular functions.

For example, you can use the configurator to set up event logging but not specific event filtering. The *DEC WANrouter 90/250 Management* guide describes the NCL commands required for network managers to fine-tune a configuration.

However, for this version of the sofware, there is one exclusion you may require for basic functionality: **You cannot use the WANrouter configurator to set up a PPP link or a frame relay connection**.

To set up a PPP link and/or a frame relay connection, complete the following:

Step	Action	See
1.	Complete this appendix, supplying all the information required to configure the WANrouter (except for PPP and frame relay information).	This appendix
2.	Run the WANrouter configurator.	Section 4.3
3.	Enter the information and create an NCL script. Do not create a management load file from the script.	Section 4.4
4.	Edit the CREATE, SET, and ENABLE script files produced by the configurator. Include the NCL commands that create and set up PPP/frame relay connections and circuits. Refer to the *DEC WANrouter 90/250 Management* guide for details of the commands that you use.	Section B.4.1
5.	Run the WANrouter configurator and create a management load file.	Section 4.6

For more information about PPP and frame relay, refer to the *DEC WANrouter 90/250 Management* guide.

A.2 Configuration Options

Determine the following:

Item	Format	Default	Your value
Use Internet Protocol (IP) routing?	yes no	Yes	
Use NetWare® IPX routing?[1]	yes no	Yes	
Time zone differential (optional)	utc differ	—	

[1]Answer this question only if you chose IP routing.

A.3 Routing

Determine the routing level:

Item	Format	Default	Your value
Routing level	routing type	—	

For a Level 1 router, use Section A.3.1. For a Level 1 and Level 2 router, use Section A.3.2.

A.3.1 Level 1 Routing

Complete Table A–1. In addition, complete Table A–2 if you are using IP routing.

Table A–1 Level 1 Routing

Item	Format	Default	Your value
Routing algorithm (Required only if you supply a Phase IV address to the load-host configurator.)	algorithm	Phase IV	
Address prefix (Required if you supply a Phase IV address to the load-host configurator.)	address prefix	—	
Phase V area address (Determine this only if you are using a Phase V routing algorithm *or* if no Phase IV address is supplied to the load-host configurator.)	phase v area	—	

Table A–2 Level 1 Routing (Extra Information for IP)

Item	Format	Default	Your value
Use RIP protocol?	yes no	Yes	
Accept default RIP route?	yes no	Yes	
Announce default RIP route?	yes no	No	
Specify RIP sources?	yes no	No	
IP address of each RIP source	decimal address	—	
Specify RIP sinks?	yes no	No	
IP address of each RIP sink	decimal address	—	
Type of Route Propagation	route1 prop	None	

A.3.2 Level 2 Routing

Complete Table A–3. In addition, complete Table A–4 if you are using IP routing.

Table A–3 Level 2 Routing

Item	Format	Default	Your value
Routing algorithm (Required if you supply a Phase IV address to the load-host configurator.)	routing algorithm	—	
Address prefix (Required if you supply a Phase IV address to the load-host configurator.)	address prefix	—	
Phase V area address (Required if there are Phase V local area fields in the NSAP *and* there is no Phase IV address.)	phase v area	—	

Table A–4 Level 2 Routing (Extra Information for IP)

Item	Format	Default	Your value
Use RIP protocol?	yes no	Yes	
Use EGP protocol?	yes no	Yes	
Accept Default RIP route?	yes no	Yes	
Announce Default RIP route?	yes no	No	
Specify RIP sources?	yes no	No	
IP address of each RIP source	decimal address	—	
Specify RIP sinks?	yes no	No	
IP address of each RIP sink	decimal address	—	
Autonomous System number (Applies **only** if you want to use the EGP protocol.)	as number	—	
Type of route propagation (Applies only if one or more IP protocols are selected.)	route2 prop	None	

A.4 Lines

Decide the behavior of each communications line on your WANrouter:

Type of Line	Protocol	Go to Section
Local Area (Ethernet)	CSMA/CD	A.4.1
Serial	HDLC	A.4.2
	DDCMP	A.4.3
	X.25	A.4.4

A.4.1 CSMA/CD

Complete Table A–5 for each circuit you wish to run on the CSMA/CD line.

Table A–5 CSMA/CD Circuits

Item	Format	Default	Your value
Circuit name	item name	csmacd–0	
Enable circuit on system startup?	yes no	Yes	
Supply DECnet routing information?	yes no	No	
Run NetWare IPX?[1]	yes no	Yes	

[1] Answer this question only if you chose NetWare IPX routing (see Section A.2).

In addition, complete as many of the following tables as necessary for each circuit:

IF you have chosen this feature...	THEN complete this table...
Supply of DECnet routing information	A–6
IP routing	A–7
NetWare IPX routing	A–8

Table A–6 CSMA/CD Circuits (Information for DECnet Routing)

Item	Format	Default	Your value
Type of DECnet routing[1]	routing type2	Level 1 and Level 2	
Level 1 cost (Determine this value only if *Type of routing* is *Level 1* or *Level 1 and Level 2*.)	cost	20	
Level 1 priority (Determine this value only if *Type of routing* is *Level 1* or *Level 1 and Level 2*.)	priority	64	
Level 2 cost (Determine this value only if *Type of routing* is *Level 2* or *Level 1 and Level 2*.)	cost	20	
Level 2 priority (Determine this value only if *Type of routing* is *Level 2* or *Level 1 and Level 2*.)	priority	64	

[1] Determine the type of routing over this circuit only if you chose Level 1 and Level 2 as the DECnet routing level (see Section A.3)

Table A–7 CSMA/CD Circuits (Information for IP)

Item	Format	Default	Your value
Run RIP on this circuit? (Necessary only if you choose to run RIP in Section A.3.)	yes no	No	
Run EGP on this circuit? (Necessary only if you choose to run EGP in Section A.3.)	yes no	No	
IP address (At least one circuit must have an IP address)	decimal address	—	
Subnet mask	subnet mask	depends on the IP address	
Alternative IP address (Available only if you supply *IP address* for the circuit.)	decimal address	—	
Alternative subnet mask (Available only only if you supply *Alternative IP address*.)	subnet mask		
RIP options (Necessary only if you choose to run RIP on the circuit.)	rip mode	—	
Autonomous System number (Required only if you choose to run EGP on the circuit. Required for each EGP neighbor.)	as number		
IP address of each EGP neighbor (Required only if you choose to run EGP on this circuit. Required for each EGP neighbor.)	decimal address		

Table A–8 CSMA/CD Circuits (Information for NetWare IPX)

Item	Format	Default	Your value
NetWare network number	net number	—	
Type of encapsulation	encap type	Ethernet	
Periodic update interval	periodic update	60	
Accept NetBIOS™ broadcast?	yes no	No	

A.4.2 HDLC

Complete Table A–9 for each HDLC line and Table A–10 for each circuit you want to run on each HDLC line.

Table A–9 HDLC Lines

Item	Format	Default	Your value
Connection type	modem connection	Non–switched	
Modem access type (Determine this value only if *Connection type* is *Switched*.)	modem access	—	
Routing data (Determine this value only if you selected *IP routing* in Section A.2 and *Modem access type* is *Dynamically assigned*.)	circuit use	—	
Line speed	line speed	—	

Table A–10 HDLC Circuits

Item	Format	Default	Your value
Circuit name	item name	same as port name	
Enable circuit on system startup?	yes no	Yes	
Supply DECnet routing information? (Not applicable if *Modem access type* is *Dynamically assigned*.)	yes no	No	

In addition, complete the following tables as necessary for each circuit:

IF you have chosen this feature...	THEN complete...
Supply of DECnet routing information	Table A–11
IP routing [1]	Table A–12

[1] Not applicable if *Modem access type* is *Dynamically assigned*.

