X25router 2000
Installation Procedures (VMS)

Order No. AA-JH75B-TN

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How to Use This Manual

Manual Objectives

This manual explains how to install the X25router 2000 software. It includes:

- A description of the preparations you must make before you begin.
- A description of the installation.
- A guide to configuring the databases used by the X25router 2000.
- A guide to testing the installation.

Intended Audience

This manual is intended for anyone responsible for managing the X25router 2000. Management tasks include:

- Installing and configuring the software on one or more VMS load hosts.
- Checking that the software can load and dump.

This manual assumes that you understand and have some experience of:

- Local area networks (LANs)
- Wide area networks (WANs)
- DECnet-VAX
- X.25 communications
- Installation of software products on VMS systems
- One or more of Digital's X.25 products

Structure of the Manual

The manual has 5 chapters and 4 appendixes.

Chapter 1 describes what is involved in installation and configuration, and defines some terms you need to know in order to configure the product.

Chapter 2 describes what you need to do before you install and configure the software.

Chapter 3 explains how to install the software on a load host.

Chapter 4 explains how to configure the load host database and the X25router 2000 permanent database, and how to load the X25router 2000.

Chapter 5 explains how to run the Installation Checkout Procedure (ICP).

Appendix A is an example of installing and configuring the software on a host.

Appendix B is an example of executing the ICP.

Appendix C lists the X25router 2000 files installed.

Appendix D lists the messages that may be displayed when you run the X25router 2000 Installation Checkout Procedure (ICP).

Associated Manuals

For more information about the X25router 2000, refer to:

- *X25router 2000 Management Guide*
- *X25router 2000 Problem Solving Guide*

For information about routing concepts, refer to:

- *Routing and Networking Overview*

For information about X.25 PSDNs, refer to the *Public Network Information* manual. For further information about X.25 and VAX P.S.I., refer to the VAX P.S.I. documentation set.

The following provide information about the hardware used with the X25router 2000 software:

- *Installing the DEC MicroServer*
- *Installing the DEC MicroServer-SP*
- *DEC MicroServer Systems Configuration Card*

- *DEC MicroServer-SP Systems Configuration Card*

You should also be familiar with the following manuals:

- *VMS Networking Manual*
- *VMS Network Control Program Manual*
- *VMS Install Utility Manual*

Manual Conventions

<*xxx*>	This 1- to 3-character symbol indicates that you press a key on the terminal. For example, <RET> indicates the RETURN key, <ESC> indicates the ESCAPE key.
<CTRL/*x*>	This symbol indicates that you press the CTRL key at the same time as you press another key; for example, <CTRL/C>, <CTRL/Y>, and so on.
Red print	indicates commands and data that you enter.
Italics	indicate variable information.

Manual Terminology

X25router 2000 and DECrouter

The configuration procedure X25ROUCONFIG.COM calls the X25router 2000 a "DECrouter" in the text displayed on the screen. This is because the X25router 2000 belongs to the DECrouter family of software products.

DEC MicroServer (DEMSA) and DEC MicroServer-SP (DEMSB)

The X25router 2000 software runs on either the DEC MicroServer hardware unit (DEMSA) or the DEC MicroServer-SP hardware unit (DEMSB). Unless stated otherwise in this manual, the term "DEC MicroServer" refers to both the DEC MicroServer and the DEC MicroServer-SP.

1
Introduction

In order to set up an X25router 2000, you need to follow these steps:

1. Install the distribution software on a load host.
2. Run the command procedure X25ROUCONFIG.COM on the load host to configure the load host database. X25ROUCONFIG.COM also automatically adds X25router 2000 entries to the DECnet node databases.
3. Run the command procedure X25ROUSETUP.COM on the load host to configure the X25router 2000 permanent database.
4. Down-line load the configured X25router 2000 software image to the DEC MicroServer hardware unit.
5. Run the X25router 2000 Installation Checkout Procedure (ICP) to test that you have installed and configured the X25router 2000 software correctly.

A load host can be any VMS Phase IV DECnet node, provided that:

- It is running VMS or MicroVMS V4.7, VMS V5.0, VMS V5.1 or VMS V5.2.
- It is connected to the same Ethernet as the DEC MicroServer hardware unit.

The load host is also used to receive up-line dumps from the X25router 2000.

You are advised to install the X25router 2000 software on at least two load hosts. This will enable you to down-line load the X25router 2000 software to the X25router 2000 and receive dumps even if one load host is unavailable. See Section 3.4 for details.

1.1 Databases Used by the X25router 2000

The X25router 2000 uses the following databases:

- The **VMS load host database**. This contains information needed to down-line load the X25router 2000, including its node name and address and hardware address. The load host database is held in the file ROUCONFIG.DAT in the SYS$COMMON:[DECSERVER] directory.
- The **DECnet node databases**, which contain information about the X25router 2000.
- The **X25router 2000 permanent and volatile databases**. These contain two types of information:
  - **DECnet information**. This information is needed for the X25router 2000 to be a node in a DECnet network. It includes the executor type and information about DECnet lines and circuits.
  - **X.25 information**. This is the X.25 information needed for the X25router 2000 to connect to an X.25 network. This information includes, for example, the packet switching data networks (PSDNs) which can be used, DTE addresses and packetsizes.

  The X25router 2000 permanent database is stored on the load host. A copy of the permanent database is down-line loaded onto the DEC MicroServer with the the X25router 2000 software. This copy forms the X25router 2000 volatile database.

1.2 Use of Network Names for the X25router 2000

You use network names to identify:

- The PSDN you wish to use.
- The route you wish to use to access the PSDN - that is, which X25router 2000 node, and which line this node uses to connect to the PSDN.

Network names have to meet the following requirements:

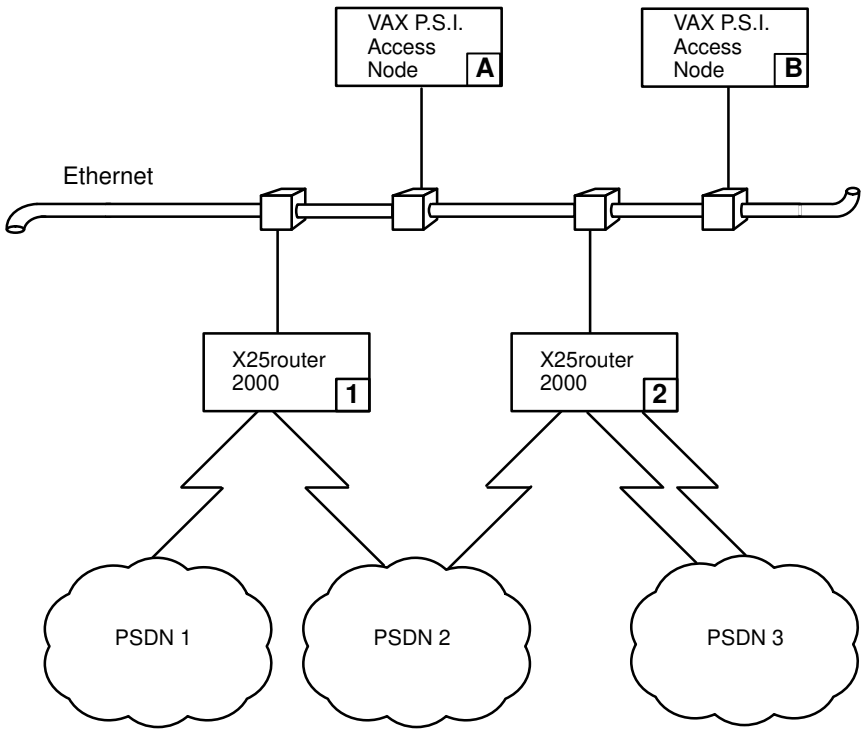
- You must have a different network name for each PSDN you want to access.
- If you have more than one connector node available to access the same PSDN, you must give each connection to the PSDN a unique network name. Examples of connector nodes are VAX P.S.I. Multi-host nodes and X25router 2000 nodes.

- The network name in the VAX P.S.I. Access node database must be the same as the network name defined in your X25router 2000 permanent database.

If you have more than one line between an X25router 2000 node and a PSDN, you may, if you wish, use different network names to distinguish between the lines.

In Figure 1–1, the network PSDN1 can be accessed only through X25router 2000 node 1, and thus requires only a single network name (PSDN1).

Figure 1–1 An Example Installation, with Two X25router 2000 Nodes



PSDN2 can be accessed through X25router 2000 node 1 and X25router 2000 node 2, so separate (unique) network names are required for VAX P.S.I. Access nodes to differentiate between the two different access routes. For example, you might choose network names "PSDN2A" and "PSDN2B".

PSDN3 can be accessed only through the two lines connected to X25router 2000 node 2. Therefore, PSDN3 does not require more than one network name. However, you may wish to distinguish between the two lines provided by X25router 2000 node 2 (for example, if the two lines have different speeds). To do this you would give PSDN3 two network names, for example "PSDN3A" and "PSDN3B".

1.3 Profile Names

The following attributes are associated with each PSDN connected to the X25router 2000:

- A profile name
- One or more DTE addresses
- One or more synchronous lines connected to the PSDN, one per DTE

The profile name is unique for each PSDN, and provides the X25router 2000 with the network characteristics. The profile names for public PSDNs appear in the *Public Network Information* manual. For a list of networks currently supported by Digital, see the *X25router 2000 Software Product Description*.

NOTE

You must use the correct profile name of a supported PSDN. Connecting to an unsupported PSDN invalidates Digital's VAX P.S.I. support.

1.4 Distribution Kits

The X25router 2000 can be installed on VMS systems from TK50 cassettes or magnetic tape. Table 1–1 gives details.

Table 1–1 Media Used to Install the X25router Software

Media type	Number
TK50	1
Magnetic tape	1

1.5 Installation Time

The installation from the distribution media of the X25router 2000 software should take no more than 10 minutes.

1.6 VMS Tailoring

For VMS V5.0 or later systems, the following VMS classes are required:

- VMS Required Saveset
- Network Support

1.7 Changing an X25router 2000 Configuration

Before you make any changes to your X25router 2000 configuration, you may need to alter the DTE Access Control Databases and Destination Access Control Databases on your VAX P.S.I. Access nodes. For details of these databases, see the *VAX P.S.I. Management Guide*.

1.7.1 Adding Further X25router 2000s to Your DECnet Network

If you have installed an X25router 2000 or a VAX P.S.I. Multi-host system on your network, and wish to provide one or more additional routes to the same PSDN via another X25router 2000:

1. Install and configure the X25router 2000, following the procedures described in Chapters 3 and 4.
2. Update the X25-ACCESS database on each of the VAX P.S.I. Access systems. See the *VAX P.S.I. Management Guide* for details.

1.7.2 Adding Load Hosts

To add a new load host to an X25router 2000 configuration, you need to install and configure the X25router 2000 on the new host. See Section 3.4 for details.

1.7.3 Adding VAX P.S.I. Access Nodes

After installing the VAX P.S.I. Access software, update the X25-SERVER database on the X25router 2000 system; this will enable appropriate incoming calls to be passed to the new VAX P.S.I. Access node. See the *X25router 2000 Management Guide* for details. Make sure the X25router 2000 is defined in

the X25-ACCESS database on the new VAX P.S.I. Access node, to allow the VAX P.S.I. Access node to make outgoing calls.

1.7.4 Adding New Connections to an X25router 2000 System

To add new network connections (a new DDCMP line, a new X.25 line DTE, or a connection to a new network) to your X25router 2000 system, run the command procedure X25ROUSETUP.COM at the load host. This is described in Section 4.2.

If you are adding a connection to a new PSDN, update the X25-ACCESS database on the VAX P.S.I. Access systems. See the *VAX P.S.I. Management Guide* for details.

2

Preparing to Install and Configure the X25router 2000

This chapter describes what you need to do before you install and configure the X25router 2000 software.

2.1 Preparing to Install

Before you install the software, you should make the following checks:

1. Check that the disk used for the X25router 2000 software is the default. Usually, this is the system disk (with the logical name SYS$SYSDEVICE).
2. Make sure you have a good backup copy of the disk you are going to use.
3. Check that there are enough free blocks on your disk to install the X25router 2000. If you try to install the X25router 2000 with too few free blocks, the installation procedure will fail.

   Table 2–1 shows how many free blocks you need.

Table 2–1 Number of Free Blocks Required

Product Type	For Installation	For Upline Dumps
X25router 2000	2000	4500
X25router 2000 with TRACE	2600	4500

To see how many free blocks there are on the disk, enter this command:

```
$ SHOW DEVICE SYS$SYSDEVICE
```

The display will show information about the disk, including the number of free blocks.

2.1.1 Privileges Required

In order to install the X25router 2000 software, you need the privileges OPER and SYSPRV.

2.2 Preparing to Configure

2.2.1 Configuration Checklist

Before you run X25ROUCONFIG.COM, check that:

1. DECnet-VAX is running on your load host node.
2. The Network Control Program (NCP) has been installed. Note that you only need to check this if your load host is running MicroVMS, rather than VMS. On VMS systems, NCP is installed automatically with DECnet-VAX.

2.2.2 Privileges Required

In order to run the configuration procedures X25ROUCONFIG.COM and X25ROUSETUP.COM, you need the privileges OPER and SYSPRV.

2.2.3 Configuration Information

Before you run X25ROUCONFIG.COM and X25ROUSETUP.COM, you need to gather information about your X25router 2000 system and the network that you will be using. Table 2–2 shows the information you require; you can also use it to record your own information.

Duplicate the sections of this table as many times as needed. For example, if you have two DTEs, you should duplicate the section headed **Information you will require for each DTE**.

See Chapter 3 of the *X25router 2000 Management Guide* for guidance on the meaning of the information in the table, and recommended values.

Digital suggests that you use the information under **Information you will require for each X25router** to complete the configuration card. The system manager needs to assign a DECnet node address and node name to the X25router node.

Table 2–2 Information You Require to Configure the X25router 2000 Software

Information you will require for each X25router 2000:		
Information	**Notes**	**Your Value**
DECnet node name of X25router 2000	A unique name of up to 6 alphanumeric digits, one of which must be a letter.	
DECnet node address of X25router 2000	A unique number in the range 1-1023. Include the area number (if any). See Section 4.1.2.2 for details.	
Ethernet address of X25router 2000	This is on a label at the back of the DEC MicroServer hardware unit.	
DECnet service circuit-ID	This identifies load host's Ethernet service circuit connected to the X25router 2000. For example, QNA-1. See Section 4.1.2.2 for details	
Information you will require for each network you use:		
Item	**Notes**	**Your Value**
Network name	Choose your own unique name. It may consist of up to 16 letters and numbers, in any combination.	
Profile name for network	Recorded in *Public Network Information* manual. Default is the network name.	
Information you will require for each DTE		
Item	**Notes**	**Your Value**
Local DTE address	DTE address for X25router 2000. Obtain this from your PTT representative.	
Channels range	A range of Logical Channel Numbers (LCNs) to be used by the DTE. Obtain this from your PTT representative.	
Synchronous port number	The X25router 2000 port number to be used for this DTE.	
Line name	The name of the line the DTE will use. For example, X25-0.	

Table 2–2 (Cont.) Information You Require to Configure the X25router 2000 Software

Information you will require for each VAX P.S.I. Access destination:

Information	Notes	Your Value
Destination name	Choose a unique name.	
Destination node name	Name of VAX P.S.I. Access node for destination.	
Destination priority	Range is 0-255. The default is 0.	
Call mask	Value between 2 and 32 hexadecimal digits. Example: FF00FE	
Call value	Value between 2 and 32 hexadecimal digits. Example: FF5053	
Closed User Group (CUG)	Name of closed user group which has access to this destination. 1 to 10 characters.	
Sending Address(es)	Remote DTE address(es) which have access to this destination.	
Subaddress range	Accepted range of subaddresses in incoming calls for this destination.	
Object identification	This must be 36.	

3
Installing the X25router 2000 Software

This chapter explains how to install the X25router 2000 distribution software on a VMS load host.

