

# **DECnet-RSX**

## **Network Generation and Installation Guide**

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This manual provides instructions on how to generate and install DECnet-RSX software on configured RSX-11M, RSX-11M-PLUS, and RSX-11S systems.

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RSX-11S V4.5  
RSX-11M-PLUS V4.3  
Micro/RX V4.3

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DECnet-11S V4.5  
DECnet-11M-PLUS V4.3  
DECnet-Micro/RX V4.3

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## Preface

This manual tells you how to generate, install, and test DECnet-11M Version 4.3, DECnet-11M-PLUS Version 4.0, and DECnet-11S Version 4.3.

The manual also describes the procedures for installing DECnet-RSX software with the RSX-11 Packetnet System Interface (PSI) product. The RSX-11 PSI product lets your DECnet-RSX node access a Packet Switching Data Network (PSDN) using the X.25 and X.29 protocols.

Throughout the manual, the term "DECnet" or "DECnet-RSX" refers to all the software that you receive with your DECnet-RSX distribution kit.

### Intended Audience

This manual is for you if you are an advanced user or Digital software specialist responsible for generating and installing a DECnet-RSX node on an RSX-11M, RSX-11M-PLUS, or RSX-11S system. The *DECnet-Micro/RXS Installation Guide* explains how to install the network software for a DECnet-Micro/RXS node.

### Structure of This Manual

The manual is organized as follows:

- |           |  |
|-----------|--|
| Chapter 1 | Outlines the tasks you must perform before, during, and after a network generation (NETGEN).   |
| Chapter 2 | Tells how to configure your RSX system to support DECnet and contains information that helps you select the appropriate devices and DECnet components. |

- Chapter 3** Describes the necessary steps for preparing your RSX-11M/M-PLUS system for NETGEN. These include specifying partition layout, performing a system generation (SYSGEN), and performing a preliminary kit merge procedure called PREGEN.
- Chapter 4** Tells how to use the DECnet RSX-11M/M-PLUS NETGEN procedure to generate the network software.
- Chapter 5** Presents the first part of the RSX-11M/M-PLUS NETGEN dialog (called NET).
- Chapter 6** Presents the second part of the RSX-11M/M-PLUS NETGEN dialog (called DEC).
- Chapter 7** Presents the third part of the RSX-11M/M-PLUS NETGEN dialog (called PSI), for holders of an RSX-11 PSI license.
- Chapter 8** Provides information on configuring a pregenerated RSX-11M-PLUS end node.
- Chapter 9** Tells how to install and load DECnet on an RSX-11M, RSX-11M-PLUS, or RSX-11S system.
- Chapter 10** Describes test procedures that check the operation of network software after installation.
- Chapter 11** Describes test procedures that check the operation of RSX-11 PSI software after a PSI installation.
- Appendix A** Presents a sample NETGEN dialog.
- Appendix B** Tells how to include NETPAN (Network Up-Line Panic Dump) capability for an RSX-11S system.
- Appendix C** Tells how to rebuild components that cannot be rebuilt using component mode (CETAB, CEX, DDMs).
- Appendix D** Describes the DECnet test sender (DTS) and the DECnet test receiver (DTR) utilities. These utilities are used for network software testing described in Chapter 10.

## Associated Documents

The following manuals are part of the DECnet-RSX document set:

- *DECnet-RSX Guide to User Utilities*
- *DECnet-RSX Programmer's Reference Manual*
- *DECnet-RSX Network Management Concepts and Procedures*
- *DECnet-RSX Guide to Network Management Utilities*

The following manuals will help with system generation (SYSGEN) procedures:

- *RSX-11M System Generation and Installation Guide*
- *RSX-11M-PLUS System Generation and Installation Guide*
- *RSX-11S System Generation and Installation Guide*

## Acronyms

These acronyms appear in the manual:

AUX	Auxiliary process
CCR	Console carrier requester
CEX	Communications Executive
CFE	Configuration File Editor
DCP	Digital Communications process
DDM	Device driver module
DLL	Down-line system loader
DLM	Data link mapping process
DLX	Direct Line Access process
DUK	KMX/KMY/KMV microcode dumper