Table A–11 HDLC Circuits (Information for DECnet Routing)

Item	Format	Default	Your value
Type of routing[1]	routing type2	Level 1 and Level 2	
Transmit password (optional)	line password		
Receive password (optional)	line password		
Level 1 cost (Determine this value only if *Type of routing* is *Level 1 and Level 2*.)	cost	20	
Level 2 cost (Determine this value if *Type of routing* is *Level 2* or *Level 1 and Level 2*.)	cost	20	
Interphase link choice	interphase link	No interphase link	
Phase IV areas reachable by this circuit[2]	phase iv areas	—	
Path cost for Phase IV areas[2]	cost	—	
Other areas reachable by WANrouter[2]	phase iv areas	—	
Path cost for other Phase IV areas[2]	cost	—	

[1] Determine the type of routing over the circuit only if you choose Level 1 and Level 2 as the DECnet routing level (see Section A.3)

[2] Determine these items only if you choose to use some form of interphase link.

Table A–12 HDLC Circuits (Information for IP)

Item	Format	Default	Your value
Run RIP on this circuit? (Necessary only if you choose to run RIP in Section A.3.)	yes no	No	
Run EGP on this circuit? (Necessary only if you choose to run EGP in Section A.3.)	yes no	No	
Neighbor IP address[1] (Address of the IP host that this circuit is connected to.)	decimal address	—	
Local IP address[1] (of this circuit)	decimal address	—	
Local subnet mask (Required if you supply the *Local IP address*.)	subnet mask	Depends on IP address	
RIP options (Necessary only if you choose to run RIP on the circuit.)	rip mode	—	
Autonomous System number (Required only if you choose to run EGP on the circuit.)	as number		
IP address of the EGP neighbor (Required only if you choose to run EGP on this circuit.)	decimal address		

[1] You must supply at least one of these items.

A.4.3 DDCMP

Complete Table A–13 for each DDCMP™ line, and Table A–14 for each circuit that you want to run on each of those lines.

Table A–13 DDCMP Lines

Item	Format	Default	Your value
Connection type	modem connection	Switched	
Modem access type (Determine this value only if *Connection type* is *Switched*.)	modem access	—	
Communications mode	comms mode	Synchronous	
Line speed	line speed	—	
Type of modem control (Determine this value only if *Connection type* is *Non–switched* and *Communications Mode* is *Asynchronous*.)	modem	Full modem control	

Table A–14 DDCMP Circuits

Item	Format	Default	Your value
Circuit name	item name	same as port name	
Enable circuit on system startup?	yes no	Yes	
Supply DECnet routing information?	yes no	No	

In addition, complete the following tables as necessary for each circuit:

IF you have chosen this feature...	THEN complete...
Supply of DECnet routing information	Table A–15
IP routing	Table A–16

Table A–15 DDCMP Circuits (Information for DECnet Routing)

Item	Format	Default	Your value
Type of routing[1]	routing type2	Level 1 and Level 2	
Transmit password (optional)	line password		
Receive password (optional)	line password		
Level 1 cost (Determine this value only if *Type of routing* is *Level 1 and Level 2*.)	cost	20	
Level 2 cost (Determine this value if *Type of routing* is *Level 2* or *Level 1 and Level 2*.)	cost	20	
Interphase link choice	interphase link	No interphase link	
Phase IV areas reachable by this circuit[1]	phase iv areas	—	
Path cost for Phase IV areas[2]	cost	—	
Other areas reachable by WANrouter[2]	phase iv areas	—	
Path cost for other Phase IV areas[2]	cost	—	

[1] Determine the type of routing over the circuit only if you choose Level 1 and Level 2 as the DECnet routing level (see Section A.3)

[2] Determine these items only if you choose to use some form of interphase link.

Table A–16 DDCMP Circuits (Information for IP)

Item	Format	Default	Your value
Run RIP on this circuit? (Necessary only if you choose to run RIP in Section A.3.)	yes no	No	
Run EGP on this circuit? (Necessary only if you choose to run EGP in Section A.3.)	yes no	No	
Neighbor IP address[1] (Address of the IP host that this circuit is connected to.)	decimal address	—	
Local IP address[1] (of this circuit)	decimal address	—	
Local subnet mask (Required if you supply the *Local IP address*.)	subnet mask	Depends on IP address	
RIP options (Necessary only if you choose to run RIP on the circuit.)	rip mode	—	
Autonomous System number (Required only if you choose to run EGP on the circuit.)	as number		
IP address of the EGP neighbor (Required only if you choose to run EGP on this circuit.)	decimal address		

[1] You must supply at least one of these items.

A.4.4 X.25

Complete Table A–17 for each X.25 line attached to your WANrouter.

Table A–17 X.25 Lines

Item	Format	Default	Your value
DTE name	item name	same as port name	
X.25 DTE address	dte address	—	
Logical channel range	logical channels	—	
Profile name	profile name	—	
Flow control negotiation?[1]	yes no	Yes	
Extended packet sequence numbering?[1]	yes no	Yes	
Minimum packet size[2]	packet size	as in profile	
Maximum packet size[2]	packet size	as in profile	
Default packet size[2]	packet size	as in profile	
Level 3 minimum window size[2]	window size	as in profile	
Level 3 maximum window size[2]	window size	as in profile	
Level 3 default window size[2]	window size	as in profile	
Interface mode[1]	interface mode	DTE	
DTE class	item name	profile name	
Level 2 window size	window size	as in profile	
Line speed	line speed		

[1] Determine these items only if your network profile supports them.
[2] Determine these values only if you choose to use flow control negotiation.

X25 Circuits

The circuits that you can configure over an X.25 line depend on:

- The type of router you are using
- The level of routing you selected in Section A.3

IF the router is a...	AND you seleted...	THEN you can configure these circuits...
DECwanrouter 90 or DECwanrouter 90EW	Level 1 and Level 2 routing	X25 Static Outgoing X25 Static Incoming X25 DA
DECwanrouter 90 or DECwanrouter 90EW	Level 1 only routing	X25 Static Outgoing X25 Static Incoming
DECrouter 250	Level 1 and Level 2 routing	X25 DA

Note that the maximum number of X.25 circuits you can configure is:

- For the DECwanrouter 90 and DECwanrouter 90EW, eight circuits.
- For the DECrouter 250, one circuit for each DTE.

Complete the following as necessary for each circuit you want to configure:

IF you have chosen this type of X.25 circuit...	THEN complete...
X25 Static Outgoing	Table A–18
X25 Static Incoming	Table A–19
X25 Dynamically Assigned	Table A–22

Table A–18 X.25 Static Outgoing Routing Circuits

Item	Format	Default	Your value
Circuit name	item name	RX25–OUT–*n*	
Enable circuit on system startup?	yes no	Yes	
Template name	item name	RX25–OUT–*n*	
DTE class (name of the DTE class specified in Table A–17)	item name	—	
Destination DTE Address	dte address	—	
Call data	call data	%xff000000444 5436e65742d4 44c4d	
Packet size (optional)	packet size	—	
Window size (optional)	window size	—	
Reverse charging? (optional)	yes no	No	
Throughput class (optional)	throughput class	—	
Supply DECnet routing information? (if you do not supply DECnet routing information, you are prompted for IP routing information)	yes no	Yes	

In addition, complete the following as necessary:

IF you have chosen this feature...	THEN complete...
Supply of DECnet routing information	Table A–20
IP routing	Table A–21