Please note that the screen displays reproduced in this chapter are the ones that appear when you run the VMS V5.0 version of VMSINSTAL. If you are running other versions of VMSINSTAL, some of the displays may be slightly different.

3.1 How the Installation Procedure Works

During the installation, the installation procedure prompts you with questions. In many cases defaults have been set up. These are indicated in square brackets. To accept the default, press <RET>.

You can cancel the X25router 2000 installation at any time by pressing <CTRL/Y>. After a short delay, you will see the message:

```
%VMSINSTAL-F-CTRLY, Installation canceled via CTRL/Y.
%VMSINSTAL-F-UNEXPECTED, Installation terminated due to unexpected event.

           VMSINSTAL procedure done at time
```

If you press <CTRL/Y> after you have been told that the files are being moved to their target directories, your system will have some new and (if previously installed) some old X25router 2000 files. To prevent problems, you should re-install the product from the beginning.

3.2 Printing the Release Notes

You should print the release notes before you install the X25router 2000, as they may give you useful information relating to the installation. This section describes the steps you follow in order to print the release notes and/or view them on-line.

1. Log in to the system manager's privileged account (SYSTEM).
2. Enter this command:

   ```
   $ @SYS$UPDATE:VMSINSTAL X25ROU ddcu OPTIONS N
   ```

   where *ddcu* is the name of the device that the distribution kit is mounted on.

   dd is the device code
   c is the controller letter
   u is the unit number

   For example, MUA0:

   OPTIONS N specifies that you wish to print or view the Release Notes.
3. The procedure now displays:

   ```
       VAX/VMS Software Product Installation Procedure Vn

   It is date at time.
   Enter a question mark (?) at any time for help.
   ```

   where *n* is the number of the version of VMS or MicroVMS you are using.

   If DECnet is currently running on your system, the procedure also displays the message:

   ```
   %VMSINSTAL-W-DECNET, Your DECnet network is up and running.
   * Do you want to continue anyway [NO]?
   ```

   Enter YES.
4. The procedure now displays:

   ```
   * Are you satisfied with the backup of your system disk [YES]?
   ```

   As you are only printing the release notes, enter YES.
5. The procedure now displays:

   ```
   The following products will be processed:
     X25ROU V1.1
           Beginning installation of X25ROU V1.1 at time
   %VMSINSTAL-I-RESTORE, Restoring product saveset A...
   ```

6. After a delay, the procedure displays the release notes options:

```
    Release Notes Options:

        1. Display release notes
        2. Print release notes
        3. Both 1 and 2
        4. Copy release notes to SYS$HELP
        5. Do not display, print or copy release notes

* Select option [2]:
```

   Digital recommends that you select Option 2.

   Note that the release notes will be copied to SYS$HELP if you choose any of the options 1 to 4.

   If you are using a load host running VMS V4.7, only options 1, 2 and 3 will be displayed.

7. If you selected Option 2 or 3, you are asked to queue the file to a printer:

```
* Queue name [SYS$PRINT]:
```

   Press <RET> or specify another print queue.

   If you selected Option 1 or 3, you will first see:

```
VMI$ROOT:[SYSUPD.X25ROU011] X25ROU011.RELEASE_NOTES;1
```

   Then the release notes will be displayed on your terminal.

8. Now the procedure displays:

```
* Do you want to continue the installation ?
```

   Enter NO. The following message is displayed:

```
%VMSINSTAL-I-RELMOVED, The product's release notes have been
successfully moved to SYS$HELP.
        Installation of X25ROU V1.1 completed at hh:mm
        VMSINSTAL procedure done at hh:mm
```

You can now read the release notes. Check for any information that is likely to affect the installation of the X25router 2000 software.

The VMSINSTAL procedure creates a file for the release notes, called X25ROU011.RELEASE_NOTES in the SYS$HELP directory.

3.3 Installing the X25router 2000 Software

To install the X25router 2000 software, follow these steps:

1. Log in to the system manager's privileged account (SYSTEM).

2. Enter this command:

```
$ @SYS$UPDATE:VMSINSTAL X25ROU ddcu
```

   Note that this command is the same as that in Step 2 in Section 3.2, except that you do not enter OPTIONS N.

3. The procedure displays:

```
    VAX/VMS Software Product Installation Procedure Vn

It is date at hh:mm.

Enter a question mark (?) at any time for help.
```

   where *n* is the number of the version of VMS or MicroVMS you are using.

   If DECnet is currently running on your system, the procedure also displays the message:

```
%VMSINSTAL-W-DECNET, Your DECnet network is up and running.
* Do you want to continue anyway [NO]?
```

   As you do not have to turn DECnet off to install the software, enter YES.

4. The procedure now displays:

```
* Are you satisfied with the backup of your system disk [YES]?
```

   If you are not satisfied, enter NO to end the procedure. When you have backed up your system disk, start the installation again.

   If you are satisfied, enter YES. The procedure then displays:

```
The following products will be processed:

  X25ROU V1.1

        Beginning installation of X25ROU V1.1 at time

%VMSINSTAL-I-RESTORE, Restoring product saveset A...
%VMSINSTAL-I-RELMOVED , The product's release notes have been
successfully moved to SYS$HELP.
```

5. The procedure then asks:

```
* Do you want to purge files replaced by this installation [YES]?
```

   Enter YES to purge files from previous installations of X25router 2000 software.

6. The procedure then displays:

```
The X25router 2000 kit has 2 components:

    o   X25router 2000 software

    o   Trace software

You may install either one or both of these components.

* Do you want to install the X25router 2000 software [YES]?
* Do you want to install the TRACE software [YES]?
```

Refer to the *X25router 2000 Problem Solving Guide* for details of the TRACE utility. If you already have the TRACE utility installed, the procedure will remind you about this, and continue.

If you ask for only the X25router 2000 to be installed, you can install TRACE at a later date. To do this, you first need to re-run VMSINSTAL. Then, answer NO to the question, `Do you want to install the X25router 2000 software?`. Finally, answer YES to the question, `Do you want to install the TRACE software?`

7. If you are using VMS V5, the procedure will ask:

```
* Does this product have an authorization key registered and loaded?
```

The procedure is asking if you have a product license installed (also known as the Product Authorization Key (PAK)).

To install a PAK, you use the VMS License Management Facility (LMF), which is available with VMS 5.0. LMF is a management tool which enables you to register, manage and track software licenses on line. You do not need a license to install and operate the X25router 2000 software. However, Digital recommends that you install a license so that you can keep your database of layered products up to date. See the *VMS License Management Utility Manual* in the VMS documentation set for more information.

If you have registered and loaded the PAK, enter YES. You will go directly to step 8.

If you have not registered and loaded the (PAK), enter NO. The procedure then displays:

```
    DIGITAL recommends that you install the license for
    the X25router 2000 on completion of the installation.

* Do you wish to exit [YES]?
```

If you wish to install the PAK, you can exit now. Otherwise, enter NO.

8. If you have asked for both components to be installed, you will see the message:

```
%VMSINSTAL-I-RESTORE, Restoring product saveset B ...
%VMSINSTAL-I-RESTORE, Restoring product saveset C ...

The following software will now be installed:

    o   X25router 2000 software

    o   Trace software
```

The installation procedure now copies the contents of the distribution volume to a subdirectory in SYS$UPDATE.

9. The procedure now checks the definition of the system logical, MOM$LOAD. If you have not defined MOM$LOAD, the procedure asks if you wish to define it now, and will automatically define it for you.

If you have already defined MOM$LOAD, but MOM$LOAD does not include a directory called SYS$SYSROOT:[DECSERVER], the procedure asks if you wish to redefine MOM$LOAD now, and will automatically redefine the logical to include SYS$SYSROOT:[DECSERVER].

If MOM$LOAD is already correctly defined, the question is not asked.

10. The procedure now displays the following messages:

```
After exiting from VMSINSTAL, do the following:

1. If the definition for MOM$LOAD in the system start-up file
   does not contain SYS$SYSROOT:[DECSERVER], you must edit your
   system start-up file so that it defines the logical MOM$LOAD
   as a search string with a value equal to itself and the
   element SYS$SYSROOT:[DECSERVER]. For example:

   DEFINE/SYSTEM/EXEC/NAME_ATTRIBUTE=NO_ALIAS/NOLOG MOM$LOAD -
   "current-search-string",SYS$SYSROOT:[DECSERVER]

   This command allows the location of the X25router 2000 image
   to be defined each time the system is rebooted, so the system
   will load correctly.
```

If you are running VMS V5.0 or V5.0-1, the following text will also be displayed:

```
   You are running on VMS V 5.0 or V 5.0-1. Logicals that are
   required to load your X25router may not be defined for you.

   There is a command file X25ROU_LOGICALS.COM in the directory
   SYS$MANAGER. This command file must be run before you try to
   load your X25router 2000. To ensure that the logicals are
   defined every time you boot your system add the line:

    $ @sys$manager:x25rou_logicals.com

    to the file SYS$MANAGER:SYSTARTUP_V5.COM
```

For all VMS versions, the following is displayed:

```
2. Configure your X25router 2000 into the load host's database.
   Execute the command procedure called X25ROUCONFIG.COM which
   is in the SYS$SYSROOT:[DECSERVER] directory. If you have
   already executed this procedure from previous installations,
   you only need to configure any additional X25router 2000
   units. All previously defined DECrouter units will still be
   configured within the load host's database. Refer to Chapter
   4 of the X25router 2000 Installation Procedures for further
   details.

3. Set up the X25router 2000 permanent database before powering
   up the hardware. Execute the command procedure called
   X25ROUSETUP.COM which is in the SYS$SYSROOT:[DECSERVER]
   directory. Refer to Chapter 4 of the X25router 2000
   Installation Procedures for further details.

   If you wish to modify the X25router 2000 database for your
   specific networking requirements, execute the X25ROUPERM.EXE
   program which is in the SYS$SYSTEM directory. This program is
   described in the X25router 2000 Management Guide.
```

```
4. REMINDER: The release notes for the  X25router  2000  are in
   X25ROU011.RELEASE_NOTES  which is in the directory SYS$HELP.
```

If you requested that TRACE be installed, the procedure also displays:

```
5. A  command  file  SYS$MANAGER:NETTRACE_INSTALL.COM  has  been
   created  to  install  the  TRACE  utility.  Edit  your system
   start-up  file to execute  this file each time your system is
   booted.
```

Note that the default name of the system start-up file is different depending on whether the load host is running VMS V4.7, or VMS V5.0 and higher:

- If the load host is running VMS V4.7, the name of the default system start-up file is SYSTARTUP.COM.
- If the load host is running VMS V5.0 or higher, the name of the default system start-up file is SYSTARTUP_V5.COM.

11. The procedure now displays:

```
%VMSINSTAL-I-MOVEFILES, Files will now be moved to their target
directories...

        Installation of X25ROU V1.1 completed at hh:mm

        VMSINSTAL procedure done at hh:mm
```

See Appendix C for a list of the files installed. See Chapter 4 for details of how to run X25ROUCONFIG.COM and X25ROUSETUP.COM.

3.4 Installing and Configuring on Multiple Load Hosts

You are advised to install the X25router 2000 software on at least two load hosts. This will enable you to down-line load the X25router 2000 software to the DEC MicroServer and receive dumps even if one load host is unavailable.

The procedure is slightly different depending on whether or not the load hosts are members of the same VAXcluster.

- **If load hosts are not members of the same VAXcluster**:
  1. Repeat the installation procedure described in this chapter at each load host.
  2. Run X25ROUCONFIG.COM and X25ROUSETUP.COM at each load host. See Section 4.1 and Section 4.2 for details.
- **If load hosts are members of the same VAXcluster**:
  1. Carry out the installation procedure on one of the nodes in the VAXcluster. A copy of the installed software is automatically placed in the SYS$COMMON area.

2. Redefine MOM$LOAD on each VAXcluster node to be used as a load host.
3. Run the command procedure X25ROUCONFIG.COM on one node within the VAXcluster.
4. Re-run X25ROUCONFIG.COM with the RESTORE option on the other VAXcluster nodes that you wish to use as load hosts. See Section 4.1.2.5 for details of the RESTORE option.
5. Run X25ROUSETUP.COM on the VAXcluster nodes you wish to use as load hosts.

4
Configuring the X25router 2000

When you have finished installing the distribution software, you must:

1. Run the command procedure X25ROUCONFIG.COM to add entries to the VMS load host database. This command procedure also automatically adds entries to the permanent and volatile DECnet node databases for the load host.
2. Run the command procedure X25ROUSETUP.COM to set up entries in the X25router 2000 permanent database.
3. Down-line load the configured X25router 2000 software to the DEC MicroServer hardware unit.

NOTE

You must not down-line load the X25router 2000 until you have run X25ROUCONFIG.COM and X25ROUSETUP.COM; if you do, it may disrupt the normal operation of your network. If you are using more than one load host, be sure that you follow the steps in Section 3.4.

4.1 Using X25ROUCONFIG.COM

When you run X25ROUCONFIG.COM, it displays a menu. The menu options allow you to:

- **List** the X25router 2000s in the load host database.
- **Add** an X25router 2000 to the load host and DECnet node databases. This is the option you use when you first install an X25router 2000.
- **Swap** an existing X25router 2000 for a new one.

- **Delete** an X25router 2000 from the load host and DECnet databases.
- **Restore** X25router 2000 information from the load host database to the DECnet node database on the load host.
- **Upgrade** an X25router 2000 entry in the load host and DECnet node databases from the previous version of the X25router 2000 software to the current version.

When you are using X25ROUCONFIG.COM, note that:

- While you are using an option, you can obtain HELP by entering a question mark (?).
- When you have finished answering the questions on a selected option, X25ROUCONFIG.COM automatically returns you to the menu.
- To exit from an option without making any changes, press <CTRL/Z>. You will return to the menu.
- To exit from X25ROUCONFIG.COM, press <CTRL/Z> at the menu.

Note that the X25router 2000 is called a "DECrouter" in some of the text displayed on the screen.

If you select the Add, Delete or Swap options, NCP messages may be displayed when you have completed the option. For details of error messages, see the *VAX/VMS System Messages and Recovery Procedures Reference Manual*.

4.1.1 Starting X25ROUCONFIG.COM

To start running X25ROUCONFIG.COM, follow these steps:

1. Log into the system account, or any account with OPER and SYSPRV privileges.
2. Enter the following command:

   ```
   $ @SYS$SYSROOT:[DECSERVER]X25ROUCONFIG
   ```

   The display reminds you that each X25router 2000 must have a unique DECnet node name and DECnet node address. The procedure then prompts you:

   ```
   Press <RET> to start, or <CTRL/Z> to exit...
   ```

3. If you press <RET>, X25ROUCONFIG.COM displays:

```
            DECrouter Configuration Procedure

                        Menu of Options

                  1 - List known DECrouters
                  2 - Add a DECrouter
                  3 - Swap an existing DECrouter
                  4 - Delete an existing DECrouter
                  5 - Restore existing DECrouters
                  6 - Upgrade existing DECrouters
            CTRL/Z - Exit from this procedure

      Your choice:
```

4.1.2 X25ROUCONFIG.COM options

Options 1 to 5 are described in Sections 4.1.2.1 to 4.1.2.5 below.

4.1.2.1 List Known DECrouters

This shows information about the load host database including the names of the load and dump files used. For example:

```
DECnet  DECnet Router  Service
Address Node   Type    Circuit  Ethernet Address   Load File   Dump File
------- ------ ------  -------  -----------------   ----------- ---------
12.1001 KANGA  X25ROU  QNA-0    08-00-2B-02-CC-24  X25011.SYS  X25KANGA.DMP
12.1002 KOALA  X25ROU  QNA-0    08-00-2B-02-AA-23  X25011.SYS  X25KOALA.DMP

Total of 2 DECrouters defined.
```

The naming conventions for the load and dump files are:

X25011.SYS for load files

X25*router*.DMP for dump files, where *router* is the node name of the X25router 2000.