<b>DUM</b>	<b>Up-line system dumper</b>
<b>ECL</b>	<b>End Communications layer</b>
<b>EPM</b>	<b>Ethernet Protocol Manager</b>
<b>EVC</b>	<b>Event collector process</b>
<b>EVF</b>	<b>Event File Interpreter utility</b>
<b>EVL</b>	<b>Event listener process</b>
<b>EVR</b>	<b>Event logging receiver process</b>
<b>FAL</b>	<b>File Access Listener</b>
<b>FTS</b>	<b>File Transfer Spooler</b>
<b>HLD</b>	<b>Host Task Loader</b>
<b>KDA</b>	<b>KMX/KMY/KMV microcode dump analyzer</b>
<b>LAB</b>	<b>LAP-B protocol process</b>
<b>LAT</b>	<b>Local Area Transport</b>
<b>LCP</b>	<b>LAT Control Program utility</b>
<b>LIN</b>	<b>Link Watcher</b>
<b>LOO</b>	<b>Loopback tester</b>
<b>LSN</b>	<b>Listen utility</b>
<b>MCM</b>	<b>Command file submission task</b>
<b>MIR</b>	<b>Loopback mirror</b>
<b>MLD</b>	<b>General Microcode Loader</b>
<b>NCP</b>	<b>Network Control Program</b>
<b>NCT</b>	<b>Network control terminal process</b>

NCTCTL	Network control terminal task
NDA	Network Crash Dump Analyzer
NETACP	Network Ancillary Control Processor
NETFOR.OLB	DECnet high level language library
NETLIB.MLB	DECnet MACRO-11 library
NFT	Network File Transfer utility
NICE	Network Information and Control Exchange
NMDRV	Network management device driver
NMVACP	Network management volatile Ancillary Control Processor
NTD	Network Display utility
NTDEMO	Network Display Server
NTINIT	Network initializer
NTL	Network loader
NVP	Network Verification Program
NW	NW: device driver
PHO	Phone Communications utility
PLI	Packet level interface
PSDN	Packet Switching Data Network
PSI	Packetnet System Interface
PSIFOR.OLB	PSI high level language library
PSI.MLB	PSI MACRO library
RCP	Routing control process

<b>RMHACP/HTDRV</b>	<b>Remote terminal host Ancillary Control Processor/HT: device driver</b>
<b>RMT/RMTACP</b>	<b>Remote Terminal utility/Remote Terminal Ancillary Control Processor</b>
<b>RTH</b>	<b>Remote command terminal host process</b>
<b>SLD</b>	<b>Satellite task loader</b>
<b>TCL</b>	<b>Remote Task Control utility</b>
<b>TLK</b>	<b>Terminal Communications utility</b>
<b>TRA</b>	<b>Trace capture task</b>
<b>TRI</b>	<b>Trace interpreter task</b>
<b>VNP</b>	<b>Virtual Network Processor</b>
<b>XPT</b>	<b>Routing layer process</b>
<b>X25ACP</b>	<b>Ancillary Control Processor for NW</b>
<b>X29ACP</b>	<b>X.29 Terminal Access Ancillary Control Processor with HTDRV</b>

## Graphic Conventions

Convention	Meaning
Special type	This special type shows examples of user input (in red) or system output (in black).
UPPERCASE	Uppercase letters indicate characters to type exactly as shown. You can type the text in upper- or lowercase. You can abbreviate uppercase words to the first three or more unique characters.
<i>lowercase italics</i>	Lowercase italics indicate variables for which you specify or the system supplies the actual values.
<code>key</code>	This symbol indicates a key to press. <code>CTRL<math>x</math></code> indicates that you press the CONTROL key and the key represented by $x$ together.

Also note the following:

- The RETURN key terminates every command line, unless otherwise noted.
- All numbers are decimal, unless otherwise noted.
- You can abbreviate command keywords to the first three or more characters that make the abbreviation unique.





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# Introduction

This chapter introduces what you must do before, during, and after network generation (NETGEN), including:

- Making preliminary planning decisions
- Performing a system generation (SYSGEN) procedure if necessary
- Performing a preliminary kit merge procedure (PREGEN) if necessary
- Performing the NETGEN procedure
- Performing additional post-NETGEN functions

The SYSGEN procedure establishes the RSX operating system environment. The PREGEN procedure converts the distribution media (disk or magnetic tape) into the form that NETGEN requires. The NETGEN procedure is an indirect command file that generates the software for a DECnet node.

The steps in preparing for and performing the NETGEN procedure vary according to your distribution kit type. The end of this chapter suggests the reading path through this manual for users of each kit type.