Table A–19 X.25 Static Incoming Routing Circuits

Item	Format	Default	Your value
Circuit name	item name	RX25–IN–*n*	
Enable circuit on system startup?	yes no	Yes	
Template name	item name	RX25–IN–*n*	
Packet size (optional)	packet size	—	
Window size (optional)	window size	—	
Throughput class request (optional)	throughput class	—	
Filter name	item name	RX25–IN–*n*	
Call data value	call data	%xff000000444 5436e65742d4 44c4d	
Call data mask	call mask	%xffffffffffffffff ffffffffff	
Sending DTE address (optional)	sending DTE address	—	
DTE class (optional) (name of the DTE class specified in Table A–17)	item name	—	
Incoming DTE address (optional)	DTE address	—	
Supply DECnet routing information?	yes no	Yes	

In addition, complete the following as necessary:

IF you have chosen this feature...	THEN complete...
Supply of DECnet routing information	Table A–20
IP routing	Table A–21

Table A–20 X.25 Static Circuits (Information for DECnet Routing)

Item	Format	Default	Your value
Transmit password (optional)	line password		
Receive password (optional)	line password		
Level 1 cost	cost	20	
Level 2 cost (Determine this value only if you selected *Level 1 and Level 2* routing)	cost	20	
Interphase link choice (Determine this value only if you selected phase V routing)	interphase link	No interphase link	

Table A–21 X.25 Static Circuits (Information for IP Routing)

Item	Format	Default	Your value
Run RIP on this circuit? (Necessary only if you choose to run RIP in Section A.3.)	yes no	No	
Run EGP on this circuit? (Necessary only if you choose to run EGP in Section A.3.)	yes no	No	
Neighbor IP address[1] (Address of the IP host that this circuit is connected to.)	decimal address	—	
Local IP address[1] (of this circuit)	decimal address	—	
Local subnet mask (Required if you supply the *Local IP address*.)	subnet mask	Depends on IP address	
RIP options (Necessary only if you choose to run RIP on the circuit.)	rip mode	—	
Autonomous System number (Required only if you choose to run EGP on the circuit.)	as number		
IP address of the EGP neighbor (Required only if you choose to run EGP on this circuit.)	decimal address		

[1] You must supply at least one of these items.

Table A–22 X.25 Dynamically Assigned (DA) Routing Circuits

Item	Format	Default	Your value
Circuit name	item name	RX25–DA–*n*	
Enable circuit on system startup?	yes no	Yes	
Use of circuit?	circuit use	—	
OSI template name[1]	item name	RX25–DA–*n*–OSI	
OSI call data[1]	osi call data	%x81	
IP template name[2]	item name	RX25–DA–*n*–IP	
IP call data[2]	ip call data	%xcc	
DTE class[3] (name of the DTE class specified in Table A–17)	item name	—	
Packet size[3] (optional)	packet size	—	
Window size[3] (optional)	window size	—	
Reverse charging?[3]	yes no	No	
Throughput class[3] (optional)	throughput class	—	
OSI filter name[1]	item name	RX25–DA–*n*–OSI	
OSI call data value[1]	osi call data	%x81	
IP filter name[2]	item name	RX25–DA–*n*–IP	
IP call data value[2]	ip call data	%xcc	
Call data mask[3]	call mask	%xff	
DTE class for receiving a call[3] (optional)	item name		
Incoming DTE address[3] (optional)	dte address	—	

[1] Required only if the circuit is used for OSI data.

[2] Required only if the circuit is used for IP data.

[3] If the circuit is used for *Both OSI and IP data*, the configurator prompts you for this item twice (once for OSI and again for IP).

A.5 Tunnel Circuits

Complete Table A–23 if you wish to use tunnel circuits to carry NetWare IPX packets over an IP link. Complete the table only if you have selected NetWare IPX and IP in Section A.2.

Table A–23 Tunnel Circuits

Item	Format	Default	Your value
Circuit type	tunnel circuit	—	
Circuit name	item name	—	
Destination IP address	ip destination	—	
NetWare network number	net number	—	
Accept NetBIOS broadcast?	yes no	No	

A.6 Backup Groups

You can define the following routing circuits as backup circuits:

- DDCMP
- HDLC
- X.25 Static Outgoing (not available on the DECrouter 250)
- X.25 DA as a secondary circuit only

Complete Table A–24 for each group of routing circuits that you want to pair as primary and secondary circuits.

Table A–24 Backup Circuits

Item	Format	Default	Your value
Enable failover?	yes no	—	
Backup group name	item name	bckgrp–*n*	
Secondary circuit name	item name	—	
Primary circuit name	item name	—	
Invoke timer (optional)	link timer	5	
Revoke timer (optional)	link timer	30	

A.7 Reachable Addresses

Define the reachable addresses for your system using the following table:

IF you chose...	THEN complete this table...
IP routing (see Section A.2)	A–25
DECnet routing Level 1 and Level 2 (see Section A.3)	A–26

Table A–25 IP Reachable Addresses

Item	Format	Default	Your value
Circuit name	circuit list	—	
Reachable address name	item name	—	
Destination address to be reached (Specify the address of the host, subnet, or network.)	decimal address		
Destination subnet mask	subnet mask	depends on subnet class	
IP address of next gateway (Required for CSMA/CD circuits. Optional for HDLC and DDCMP circuits. Not applicable to X.25 DA circuits.)	decimal address	—	
DTE address of next IP router (Required for X.25 DA circuits. Not applicable to all other types of circuit.)	dte address	—	
IP reachable address cost	cost	20	

Table A–26 OSI Reachable Addresses

Item	Format	Default	Your value
Circuit name	circuit list	—	
Reachable address name	item name		
Reachable address prefix of domain	domain prefix		
Reachable address cost	cost	20	
LAN hardware address of node connecting to foreign domain (Required for CSMA/CD cicrcuits. Not applicable to all other types of circuit)	hardware address	—	
DTE address of destination node (Required for X.25 DA circuits. Not applicable to all other types of circuit.)	dte address	—	

A.8 Event Logging

If you want to set up event logging, answer the following question for each event logging stream, and then go to the appropriate section.

Do you want a naming service (DECdns or Local) to find sink addresses?	Then, go to Section...
Yes	A.8.1
No	A.8.2

A.8.1 DECdns/Local Event Sinks

Complete Table A–27 for each DECdns/Local event sink you require.

Table A–27 DECdns/Local Event Sinks

Item	Format	Default	Your value
Event stream name[1]	item name	—	
Event sink name	sink name	—	
Type of sink name	sink type	node name	

[1]You can specify names for up to two event streams.

A.8.2 Non-DECdns/Local Event Sinks

To prevent DECdns or the Local naming service finding the address of any event sink, supply one of the optional items in Table A–28.

Table A–28 Non-DECdns/Local Event Sinks

Item	Format	Default	Your value
Event stream name	item name	—	
NSAP address of event sink[1] (optional)	nsap address	—	
Phase IV address of event sink[1] (optional)	phase iv address	—	
Phase IV node[1] (optional) (Applies to OpenVMS systems only)	phase iv node	—	

[1] You must supply at least one of these items.

A.9 Format Definitions

This section provides more information about the format of items that you can supply to the configurator. The formats are listed alphabetically.

address extension

A string of hexadecimal digits.

address prefix

The IDP and (optional) pre-DSP fields of an NSAP address that is:

- Phase IV compatible
- In DEC format

The address prefix contains up to 22 digits.

Examples:

```
37:12345:
49::
```

algorithm

Choose one of:

```
Phase IV
Phase V
```

as number

A decimal number between 1 to 65535 that identifies the Autonomous System to which the WANrouter belongs.

call data

An even number (maximum 252) of hexadecimal digits preceded by the characters:

```
%x
```

call mask

An even number (maximum 252) of hexadecimal digits preceded by the characters:

```
%xff
```

Note that call mask should contain the same number of digits as call data.

circuit list

A menu of circuit names. Choose one of those names.

circuit use

Choose one of the following:

```
OSI data
IP data
Both OSI and IP data
```

comms mode

Choose between:

```
Synchronous
Asynchronous
```

cost

An integer between 1 and 63 (inclusive).

decimal address

Four integers separated by periods:

n.n.n.n

domain prefix

All of, or the leading digits of, the NSAP address. This address can be any of the following formats:

- DEC
- OSI
- HRPF

The prefix contains a maximum of 40 digits.