4.1.2.2 Add a DECrouter

This option allows you to add an X25router 2000 to your system. It displays the following prompts:

1. `DECrouter type (DR200, DR2000, X25ROU):`

   Specify X25ROU for an X25router 2000.

2. `DECnet node name for unit:`

   Specify a DECnet node name for the X25router 2000. This must be up to six alphanumeric characters, at least one of which must be a letter.

   The name must be unique on your DECnet network.

3. `DECnet node address for unit:`

   Specify the DECnet node address for the X25router 2000. This is a number from 1 to 1023.

   If your network is divided into areas, include the area number within the address (the area address is inserted in front of the node address). For example, if an address is 12.1001, 12 is the area number and 1001 is the node number. If you omit the area number, the area number of the current load host is used as a default.

   The number you specify must be unique on your DECnet network. It must not already exist in the DECnet node database for your load host. If you enter a DECnet node address that is already in the database, the following will happen:

   - An X25ROUCONFIG.COM error will be displayed.
   - Nothing will be added to the database.
   - You will exit from the ADD option and return to the menu.

4. `Ethernet address for unit (nn-nn-nn-nn-nn-nn):`

   Specify the Ethernet address of the X25router 2000. This address is on the back of the DEC MicroServer hardware unit, and is on the *DEC MicroServer Systems Configuration Card*. Enter the Ethernet address as six pairs of hexadecimal digits, with a hyphen separating each pair. For example:

   08-00-2B-00-11-AB

5. `DECnet Service Circuit-ID [`*`ddd`*`-0]:`

   In the prompt, *ddd* is an acronym that indicates an Ethernet controller type. It will be one of the following:

   UNA for DEUNA or DELUA
   QNA for DEQNA
   BNA for DEBNA or DEBNT (VMS V4.7 only)
   SVA for DESVA

   The DEBNT is not supported on VMS V5.0 and later. It is supported on VMS V4.7.

   To accept the default, simply press <RET>.

   You can specify a different service circuit-ID from the default. Usually, you only need to change the integer, as the acronym denotes a supported Ethernet controller type for your CPU type. However, you can change both the acronym and the integer if you wish.

   If you change the service circuit-ID, the new circuit-ID becomes the default.

Once you have specified the service circuit-ID, X25ROUCONFIG.COM adds the new X25router 2000 entry to the database, and sets SERVICE ENABLED on the circuit supporting the Ethernet controller. This allows the load host to down-line load the X25router 2000 software to the DEC MicroServer.

When X25ROUCONFIG.COM sets SERVICE ENABLED on the circuit, this may cause the circuit to be turned off and then turned on again. This in turn may cause events to be logged.

If an NCP error message is displayed while you are adding an X25router 2000, the entry will be added to the load host database, but will not be added to the DECnet node databases. Therefore, you should immediately use Option 4 to delete the entry, locate and fix the condition that is responsible for the DECnet error, and return to Option 2 to add the entry again.

4.1.2.3 Swap an Existing DECrouter

This option allows you to swap an existing X25router 2000 for a new hardware unit but retain the original DECnet address. The Swap option is useful when you want to replace a faulty hardware unit. X25ROUCONFIG.COM asks you to specify the new Ethernet address.

The procedure displays the following message:

```
If you use this option, and you have more than one load host for the
DECrouter, you must modify the database for each load host. To do this,
execute X25ROUCONFIG on each load host, and select the SWAP option.
```

The procedure asks:

```
    What is the node name of the DECrouter you want to swap?
```

Specify the node name of the existing X25router 2000 that you want to replace. The configuration procedure displays the Ethernet address of the old unit and asks the following question:

```
DECrouter node-name at Ethernet Address
nn-nn-nn-nn-nn-nn is being swapped.
Enter the Ethernet address of the new X25ROU to replace node-name.
```

Specify the Ethernet address of the new unit. This address is situated on the back of the hardware unit, and is on the *DEC MicroServer Systems Configuration Card*. Enter the Ethernet address as six pairs of hexadecimal digits, with a hyphen separating each pair. For example:

08-00-2B-00-11-AB

4.1.2.4 Delete an Existing DECrouter

You use this option to delete an X25router 2000 from the database. You might want to do this when you reconfigure the network or change the load hosts.

X25ROUCONFIG.COM prompts you for the name of the X25router 2000:

```
What is the DECnet node name of the unit you want to delete?
(CTRL/Z to return to menu)
```

Specify the DECnet node name of the X25router 2000 you want to delete. The procedure checks that there is an entry for the specified node name in the database, removes the entry and returns you to the menu.

If the entry does not exist, X25ROUCONFIG.COM informs you about this, and returns you to the menu.

4.1.2.5 Restore Existing DECrouters

You use this option to restore information about X25router 2000s in the load host database to the DECnet node database on the load host. The Restore option affects both the volatile and the permanent DECnet node databases.

You might need to do this in the following circumstances. If your network contains a large number of nodes, you may store your DECnet node database on a remote, central node and copy this database to each node at system start-up. In these circumstances, Digital advises that you define only the DECnet address and node name of each X25router 2000 in the central database, as only the load hosts need any more information. If you do this, you will need to restore the X25router 2000 information from the load host database on a node to the DECnet node database on that node. You will need to do this each time you copy the DECnet node database from the central node.

The following messages confirm that the configurations have been restored.

```
Restoring existing DECrouters from to host DECnet database.
Host DECnet database successfully restored.
```

4.1.2.6 Upgrade Existing DECrouters

This option allows you to upgrade X25router 2000 entries in the load host and DECnet node databases from the previous version of X25router 2000 software to the current version.

You can either specify the node name of the X25router 2000 that you wish to upgrade, or specify all X25router 2000s.

The procedure displays the following message:

```
    If  you  use  this option, and you have more than one load
    host for any  DECrouters, you must modify the database for
    each  load host. To do  this, execute X25ROUCONFIG on each
    load host, and select the UPGRADE option.

    Enter the node name of the DECrouter to upgrade. To upgrade
    all defined DECrouters enter *.

What is the DECnet node name of the DECrouter ?
```

Enter the DECnet node name of the X25router 2000 that you want to upgrade.

The procedure then displays:

```
DECrouter node-name to be upgraded to SYS$COMMON:[DECSERVER]X25011.SYS
Executing NCP commands to upgrade DECrouters
```

4.1.3 Restoring the Configuration Automatically

You can automate the menu option **Restore Existing DECrouters** by running X25ROUCONFIG.COM with the RESTORE parameter:

```
$ @SYS$SYSROOT:[DECSERVER]X25ROUCONFIG RESTORE
```

The RESTORE parameter bypasses the menu and automatically runs the restore procedure described in Section 4.1.2.5.

If you want this automatically done at system start-up, include the following statement after the line @SYS$MANAGER:STARTNET in the start-up command procedure:

```
@SYS$SYSROOT:[DECSERVER]X25ROUCONFIG RESTORE
```

4.2 Using X25ROUSETUP.COM

You run X25ROUSETUP.COM to configure the X25router 2000 permanent database. In most cases, this is all you need to do to set up this database. If you wish to tailor the database to your specific networking requirements, you should run X25ROUPERM.EXE, described in the *X25router 2000 Management Guide*.

When you run X25ROUSETUP.COM, it prompts you with a series of questions. You can obtain HELP at any time by entering a ?. You can exit from the procedure by typing <CTRL/Z>.

Section 4.2.1 describes how to configure the X25router 2000 for the DEC MicroServer (DEMSA); Section 4.2.2 describes how to configure it for the DEC MicroServer-SP (DEMSB).

In the next sections, the screen prompts are shown in a series of numbered steps. These step numbers do not appear on the screen. Their purpose is to guide you through the procedure.

X25ROUSETUP.COM contains four stages:

- Enter information about the type of X25router 2000 and about access control.
- Enter information about X.25 connections.
- Enter information about X25-SERVER destinations.
- Enter information about DECnet circuits.

4.2.1 Running X25ROUSETUP.COM: DEMSA

Follow these steps:

1. Log into the system account, or any account with OPER and SYSPRV privileges, and enter the following command:

   ```
   $ @SYS$SYSROOT:[DECSERVER]X25ROUSETUP
   ```

2. X25ROUSETUP.COM displays:

   ```
   This command procedure sets up the permanent database for
   the X25router 2000.  Usually, executing this procedure is
   all you need to do to set up the database.

   The  procedure consists of a series of questions. If you
   need help  with  answering  a  question,  enter  ?  as a
   response and the HELP text will be displayed.

   X25router 2000 node name     (node-id):
   ```

   Enter the DECnet node name for the X25router 2000.

   This name can consist of up to six alphanumeric characters, the first of which must be alphabetic. The name identifies the X25router 2000 within the network, and should therefore be unique within the network.

3. The procedure now displays:

   ```
   X25router 2000 type [DEMSA, DEMSB]:
   ```

   Enter DEMSA. To configure X25router 2000 for the DEMSB hardware unit, see Section 4.2.2.

4. If you enter a node name which already exists, the procedure displays:

   ```
   A configuration file for node already exists.

   You may  either keep the existing configuration file and
   modify it or create a new database.

Do you want to create a new database [YES]?
   ```

If you answer YES, the procedure displays:

```
The old configuration file for node will be
renamed to new-name
```

A new version of the configuration file will be created. The previous version will be renamed and stored in the SYS$COMMON:[DECSERVER] directory.

If you answer NO, the procedure asks:

```
Do you want to change the EXECUTOR characteristics now [YES]?
```

Answer YES to change the DECnet EXECUTOR characteristics of your X25router 2000 node. If you answer NO, the procedure goes to a later stage of the procedure, which involves defining the PSDNs and DTEs for each network.

5. The procedure now displays:

```
Your X25router 2000 can be one of three types of DECnet
node:

    NONROUTING (end node)
    ROUTING IV (level 1 router)
    AREA       (level 2 router)

Specify the type you require.

Node type             [NONROUTING]:
```

If your configuration will use any DLM or DDCMP circuits, you must specify AREA or ROUTING IV. Specify NONROUTING only if your configuration will use just the Ethernet circuit, or just the Ethernet circuit and PVC circuits.

An AREA router can forward packets from one area within a network to another area. A ROUTING IV router can only forward packets within its own area.

6. If you specified NONROUTING, you now go to Step 8, which asks about the X25router 2000 type.

   If you specified ROUTING IV or AREA, the procedure displays:

```
Ethernet circuit cost          [4]:
```

   Specify a value in the range 1 to 63. The cost is a value assigned to a circuit between two adjacent nodes. Packets are routed along paths with the smallest cost.

   The procedure now displays:

```
Router priority              [64]:
```

   Specify a value in the range 1 to 127. The router with the highest priority will become the designated router for the Ethernet.

7. The procedure now displays:

```
If you want to use incoming datalink mapping (DLM)
circuits you need to specify a subaddress range to use
to pass the incoming X.25 calls to DECnet.

If you do not want to use incoming DLM circuits, just
press <RETURN> to continue.

Subaddress range            [NONE]:
```

   A subaddress is used to identify which software a call is to be routed to. It must be a decimal number of up to four digits.

   To use incoming DLM circuits, enter the subaddress or range of subaddresses for incoming X.25 calls to be passed to DLM. The range should be in the form: *n-N*, where *n* is the bottom of the range, and *N* is the top of the range. For example, for subaddresses ranging from 90 to 99, enter: 90-99.

8. The procedure now displays:

```
The X25router 2000 supports the following combinations
of lines, line speeds and ports. Specify the type you
require.

Type    Number of lines    Maximum Speed          Ports
                             (per second)

  1            4               64 K             0,1,2,3
  2            3              256 K             0,1,2
  3            2              384 K             0,1

Type                          [1]:
```

   Specify Type 1 or 2.

9. The procedure now displays:

```
Enter the username and password to be used to control
access to the X25router 2000. If you specify this
information here, then it must be supplied whenever
lines, DTEs or circuits on the X25router 2000 are
being modified.

If this information is not specified, anyone can
modify the X25router 2000. DIGITAL STRONGLY RECOMMENDS
that you specify access control for the NML object.

NML Username [NONE]:
NML Password:
Verification:
```

   If you supply an NML username and password, only users who supply this username and password will be allowed to alter the X25router 2000 volatile database. The username and password each consist of up to 16 alphanumeric or punctuation characters.

Digital strongly recommends that you specify an NML username and password. Otherwise, any user on the network can modify your X25router 2000.

Remember what you specify for the username and password, as you will need it to modify the X25router 2000 volatile database.

For example, to gain access to the X25router 2000 volatile database which has a username "ENGLAND" and a password "LONDON", and is on a node called "EUROPE", you would use the command:

```
NCP>set executor node EUROPE user ENGLAND password LONDON
```

For more details about using the username and password, see the *X25router 2000 Management Guide*.

10. The procedure now displays:

```
    Enter  the  username  and password to be used for the
    TRACE utility. If you specify  this  information here,
    then it must be supplied when using the TRACE utility
    on the X25router 2000.

    If this  information  is  not  specified,  anyone  can
    monitor the traffic on  the  X25router 2000.

    DIGITAL STRONGLY RECOMMENDS that you set up a username
    and password for the TRACE utility.

TRACE Username [NONE]:
TRACE Password:
Verification:
```

If you supply a TRACE username and password here, only those who supply this username and password will be allowed to use the TRACE utility to monitor traffic on this X25router 2000. The username and password each consist of up to 16 alphanumeric or punctuation characters.

Digital strongly recommends that you set up a username and password for the TRACE utility. Otherwise, any user within the network with OPER privileges and TRACE installed on their VMS node can monitor the traffic on your X25router 2000.

Remember what you specify for the username and password, as you will need it when you use the TRACE utility.

For example, if you wished to use the TRACE utility on an X25router 2000 on a node called "AFRICA", with a TRACE username "MOROCCO" and password "CASABLANCA", you would use the command:

```
TRACE>start AFRICA"MOROCCO CASABLANCA"::X25L2
```

where X25L2 is the tracepoint name.

For more details of using the TRACE utility, see the *X25router 2000 Problem Solving Guide*.

11. The procedure now displays a list of configurator commands it will use to update the X25router 2000 permanent database with the information given so far. It also asks:

```
Do you want the permanent database defined now [YES]?
```

    If you are configuring a new X25router 2000, you must answer YES, or the procedure will not continue. If you wish to modify the configuration of an existing X25router 2000, you should also answer YES.

    You should answer NO only if this X25router 2000 has previously been configured, and you do not want to change the configuration. If you answer NO, the procedure will simply continue.

12. The procedure now displays:

```
    This command procedure allows you to define one or
    more PSDN(s) and one or more DTEs associated with each
    network.

Do you want to define the X25-PROTOCOL database now [YES]?
```

    Answer YES if you want to define the PSDNs and DTEs associated with each network. If you answer NO, you will go to a later stage of the procedure, to set up X25-SERVER destinations.

    If you answer YES, the procedure continues:

```
    You can use this procedure to purge the database to
    remove all line, DTE and X.25 protocol information
    before updating the permanent database.

    The following configurator command will be used to
    purge the line permanent database:

    PURGE known lines all

    The following configurator commands will be used to
    purge the DTE and X.25 permanent database:

    PURGE module x25-protocol known networks all
    PURGE module x25-protocol known dtes known networks all

Do you want the information in the line permanent database
to be purged [NO]?
```

    If you wish to keep previous definitions for lines (including DDCMP lines), press <RET>. The procedure then asks:

```
Do you want the information in the X.25 and DTE
permanent database purged [NO]?
```

    If you wish to keep previous definitions for DTEs, press <RET>. If you enter YES, to purge the databases, you will see this message:

```
    A command procedure will now be executed to perform
    the requested definitions.

    Please ignore any error messages.
```

Ignore any error messages that may appear.

13. The procedure now displays:

```
PSDN and profile names are defined here. You can define
one or more PSDNs.  For each PSDN  you will be asked to
provide the  network name and the profile name for that
network.

Network name   (string):
```

    Enter the network name that connects to the PSDN. For details of network names, see Section 1.2.