## 1.1 Making Preliminary Decisions

The contents of your kit reflect a basic decision that you have already made. You have chosen to build one of the following:

- a full function DECnet node that can route messages from one node to another

- a configurable end node that can communicate with other nodes but which cannot route messages from one node to another
- a pregenerated end node that is, to a great extent, predefined

Before performing a NETGEN, you must make some preliminary decisions, as follows:

- Decide what communications device(s) you want for your target system (the system on which the DECnet node will run).
- Decide what optional DECnet components (described in Chapter 2, Table 2-3) you want for your target system.
- Decide what library you want to use if your target system supports the memory-resident FCS library or the supervisor mode FCS library.

You may also need to specify the partition layout for your system. On RSX-11M-PLUS and large RSX-11M systems, the partition layout supplied by your RSX system generation usually proves adequate. For other systems, you may need to modify the layout. Section 3.2 explains this procedure.

## 1.2 Performing a SYSGEN Procedure

If you have not already generated and/or installed your target system, you must first do so (see Sections 3.1 and 3.2). Even if you have already performed a SYSGEN for the node, you may need to do so again to include DECnet node support. An RSX-11M-PLUS SYSGEN by the user is never required for DECnet RSX-11M-PLUS pregenerated end nodes.

## 1.3 Performing a PREGEN Procedure

The PREGEN procedure (see Section 3.3) converts the distribution media (disk or magnetic tape) into a form that is directly usable by NETGEN. You may have one to three distribution media depending on the type of kit you ordered and whether you have purchased a license for the PSI product. If you have more than one distribution medium, PREGEN selects certain parts of each and copies them to the working generation disk used by NETGEN. This minimizes or eliminates the swapping of disks later. A PREGEN is never required for RSX-11M-PLUS pregenerated end nodes.

## 1.4 Performing a NETGEN Procedure

To perform a NETGEN, you engage in a dialog with the NETGEN procedure, basing your responses to displayed questions on information developed during the preliminary, decision-making phase. The NETGEN procedure creates a version of DECnet-RSX that is tailored to your needs. The NETGEN procedure generates output that is used to install the network. The type of NETGEN you use depends on the type of kit you purchased. The NETGEN procedure for RSX-11M/S and RSX-11M-PLUS nodes is described in Chapters 4, 5, 6, and 7. A shorter NETGEN procedure for RSX-11M-PLUS pregenerated nodes is described in Chapter 8.

Table 1-1 lists the disk areas where the files generated by NETGEN reside on the target disk. Group code *x* refers to the group code for NETGEN output that you specify in NETGEN. The *dduu:* for listing and map files may represent the NL: device or any disk in the system. You define the devices in NET, Section 1, Question 03.00. For pre-SYSGENned RSX-11M-PLUS systems, no map or listing files are produced. A description of these NETGEN files is provided in the subsections that follow.

**Table 1-1: Summary of NETGEN Output Files**

Files	DECnet	
	-11M -11S	/M-PLUS
<b>Libraries</b>		
NETLIB.MLB (MACRO library)	[1,1]	[1,1]
NETFOR.OLD (High-level language library)		
NETHLP.ULB (help file for NCP/VNP/CFE/NFT)	[1,2]	[1,2]
<b>Command files and work files</b>		
NETINS.CMD	[x,1]	[x,1]
NETREM.CMD (not for RSX-11S)		
NETCFE.CMD		
NETCFG.TXT		
Saved response files		
<b>Prefix files (used to specify conditional assembly parameters)</b>		
NETGEN's copy of RSXMC.MAC	[x,10]*	[x,10]
Object files, assembly and task build command files	[x,24]	[x,24]

(continued on next page)

**Table 1-1 (Cont.): Summary of NETGEN Output Files**

Files	DECnet	
	-11M	/M-PLUS
	-11S	
Listing and map files	<i>dduu</i> :[x,34]	<i>dduu</i> :[x,34]
Tasks and processes	[x,54]	[x,64]
CETAB.MAC (permanent database) NETGEN's copy of RSX11M.STB or RSX11S.STB		
* Not in pregenerated RSX-11M-PLUS end node systems		

#### **1.4.1 NETINS.CMD**

The network installation command file is invoked to install DECnet software after you perform NETGEN. Chapter 9 describes this command file and how it is used.