Example:

```
(DEC Format) 37:32655678:3214
(OSI Format) 3732655678+3214
(HRPF Format)/3732655678+3214
```

dte address

A decimal number of up to 15 digits, including wildcards.

Obtain this from your PSDN.

encap type

Choose from:

```
Ethernet
SNAP
802.2
Novell
```

file definition

The location of a file on a load host. The length and construction of this string is determined by the operating system of the load host.

hardware address

Six pairs of hexadecimal digits separated by dashes.

Example:

```
08-00-2B-65-BB-43
```

interphase link

Choose from:

```
Phase IV level 2 router
Interphase link Phase V router running Phase IV
     protocols at level 2
No interphase link
```

ip call data

An even number (maximum 252) of hexadecimal digits, preceded by the characters:

```
%xcc
```

ip destination

If tunnel circuit is `Point to point`: a single decimal address:

n.n.n.n

If tunnel circuit is `Broadcast`, one or more instances of decimal address.

item name

The name of an object. Contains up to 32 alphanumeric characters.

line password

An even number (maximum 38) of hexadecimal digits preceded by:

```
%x
```

line speed

Choose from:

```
300
600
1200
2400
4800
9600
19200
38400
56000
64000
```

However, for lines serial-3 to serial-8 on the DECrouter 250, choose from:

```
300
600
1200
2400
4800
9600
19200
```

link timer

A timer value (in seconds) expressed as a decimal number between 0 and 65535 (inclusive).

logical channels

A list of X.25 logical channel numbers. Each number is separated by a comma.

A logical channel can be a single channel number or two channel numbers separated by a dash (indicating a range of channel numbers).

Example:

```
30, 1024–1048
```

This indicates the channels 30 and 1024 to 1048 (inclusive).

modem

Choose between:

```
Full modem control
Data leads only
```

modem connection

Choose between:

```
Non-switched
Switched
```

modem access

Choose from:

```
Static Outgoing
Static Incoming
Dynamically assigned
```

Dynamically assigned is available only if this is a DECnet Level 2 router.

net number

A hexadecimal number of up to 8 digits, **excluding** the values 0 and FFFFFFFF.

nsap address

NSAP address format.

Example:

```
41:23456789:00–A5:07–CA–4B–65–BB–43:21
```

osi call data

An even number (maximum 252) of hexadecimal digits, preceded by the characters:

```
%x81
```

packet size

A decimal number from 16 through 4096 that is a power of 2.

Obtainable from the profile and your PSDN subscription information.

password

The password of the account on the load host used to retrieve the appropriate file. The length and construction of this string is determined by the operating system of the load host.

periodic update

An integer between 60 and 65535 (inclusive).

This sets the period between IPX RIP and SAP updates on the circuit.

phase iv address

A DECnet Phase IV network address of two integers separated by a period.

Example:

```
34.3
```

phase iv areas

A list of Phase IV area numbers, separated by commas. Each area number can be an integer (indicating a single area) or two integers separated by a dash (indicating a range of area addresses). Each integer has a maximum value of 63.

Example:

```
23,30–35,40
```

This list identifies the areas 25, 30 to 35 (inclusive), and 40.

phase iv node

The name of a DECnet Phase IV node. Up to 6 alphanumeric characters, the first of which is a letter.

Example:

```
ROUTE2
```

phase v area

The IDP, (optional) pre-DSP, and Local Area fields of an NSAP address. That address is in DEC format.

The phase v area contains up to 40 digits.

Example:

```
41:23456789:00–A5
```

priority

An integer bewtween 1 and 127 (inclusive).

profile name

The name of the profile for the DTE's PSDN.

redirect reason

Choose one of the following:

```
Busy
Out of order
Not specified
```

rip mode

Choose from:

```
Only receive RIP messages
Only send RIP messages
Send and receive RIP messages
```

route1 prop

Choose either or both of the following:

```
IS-IS to RIP
RIP to IS-IS
```

route2 prop

Possible choices are:

```
RIP to EGP
EGP to RIP
IS-IS to RIP
RIP to IS-IS
EGP to IS-IS
IS-IS to EGP
```

Actual choices depend on algorithms previously chosen.

routed protocols

Choose any or all of the following:

```
OSI routing
DECnet Phase IV routing
IP routing
```

The `IP routing` option appears only if you choose to use IP routing in Section A.2.

routing algorithm

Choose one of the following:

```
Level 1 Phase IV and Level 2 Phase IV
Level 1 Phase IV and Level 2 Phase V
Level 1 Phase V and Level 2 Phase IV
Level 1 Phase V and Level 2 Phase V
```

routing type

Choose from:

```
Level 1 only
Level 1 and Level 2
```

routing type2

Choose from:

```
Level 1 and Level 2
Level 2 only
```

sending DTE address

When you specify a sending DTE address, the WANrouter checks the calling address field of incoming X.25 packets for that address. If they do not match, the call will be rejected on this circuit.

Specify a decimal number of up to 15 digits, including wildcards.

sink name

DNS node name.

sink type

DNS node name or DNS object name.

subnet mask

Four integers separated by periods:

n.*n*.*n*.*n*

In IP subnet masks, a value of 255 for any integer indicates the parts of the IP address that make up the network address.

Example:

```
255.255.255.0
```

Here, the first 3 digits are the network address and the final one identifies the host.

throughput class

Specify the the incoming and outgoing baud rates in the following way:

[*incoming*..*outgoing*]

Example:

```
[300..1200]
```

tunnel circuit

Choose from:

```
Point to point
Broadcast
```

utc differ

The number of hours by which the time zone used by the WANrouter differs from the UTC reference zone. UTC is the time standard that has replaced GMT. Enter plus (+) or minus (–) followed by the number of hours.

Example: if the time zone is 4.5 hours later, enter +4.5.

window size

An integer between 1 and 127 (inclusive).

Obtainable from your PSDN subscription information.

x25 circuit type

Choose between:

```
X25 Static Outgoing
X25 Static Incoming
X25 DA (Dynamically Assigned)
```

yes no

Choose between:

```
Yes
No
```

B

Advanced User Tasks

B.1 Overview

There are additional tasks that may need to be carried out from time to time. These tasks require more system experience than other tasks such as installing, configuring, and loading the WANrouter software.

This appendix shows how to complete these tasks:

To complete this task...	See Section...
Save a WANrouter configuration part way through	B.2
Resume an incomplete WANrouter configuration	B.3
Edit the NCL script files	B.4
Copy configuration files to another WANrouter	B.5

B.2 Saving an Incomplete Configuration

When configuring a WANrouter, you can do either of the following:

1. Save the current state of the configuration and leave the configurator.
2. Save the current state of the configuration and continue to enter configuration information.

The following sections describe how to complete these tasks.

B.2.1 Saving the Configuration and Leaving the Configurator

While configuring a WANrouter, you can save the work you have done so far and return to it at a later time for completion.

To do this, choose `Save current configuration and EXIT` from the Options menu in the configurator.

B.2.2 Saving the Configuration and Continuing

Unless you take precautions, a failure of the load host during a WANrouter configuration means that all the information you have entered up until that point is lost. You would have to start the WANrouter configuration from the very beginning.

You can avoid this by saving the configuration at strategic points. To do this, choose `Save current configuration` from the Options menu in the configurator.