    If you do not want to enter a network name, press <RET>. The procedure will ask:

```
Do you want to define any more networks [NO]?
```

    If you answer YES, you will be asked for a network name again.

    If you answer NO, the procedure will update the X25router 2000 permanent database with any network(s) you have defined. You will then go to a later stage of the procedure, to set up X25-SERVER destinations.

    If you do enter a network name, the procedure will display:

```
Profile name   (string) [network-id]:
```

    Enter the profile name of the PSDN to which the DTE will connect. Refer to Section 1.3 in Chapter 1 for details of profile names. If the profile name is identical with the network name, simply press <RET>.

14. The procedure now displays:

```
The following configurator command will be used to
update the permanent database:

DEFINE module x25-protocol network network-id  -
                            profile profile-name

Do you want the information in the permanent database
updated  [YES]?
```

    If you answer NO, the permanent database will not be updated. (You may enter the required NCP commands later, if you wish.) You will be asked if you want to define any more networks; see the previous step.

    If you want the database updated, answer YES.

15. The procedure now displays:

```
DTEs are  defined  here.  You  can  define  one or more
DTEs connected  to this network. For each DTE  you will
be asked to provide the following information:

    o   DTE address
    o   Range of channels to be used by the DTE
    o   Synchronous port number to be used by the line
    o   Line associated with the DTE
```

```
DTE address       (number):
```

Enter your DTE address. For details on the format of this address, see the *Public Network Information* manual.

The procedure now displays:

```
Channels range      (list):
```

Enter the channels that the DTE will use for outgoing calls. Specify high-numbered channels before low-numbered channels. Each entry in the channels list can be either a single channel number or a channel range (with a hyphen separating the high and low numbers). The entries in the list must be separated by commas. For example:

Channels range (list):1555,1544-1540,1536

The PSDN authorities allocate channel ranges at subscription time. For details on the channel ranges your PSDN can allocate, see the *Public Network Information* manual.

The procedure now displays:

```
Synchronous port     (0-3):
```

Enter the number of the synchronous port on the X25router 2000 that will be used for the DTE.

```
Line name (string) [X25-n]:
```

Enter the name of the line that the DTE will use, in the form:

X25-*string*

where *string* is a string of up to 12 alphanumeric characters. The default line name is X25-*n*, where *n* is the number of the synchronous port.

16. The procedure now displays:

```
The following configurator commands will be used to update
the permanent database.

DEFINE line line-id
    protocol lapb -
    network network-id -
    device SYN-n -
    state on

DEFINE module x25-protocol dte dte-address  -
    network network-id -
    channels  channel-list -
    line line-id  -
    state on

Do you want to update the permanent database now  [YES]?
```

If you answer NO, the permanent database will not be updated.

If you want the database updated, answer YES.

The procedure now asks:

```
Do you want to define any more DTEs connected
to this network [NO]?
```

Answer YES if more DTEs are required for this network. The procedure then repeats the questions to define a DTE. When you have finished defining all DTEs, and this question appears again, answer NO.

17. The procedure now asks:

```
Do you want to define any more networks [NO]?
```

Answer YES to define more networks. The procedure then repeats the questions to define DTEs for the next network. If you have finished defining networks, answer NO.

The procedure now displays:

```
    A command procedure will now be executed to perform
    the requested definitions.

X25ROUperm V1.1, X25router 2000 configuration program
%X25ROUPERM-I-FILUPD, configuration file updated
```

18. The procedure now displays:

```
    X25-SERVER destinations are set up here. These permit
    incoming calls received by this node to be redirected to
    the appropriate host. This procedure asks for a list
    of hosts with P.S.I. Access installed.

Do you want to define the X25-SERVER database now [YES]?
```

X25-SERVER destinations allow incoming calls to be directed to VAX P.S.I. Access nodes. If you intend using the X25router 2000 as a connector node for VAX P.S.I. Access systems, you should now set up X25-SERVER destinations for those incoming calls destined for Access hosts.

Answer YES to define the X25-SERVER database. If you answer NO, the procedure goes on to defining DECnet circuits, Step 22.

19. If you answer YES, the procedure displays:

```
    Destination name  (string)                :
```

Destinations are used by the X25router 2000 system to identify the destinations of incoming calls so that they are directed to the correct Access nodes. The destination name is a string of up to 16 alphanumeric characters.

See the information you supplied in Section 2.2.3 for the destination names for your system.

The procedure now displays:

```
    Destination node name  (string)              :
```

The destination node name is the name of the VAX P.S.I. Access node to which incoming calls should be directed.

The procedure now displays:

```
Destination priority                          [0]  :
```

Destination priority is the processing priority for the redirection of incoming calls to the destination. Priority is an integer number in the range 0 to 255.

The rest of the parameters are optional. If you do not specify them, they will not be checked when an incoming call arrives.

```
Call mask              (2-32 hex)         [None] :
```

The call mask is used in conjunction with a call value, and determines whether the incoming call is accepted. Enter a hexadecimal value of between 2 and 32 digits.

```
Call value             (2-32 hex)         [None] :
```

Call value specifies the string used to test incoming call data. The user-data field in the incoming call is matched using the call mask. If it then matches the call value, the incoming call is accepted.

```
Closed user group name (1-16 characters) [None] :
```

Closed user group (CUG) specifies which user group (CUG or bilateral CUG) has access to the destination.

```
Sending address        (1-15 decimal)     [None] :
```

This specifies which remote DTE addresses have access to the destination. If none is specified, all call requests from remote DTEs are accepted. Wildcards (* and %) may be used in this address.

```
Subaddress range       (decimal range)    [None] :
```

The subaddress is used to determine whether an incoming call is to be accepted. If the subaddress of the incoming call is within the subaddress range, the call request is accepted. If none is specified, call requests with any subaddress are accepted. Enter only one range, for example, 50-99 or 122 or 1010-1234. Specify a range which is different from the range you specified earlier for incoming DLM circuits, to distinguish the two.

```
Object identification  (string)           [36]   :
```

As VAX P.S.I. Access requires a value of 36 for this parameter (the default value), simply press <RET>.

20. The procedure now displays:

```
The destination will be set up using the following
configurator commands:

DEFINE node node-id name node-name
DEFINE module x25-server -
        destination dest-name -
        node dest-node -
        [priority dest-priority] -
        [call mask call-mask] -
        [call value call-value] -
        [group cug-name] -
        [sending address dte-address] -
        [subaddress sub-address-range] -
        [user user-id] -
        [password password] -
        [account account-name] -
        [object object-id]
```

Only the fields you have specified will be displayed.

The procedure also asks:

```
Do you want to define this destination now  [YES]?
```

Answer YES to execute the configurator commands. If you answer NO, the procedure will not execute the configurator commands.

21. The procedure now asks:

```
Do you want to define any more destinations  [NO]?
```

If you have further destinations to set up, answer YES.

If you enter NO to indicate that you have finished defining destinations, the procedure displays:

```
A command procedure will now be executed to perform the
requested definitions.

X25ROUperm V1.1, X25router 2000 Configuration Program

%X25ROUPERM-I-FILUPD configuration file updated
```

22. You are now asked about the circuits that you want to use with the X25router 2000. The procedure displays:

```
You may  now  define  the DECnet and X.25 PVCs you will
use on the X25router 2000.

Do you want to define the circuit database now [YES]?
```

Answer YES if you wish to set up any of the following: DLM circuits; DDCMP circuits; PVC circuits.

Note that if you specified NONROUTING IV for this X25router 2000, you can only set up PVC circuits here.

23. The procedure now asks:

```
You can  use  this  procedure to purge the database to
remove all  DECnet and X.25 circuit information before
updating the permanent database.

The following  configurator  command  will  be used to
purge the circuit permanent database:

PURGE known circuits all

Do you want the information in the circuit permanent database
purged [NO]?
```

If you answer YES, the circuit database is purged to remove all existing DECnet and X.25 circuit information.

24. The procedure now displays:

```
You can now define the circuits and lines to be used.
The circuit types are DDCMP, DLM and PVC.

DDCMP circuits
--------------

You can define up to four DDCMP circuits for the DEMSA
and one circuit for the DEMSB.

DDCMP lines may have any name that does not begin with
PVC-

For  each  DDCMP circuit you define, a line will also be
configured  to  run the DDCMP  protocol. Note that for a
DEMSB, you can have either an X.25 line, or a DDCMP line.

DLM circuits
------------

You may define up to sixty-three DLM circuits  for  the
DEMSA,  but only two DLM circuits for the DEMSB.

You may use any name for DLM circuits that does not begin
with  PVC-.

PVCs
----

You  can define up to  512 PVCs for the DEMSA, but only
sixteen PVCs for the DEMSB. Note that for each  DLM you
define, you can define one less PVC.

You must start  the circuit name  with the  string PVC-,
except for DLM PVCs.

Circuit name      (string):
```

Enter the circuit name for the first circuit.

To set up a PVC circuit, enter a name that begins PVC-.

To set up a DLM or DDCMP circuit, enter a name that does **not** begin PVC-. Skip to Step 26.

25. If you enter a name that begins PVC-, the procedure displays:

```
This circuit is a PVC.

Please enter the required circuit information.

Local DTE          (number):
```

When you have entered a local DTE, the procedure displays:

```
Network            (string):
```

When you have entered the network name, the procedure displays:

```
Channel            (number):
```

When you have entered a channel number, the procedure displays the configurator command it will use to define the circuit. It then asks if you want to define any more circuits; see Step 29.

26. If you enter a name that does not begin with PVC, the procedure asks:

```
Circuit type [DDCMP, DLM]:
```

Enter DLM to define a DLM circuit. Enter DDCMP to define a DDCMP circuit; you will then skip to Step 28.

27. If you enter DLM, the procedure displays:

```
You must now specify the usage as INCOMING, OUTGOING or
PERMANENT

Usage                        :
```

If you have specified the usage as INCOMING or OUTGOING, the procedure asks first for:

```
Remote DTE         (number):
```

For all types of usage, the procedure asks for:

```
Local DTE          (number):
Network            (string):
```

If you have specified PERMANENT or OUTGOING, you must supply the network name here. This is optional for INCOMING.

If you have specified OUTGOING, you will be asked for:

```
Recall timer (number) [60]:
Maximum recalls (number) [100]:
```

If you have specified PERMANENT, you will be asked for:

```
Channel            (number):
```

For all types of usage, the procedure now asks for:

```
Circuit cost  (number) [5]:
State         (string) [ON]:
```

The cost is a value assigned to a circuit between two adjacent nodes. Packets are routed on paths with the least cost.

The procedure now continues at Step 29.

28. If you enter DDCMP, the procedure displays:

```
This circuit is a DDCMP circuit.

Please enter the information about the line which will
be used for this circuit.

Line name   (string) [circuit-name]:
```

The default line name is the circuit name. If you do not use the default, specify a string of between 1 and 16 alphanumeric characters.

The procedure now displays:

```
Synchronous port  (0-3) :
Circuit cost  (number) [5] :
```

The cost is a value assigned to a circuit between two adjacent nodes. Packets are routed on paths with the least cost.

29. The procedure now displays the configurator commands it will use to set up the circuit, and asks:

```
Do you want the information in the permanent database updated  [YES]?
```

Enter YES to update the permanent database with circuit information.

The procedure now asks:

```
Do you want to define any more circuits [NO]?
```

If you answer YES, the procedure will ask for another circuit name. If you have finished defining all the circuits, answer NO.

30. Once you have finished defining circuits, X25ROUSETUP.COM ends, with the message:

```
A command procedure will now be executed to perform the
requested definitions.


X25ROUSETUP complete.

The databases are now set up and you may load the
X25router 2000.
```

Now you need to load the X25router 2000. See Section 4.3 for details.

4.2.2 Running X25ROUSETUP.COM: DEMSB

To run X25ROUSETUP.COM, follow these steps:

1. Log into the system account, or any account with OPER and SYSPRV privileges, and enter the following command:

```
$ @SYS$SYSROOT:[DECSERVER]X25ROUSETUP
```

2. X25ROUSETUP.COM displays:

```
This command procedure sets up the permanent database for
the X25router 2000.  Usually, executing this procedure is
all you need to do to set up the database.

The  procedure consists of a series of questions. If you
need  help  with  answering  a  question,  enter ?  as a
response and the HELP text will be displayed.

X25router 2000 node name     (node-id):
```

   Enter the DECnet node name for the X25router 2000.

   This name can consist of up to six alphanumeric characters, the first of which must be alphabetic. The name identifies the X25router 2000 within the network, and should therefore be unique within the network.

3. The procedure now displays:

```
X25router 2000 type [DEMSA, DEMSB]:
```

   Enter DEMSB. To configure a DEMSA X25router 2000, see Section 4.2.1.

4. If you enter a node name which already exists, the procedure displays:

```
A configuration file for node already exists.

You may either keep the existing configuration file and
modify it or create a new database.

Do you want to create a new database [YES]?
```

   If you answer YES, the procedure displays:

```
The old configuration file for node will
be renamed to new-name.
```

   A new version of the configuration file is created. The previous version is renamed and stored in the SYS$COMMON:[DECSERVER] directory.

   If you answer NO, the procedure asks:

```
Do you want to change the EXECUTOR characteristics now [YES]?
```

   Answer YES to change the DECnet EXECUTOR characteristics of your X25router 2000 node. If you answer NO, the procedure goes to a later stage of the procedure, which involves defining the PSDNs and DTEs for each network.

5. The procedure now displays:

```
Your X25router 2000 can be one of two types of DECnet
node:

    NONROUTING (end node)
    ROUTING IV (level 1 router)

Specify the type you require.

Node type            [NONROUTING]:
```

   If your configuration will use any DLM or DDCMP circuits, you must specify ROUTING IV. Specify NONROUTING only if your configuration will use just the Ethernet circuit, or just the Ethernet circuit and PVC circuits.

6. If you specified NONROUTING, you now go to Step 8.

   If you specified ROUTING IV, the procedure displays:

```
Ethernet circuit cost [4]:
```

   Specify a value in the range 1 to 63. The cost is a value assigned to a circuit between two adjacent nodes. Packets are routed along paths with the smallest cost.

   The procedure now displays:

```
Router priority [64]:
```

   Specify a value in the range 1 to 127. The router with the highest priority will become the designated router for the Ethernet.

7. The procedure now displays:

```
If you want to use incoming datalink mapping (DLM)
circuits you need to specify a subaddress range to use
to pass the incoming X.25 calls to DECnet.

If you do not want to use incoming DLM circuits, just
press <RETURN> to continue.

Subaddress range           [NONE]:
```

   A subaddress is an optional address, which can be used to decide to which software a call is to be routed. It must be a decimal number of up to four digits.

   To use incoming DLM circuits, enter the subaddress or range of subaddresses for incoming X.25 calls to be passed to DLM. The range of subaddresses should be in the form: *n-N*, where *n* is the bottom of the range, and *N* is the top of the range. For example, for subaddresses ranging from 90 to 99, enter: 90-99.

8. The procedure now displays details about the type of X25router 2000:

```
The X25router 2000 is configured as follows.

Number of lines    Maximum Speed          Ports
                   (per second)

1                  19.2 Kb                0
```

9. The procedure goes on to ask about access control:

```
Enter the  username and password to be used to control
access  to  the  X25router 2000.  If  you specify this
information here, then it must  be  supplied  whenever
lines,  DTEs  or  circuits  on the  X25router 2000 are
being modified.

If  this information  is  not specified, anyone can
modify the X25router 2000. DIGITAL STRONGLY RECOMMENDS
that you specify access control for the NML object.

NML Username [NONE]:
NML Password:
Verification:
```

   If you supply an NML username and password, only users who supply this username and password will be allowed to alter the X25router 2000 permanent database. The username and password each consist of up to 16 alphanumeric or punctuation characters.

   If you do not wish to supply the username and password, simply press <RET> in response to the prompts. However, **Digital strongly recommends that you specify access control for the NML object. Otherwise, any user on the network can modify your X25router 2000**.

   Remember what you specify for the username and password, as you will need it to modify the X25router 2000 volatile database.