#### **1.4.2 NETREM.CMD**

The network remove command file is the file invoked when you want to turn the network off and remove network tasks. NETREM.CMD is not generated for RSX-11S nodes.

#### **NOTE**

The NETREM.CMD procedure will unload the HT: device but cannot unload the HT: device's data structures. Any subsequent loads are restricted to networks with the same number of HT: devices. In order to load a network with a different number of HT: devices, you must reboot the operating system.

#### **1.4.3 NETCFE.CMD**

The network CFE command file is an indirect command file that can be used as input to the Configuration File Editor (CFE). This file provides a record of the permanent database configuration (CETAB.MAC) as created by NETGEN. It can also be used as a template for making changes to the permanent database. In this case, you edit the command file to reflect the appropriate changes and then use the file as an indirect command file to CFE.

#### 1.4.4 NETCFG.TXT

The network configuration file provides information in text form on the configuration of devices, processes, and CEX products on the target system.

#### 1.4.5 CETAB.MAC

The CETAB.MAC file contains the permanent database used to load the configuration defined for the target node.

### 1.5 Performing Post-NETGEN Functions

Post-NETGEN functions include installing DECnet software, testing the newly installed network, reconfiguring and tuning the network, and regenerating as required (see Chapter 4).

#### 1.5.1 Installing DECnet Software

To install DECnet software, you execute the NETINS.CMD file. In many cases, this indirect command file is all that is necessary to bring up the node. For a more complete description of installing DECnet software and bringing up the node, including editing the NETINS.CMD file, see Chapter 9. For a detailed explanation of the NCP commands necessary to bring up a node, see the *DECnet-RSX Network Management Concepts and Procedures*.

#### 1.5.2 Testing a Newly Installed Network

The newly installed network should be tested by running the tests described in Chapters 10 and 11.

Chapter 10 describes procedures for determining whether or not

- node software is operational
- node and communications hardware are functioning properly
- the node is able to communicate with a remote node

Chapter 11 is for users of RSX-11 PSI. It describes procedures for

- verifying whether or not RSX-11 PSI software was properly generated and installed
- verifying that X.29 software was installed correctly
- testing data link mapping (DLM) circuits

### 1.5.3 Reconfiguring and Tuning After NETGEN

After the DECnet node is up and running, you can add features or change parameters to improve performance. On RSX-11M/M-PLUS nodes you have three options: you can perform a new NETGEN; you can perform a partial NETGEN; or you can use one of the network utilities described in this section. On pregenerated RSX-11M-PLUS end nodes, you must use the network utilities or perform a new NETGEN.

For example, to add a line to RSX-11M/M-PLUS nodes, you must perform a new NETGEN. To add or change an individual component (such as TLK) on RSX-11M/M-PLUS nodes you can perform a partial NETGEN. You can modify many network parameters on all types of nodes using CFE commands, NCP commands, or VNP commands. A short description of these utilities is given in the next three sections. For more information on using these utility commands and on tuning the network, see the *DECnet-RSX Guide to Network Management Utilities*.

#### 1.5.3.1 Configuration File Editor (CFE) Commands

CFE is used to change the permanent database of the network; it allows you to edit the configuration file CETAB.MAC. This file retains the master copy of a wide variety of network parameters and is read each time the network is loaded. Changes made using CFE do not take effect until the network is reloaded. CFE can change many parameters that NCP (as described later in this chapter) cannot change.

#### 1.5.3.2 Network Control Program (NCP) Commands

You can modify a wide range of network parameters using NCP commands. These commands affect the running system (the volatile database) only. The next time the network is loaded (for example, after using the NCP command SET SYSTEM), all parameters assume their previous values as recorded in the permanent database.

#### 1.5.3.3 Virtual Network Processor (VNP) Commands

VNP supports a subset of NCP commands that allows you to change the system image file for RSX-11 systems in much the same way that VMR can be used to perform MCR operations on the system image. As with VMR, any changes you make will not become effective until the next time the system is booted. VNP is especially useful for RSX-11S systems because the RSX-11S NCP utility is a limited subset of the full NCP utility.

## 1.6 Reading Paths

Your reading path through this manual depends on the target operating system, your kit type, and the type of kit distribution media you received. Table 1-2 shows what chapters to read in this manual according to your target system and kit type. In addition, within Chapter 3, your distribution media type influences your reading path.