B.2.3 Result

In both cases, the configurator saves all the information that you have entered in a file. The following table shows the location and name of the file:

Item	Name
MS-DOS:	
Location	*d:**install-dir*\CLIENTS*load-client-name*\ where: • *d:* is the drive and *install-dir* is the directory used for the DECROU software installation. • *load-client-name* is the load client name you chose for the WANrouter.
File	*load-client-name*.DAT
OpenVMS:	
Location	SYS$COMMON:[MOM$SYSTEM]
File	VR2_*load-client-name*.DAT
DEC OSF/1:	
Location	/usr/lib/dnet/
File	vr2_*load-client-name*.dat

In the previous table, *load-client-name* is the load client name you chose for the WANrouter.

B.3 Restoring an Incomplete Configuration

To complete a WANrouter configuration that you previously saved, follow the procedure in Table B–1.

Table B–1 Restoring an Incomplete WANrouter Configuration

Step	Action	Result
1.	Start the WANrouter configurator (see Section 4.3).	The Main Menu appears.
2.	Choose `Modify an existing configuration`.	The load client menu appears.
3.	Choose the load client name of the WANrouter.	A menu of completed sections appears.
4.	Choose one of the completed sections.	The Options menu appears
5.	Choose `Continue to new section`.	The first screen of the first incomplete section appears.
6.	Enter values on all screens in that section, using the information recorded in Appendix A.	The Options menu appears.
7.	Choose `continue to new section`	The next incomplete section appears (go to step 6) or The *Create NCL Script* section appears (go to step 8).
8.	Choose `Create the NCL script` or `Go to the Sections Menu`.	If you choose `Create the NCL script`:, the Main Menu appears (go to step 10). If you choose `Go to the Sections Menu`, the Sections Menu appears (go to step 9).
9.	You can modify the configuration. Follow the guidelines and procedures in Chapter 7.	The configuration is modified and the NCL script is created.
10.	Create the load file (see Section 4.6).	—
11.	Load the WANrouter (see Chapter 5).	The WANrouter loads and uses the configuration.

B.4 User NCL Script Files

Sections B.4.1 to B.4.3 describe the user NCL script files and show how to use them in a WANrouter configuration.

B.4.1 Definition

In addition to the master NCL script and the management load file, the WANrouter configurator also creates three user NCL script files. Table B–2 shows the location and names of these files.

Table B–2 User NCL Script Files: Location and Names

Item	Name
MS-DOS:	
Location of the user NCL script files	*d:**install-dir*\CLIENTS*load-client-name*\
NCL CREATE commands	CREATE.NCL
NCL SET commands	SET.NCL
NCL ENABLE commands	ENABLE.NCL
OpenVMS:	
Location of the user NCL script files	SYS$COMMON:[MOM$SYSTEM]
NCL CREATE commands	VR2_*load-client-name*_EXTRA_CREATE.NCL
NCL SET commands	VR2_*load-client-name*_EXTRA_SET.NCL
NCL ENABLE commands	VR2_*load-client-name*_EXTRA_ENABLE.NCL
DEC OSF/1:	
Location of the user NCL script files	/usr/lib/dnet/
NCL CREATE commands	vr2_*load-client-name*_extra_create.ncl
NCL SET commands	vr2_*load-client-name*_extra_set.ncl
NCL ENABLE commands	vr2_*load-client-name*_extra_enable.ncl

Note that in Table B–2:

- *d:* is the drive and *install-dir* is the directory used for the DECROU software installation.
- *load-client-name* is the load client name of the router to which these files belong.

B.4.2 Use

The WANrouter configurator creates a new master NCL script whenever you reply `Yes` to the prompt:

```
Create NCL Script?
```

If you were to make changes to a master NCL script, you would lose the changes whenever you created a new NCL script for that router. The user NCL script files allow you to make changes or enhancements without having to edit the master NCL script.

Edit the user NCL script files if you need to:

- Change defaulted information that you cannot change using the WANrouter configurator. Example: timer values.
- Set up facilities that the WANrouter configurator does not supply. Example: fine-tuning of event logging.

When you have edited the files, run the WANrouter configurator to create a new management load file and then reload the router.

B.4.3 Guidelines

When editing the user NCL script files, bear in mind the following:

- Always put CREATE, ENABLE, and SET commands in their appropriate files.
- Put the event dispatcher commands PASS, BLOCK, IGNORE, and SET in the SET file.
- If the WANrouter is connected to a DECnet/OSI-compliant router that does not use the IS–IS protocol, add the following command to the SET file:

  `SET ROUTING CIRCUIT` *`circuit-id`* `DNA NEIGHBOR FALSE`

  Replace *circuit-id* with the name of the circuit connecting the WANrouter to the OSI-compliant router.
- If you change the name of an item using the configurator (for example, the name of a circuit), you also need to change the name for that item where it appears in the user NCL script files.

Note

Do not delete any of the user NCL script files. If you do, the NCL script for the router will not create a management load file that can be loaded.

B.5 Copying Configuration Files to Another WANrouter

You may want to use a similar configuration for another WANrouter of the same hardware type. One way to do this is to make a copy of the configuration files and then modify the copy. Section B.5.1 describes how to do this.

B.5.1 Procedure

Complete the actions in Table B–3. This table uses the following terms:

- **Original** WANrouter is the system that you are copying
- **New** WANrouter is the system that you are configuring using a copy of the configuration files

Table B–3 Copying Files to Another WANrouter

Step	Action
1.	Configure the load host for both WANrouter systems (see Chapter 3).
2.	Configure the **original** WANrouter (see Chapter 4). Make sure that you create the management load file.
3.	Set your current default directory to the location of the configuration files: **MS-DOS:** *d:**install-dir*\CLIENTS*load-client-name* For example: C:\DECROU\CLIENTS\WROU1 **OpenVMS:** SYS$COMMON:[MOM$SYSTEM] **DEC OSF/1:** /usr/lib/dnet/
4.	Make a copy of the data file: **MS-DOS:** *d:*>COPY *load-client-name*.DAT *d:**install-dir*\CLIENTS*load-client–name**load-client-name2*.DAT **OpenVMS:** $ COPY VR2_*load-client-name*.DAT VR2_*load-client-name2*.DAT **DEC OSF/1:** # cp vr2_*load-client-name*.dat vr2_*load-client-name2*.dat Replace *load-client-name* with the load client name that identifies the **original** WANrouter, and *load-client-name2* with the load client name of the **new** WANrouter
5.	Modify the configuration for the **new** WANrouter (see Chapter 7).

C

MS-DOS Hosts: Additional Information

C.1 Overview

The following pages contain additional information on the facilities you need to load and manage a WANrouter using a PC.

For this type of information...	See Section...
Which network operating systems to use for loading and managing a router	C.2
How to set up and use the Network Applications Interface if PATHWORKS for DOS is not used.	C.3
How to run the facilities used to manage a router	C.4
How to use NCL to manage a router	C.5
How to set up a BOOTP/TFTP server for loading and dumping a router	C.6
How to increase the TCP sockets on systems running PATHWORKS	C.7
Details about PING on systems running PATHWORKS	C.8
How to access DECROU facilities from any directory	C.9

C.2 Network Operating Systems

To load and manage a router from a PC, you can use one of the following:

- PATHWORKS for DOS Version 5.0 or later
- Network Applications Interface (supplied with the WANrouter software)

If your system does not use PATHWORKS, follow the instructions in Section C.3.

C.3 The Network Applications Interface (NAI)

Use the NAI to load and manage your router if the PC does **not** run PATHWORKS for DOS. However, you cannot run the NAI at the same time as any other network software. So, before using the NAI, make sure that you remove from memory any other network system that you run.