   For example, to gain access to the X25router 2000 volatile database which has a username "ENGLAND" and a password "LONDON", and is on a node called "EUROPE", you would use the command:

```
NCP>set executor node EUROPE user ENGLAND password LONDON
```

   For more details about using the username and password, see the *X25router 2000 Management Guide*.

10. The procedure now displays:

```
Enter the  username  and  password to be used for the
TRACE utility.  If you specify  this information here,
then it must be supplied when using the TRACE utility
on the X25router 2000.

If this  information  is  not  specified, anyone can
monitor  traffic on  the  X25router 2000.
```

```
    DIGITAL STRONGLY RECOMMENDS that you set up a username
    and password for the TRACE utility.

TRACE Username [NONE]:
TRACE Password:
Verification:
```

If you supply a TRACE username and password here, only those who supply this username and password will be allowed to use the TRACE utility to monitor traffic on this X25router 2000. The username and password each consist of up to 16 alphanumeric or punctuation characters.

If you do not wish to supply the username and password, simply press <RET> in response to the prompts. However, **Digital strongly recommends that you specify a username and password for the TRACE utility. If you do not, any user within the network with OPER privileges and TRACE installed on their VMS node can monitor the traffic on your X25router 2000.**

Remember what you specify for the username and password, as you will need it when you use the TRACE utility.

For example, if you wished to use the TRACE utility on an X25router 2000 on a node called "AFRICA", with a TRACE username "MOROCCO" and password "CASABLANCA", you would use the command:

```
TRACE>start AFRICA"MOROCCO CASABLANCA"::X25L2
```

where X25L2 is the tracepoint name.

For more details of using the TRACE utility, see the *X25router 2000 Problem Solving Guide*.

11. The procedure now displays a list of configurator commands it will use to update the X25router 2000 permanent database with the information given so far. It also asks:

    ```
    Do you want the permanent database defined now [YES]?
    ```

    If you are configuring a new X25router 2000, you must answer YES, or the procedure will not continue. If you wish to modify the configuration of an existing X25router 2000, you should also answer YES.

    You should answer NO only if this X25router 2000 has previously been configured, and you do not want to change the configuration. In this case, if you answer NO, the procedure will simply continue.

12. The procedure now displays:

    ```
        This command procedure allows you to define one or
        more PSDN(s) and one or more DTEs associated with each
        network.

    Do you want to define the X25-PROTOCOL database now [YES]?
    ```

Answer YES if you want to define the PSDNs and DTEs associated with each network. If you answer NO, you will go to a later stage of the procedure, to set up X25-SERVER destinations.

If you answer YES, the procedure continues:

```
You can  use this  procedure to purge the database to
remove  all  line,  DTE and X.25 protocol information
before updating the permanent database.

The following  configurator command will be used to
purge the line permanent database:

PURGE known lines all

The following configurator commands will be used to
purge the DTE and X.25 permanent database:

PURGE module x25-protocol known networks all
PURGE module x25-protocol known dtes known networks all

Do you want the information in the line permanent database
purged [NO]?
```

If you wish to keep previous definitions for lines (including DDCMP lines), press <RET>. The procedure then asks:

```
Do you want the information in the X.25 and DTE
permanent database purged [NO]?
```

If you wish to keep previous definitions for DTEs, press <RET>. If you enter YES, to purge the databases, you will see this message:

```
A command procedure will now be executed to perform
the requested definitions.

Please ignore any error messages.
```

Igore any error messages that may appear.

13. The procedure now displays:

```
PSDN and profile names are defined here. You can define
one or more PSDNs.  For each PSDN  you will be asked to
provide the  network name and the profile name for that
network.

Network name   (string):
```

Enter the network name that connects to the PSDN. For details of network names, see Section 1.2.

If you do not want to enter a network name, press <RET>. The procedure will ask:

```
Do you want to define any more networks [NO]?
```

If you answer YES, you will be asked for a network name again.

If you answer NO, the procedure will update the X25router 2000 permanent database with the network(s) you have defined. You will then go to a later stage of the procedure to set up X25-SERVER destinations.

If you do enter a network name, the procedure will display:

```
Profile name    (string) [network-id]:
```

Enter the profile name of the PSDN to which the DTE will connect. See Section 1.3 in Chapter 1 for details of profile names. If the profile name is identical with the network name, simply press <RETURN>.

14. The procedure now displays:

```
The following configurator command will be used to
update the permanent database:

DEFINE module x25-protocol network network-id  -
                            profile profile-name

Do you want the information in the permanent database updated  [YES]?
```

If you answer NO, the permanent database will not be updated. (You may enter the required NCP commands later, if you wish.) You will be asked if you want to define any more networks; see the previous step.

If you want the database updated, answer YES.

15. The procedure now displays:

```
A DTE is defined here. You can define one DTE connected
to  this  network.  For the  DTE  you  will be asked to
provide the following information:

    o   DTE address
    o   Range of channels to be used by the DTE
    o   Line associated with the DTE

DTE address        (number):
```

Enter your DTE address. For details on the format of this address, see the *Public Network Information* manual.

16. The procedure now displays:

```
Channels range       (list):
```

Enter the channels that the DTE will use for outgoing calls. Specify high-numbered channels before low-numbered channels. Each entry in the channels list can be either a single channel number or a channel range (with a hyphen separating the high and low numbers). The entries in the list must be separated by commas. For example:

Channels range (list):1555,1544-1540,1536

The PSDN authorities allocate channel ranges at subscription time. For details on the channel range your PSDN can allocate, see the *Public Network Information* manual.

The procedure now displays:

```
Line name (string) [X25-0]:
```

Enter the name of the line that the DTE will use, in the form:

X25-*string*

where *string* is a string of up to 12 alphanumeric characters. The default line name is X25-0.

17. The procedure now displays:

```
The following configurator commands will be used to update
the permanent database.

DEFINE line X25-0
    protocol LAPB -
    network network-id -
    device SYN-0 -
    state on

DEFINE module x25-protocol dte dte-address  -
    network network-id -
    channels  channel-list -
    line X25-line-id  -
    state on

Do you want to update the permanent database now  [YES]?
```

If you answer NO, the permanent database will not be updated.

If you want the database updated, answer YES.

The procedure now asks:

```
Do you want to define any more networks [NO]?
```

Answer YES to define more networks. The procedure then repeats the questions to define the next network. If you have finished defining networks, answer NO.

The procedure now displays:

```
A command  procedure  will  now  be  executed  to perform
the requested  definitions.

X25ROUPERM V1.1, X25router 2000 configuration program

%X25ROUPERM-I-FILUPD, configuration file updated
```

18. The procedure now displays:

```
X25-SERVER destinations are set up  here.  These  permit
incoming calls received by this node to be redirected to
the appropriate host.  This  procedure  asks  for a list
of hosts with P.S.I. Access installed.

Do you want to define the X25-SERVER database now [YES]?
```

X25-SERVER destinations allow incoming calls to be directed to VAX P.S.I. Access nodes. If you intend using the X25router 2000 as a connector node for VAX P.S.I. Access systems, you should set up X25-SERVER destinations here for those incoming calls destined for Access hosts.

Answer YES to define the X25-SERVER database. If you answer NO, the procedure goes on to defining DECnet circuits, Step 22.

19. If you answer YES, the procedure displays:

```
Destination name        (string)                :
```

Destinations are used by the X25router 2000 system to identify the destinations of incoming calls so that they are directed to the correct Access nodes. The destination name is a string of up to 16 alphanumeric characters.

See the information you supplied in Section 2.2.3 for the destination names for your system.

The procedure now displays:

```
Destination node name   (string)                :
```

The destination node name is the name of the VAX P.S.I. Access node to which incoming calls should be directed.

The procedure now displays:

```
Destination priority                        [0]  :
```

Destination priority is the processing priority for the redirection of incoming calls to the destination. Priority is an integer number in the range 0 to 255.

The rest of the parameters are optional. If you do not specify them, they will not be checked when an incoming call arrives.

```
Call mask               (2-32 hex)         [None] :
```

The call mask is used in conjunction with a call value, and determines whether the incoming call is accepted. Enter a hexadecimal value of between 2 and 32 digits.

```
Call value              (2-32 hex)         [None] :
```

Call value specifies the string used to test incoming call data. The user-data field in the incoming call is matched using the call mask. If it then matches the call value, the incoming call is accepted.

```
Closed user group name (1-16 characters) [None] :
```

Closed user group (CUG) specifies which user group (CUG or bilateral CUG) has access to the destination.

```
Sending address         (1-15 decimal)     [None] :
```

This specifies which remote DTE addresses have access to the destination. If none is specified, all call requests from remote DTEs are accepted. Wildcards (* and %) may be used in this address.

```
Subaddress range        (decimal range)    [None] :
```

The subaddress is used to determine whether an incoming call is to be accepted. If the subaddress of the incoming call is within the subaddress range, the call request is accepted. If none is specified, call requests with any subaddress are accepted. Enter only one range, for example, 50-99 or 122 or 1010-1234. Specify a range which is different from the range you specified earlier for incoming DLM circuits, to distinguish the two.

```
Object identification  (string)           [36]    :
```

As VAX P.S.I. Access requires a value of 36 for this parameter (the default value), simply press <RET>.

20. The procedure now displays:

```
The destination will be set up using the following
configurator commands:

DEFINE node node-id name node-name
DEFINE module x25-server -
destination dest-name -
node dest-node -
[priority dest-prio] -
[call mask call-mask] -
[call value call-value] -
[group cug-name] -
[sending address dte-address] -
[subaddress sub-address-range] -
[user user-id] -
[password password] -
[account account-name] -
[object object-id]
```

Only the fields you have specified will be displayed.

The procedure also asks:

```
Do you want to define this destination now  [YES]?
```

Answer YES to execute the configurator command shown above. If you answer NO, the procedure will not execute the configurator command displayed above.

21. The procedure now asks:

```
Do you want to define any more destinations  [NO]?
```

If you have further destinations to set up, answer YES.

If you answer NO to indicate that you have finished defining destinations, the procedure displays:

```
    A command procedure will now be executed to perform the
    requested definitions.

X25ROUPERM V1.1, X25router 2000 Configuration Program

%X25ROUPERM-I-FILUPD configuration file updated
```

22. You are now asked about the circuits that you want to use with the X25router 2000. If you specified ROUTING IV, the procedure displays:

```
    You may  now  define the DECnet and X.25 PVCs you will
    use on the X25router 2000.

Do you want to define the circuit database now [YES]?
```

Answer YES if you wish to set up any of the following: DLM circuits; DDCMP circuits; PVC circuits.

If you specified NONROUTING, the procedure displays:

```
    You  may now define the X.25 PVCs you will use on the
    X25router 2000.

Do you want to define the circuit database now [YES]?
```

If you specified NONROUTING, you can only set up PVC circuits here.

23. The procedure now asks:

```
    You can  use  this  procedure to purge the database to
    remove all  DECnet and X.25 circuit information before
    updating the permanent database.

    The following  configurator  command  will  be used to
    purge the circuit permanent database:

    PURGE known circuits all

Do you want the information in the circuit permanent database
purged [NO]?
```

If you answer YES, the circuit database is purged to remove all existing DECnet and X.25 circuit information.

24. If you specified ROUTING IV, the procedure now displays:

```
    You can now define the circuits and lines to be used.
    The circuit types are DDCMP, DLM and PVC.

    DDCMP circuits
    --------------

    You can define up to four DDCMP circuits for the DEMSA
    and one circuit for the DEMSB.

    DDCMP lines may have any name that does not begin PVC-.

    For each DDCMP circuit  you define,  a line will also be
    configured to run  the  DDCMP protocol.  Note that for a
    DEMSB, you can have either an X.25 line, or a DDCMP line.
```

```
DLM circuits
------------

You may define up to sixty-three DLM circuits for the
DEMSA, but only two DLM circuits for the DEMSB.

You may use any name for DLM circuits that does not
begin with  PVC-.

PVCs
----

You  can  define up to 512 PVCs for the DEMSA, but only
sixteen PVCs for the DEMSB. Note that for each  DLM you
define, you can define one less PVC.

You must start the  circuit name with the string PVC-,
except for DLM PVCs.

Circuit name      (string):
```

If you specified NONROUTING, only the text describing PVCs is displayed. Enter the circuit name for the first circuit.

To set up a PVC circuit, enter a name that begins PVC-.

To set up a DDCMP or DLM circuit, enter a name that does **not** begin PVC-. Skip to Step 28.

25. If you enter a name that begins PVC-, the procedure displays:

```
This circuit is a PVC.

Please enter the required circuit information.

Local DTE         (number):
```

When you have entered a local DTE, the procedure displays:

```
Network           (string):
```

When you have entered the network name, the procedure displays:

```
Channel           (number):
```

When you have entered a channel number, the procedure displays the configurator command it will use to define the circuit. It then asks if you want to define any more circuits; see Step 29.

26. If you enter a name that does not begin with PVC, the procedure asks:

```
Circuit type [DDCMP, DLM]:
```

Enter DLM to define a DLM circuit. Enter DDCMP to define a DDCMP circuit; you will then skip to Step 28.

27. If you enter DLM, the procedure displays:

```
You must now specify the usage as INCOMING, OUTGOING or
PERMANENT

Usage                    :
```

If you have specified the usage as INCOMING or OUTGOING, the procedure asks first for:

```
Remote DTE          (number):
```

For all types of usage, the procedure asks for:

```
Local DTE           (number):
Network             (string):
```

If you have specified PERMANENT or OUTGOING, you must supply the network name. This is optional for INCOMING.

If you have specified OUTGOING, you will be asked for:

```
Recall timer (number)  [60]:
Maximum recalls (number)  [100]:
```

If you have specified PERMANENT, you will be asked for:

```
Channel             (number):
```

For all types of usage, the procedure now asks for:

```
Circuit cost  (number) [5]:
State         (string) [ON]:
```

The cost is a value assigned to a circuit between two adjacent nodes. Packets are routed on paths with the least cost.

The procedure now continues at Step 29.

28. If you enter DDCMP, the procedure displays:

```
This circuit is a DDCMP circuit.

Please enter the information about the line which will
be used for this circuit.

Line name   (string) [circuit-name]:
```

The default line name is the circuit name. If you do not use the default, specify a string of between 1 and 16 alphanumeric characters.

The procedure now displays:

```
Circuit cost  (number) [5] :
```

The cost is a value assigned to a circuit between two adjacent nodes. Packets are routed on paths with the least cost.

29. The procedure now displays the configurator commands it will use to set up the circuit, and asks:

```
Do you want the information in the permanent database updated  [YES]?
```

Enter YES to update the permanent database with circuit information.

The procedure now asks:

```
Do you want to define any more circuits [NO]?
```

If you answer YES, the procedure will ask for another circuit name. If you have finished defining all the circuits, answer NO.

30. Once you have finished defining circuits, X25ROUSETUP.COM ends, with the message:

```
    A command procedure will now be executed to perform the
    requested definitions.

X25ROUPERM V1.1, X25router 2000 Configuration Program

X25ROUPERM-I-FILUPD configuration file updated

    X25ROUSETUP complete.

    The  databases  are  now  set  up  and you may load the
    X25router 2000.
```

Now you need to load the X25router 2000. See Section 4.3 for details.

4.3 Loading the Software

1. Enable event logging by issuing the following commands:

```
$ @SYS$SYSTEM:STARTUP OPCOM
$ RUN SYS$SYSTEM:NCP
NCP>SET LOGGING MONITOR STATE ON
NCP>SET LOGGING MONITOR EVENTS 0.3,7
NCP>EXIT
$ REPLY/ENABLE=NETWORK
```

2. Down-line load the X25router 2000 software image to the DEC MicroServer hardware unit by plugging the unit into the power supply.

   The hardware unit goes through a series of diagnostic checks, and then automatically down-line loads the software image from the load host. Once the load is complete, the LED display on the hardware unit will show a moving pattern which indicates that the software is running.

When loading the software, the X25router 2000 will try for 5 minutes to load the permanent database. It will then reboot if the database cannot be loaded.