**Table 1-2: Reading Paths**

<b>Kit Type</b>	<b>Target System: RSX-11M/S</b>	<b>Target System: RSX-11M-PLUS</b>
DECnet node	Chapters 2,3,4,5,6,9,10	Chapters 2,3,4,5,6,9,10
DECnet node with PSI	Chapters 2,3,4,5,6,7,9,10,11	Chapters 2,3,4,5,6,7,9,10,11
<i>Pregenerated DECnet end node</i>		Chapters 2,8,9,10





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## Configuring Your Network Node

This chapter tells you how to configure your RSX system to support DECnet software. It also gives guidelines on configuring your network and selecting components to incorporate into your DECnet node.

### 2.1 RSX-11 Configuration Requirements to Support DECnet-RSX Software

An RSX system that supports DECnet must consist of a certain minimum software/hardware configuration. In addition, the requirements for the host system (the system on which you are performing NETGEN) differ from the requirements for the target system (the system on which the DECnet node will run). In many cases, the same system serves in both capacities.

#### 2.1.1 Requirements for the Host System

The host system can be an RSX-11M Version 4.2, an RSX-11S Version 4.2, an RSX-11M-PLUS Version 4.0, or a VMS system running VAX-11 RSX Version 2.0.

To generate the software for the target node, the host system must provide a certain minimum amount of disk space. One RL01 disk drive (or larger), in addition to the disk used for the operating system, satisfies this minimum. With a large disk (such as an RP05 or RM80), one disk is usually sufficient to store the operating system and all files necessary to perform NETGEN. See Section 3.3 for PREGEN requirements.

The host system must also provide sufficient target disk capacity for tasks, maps, and listings as indicated in Table 2-1.

**Table 2-1: Target Disk Capacity \***

<b>System Type</b>	<b>Tasks</b>	<b>Maps and Listings</b>
DECnet/PSI	4,500 blocks	3,000 blocks
DECnet-only routing or end node	5,000 blocks	2,900 blocks**
Pregenerated RSX-11M-PLUS end node	5,000 blocks	

\* If you will not be generating all tasks, and if maps and listings are stored on separate disks, the required capacity of the target disk is reduced correspondingly.

\*\* About 1,300 for RSX-11M-PLUS.

### **2.1.2 Requirements for the Target System**

The target system must be RSX-11M Version 4.2, RSX-11M-PLUS Version 4.0, or RSX-11S Version 4.2.

The target system must be a mapped system with a minimum of 24K words of memory dedicated to the DECnet software. Additional memory is required for user-written network tasks and any DECnet utilities.

The target system must have at least one communications device not in use by the Executive to satisfy the minimum hardware requirements. If you have an RSX-11M-PLUS system, see Section 3.1.1.4 for instructions on reconfiguring system devices for use by DECnet. Table 2-2 lists the communication devices supported for DECnet and PSI systems.

**Table 2-2: Supported Communications Devices**

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**SUPPORTED FOR DECnet SYSTEMS****UNIBUS****Q-bus**

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**Asynchronous Line Support**

DL11	DLV11
DZ11	DZV11 or DZQ11
DHU11	DHV11 or DHQ11
KMC11/DZ11	

**Synchronous Line Support**

DMP11	DMV11
DUP11	DPV11
DU11	DUV11
DMC11	
DMR11	
DV11	
KMC11/DUP11	

**Parallel Line Support**

PCL11

**Ethernet Line Support**

DEUNA	DEQNA
DELUA	DELQA

---

**SUPPORTED FOR PSI SYSTEMS****UNIBUS****Q-bus**

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DUP11	DPV11
KMS11-BD	KMV-11A
KMS11-PX	

---

## 2.2 Network Configuration Guidelines

In generating your node, several guidelines must be observed to assure proper network routing operation. These guidelines fall into one of three categories:

- General guidelines – for all network nodes (Section 2.2.1)
- Ethernet guidelines – for all Ethernet nodes (Section 2.2.2)
- Area guidelines – for all nodes in a multiarea network (Section 2.2.3)

Most of the guidelines that are presented in the following three sections are mandatory rules that must be followed to configure a network that will function correctly. Other guidelines are included that, while not mandatory, will aid in creating a more useful network.

### 2.2.1 General Guidelines

The following guidelines apply to all Phase IV nodes:

- **All nodes in the network must have a unique network-wide address.** If two nodes have the same address and the path costs to the nodes are different, messages will always be sent to the node with the lower path cost. If the two nodes have the same path cost, the result is not predictable. In both cases, any node can receive messages from the identically addressed nodes but can send messages to only one of them.