The following sections show how to set up, start, and stop the NAI. In addition, there is information on the Ethernet drivers used to communicate with the router.

C.3.1 Setting Up the NAI

C.3.1.1 Preparation

Gather the information listed in Table C–1.

Table C–1 NAI Information

Item	Description	Your Value
Node name	The node name of the PC. This name must be unique to the PC and contain no more than 6 characters.	
Node IP address	The IP address of the PC.	
Node IP mask	The subnet mask for the PC's IP address.	
Node DECnet address	The DECnet address of the PC.	
Datalink driver name	The name of the subdirectory in the DECROU area that contains the Ethernet driver to be used to communicate with the router. Section C.3.4.2 lists the subdirectory names.	
Is a Gateway to be used?	Choose `Y` if there is an IP Gateway on the LAN to which the PC is connected. Otherwise, choose `N`.	
Gateway IP address	The IP address of the IP Gateway. Determine this value only if you answered `Y` to *Is a Gateway to be used?*	

C.3.1.2 Start the NAI Setup Program

Follow the procedure in C–2 to start the NAI setup program.

Table C–2 Starting the NAI Setup Program

Step	Action
1.	Change directory to the installation directory for DECROU. For example: `C:\> cd DECROU`
2.	Enter the following command: `NETSET`

C.3.1.3 Enter the Information

NETSET displays a screen with one field for each of the items in Table C–1. Type in each value, using the Enter or Tab keys to move from one entry to the next.

If you enter `N` in reply to *Is a Gateway to be used?*, leave the entry for *Gateway IP Address* blank.

When you have supplied all the necessary information, press Ctrl/Enter.

C.3.1.4 Future Use

Repeat the procedure in Sections C.3.1.1 to C.3.1.3 each time you install a new version of the DECROU software.

C.3.2 Starting the NAI

There are two ways of starting the NAI:

- Manually — by entering a command on the keyboard
- Automatically — by modifying AUTOEXEC.BAT

The following sections show how to do both of these.

C.3.2.1 Manually

Follow the procedure in Table C–3 to start the NAI.

Table C–3 Starting the NAI

Step	Action
1.	Change directory to the installation directory for DECROU. For example: `C:\> cd DECROU`
2.	Enter the following command: `NET\STARTNET`

C.3.2.2 Automatically

To start the NAI each time that you boot the PC, add the following line to the PC's AUTOEXEC.BAT file:

`call` *`d`*`:\`*`install-dir`*`\NET\STARTNET.BAT`

Replace *`d:\install-dir`* with the name of the drive and directory that holds the DECROU software.

C.3.2.3 Suggested Use

Immediately after setting up the NAI, it is best to manually start the NAI. In this way, you do not have to reboot the PC to be able to use it.

If the PC is occasionally to be used as a load host, start the NAI manually each time. In this way, you can use the PC for other purposes when it is not loading a router.

If the PC's main function is to load and manage one or more routers, start the NAI automatically.

C.3.3 Stopping the NAI

Follow the procedure in Table C–4 to stop the NAI.

Table C–4 Stopping the NAI

Step	Action
1.	Change directory to the installation directory for DECROU. For example: `C:\> cd DECROU`
2.	Enter the following command: `NET\STOPNET`
3.	Reply to the confirmation question.

C.3.4 Ethernet Drivers

The PC communicates with the router through an Ethernet controller. The following sections show which Ethernet controllers and drivers you can use with the NAI.

C.3.4.1 Location of Ethernet Drivers

The Ethernet drivers that DECROU and the NAI use are in the directory:

d:\install-dir\NET\DRIVERS

Replace *d:\install-dir* with the name of the drive and directory that holds the DECROU software.

In that directory, there is one subdirectory for each Ethernet driver. For example, the subdirectory DEPCA™ contains the driver for the DEPCA family of Ethernet adaptors.

These subdirectories contain the driver file and the PROTOCOL.INI file for that driver.

C.3.4.2 Supplied Ethernet Drivers

The DECROU software includes a number of Ethernet drivers that Digital has tested and are known to work with DECROU. Table C–5 lists the subdirectory names supplied with DECROU and describes their contents.

Table C–5 Supplied Ethernet Drivers

This subdirectory contains the...	Driver for this...
DEPCA	DEPCA family of Ethernet adaptors
DEPEA	DEPEA Personal Ethernet adaptor
EWRK3	EtherWORKS™ and EtherWORKS 3 adaptors

C.3.4.3 Support for Other NDIS Drivers

Other Ethernet controllers that have their own NDIS drivers may work with the DECROU software. However, these have not been tested by Digital.

Follow the procedure in Table C–6 to add another NDIS driver.

Table C–6 Adding an NDIS Driver to the DECROU Software

Step	Action
1.	Create a new subdirectory for the driver. Make sure that the name of the subdirectory is the same as the name of the driver. For example, the directory to hold the driver called ELNKPL is: `C:\`*`install-dir`*`\NET\DRIVERS\ELNKPL` Replace *`install-dir`* with the name of the directory that holds the DECROU software.
2.	Copy the driver file and its PROTOCOL.INI file into the subdirectory.
3.	To use the new driver, run the NAI Setup program (see Sections C.3.1.1 to C.3.1.3).

C.3.4.4 Nonstandard Settings

If your Ethernet adaptor uses nonstandard settings, edit the PROTOCOL.INI file for the appropriate driver **before** running the NAI setup program. This ensures that the correct values are placed in the master PROTOCOL.INI file.

To change settings for any driver, always edit its PROTOCOL.INI file and then use the NAI setup program.

C.4 Router Management Menu

There are a number of facilities that you use when managing a router. The Router Management menu is a convenient way of starting any of these facilities.

C.4.1 Displaying the Router Management Menu

Follow the procedure in Table C–7 to display the Router Management Menu.

Table C–7 Displaying the Router Management Menu

Step	Action
1.	Change directory to the installation directory for DECROU. For example: `C:\> cd DECROU`
2.	Enter the following command: `DECROU`

C.4.1.1 Notes for Users of MS-DOS/V for Japanese

If your PC uses MS-DOS/V for Japanese, change the screen mode to English before displaying the Router Management Menu.

Do one of the following:

- Switch screen mode to English by entering the following:
  `CHEV US`
- Restart MS-DOS/V with English mode by entering the following:
  `SWITCH`

C.4.1.2 Monochrome Monitors

If your PC does not have a color monitor, use the following form of the DECROU command:

`DECROU/BW`

C.4.2 Choosing Options

Choose an option from the menu as follows:

Step	Action
1.	Highlight the option you want using the up arrow and down arrow keys.
2.	Press Enter.

C.4.3 Available Facilities

Table C–8 lists the options on the Router Management Menu and describes what each provides.

Table C–8 Facilities of the Router Management Menu

Menu Option	Description	For More Information
NCL	Starts the NCL Management tool	Section C.5
DOS	Runs a new copy of the MS-DOS command processor	The documentation for your PC
EXIT	Cancels the Router Management Menu and returns to MS-DOS	Section C.4.5

C.4.4 Recalling a Previous Screen

Some of the facilities on the Router Management Menu write information to the screen and then redisplay the menu. To look at the screen displayed immediately before the Router Management Menu appeared, press either the Page Up or Page Down keys.

For example, an application may display an error message and then return to the Router management Menu. If you were not able to read the message fully, press Page Up or Page Down and it will reappear.

C.4.5 Canceling the Menu

When you have finished using the Router Management Menu, choose the `EXIT` option. This returns you to MS-DOS.

C.5 NCL

NCL is an application that accepts commands to manage and monitor nodes on a network. These commands are the Network Control Language (NCL). The following sections show how to use NCL on an MS-DOS system to manage one or more routers.