During the load sequence all relevant events will be reported on the terminal:

- If the event messages mention no errors, you can assume that the load has been successful, and go on to test the software.
- If errors occur, refer to the *X25router 2000 Problem Solving Guide*. First check that the hardware is working correctly.

If the hardware is working correctly, the problem is probably due to the load host. Check the load host database and make sure that you have entered the correct Ethernet address for the X25router 2000. Check that the X25router 2000 images are in the correct directory and that DECnet is running.

When you have loaded the software, test the installation, using the Installation Checkout Procedure described in Chapter 5.

5
Testing the Installation

5.1 Introduction

This chapter explains how to run the Installation Checkout Procedure (ICP). The ICP checks that the X25router 2000 software is installed and configured correctly.

The ICP consists of:

- An application which performs the testing. The application is defined as part of the X25router 2000 initialization sequence, and declares itself as a DECnet object with the name X25ICP.
- A command file X25ROU_ICP, which you use to set up and run a test.

There are three ways you can run the ICP:

- In loopback across a PSDN to the same X25router 2000.

  To do this, simply follow the procedure in Section 5.3.
- Across a PSDN to a remote X25router 2000.

  To do this, you need first to set up an ICP destination on the remote X25router 2000, as described in Section 5.4.1. Then follow the procedure in Section 5.4.2.
- Across a PSDN to a DTE on a remote VMS system. This remote system must be running VAX P.S.I. or RSX P.S.I., and also running PSIXTR (X.25 Test Receiver).

  To do this, you need first to set up an ICP destination on the remote VMS system, as described in Section 5.5.1. Then follow the procedures in Section 5.5.2.

See Appendix D for a list of ICP messages.

5.2 Preparing to Run X25ROU_ICP

Before you run X25ROU_ICP, check that the following requirements are met:

- The local DTE you are using is not a member of a Closed User Group (CUG). You cannot run the ICP using a DTE that is a member of a CUG.
- Your DTE supports at least one Switched Virtual Circuit (SVC).
- You have NETMBX, OPER and SYSPRV privileges.
- The ICP has been defined, and has declared itself as a DECnet object. Check this by entering the following NCP commands:

  ```
  NCP> SET EXEC NODE x25router
  NCP> SHOW KNOWN OBJECT
  ```

  where *x25router* is the X25router 2000 node name.

  The system will respond with output similar to the following:

  ```
  Known Object Volatile Summary as of date time

   Object   Number  File/PID             User Id       Password

  X25ICP         0  800599D0
  NML           19  8005B280             user-id       *Set*
  MIRROR        25  8005B200
  X25_GATEWAY   31  8005C250
  NETTRACE$     54  800586D0             user-id       *Set*
  DTR           63  8005B3D0
  ```

  Check that X25ICP is included in the display. If it is not present, contact your software support specialist.

- The X25router 2000 is installed, configured and running, and that a DTE is up and running. To check this, enter the following command:

  ```
  NCP> SET EXECUTOR NAME x25router
  NCP>SHOW KNOWN DTE
  ```

  where *x25router* is the X25router 2000 node name.

  If a DTE is up and running, it will appear in the display produced by the command, with a state and substate of ON-RUNNING.

  If no DTEs are up and running, wait for two minutes, and enter the command again. If the display shows that there are still no DTEs up and running, check both the DTE address and the physical connection to the PSDN. If everything appears to be in order, confirm with the network authority that the DTE is operational.

  If you need to investigate the problem further, see the *X25router 2000 Problem Solving Guide*.

  Exit from NCP by entering the command

  ```
  NCP>EXIT
  ```

5.3 Running the ICP in Loopback to the Local X25router 2000

Start the ICP at a terminal on the host system, by entering the command:

```
$ @SYS$TEST:X25ROU_ICP
```

The procedure displays the following:

```
This  command  file  is  used  to  run  the Installation
Checkout Procedure (ICP) for the X25router 2000.

This ICP can be run in any of the following ways:

-   As a loopback test to the same X25router 2000
-   To a remote X25router 2000
-   To a VMS system running native mode VAX P.S.I.

In all cases, the ICP assumes  that at least one DTE is
up and running.

As well as performing a test, the ICP can also  be used
to set up  and clear a destination. This is useful when
running a test from another node.

During the ICP, you will be asked to supply:

-   The X25router 2000 node name
-   The name of a network to which your X25router 2000
    is connected

For a local (loopback) test  you will be asked to supply
the address of a DTE on the X25router 2000. The ICP will
set up  a suitable destination for  the duration  of the
test.

For a test to a  remote node you will be asked to supply
the  remote DTE address  and  subaddress.  Note that you
must have  already set up  a destination for  the remote
DTE.

If you  do not want to  run  the  Installation  Checkout
Procedure press <RET> in response to the first prompt.

X25router 2000 node name:
```

Enter the X25router 2000 node name.

The procedure continues:

```
Do you want to run the ICP to the local node [YES]?
```

Press <RET>. The procedure will ask you for the network name:

```
Network name            (string):
```

Enter the name of a network to which your X25router 2000 is connected. If you have defined only one network, you may press <RET>. Note that you will need to consult the relevant network authorities to make sure you can do this, as not all PSDNs allow you to perform loopback testing.

Next, the procedure will prompt you for the destination for the ICP.

```
Local DTE address       (string):
```

Enter the local DTE address.

The ICP takes approximately 1.5 minutes, during which time no messages are displayed. When the ICP completes successfully, the procedure displays:

```
%X25ROU-I-SETDEST, ICP destination has been set
%X25ROU-I-NORMAL, X25router 2000 test finished successfully
%X25ROU-I-CLEAR, ICP destination has been cleared
```

Then, the procedure displays some details of the test:

```
Test Statistics
Number of Transmits =   n
Number of Receives  =   m
```

where *n* and *m* should be approximately equal; they may differ by 1 or 2.

If the ICP completes with errors, see Section 5.6.

5.4 Running the ICP to a Remote X25router 2000

In order to run the ICP to a remote X25router 2000 across a PSDN, you need first to set up an ICP destination on the remote X25router 2000, as described in Section 5.4.1. Then run the ICP, as described in Section 5.4.2.

5.4.1 Setting Up an ICP Destination on a Remote X25router 2000

To set up an ICP destination on another X25router 2000, use the command:

```
$ @SYS$TEST:X25ROU_ICP SET
```

The procedure displays:

```
This  command  file  is  used  to  run  the Installation
Checkout Procedure (ICP) for the X25router 2000.

This ICP can be run in any of the following ways:

-   As a loopback test to the same X25router 2000
-   To a remote X25router 2000
-   To a VMS system running Native mode VAX P.S.I.

In all cases, the ICP  assumes  that at least one DTE is
up and running.

As  well  as performing a test, the ICP can also be used
to set up  and clear a destination.  This is useful when
running a test from another node.
```

```
During the ICP, you will be asked to supply:

-   The X25router 2000 node name
-   The name of a network to which your X25router 2000
    is connected

For a local (loopback) test you will be asked to supply
the address of a DTE on the X25router 2000. The ICP will
set up  a suitable destination for  the duration  of the
test.

For a test to a remote node you will be asked to supply
the  remote DTE address  and  subaddress. Note that you
must have  already set up  a destination for the remote
DTE.

If you do not want to  run  the  Installation  Checkout
Procedure press <RET> in response to the first prompt.
```

Then the procedure will prompt you for the node name and destination subaddress.

```
X25router 2000 node name:
```

Enter the node name of the remote X25router 2000.

```
Please enter destination subaddress:
```

Enter an otherwise unused subaddress in the range 0 to 9999.

The procedure will respond:

```
%X25ROU-I-SETDEST, ICP destination has been set
```

Now follow the procedure described in Section 5.4.2.

5.4.2 Running the ICP

To run the ICP to a remote X25router 2000, follow this procedure:

Start the ICP at a terminal on the host system, by entering the command:

```
$ @SYS$TEST:X25ROU_ICP
```

The procedure displays:

```
This command file is used to run the  Installation
Checkout Procedure (ICP) for the X25router 2000.

This ICP can be run in any of the following ways:

-   As a loopback test to the same X25router 2000
-   To a remote X25router 2000
-   To a VMS system running native mode VAX P.S.I.

In all cases,  the ICP assumes that at least one DTE is
up and running.
```

```
As well as performing a test, the ICP can also  be used
to set up  and clear a destination. This is useful when
running a test from another node.

During the ICP, you will be asked to supply:

-   The X25router 2000 node name
-   The name of a network to which your  X25router 2000
    is connected

For a local (loopback) test  you will be asked to supply
the address of a DTE on the X25router 2000. The ICP will
set up a  suitable destination for  the duration  of the
test.

For a test to a  remote node you will be asked to supply
the  remote DTE address  and  subaddress.  Note that you
must have  already set up  a destination for  the remote
DTE.

If you  do not want to  run  the  Installation  Checkout
Procedure press <RET> in response to the first prompt.

X25router 2000 node name:
```

Enter the X25router 2000 node name.

The procedure continues:

```
Do you want to run the ICP to the local node [YES]?
```

Enter NO. The procedure displays:

```
Network name            (string):
```

Enter the name of a network to which your X25router 2000 is connected.

The procedure now displays:

```
Remote DTE address            (string):
Remote subaddress             (string):
```

Specify the remote DTE address as a string of up to 15 digits. See the *Public Network Information* manual for details of the DTE address format for your network. Specify a subaddress if required.

The ICP takes approximately 1.5 minutes, during which time no messages are displayed. When the ICP completes successfully, the procedure displays:

```
%X25ROU-I-NORMAL, X25router 2000 test finished successfully
```

Then the procedure displays some details of the test:

```
Test Statistics
Number of Transmits =   n
Number of Receives  =   m
```

where *n* and *m* should be approximately equal; they may differ by 2 or 3.

If the ICP completes with errors, see Section 5.6.

5.4.3 Clearing the Destination on a Remote X25router 2000

You will need to clear the destination on the remote X25router 2000 in order to complete the ICP. Enter the following commands:

```
$ @SYS$TEST:X25ROU_ICP CLEAR
```

The procedure displays:

```
This  command  file  is  used  to  run  the  Installation
Checkout Procedure (ICP) for the X25router 2000.

This ICP can be run in any of the following ways:

-   As a loopback test to the same X25router 2000
-   To a remote X25router 2000
-   To a VMS system running Native mode VAX P.S.I.

In all cases, the ICP assumes that at least one DTE is
up and running.

As  well as performing a test, the ICP can also  be used
to set up  and clear a destination.  This is useful when
running a test from another node.

During the ICP, you will be asked to supply:

-   The X25router 2000 node name
-   The name of a network to which your  X25router 2000
    is connected

For a local (loopback) test you will be asked  to supply
the address of a DTE on the X25router 2000. The ICP will
set up a  suitable destination for  the duration  of the
test.

For a test to a  remote node you will be asked to supply
the  remote DTE address  and  subaddress.  Note that you
must have  already set up  a destination for  the remote
DTE.

If you  do not want to  run  the  Installation  Checkout
Procedure press <RET> in response to the first prompt.

X25router 2000 node name:
```

Enter the node name of the remote X25router 2000. You will then see the message:

```
%X25ROU-I-CLEAR, ICP destination has been cleared
```

5.5 Running the ICP to a Remote VMS Node

In order to run the ICP to a remote VMS node across a PSDN, you need first to set up an ICP destination on the remote VMS node, as described in Section 5.5.1. Then run the ICP, as described in Section 5.5.2.

5.5.1 Setting Up a Destination on a Remote VMS Node

You can run the ICP over a PSDN to a remote VMS node running either RSX P.S.I. or Native mode VAX P.S.I. Before you can do this, you need to set up a destination and an object on this remote node. You do this by entering NCP or X25ROUPERM commands at the remote node. This section gives examples of the NCP commands you may use for this.

The following example commands set up and show a destination on the remote VMS node.

```
NCP> SET X25-SERVER DESTINATION PSIXTR OBJECT PSIXTR-
SUBADDRESS 27 PRIORITY 127

NCP> SHOW X25-SERVER DESTINATION PSIXTR
```

The procedure displays:

```
Module X25-Server Volatile Summary as of 30-MAY-1989 13:36:24

Destination              = PSIXTR
Object                   = PSIXTR
Priority                 = 127
Subaddresses             = 27
```

The following example commands set up and show an object on the remote VMS node.

```
NCP>SET OBJECT PSIXTR FILE SYS$TEST:PSIXTR.COM USER PSIUSER-
PASSWORD SECRET NUMBER 0

NCP>SHOW OBJECT PSIXTR
```

The procedure displays:

```
Object Volatile Summary as of 30-MAY-1989 13:47:17

   Object   Number  File/PID                  User Id      Password

   PSIXTR        0  PSIXTR.COM                PSIUSER
```

The following example commands check that the remote DTE is up and running at the remote node.

```
NCP> SHOW DTE 314212423567 NETWORK psdn_net1
```

If the DTE is up and running, the procedure will display:

```
Module X25-Protocol Volatile Summary as of 19-MAY-1989 14:19:26

  DTE              Network          State              Active    Active
                                                       Channels  Switched
  314212423567     psdn_net1        on  -running         0          0
```

When you have set up a destination and object on the remote node, follow the procedure in Section 5.5.2.

5.5.2 Running the ICP

To run the ICP to a remote VMS node, follow this procedure.

Start the ICP at a terminal on the host system, by entering the command:

```
$ @SYS$TEST:X25ROU_ICP
```

The procedure displays.

```
This command file is used to run the  Installation
Checkout Procedure (ICP) for the X25router 2000.

This ICP can be run in any of the following ways:

-   As a loopback test to the same X25router 2000
-   To a remote X25router 2000
-   To a VMS system running Native mode VAX P.S.I.

In all cases, the ICP assumes that at least one DTE is
up and running.

As  well  as performing a test, the ICP can also be used
to set up  and clear a destination.  This is useful when
running a test from another node.

During the ICP, you will be asked to supply:

-   The X25router 2000 node name
-   The name of a network to which your  X25router 2000
    is connected

For a local (loopback) test  you will be asked to supply
the address of a DTE on the X25router 2000. The ICP will
set up a  suitable destination for  the duration  of the
test.

For a test to a  remote node you will be asked to supply
the  remote DTE address  and  subaddress.  Note that you
must have  already set up  a destination for  the remote
DTE.

X25router 2000 node name:
```

Enter the X25router 2000 node name.

The procedure continues:

```
Do you want to run the ICP to the local node [YES]?
```

Enter NO. The procedure displays:

```
Network name            (string):
```

Enter the name of a network to which your X25router 2000 is connected.

The procedure now displays:

```
Remote DTE address      (string):
Remote subaddress       (string):
```

Specify the remote DTE address as a string of up to 15 digits. See the *Public Network Information* manual for details of the DTE address format for your network. Specify a subaddress if required.

The ICP takes approximately 1.5 minutes, during which time no messages are displayed. When the ICP completes successfully, the procedure displays:

```
%X25ROU-I-NORMAL, X25router 2000 test finished successfully
```

Then, the procedure displays some details of the test:

```
Test Statistics
Number of Transmits =   n
Number of Receives  =   m
```

where *n* and *m* should be approximately equal; they may differ by 1 or 2.

If the ICP completes with errors, see Section 5.6.

5.5.3 Clearing the Destination

To complete the ICP, you will need to clear the destination on the remote node. Enter the following commands:

```
$ RUN SYS$SYSTEM:NCP
NCP> CLEAR X25-SERVER DESTINATION PSIXTR ALL
NCP> CLEAR OBJECT PSIXTR ALL
```

5.6 What to Do if the ICP Completes with Errors

If the ICP completes with errors, first work through the following checklist, to ensure you have run the ICP correctly:

1. Check the DTE address or subaddress. If they are incorrect, try the test again.
2. Check the software installation. If the test fails again, try one of the problem solving methods described below.

3. The PSDN may not be up. Try the test again later. If it fails, try one of the problem solving methods described below.
4. Check that X25router 2000 is connected to the modem, and that the modem is working correctly. Then, try the test again.