C.5.1 Creating Node Names

Each NCL command includes the node name of the router that the command affects. This node name is one of the following:

- The DECnet Phase IV address you supplied to the load-host configurator (see Section 3.2.1)
- A DECnet Phase IV node name

Table C–9 shows how to create a DECnet Phase IV node name for a router.

Table C–9 Creating a DECnet Phase IV Node Name

Step	Action
1.	Enter the following at the MS-DOS command prompt: `NCP`
2.	Enter the following NCP command: `DEFINE NODE` *`address`* `NAME` *`name`* In the command, replace *address* with the Phase IV node address of the router, and *name* with the Phase IV node name of the router. The node name can contain up to 6 characters and must be unique to that router.

C.5.2 Starting NCL

Follow the procedure in Table C–10 to start NCL.

Table C–10 Starting NCL

Step	Action
1.	Display the Router Management Menu (see Section C.4.1).
2.	Choose `NCL`. When NCL is ready for a command it displays the following prompt: `ncl>`

C.5.3 Using NCL

The following sections give more information on using NCL to manage a router.

C.5.3.1 Help Information

The NCL application contains help on the commands you can enter. Use the following NCL command to access the help information:

```
HELP
```

A list of available help topics appears on the screen. Type in the name of the topic you need, and then press Return. The system responds by displaying a further level of help topics or information on the topic you selected. Continue entering names of topics until you reach the information you require.

To move back one level of help information, press Return without typing a topic name. To leave NCL help and return to the NCL command prompt, press Return until that prompt appears.

C.5.3.2 Command Line Editing

You can edit NCL commands as you type them. Table C–11 lists the keys you can use to edit commands.

Table C–11 Keys for Editing NCL Commands

Use this key...	To do this...
Up arrow	Recall a previous command
Down arrow	After recalling a previous command, recall the next command in the series
Left arrow	Move the cursor to the left in a command
Right arrow	Move the cursor to the right in a command
Enter or Return	Enter a command you have typed
Insert	Toggle between inserting characters and typing over characters in a command
Ctrl/A	Move the cursor to the beginning of a command
Ctrl/E	Move the cursor to the end of a command
Ctrl/U	Delete the text from the cursor position to the beginning of the line
Hyphen	Use this at the end of a line to continue a command onto the next line

C.5.3.3 Length of Commands

Each NCL command can contain a maximum of 2048 characters. Each line of an NCL command can contain a maximum of 1024 characters.

To divide a command into two or more lines, end each (except the last line) with a hyphen. On the last line, press Enter or Return to enter the command.

C.5.3.4 Controlling Output

The SHOW commands display information about a router and its behavior. NCL divides these displays into screens. After the final screen, the NCL prompt reappears. Table C–12 lists the keys to control output of these screens before the NCL prompt appears.

Table C–12 Keys to Control NCL Output

Use this key...	To do this...
Enter or Return	Move to the next line of the display
B	Move back to the previous screen of the display
Spacebar	Move to the next screen of the display

When the NCL prompt reappears. you can look again at the last seven screens of a display. Table C–13 shows the keys you use to do this.

Table C–13 Reviewing Display Screens

Page Up	Move to a previous screen in the display. If there are no more screens, the following message appears: `no more screens`
Page Down	Move to a following screen in the display. If you press this key when the last screen is displayed, the following message appears: `current page reached`

C.5.3.5 The SNAPSHOT Command

If you use the SNAPSHOT command, always specify the name of a file to hold its output.

For example, to capture information on CSMA/CD station counters from a node called PEACH, use the following NCL command:

```
ncl> SNAPSHOT NODE PEACH CSMA-CD STATION * ALL COUNTERS, TO PEACH.TMP
```

C.5.3.6 Displaying SNAPSHOT Information

When using a SHOW command to look at output from a SNAPSHOT command, always specify the name of the file that holds the SNAPSHOT output.

For example, to show the information in PEACH.TMP, use the following NCL command:

```
ncl> SHOW NODE PEACH CSMA-CD STATION * ALL COUNTERS, FROM PEACH.TMP
```

C.5.3.7 DECdns Names

On MS-DOS systems, there is a restriction for NCL commands that contain a DECdns name. The DECdns name must have the following format:

NSCTS:.node-name

Where:

NSCTS (namespace creation timestamp) is a unique identifier for the namespace in which the full name is registered. The NSCTS is created automatically when the namespace is created and consists of 14 hexadecimal digits.

node-name is the name that identifies the node.

For example:

```
00-12-23-56-77-A0-A1-A2-A3-A4-A5-A6-A7-18:.main.node.name
```

In this example:

- `00-12-23-56-77-A0-A1-A2-A3-A4-A5-A6-A7-18` is the NSCTS
- `:.main.node.name` is the node name that identifies the node

Complete one of the procedures (A or B) in Table C–14 to display the NSCTS for a DECdns full name.

Table C–14 Obtaining the NSCTS of a Namespace

Procedure A

Step	Action
1.	Identify a host that is running DECnet/OSI and that has a DECnet Phase IV address.
2.	Enter the following NCL command: `ncl> SHOW NODE` *`phase-IV-address`* `DNS CLERK KNOWN NAMESPACE *` In the resulting display, the NSCTS appears after the label `NSCTS`.

Procedure B

Step	Action
1.	Identify a router that is running DECnet/OSI and that has a DECnet Phase IV address.
2.	Enter the following NCL command: `ncl> SHOW NODE` *`phase-IV-address`* `NAME` In the displayed name, the hexadecimal digits appearing before the colon (:) make up the NSCTS.

C.5.4 Leaving NCL

To leave NCL and return to the Router Management Menu, press Ctrl/Z or Ctrl/C. Alternatively, enter the following command:

```
EXIT
```

C.6 BOOTP/TFTP Server

The BOOTP/TFTP server is the software that enables an MS-DOS system to use BOOTP/TFTP to load and dump from the router:

- For loading, BOOTP determines the IP address of the device to be loaded, and the name of a file to be loaded. TFTP is the protocol actually used for loading.
- For dumping, the router uses BOOTP to find a host that can receive a dump. TFTP is used to write the dump.

C.6.1 How BOOTP Finds the Load Files on the WANrouter

The WANrouter software uses the BOOTP.TAB file to find the IP address and client name of the router.

This BOOTP.TAB file also contains path names for WANrouter load files. However, it does not use the BOOTP.TAB file to find the WANrouter load files. Instead, it looks for the following file:

*d:**install-dir*\CLIENTS*load-client-name*\SYSTEM

This file is the combined system image and management load file that can be loaded onto the router.

C.6.2 Using the BOOTP/TFTP Server

When you first start the BOOTP/TFTP server (see Section 5.2.2), the window only shows a command prompt:

time Command (? for list) > _

where *time* is the time in hours, minutes, and seconds.

To display the server menu, enter a question mark (?) at the server window prompt.

C.6.2.1 The BOOTP/TFTP Server Menu

There are two columns on the server menu. These correspond with the first two columns in Table C–15. The third column is used to indicate whether the server is running in foreground mode (F) or background mode (B). The fourth column provides more information on the server menu options.

Table C–15 BOOTP/TFTP Server Menu

Key	Action	Mode	Explanation
d	Toggle responding to dump	FB	Decides whether this PC will accept a BOOTP/TFTP dump request from the WANrouter.
l or Page Down	Show the lower log display	FB	Displays the last twelve events that have been sent during a load or dump.
t	Toggle display of unsatisfied requests	FB	Shifts between displaying and not displaying requests from devices for a load.
u or Page Up	Show the upper log display	FB	Displays the twelve events previous to the last twelve sent during a load or dump.
x or END	Exit from BOOTP	F	Closes down the BOOTP/TFTP server.
x or END	Exit leaving the TSR running	B	Returns to the command prompt. The server continues to run in background mode.
xz	Clear the log file	F	Deletes the contents of the log file so far.
e	Exit leaving the window up	B	For diagnostic purposes only.
r	Terminate and remove the TSR	B	Closes down the BOOTP/TFTP server.