You can use the following to help diagnose problems:

- The TRACE utility. See the *X25router 2000 Problem Solving Guide* for details.
- The X25router 2000 status and error counters. To use these, enter the following command:

  ```
  NCP> TELL X25router SHOW LINE line-id COUNTERS
  ```

  where *X25router* is the node name.
  line-id is the name of the line used on the X25router 2000.
- Line-level loopback tests, to test the physical line. See the *X25router 2000 Problem Solving Guide* for details.

Refer to your PSDN authorities and to your software support specialist if you need further assistance.

A

Example Installation and Configuration

```
$ @sys$update:vmsinstal x25rou011 mua0: options n

        VAX/VMS Software Product Installation Procedure V5.1


It is 15-JUL-1989 at 11:02.
Enter a question mark (?) at any time for help.

%VMSINSTAL-W-DECNET, Your DECnet network is up and running.
* Do you want to continue anyway [NO]? yes
* Are you satisfied with the backup of your system disk [YES]?

The following products will be processed:

  X25ROU V1.1

        Beginning installation of X25ROU V1.1 at 11:03

%VMSINSTAL-I-RESTORE, Restoring product saveset A ...

    Release Notes Options:

        1.  Display release notes
        2.  Print release notes
        3.  Both 1 and 2
        4.  Copy release notes to SYS$HELP
        5.  Do not display, print or copy release notes

* Select option [2]: 4
* Do you want to continue the installation? no
%VMSINSTAL-I-RELMOVED , The product's release notes have been
successfully moved to SYS$HELP.

        Installation of X25ROU V1.1 completed at 11:04


        VMSINSTAL procedure done at 11:04

$ @sys$update:vmsinstal x25rou011 mua0

        VAX/VMS Software Product Installation Procedure V5.1


It is 17-JUL-1989 at 14:22.
```

```
Enter a question mark (?) at any time for help.

%VMSINSTAL-W-DECNET, Your DECnet is up and running.
* Do you want to continue anyway [NO]? YES
* Are you satisfied with the backup of your system disk [YES]?

The following products will be processed:

  X25ROU V1.1


        Beginning installation of X25ROU V1.1 at 14:22

%VMSINSTAL-I-RESTORE, Restoring product saveset A ...
%VMSINSTAL-I-RELMOVED , The product's release notes have been
successfully moved to SYS$HELP.

* Do you want to purge files replaced by this installation [YES]?

The X25router 2000 kit has 2 components.

    o    X25router 2000 software

    o    Trace software

You may install either one or both of these components.

* Do you want to install the X25router 2000 software [YES]?
* Do you want to install the TRACE software [YES]?


        Product:      X25ROUTER-2000
        Producer:     DEC
        Version:      1.1
        Release Date:

* Does this product have an authorization key registered and loaded? NO

    DIGITAL recommends that you install the license for
    the X25router 2000 on completion of the installation.

* Do you wish to exit [YES]? NO

%VMSINSTAL-I-RESTORE, Restoring product saveset B ...
%VMSINSTAL-I-RESTORE, Restoring product saveset C ...

The following software will now be installed:

        o   X25router 2000 software

        o   Trace software

%X25ROU-I-FILEXISTS, VMI$ROOT:[SYSLIB]NETTRACE$KEY.INIT already exists on
system
%X25ROU-I-FILNOTINST, VMI$ROOT:[SYSLIB]NETTRACE$KEY.INIT not installed

The system logical MOM$LOAD is already defined as:
     MOM$SYSTEM:,MDM$MAINT

To load the X25router, MOM$LOAD should be redefined as:

        MOM$SYSTEM:,MDM$MAINT,SYS$SYSROOT:[DECSERVER]

* Do you want to redefine this now [YES]?


After exiting from VMSINSTAL, do the following:
```

1. If the definition for MOM$LOAD in the system start-up file does not contain SYS$SYSROOT:[DECSERVER], you must edit your system start-up file so that it defines the logical MOM$LOAD as a search string with a value equal to itself and the element SYS$SYSROOT:[DECSERVER]. For example:

   ```
   DEFINE/SYSTEM/EXEC/NAME_ATTRIBUTE=NO_ALIAS/NOLOG MOM$LOAD -
   "current-search-string",SYS$SYSROOT:[DECSERVER]
   ```

   This command allows the location of the X25router 2000 image to be defined each time the system is rebooted, so the system will load correctly.

2. Configure your X25router 2000 into the load host's database. Execute the command procedure called X25ROUCONFIG.COM which is in the SYS$SYSROOT:[DECSERVER] directory. If you have already executed this procedure from previous installations, you only need to configure any additional X25router 2000 units. All previously defined DECrouter units will still be configured within the load host's database. Refer to Chapter 4 of the X25router 2000 Installation Procedures for further details.

3. Set up the X25router 2000 permanent database before powering up the hardware. Execute the command procedure called X25ROUSETUP.COM which is in the SYS$SYSROOT:[DECSERVER] directory. Refer to Chapter 4 of the X25router 2000 Installation Procedures for further details.

   If you wish to modify the X25router 2000 database for your specific networking requirements, execute the X25ROUPERM.EXE program which is in the SYS$SYSTEM directory. This program is described in the X25router 2000 Management Guide.

4. REMINDER: The release notes for the X25router 2000 are in X25ROU011.RELEASE_NOTES which is in the directory SYS$HELP.

5. A command file SYS$MANAGER:NETTRACE_INSTALL.COM has been created to install the TRACE utility. Edit your system start-up file to execute this file each time your system is booted.

   Please ignore any error messages while TRACE is installed.

```
%VMSINSTAL-I-MOVEFILES, Files will now be moved to their target directories...

        Installation of X25ROU V1.1 completed at 14:28

        VMSINSTAL procedure done at 14:28

$ @sys$sysroot:[decserver]x25rouconfig

    You must assign a unique DECnet node name and DECnet node
    address for each DECrouter that you are going to configure.
    If at any time you specify a node name or node address that
    has already been defined within the network, the previous
    definition will be replaced by what you have specified for
    the DECrouter.

Enter <RET> to start, or CTRL/Z to exit.

              DECrouter Configuration Procedure

                              Menu of Options
```

```
                        1 - List known DECrouters
                        2 - Add a DECrouter
                        3 - Swap an existing DECrouter
                        4 - Delete an existing DECrouter
                        5 - Restore existing DECrouters
                        6 - Upgrade existing DECrouters
                    CTRL/Z - Exit from this procedure

        Your choice: 1

DECnet  DECnet Router Service
Address Node   Type   Circuit Ethernet Address  Load File     Dump File
------- ------ ------ ------- ----------------- ------------- -------------
43.989  ZEBRA  X25ROU QNA-0   08-22-22-22-22-22 X25010.SYS    X25ZEBRA.DMP
63.99   HORSE  X25ROU QNA-0   80-11-22-33-44-55 X25010.SYS    X25HORSE.DMP
63.999  CAMEL  X25ROU QNA-0   80-55-44-33-22-11 X25010.SYS    X25CAMEL.DMP

Total of 3 DECrouters defined.
(Press RETURN for menu)

              DECrouter Configuration Procedure

                               Menu of Options

                        1 - List known DECrouters
                        2 - Add a DECrouter
                        3 - Swap an existing DECrouter
                        4 - Delete an existing DECrouter
                        5 - Restore existing DECrouters
                        6 - Upgrade existing DECrouters
                    CTRL/Z - Exit from this procedure

        Your choice: 6
DECrouter type ? x25rou


    Enter ? if you require help, enter CTRL/Z to return to menu
    without changing the unit's entry in the database.

    If  you  use this option, and you  have  more than one load
    host for any DECrouters, you must  modify  the database for
    each load host. To do this, execute  X25ROUCONFIG  on  each
    load host, and select the UPGRADE option.

    Enter the node name of the DECrouter to upgrade. To upgrade
    all defined DECrouters enter *.

What is the DECnet node name of the DECrouter ? CAMEL
DECrouter CAMEL to be upgraded to SYS$COMMON:[DECSERVER]X25011.SYS
Executing NCP commands to upgrade DECrouters
```

```
              DECrouter Configuration Procedure

                              Menu of Options

                       1 - List known DECrouters
                       2 - Add a DECrouter
                       3 - Swap an existing DECrouter
                       4 - Delete an existing DECrouter
                       5 - Restore existing DECrouters
                       6 - Upgrade existing DECrouters
                   CTRL/Z - Exit from this procedure

        Your choice: 1

DECnet  DECnet Router Service
Address Node   Type   Circuit Ethernet Address  Load File     Dump File
------- ------ ------ ------- ----------------- ------------- -------------
43.989  ZEBRA  X25ROU QNA-0   08-22-22-22-22-22 X25010.SYS    X25ZEBRA.DMP
63.99   HORSE  X25ROU QNA-0   80-11-22-33-44-55 X25010.SYS    X25HORSE.DMP
63.999  CAMEL  X25ROU QNA-0   80-55-44-33-22-11 X25011.SYS    X25CAMEL.DMP

Total of 3 DECrouters defined.
(Press RETURN for menu)

              DECrouter Configuration Procedure

                              Menu of Options

                       1 - List known DECrouters
                       2 - Add a DECrouter
                       3 - Swap an existing DECrouter
                       4 - Delete an existing DECrouter
                       5 - Restore existing DECrouters
                       6 - Upgrade existing DECrouters
                   CTRL/Z - Exit from this procedure

        Your choice: 6
DECrouter type ? x25rou

    Enter ? if you require help, enter CTRL/Z to return to menu
    without changing the unit's entry in the database.


    If  you  use this option, and you have more than one  load
    host for any DECrouters, you must modify the database  for
    each  load host. To do this, execute X25ROUCONFIG on  each
    load host, and select the UPGRADE option.

    Enter the node name of the DECrouter to upgrade. To upgrade
    all defined DECrouters enter *.

What is the DECnet node name of the DECrouter ? *
DECrouter ZEBRA to be upgraded to SYS$COMMON:[DECSERVER]X25011.SYS
DECrouter HORSE to be upgraded to SYS$COMMON:[DECSERVER]X25011.SYS
Executing NCP commands to upgrade DECrouters


              DECrouter Configuration Procedure

                              Menu of Options
```

```
                        1 - List known DECrouters
                        2 - Add a DECrouter
                        3 - Swap an existing DECrouter
                        4 - Delete an existing DECrouter
                        5 - Restore existing DECrouters
                        6 - Upgrade existing DECrouters
                    CTRL/Z - Exit from this procedure

        Your choice: 2

    Enter ? if you require help, enter CTRL/Z to return to menu
    without adding a unit to the database.

DECrouter type (DR200, DR2000, X25ROU)? x25rou
DECnet node name for unit? whale
DECnet node address for unit? 63.787
Ethernet address for unit (nn-nn-nn-nn-nn-nn)?08-66-66-66-66-66
DECnet Service Circuit-ID [QNA-0]?
%NCP-W-UNRCMP, Unrecognized component , Node
%NCP-W-UNRCMP, Unrecognized component , Node

    If you get an  error  message  now, the new unit will not be
    added to the database, and you should  delete the entry from
    the directory using the delete option.

              DECrouter Configuration Procedure

                                Menu of Options

                        1 - List known DECrouters
                        2 - Add a DECrouter
                        3 - Swap an existing DECrouter
                        4 - Delete an existing DECrouter
                        5 - Restore existing DECrouters
                        6 - Upgrade existing DECrouters
                    CTRL/Z - Exit from this procedure

        Your choice: 3


    Enter ? if you require help, enter CTRL/Z to return to menu
    without changing the unit's entry in the database.


    If you use this option, and you have more than one load host
    for  the  DECrouter,  you  must modify the database for each
    load  host.  To  do  this, execute X25ROUCONFIG on each load
    host, and select the SWAP option.

What is the DECnet node name of the DECrouter you want to swap? CAMEL
DECrouter CAMEL at Ethernet address 80-55-44-33-22-11 is being modified.

    Enter the new Ethernet address and any other DECnet characteristics
    you want to modify.


DECrouter type[X25ROU]?
DECnet node name for unit[CAMEL]?
Ethernet address for unit (nn-nn-nn-nn-nn-nn)?08-55-99-88-77-66
DECnet Service Circuit-ID [QNA-0]?


              DECrouter Configuration Procedure

                                Menu of Options
```

```
                    1 - List known DECrouters
                    2 - Add a DECrouter
                    3 - Swap an existing DECrouter
                    4 - Delete an existing DECrouter
                    5 - Restore existing DECrouters
                    6 - Upgrade existing DECrouters
                CTRL/Z - Exit from this procedure

        Your choice: 5

          Restoring existing DECrouters to host DECnet database...
          Host DECnet database successfully restored.

              DECrouter Configuration Procedure

                              Menu of Options

                    1 - List known DECrouters
                    2 - Add a DECrouter
                    3 - Swap an existing DECrouter
                    4 - Delete an existing DECrouter
                    5 - Restore existing DECrouters
                    6 - Upgrade existing DECrouters
                CTRL/Z - Exit from this procedure

        Your choice: 4

What is the DECnet node name of the unit you want to delete?
(CTRL/Z to return to menu) camel
%NCP-I-SUCCESS,  Success
Remote node =   63.999 (CAMEL)
%NML-I-RECDELET, Database entry deleted

              DECrouter Configuration Procedure

                              Menu of Options

                    1 - List known DECrouters
                    2 - Add a DECrouter
                    3 - Swap an existing DECrouter
                    4 - Delete an existing DECrouter
                    5 - Restore existing DECrouters
                    6 - Upgrade existing DECrouters
                CTRL/Z - Exit from this procedure

        Your choice:<CTRL/Z>

$ @sys$sysroot:[decserver]x25rousetup

        This command procedure sets  up  the  permanent database
        for the X25router 2000.  Usually,  executing this script
        is all you need to do to set up the database.

        The procedure consists of a  series of questions. If you
        need  help  with  answering  a  question,  enter ?  as a
        response and the HELP text will be displayed.


        X25router 2000 node name     (node-id): nodea

        X25router 2000 type [DEMSA, DEMSB]: demsa

        A configuration file for NODEA already exists.
```

```
        You may either keep the existing  configuration file and
        modify it or create a new database.

Do you want to create a new database [YES]?

            The old configuration file for NODEA will be renamed.

%RENAME-I-RENAMED, SYS$COMMON:[DECSERVER]X25NODEA.SYS;1 renamed
to SYS$COMMON:[DECSERVER]X25NODEA.OLD;2

        Your X25router 2000  can be one of three types of DECnet
        node:

            NONROUTING (end node)
            ROUTING IV (level 1 router)
            AREA       (level 2 router)

        Specify the type you require.

        Node type            [NONROUTING]: routing iv
        Ethernet circuit cost         [4]:
        Router priority              [64]:

        If  you  want  to  use  incoming  datalink mapping (DLM)
        circuits you need to specify a  subaddress  range to use
        to pass the incoming X.25 calls to DECnet.

        If you  do  not want to use  incoming DLM circuits, just
        press <RETURN> to continue.

        Subaddress range           [NONE]: 1-5

        The X25router 2000 supports  the following  combinations
        of lines,  line speeds  and  ports. Specify the type you
        require.

        Type    Number of lines    Maximum Speed          Ports
                                     (per second)

          1            4               64 Kb            0,1,2,3
          2            3              256 Kb            0,1,2
          3            2              384 Kb            0,1

        Type                          [1]:


        Enter the username  and password to be used to control
        access  to  the  X25router 2000.  If  you specify this
        information here,  then it must be  supplied  whenever
        lines,  DTEs  or  circuits on the  X25router 2000  are
        being modified.

        If this  information  is  not specified,  anyone  can
        modify the X25router 2000. DIGITAL STRONGLY RECOMMENDS
        that you specify access control for the NML object.

NML Username [NONE]: nmluser
NML Password:
Verification:


        Enter  the  username  and password to be used for the
        TRACE utility. If you specify  this  information here,
        then it must be supplied when using the TRACE utility
        on the X25router 2000.
```

```
        If this  information  is  not specified,  anyone  can
        monitor the traffic on the X25router 2000.

        DIGITAL STRONGLY RECOMMENDS that you set up a username
        and password for the TRACE utility.

TRACE Username [NONE]: traceuser
TRACE Password:
Verification:


        The  following  configurator  commands will be used to
        define the permanent database.

        set executor type ROUTING IV
        set circuit ETHERNET router priority 64
        set circuit ETHERNET cost 4
        set executor subaddress 1-5
        set logging monitor events 0.0-2,4-6,8,9
        set logging monitor events 2.0-1
        set logging monitor events 4.2-13,16,19
        set logging monitor events 5.0-21
        set logging monitor events 7.0-11
        set object nml user NMLUSER password *Set*
        set object nettrace$ user TRACEUSER password *Set*

Do you want the permanent database defined now [YES]?

X25ROUPERM V1.1, X25router 2000 Configuration Program
X25ROUPERM-I-NEWRTR this is a new X25router
X25ROUPERM-I-FILNEW new configuration file created

        This command  procedure allows  you  to  define  one or
        more  PSDN(s) and one or more DTEs associated with each
        network.

Do you want to define the X25-PROTOCOL database now [YES]?

        You  can  use  this  procedure to purge the database to
        remove  all  line,  DTE and  X.25  protocol information
        before updating the permanent database.

        The  following  configurator  command  will  be used to
        purge the line permanent database:

        PURGE known lines all

        The  following  configurator  commands  will be used to
        purge the DTE and X.25 permanent database:

        PURGE module x25-protocol known networks all
        PURGE module x25-protocol known dtes known networks all

Do you want the information in the the permanent database
to be purged [NO]?
Do you want the information in the X.25 and DTE
permanent database to be purged [NO]?

        A command  procedure will now  be  executed  to perform
        the requested  definitions.

        Please ignore any error messages.

X25ROUPERM V1.1, X25router 2000 Configuration Program
```

```
        PSDN and profile names are defined here. You can define
        one or more PSDNs.  For each PSDN  you will be asked to
        provide the  network name and the profile name for that
        network.

        Network name   (string): nodea_pss
        Profile name   (string) [nodea_pss]: pss

        The  following  configurator  command  will be  used to
        update the permanent database:

        DEFINE module x25-protocol network nodea_pss -
                                        profile pss

Do you want the information in the permanent database
updated  [YES]?

        DTEs are  defined  here.  You  can  define  one or more
        DTEs  connected to this network. For each DTE  you will
        be asked to provide the following information:

            o   DTE address
            o   Range of channels to be used by the DTE
            o   Synchronous port number to be used by the line
            o   Line associated with the DTE

        DTE address       (number): 23421234567890
        Channels range      (list): 515-512,10-5
        Synchronous port     (0-3): 0
        Line name (string) [X25-0]:

        The following  configurator  commands  will be used to update
        the permanent database.

        DEFINE line X25-0 -
            protocol LAPB -
            network nodea_pss -
            device SYN-0 -
            state on

        DEFINE module x25-protocol dte 23421234567890 -
            network nodea_pss -
            channels 515-512,10-5 -
            line X25-0 -
            state on

Do you want to update the permanent database now  [YES]?
Do you want to define any more DTEs connected
to this network [NO]?

Do you want to define any more networks [NO]?


        A command  procedure  will  now be executed  to perform
        the requested  definitions.


X25ROUPERM V1.1, X25router 2000 Configuration Program
X25ROUPERM-I-FILUPD configuration file updated

        X25-SERVER destinations are set up  here.  These  permit
        incoming calls received by this node to be redirected to
        the appropriate host.  This  procedure  asks  for a list
        of hosts with PSI Access installed.
```

```
Do you want to define the X25-SERVER database now [YES]?
        Destination node name  (string)                 : nodeb
        Destination priority                      [0]    :
        Call mask              (2-32 hex)         [None] :
        Call value             (2-32 hex)         [None] :
        Closed user group name (1-16 characters) [None] :
        Sending address        (1-15 decimal)     [None] :
        Subaddress range       (decimal range)    [None] : 36
        Object identification  (string)           [36]   :

        The  destination  will  be set  up  using the  following
        configurator command:

        DEFINE node 63.999 name NODEB
        DEFINE module x25-server -
                destination nodeb -
                node NODEB -
                subaddress 36 -
                object 36

Do you want to define this destination now  [YES]?
Do you want to define any more destinations  [NO]?

        A command procedure will now be executed to perform the
        requested definitions.

X25ROUPERM V1.1, X25router 2000 Configuration Program
X25ROUPERM-I-FILUPD configuration file updated

        You may  now define  the DECnet and X.25 PVCs you will
        use on the X25router 2000.

Do you want to define the circuit database now [YES]?

        You can  use  this  procedure to purge the database to
        remove all  DECnet and X.25 circuit information before
        updating the permanent database.

        The following  configurator  command  will  be used to
        purge the circuit permanent database:

        PURGE known circuits all

Do you want the information in the circuit permanent database
purged [NO]?

        You  can  now  define the circuits and lines to be used.
        The circuit types are DDCMP, DLM and PVC.

        DDCMP circuits
        --------------

        You  can define up to four DDCMP  circuits for the DEMSA
        and one circuit for the DEMSB.

        DDCMP lines may have any name that does not begin PVC-.

        For each DDCMP circuit you define,  a  line will also be
        configured  to  run the DDCMP  protocol. Note that for a
        DEMSB, you can have either an X.25 line, or a DDCMP line.

        DLM circuits
        ------------

        You may define up to sixty-three DLM circuits  for  the
        DEMSA, but only two DLM circuits for the DEMSB.
```

```
        You  may use any name for  DLM circuits  that  does not
        begin PVC-.

        PVCs
        ----

        You can  define up to  512 PVCs for the DEMSA, but only
        sixteen PVCs for the DEMSB. Note that for each  DLM you
        define, you can define one less PVC.

        You must start  the circuit name  with the  string PVC-,
        except for DLM PVCs.


        Circuit name      (string): dlm-out

Circuit type [DDCMP, DLM] ? dlm

        You must now specify the usage as  INCOMING, OUTGOING or
        PERMANENT

        Usage                     : outgoing
        Remote DTE        (number): 23420987654321
        Local DTE         (number): 23421234567890
        Network           (string): nodea_pss
        Recall timer (number) [60]:
        Maximum recalls (number) [100]:
        Circuit cost  (number) [5]:
        State        (string) [ON]:

        The following  configurator  commands  will  be  used to
        update the permanent database:

        DEFINE circuit DLM-OUT cost 5 usage OUTGOING number -
23420987654321 DTE 23421234567890 network nodea_pss -
maximum recalls 100 recall timer 60 state ON

Do you want the information in the permanent database updated  [YES]?

Do you want to define any more circuits [NO]? yes

        Circuit name      (string): ddcmp-1

Circuit type [DDCMP, DLM] ? ddcmp

        This circuit is a DDCMP circuit.

        Please enter the  information about  the line which will
        be used for this circuit.

        Line name   (string) [DDCMP-1]:
        Synchronous port  (0-3) :1
        Circuit cost  (number) [5]:

        The following  configurator  commands  will  be  used to
        update the permanent database:

        DEFINE line DDCMP-1 protocol DDCMP point device SYN-1 state on
        DEFINE circuit DDCMP-1 cost 5 line DDCMP-1 state on

Do you want the information in the permanent database updated  [YES]?

Do you want to define any more circuits [NO]? yes

        Circuit name      (string): dlm-in

Circuit type [DDCMP, DLM] ? dlm
```

```
        You must now specify the usage as  INCOMING, OUTGOING or
        PERMANENT

        Usage                       : incoming
        Remote DTE        (number):
        Local DTE         (number):
        Network           (string):
        Circuit cost  (number) [5]:
        State        (string) [ON]:

        The following  configurator  commands  will  be  used to
        update the permanent database:

        DEFINE circuit DLM-IN cost 5 usage INCOMING state ON

Do you want the information in the permanent database updated  [YES]?

Do you want to define any more circuits [NO]? yes

        Circuit name      (string): pvc-1


        This circuit is a PVC.

        Please enter the required circuit information.

        Local DTE         (number): 23421234567890
        Network           (string): nodea_pss
        Channel           (number): 65

        The following  configurator  commands  will  be  used to
        update the permanent database:

        DEFINE circuit PVC-1 usage PERMANENT DTE 23421234567890 -
network nodea_pss channel 65 state on

Do you want the information in the permanent database updated  [YES]?

Do you want to define any more circuits [NO]?

        A command procedure  will now be executed to perform the
        requested  definitions.

X25ROUPERM V1.1, X25router 2000 Configuration Program
%X25ROUPERM-I-FILUPD configuration file updated

        X25ROUSETUP complete.

        The  databases   are  now  set  up  and you may load the
        X25router 2000.
```

B

Example of Testing an Installation, Using the ICP

```
$ @SYS$TEST:X25ROU_ICP

        This  command  file  is  used  to  run  the Installation
        Checkout Procedure (ICP) for the X25router 2000.

        This ICP can be run in any of the following ways:

        -   As a loopback test to the same X25router 2000
        -   To a remote X25router 2000
        -   To a VAX running native mode VAX P.S.I.

        In all cases, the ICP  assumes  that at least one DTE is
        up and running.

        As  well  as performing a test, the ICP can also be used
        to set up  and clear a destination.  This is useful when
        running a test from another node.

        During the ICP, you will be asked to supply:

        -   The X25router 2000 node name
        -   The  name  of a network to which your X25router 2000
            is connected.

        For a local (loopback) test  you will be asked to supply
        the address of a DTE on the X25router 2000. The ICP will
        set up a  suitable destination for  the duration  of the
        test.

        For a test to a  remote node you will be asked to supply
        the  remote DTE address  and  subaddress.  Note that you
        must have  already set up  a destination for  the remote
        DTE.

        If you  do not want to  run  the  Installation  Checkout
        Procedure press <RET> in response to the first prompt.

        X25router 2000 node name: KB1664
        Do you want to run the ICP to the local node [YES]?

        Network Name            (string): PSS
        Local DTE address       (string): 23421234567890
```

```
%X25ROU-I-SETDEST, ICP destination has been set

%X25ROU-I-NORMAL, X25router 2000 test finished successfully

%X25ROU-I-CLEAR, ICP destination has been cleared

        Test Statistics
        Number of Transmits =   50
        Number of Receives  =   51
```

C
Lists of Files Installed

This appendix lists the files installed on your VMS load host by the X25router 2000 installation procedure.

C.1 X25router 2000 files

SYS$HELP directory

- X25ROUPERM.HLB
- X25ROU011.RELEASE_NOTES

SYS$MANAGER directory

- X25ROU_LOGICALS.COM

  This is installed for VMS V5.0 and VMS V5.0-1 systems only.

SYS$SYSROOT:[DECSERVER] directory

- X25011.SYS
- X25ROUCONFIG.COM
- X25ROU_DEFINE.COM
- X25ROU_DEFINE_HELP.COM
- X25ROU_MULTI_HOST.COM
- X25ROUSETUP.COM
- X25ROU_PROFILES.SYS

In addition to the files listed above, which are copied into the directory SYS$SYSROOT:[DECSERVER], the installation procedure also creates the following files in SYS$SYSROOT:[DECSERVER]:

- ROUCONFIG.DAT (if it does not already exist)
- X25*node-name*.SYS (for each X25router 2000 node)

  where *node-name* is the name of an X25router 2000 node.

SYS$SYSTEM directory

- X25ROUPERM.EXE

SYS$TEST directory

- X25ROU_ICP.COM

C.2 TRACE files

If you install the TRACE utility, the TRACE files are installed as follows:

SYS$SYSTEM directory

- NETLTC.EXE
- NETTRACE.EXE

SYS$HELP directory

- TRACEHLP.HLB

SYS$LIBRARY directory

- NETTRACE$DDCMP_ANALYZE.EXE
- NETTRACE$ETHERNET_ANALYZE.EXE
- NETTRACE$GAP_ANALYZE.EXE
- NETTRACE$KEY.INIT
- NETTRACE$L2_ANALYZE.EXE
- NETTRACE$L2E_ANALYZE.EXE
- NETTRACE$L3_ANALYZE.EXE
- NETTRACE$L3_DDX76_ANALYZE.EXE

- NETTRACE$NSP_ANALYZE.EXE
- NETTRACE$ROUTING_ANALYZE.EXE
- NETTRACE$SYNC_ANALYZE.EXE

SYS$MANAGER directory

- NETTRACE_INSTALL.COM

SYS$MESSAGE directory

- NETTRACE_MESSAGES.EXE

D
ICP Messages

This appendix lists the messages that may be displayed when you are running the X25router 2000 Installation Checkout Procedure (ICP).

X25router 2000 ICP messages have the prefix "X25ROU-" and are displayed in 1, 2 or 3 parts:-

- The X25router 2000 ICP message text (one or two lines)
- A VMS message associated with the ICP message
- In some cases text indicating additional diagnostic information (an internal VAX P.S.I. error code)

Note that the X25router 2000 ICP messages are not subject to the normal VMS message processing rules. The SET MESSAGE/NOSEVERITY command has no effect on the message format.

D.1 ICP Information Messages

`%X25ROU-I-NORMAL, X25router 2000 test finished successfully`

Normal successful completion of the ICP (RUN command).

`%X25ROU-I-SETDEST, ICP destination has been set`

ICP destination has been set (RUN and SET commands).

`%X25ROU-I-SUBADR,` *`nnn`* `is not a valid subaddress`

The subaddress string *nnn* is not a valid number (RUN and SET commands).

```
%X25ROU-I-CLEARED, circuit unexpectedly cleared
%X25ROU-I-CAUSEDIAG, Cause = nn, Diagnostic = nn)
```

The virtual circuit being used for the test has been cleared with an unexpected cause/diagnostic code, indicating that the test was terminated unexpectedly (RUN command).

```
%X25ROU-I-CLEAR, ICP destination has been cleared
```

The destination used to run a test has been cleared (RUN and CLEAR commands).

D.2 ICP Error Messages

```
%X25ROU-E-UNRECCOM, Invalid or unrecognized command: text
```

Invalid command argument to ICP.

```
%X25ROU-E-NOCONNECT, failed to connect to node
VMS error message)
```

The ICP is unable to connect to the X25router 2000. A VMS DCL message indicating a reason for the failure follows the ICP message.

```
%X25ROU-E-CLRFAIL, failed to clear the ICP destination
VMS error message
[%X25ROU-I-IOST2, IOST2 = nnn]
```

The X25router 2000 ICP object (X25ICP) failed to clear the destination. A VMS DCL message indicating a reason for the failure follows the ICP message. The third line of the message (if present) provides some further diagnostic information (RUN and CLEAR commands).

```
%X25ROU-E-SETFAILED, failed to set up the ICP destination
VMS error message
[%X25ROU-I-IOST2, IOST2 = nnn]
```

The X25router 2000 ICP object (X25ICP) has failed to set up a destination. A VMS DCL message indicating a reason for the failure follows the ICP message. The third line of the message (if present) provides some further diagnostic information (RUN and CLEAR commands).

```
%X25ROU-E-SENDFAILED, failed to send command to X25router 2000
VMS error message
```

The ICP command procedure failed to send a command to the X25router 2000. A VMS DCL message indicating a reason for the failure follows the ICP message.

```
%X25ROU-E-READFAILED, failed to read command status from X25router 2000
VMS error message
```

The ICP command procedure failed to read the status message from the X25router 2000. A VMS DCL message indicating a reason for the failure follows the ICP message.

D.3 ICP Fatal Messages

```
%X25ROU-F-RUNFAIL, X25router 2000 ICP has failed
VMS error message
[%X25ROU-I-IOST2, IOST2 = nnn])
```

The ICP test has failed. A VMS DCL message indicating a reason for the failure follows the ICP message. The third line of the message (if present) provides some further diagnostic information (RUN command).

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