C.6.3 Stopping the BOOTP/TFTP Server

To stop the BOOTP/TFTP server, complete one of the following procedures:

- If the server is running in foreground mode, press the X key.
- If the server is running in background mode, complete the following steps:

Step	Action
1.	Display the server window (see Section 5.2.2.).
2.	Press the R key.

C.7 UDP Sockets and PATHWORKS

If your MS-DOS system is running PATHWORKS for DOS V5.0 or later and you use BOOTP/TFTP as the load protocol, Digital recommends that you set the UDPMaxSock parameter in PWTCP.INI to a minimum of 12.

This allows for the following UDP sockets on your system:

- 1 socket for TFTP requests
- 1 socket for BOOTP (all purposes)
- 1 socket for each active file transfer (maximum 10)

C.8 Using PATHWORKS for Problem Solving

PATHWORKS for DOS V5.0 or later provides PING as a utility for troubleshooting IP network problems. Refer to your IP network documentation for more information about using PING.

C.9 Accessing DECROU Utilities

To access the DECROU utilities from any directory, add details of the location for the DECROU software to the PATH statement in your AUTOEXEC.BAT file.

C.10 X.25 PSDN Information

During the installation procedure, the following file is installed:

*d:**install–dir*\VR2\DOCS\FCNS_NI.TXT

where *d:**install–dir* is the drive and directory used for the DECROU software installation.

This file contains general information about X.25 PSDNs along with details of PSDNs supported by the WANrouter.

D

OpenVMS Hosts: Additional Information

D.1 Overview

The following pages contain additional information for all OpenVMS load hosts.

D.2 X.25 Profile Files

By default, the WANrouter software uses the latest X.25 profile files installed in MOM$SYSTEM (see Section 2.3.3). If you encounter problems because the software is using existing X.25 profiles (not WANrouter X.25 profile files), complete the following steps:

Step	Action
1.	Rename (not copy) the profile files that already exist on your system. For example: `RENAME FCNS$X25L2_PRF.DAT;2 FCNS$X25L2_PRF_OLD.DAT`
2.	Check that the WANrouter profile files are installed. See Section 2.3.3.
3.	Reconfigure the WANrouter and create a management load file. Follow the procedures in Chapter 4. When you create the management load file, the WANrouter software uses the X.25 profile files supplied with the WANrouter kit.
4.	Rename the temporary files back to their original names. For example: `RENAME FCNS$X25L2_PRF_OLD.DAT FCNS$X25L2_PRF.DAT;2`

To avoid the same profile problems reoccurring, complete the steps in the previous table each time you reconfigure the WANrouter and create a management load file.

D.3 X.25 PSDN Information

During the installation procedure, the following file is installed:

```
SYS$HELP:FCNS$NI.TXT
```

This file contains general information about X.25 PSDNs along with details of PSDNs supported by the WANrouter.

D.4 Defining Environment Variables

Do not define “DECROU” as an environment variable on your load host. This definition is already used by the WANrouter software.

D.5 Removing the WANrouter Software

To remove the WANrouter software from an OpenVMS load host, enter the following command:

```
@SYS$MANAGER:VR2$DEINSTALL.COM
```

E

DEC OSF/1 Hosts: Additional Information

E.1 Overview

The following pages contain additional information for DEC OSF/1 load hosts.

E.2 Setting Up DEC OSF/1 Systems for BOOTP/TFTP

Complete the following steps:

Step	Action
1.	When you run the load-host configurator, select either `BOOTP` or `MOP` and `BOOTP`.

2.	If your load host is not configured as a BOOTP server, ensure that the BOOTP and TFTP daemons are started on system startup. Complete the following:
	i Edit the file /etc/services to include the following lines:
	`bootps 67/udp`
	`tftp 69/udp`
	ii Edit the file /etc/inetd.conf to include the following lines:
	`bootps dgram udp wait root /usr/sbin/bootp bootpd –s`
	`tftp dgram udp wait root /usr/sbin/tftpd tftpd`
	iii Enter the following command to force the inetd daemon to reread the inetd.conf file:
	`kill –l` *`process-id`*
	where *process-id* is the process number of the inetd process.
	iv Edit the file /etc/bootptab to include the following lines:
	`.decroudefaults:\`
	`:hd=/usr/local/bootfiles:bf=system:`
	Note that these lines must be listed before the line:
	`load-client-name``:ht=1:ha=`*`hw-addr`*`:ip=`*`ip-addr`*`:tc=.decroudefaults:`
	For example:
	`.decroudefaults:\`
	`:hd=/usr/local/bootfiles:bf=system:`
	`wr90ew:ht=1:ha=08002b995ea0:ip=1.2.3.4:tc=.decroudefaults:`

3.	You can start TFTP in restricted mode. To set this up, follow the procedure in Section E.3.

E.3 Starting TFTP in Restricted Mode

You may want to start the TFTP daemon on the load host using restricted mode (also known as the -r *directory* option). This is a security feature. It ensures that only the directory tree starting with *directory* is searched for load files.

To use this feature, complete the steps in Table E–1.

Table E–1 Starting TFTP in Restricted Mode on DEC OSF/1 Hosts

Step	Action
1.	On the load host, create the following directory: */directory/load-directory* where: *directory* is at the top of the directory to be searched *load-directory* is the directory in which the load files are stored, as specified by /etc/bootptab
2.	Copy the combined system image and management load file to *load-directory*.
3.	Start TFTP by entering -r *directory*.

E.4 Location of BOOTP Load Files

This section specifies the directory and filenames that need to be in the /etc/bootptab file so that the DEC OSF/1 BOOTP load host correctly responds to load and dump requests from the router.

E.4.1 Directory Used for Storing Load Files

The BOOTP client database /etc/bootptab specifies where BOOTP load files are stored. By default, this database specifies /usr/local/bootfiles as the directory that stores BOOTP load files.

On the WANrouter, the configurator combines the system image and management load file into a single BOOTP file that can be loaded onto the router. The configurator places this file in /usr/lib/mop which contains MOP load files, and not the directory specified in the BOOTP client database. Then it sets up a softlink between the BOOTP load file in /usr/lib/mop to the file in the directory listed in /etc/bootptab.

This allows the same files to be loaded no matter which protocol is specified.

E.4.2 File Names

Table E–2 shows the names of the files linked by the softlink required for BOOTP/TFTP loading.

Table E–2 File Names Required for DEC OSF/1 BOOTP Loading

For this type of router...	This file...	Is linked to this file...
DECwanrouter 90	system.*load-client-name*	/usr/lib/mop/ vr29013_*load-client-name*.sys
DECwanrouter 90EW	system.*load-client-name*	/usr/lib/mop/ vr29f013_*load-client-name*.sys
DECrouter 250	system.*load-client-name*	/usr/lib/mop/ vr22013_*load-client-name*.sys

In Table E–2, *load-client-name* is the load client name for the WANrouter. Digital recommends that:

- You use /usr/local as the directory for the BOOTP files
- You make the BOOTP load client name the same as the MOP load client name

The configurator sets both of these automatically.

E.5 Defining Environment Variables

Do not define “DECROU” as an environment variable on your load host. This definition is already used by the WANrouter software.

E.6 X.25 PSDN Information

During the installation procedure, the following file is installed:

```
/usr/lib/dnet/fcns_ni.txt
```

This file contains general information about X.25 PSDNs along with details of PSDNs supported by the WANrouter.

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