The text accompanying question 02.00 in Section 1 of the DEC portion of the network generation procedure tells you how to specify a node address. NETGEN also gives you the opportunity to assign a node name and a node ID to the node being generated. See questions 01.00 and 03.00 in Section 1 of the DEC portion of the generation procedure.

- **All routing nodes within an area should have the same value specified for the highest node number parameter.** For Phase III nodes this may not be possible due to the expanded capability of Phase IV. For more information on areas and Phase III restrictions, see Section 2.2.3. If this guideline is not followed, a node with a greater value specified for the highest node number parameter would be able to send a routing message that a node with a lesser value for this parameter could not handle. In such a case, when the routing node with the lesser value receives the routing message, a partial routing update loss occurs. Nodes whose routing information was in the part of the routing message that was lost would then be unreachable.

The highest node number parameter is established by your response to Question 05.00 in Section 1 of the DEC portion of NETGEN.

- **All nodes should use the same large buffer size.** The value specified for the large buffer size can create a situation in which a message segment cannot be forwarded. If, for example, the large buffer size specified for an intermediate node were smaller than the segment size agreed upon by the source and destination nodes, the intermediate node would not be able to forward it. For this reason, all routing nodes in the network must have a large buffer size at least as large as the largest segment size in use in the network. This guideline is not mandatory for end nodes because they will never act as intermediate nodes. However, end nodes should never use a large buffer size that is greater than that used by the routing nodes in the network.

#### NOTE

On a DECnet-RSX system you must add 18 to the segment size value when setting the large buffer size. The value 18 is the size of the Routing layer and End Communications layer protocol overhead. The NETGEN procedure and CFE will check this automatically.

More information about determining the large buffer size and message segment size is given in the *DECnet-RSX Network Management Concepts and Procedures* manual. You specify the size of the large data buffer in response to question 02.00 in Section 8 of the NET portion of the network generation procedure.

- **All nodes should reference other nodes by the same name.** If, for example, a node is known as BOSTON by one node, all other nodes should also refer to it as BOSTON. Although the concept of node names is a local one, you should make every effort to use a common node name list on all nodes. As networks increase in size, the bookkeeping associated with network maintenance is simplified if all nodes reference remote nodes by the same logical name. A command file is provided to aid you in establishing a common set of node names (see the description of NETNODES.CMD in the *DECnet-RSX Network Management Concepts and Procedures* manual).

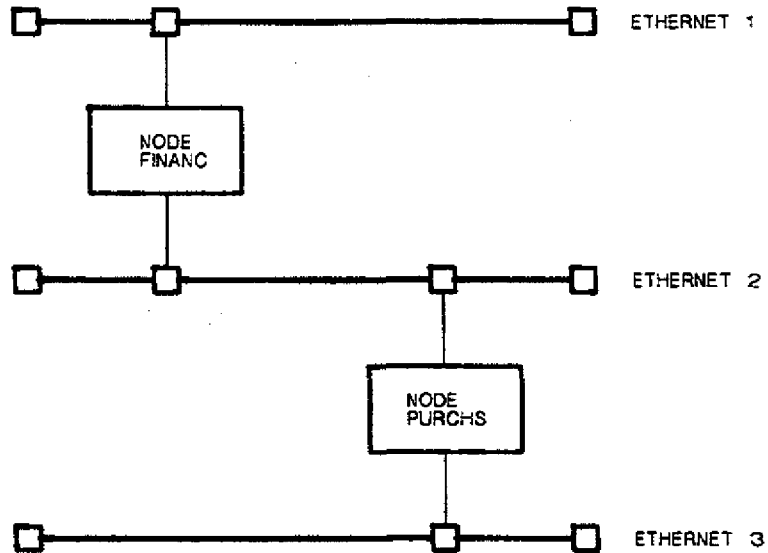
Remote node names are specified in response to question 07.00 in Section 1 of the DEC portion of NETGEN.

## 2.2.2 Ethernet Configuration Guidelines

When generating a routing node attached to one or more Ethernet circuits, you must use the following guidelines to ensure proper node operation. The *DECnet-RSX Network Management Concepts and Procedures* manual explains how to set these parameters using the Configuration File Editor (CFE).

- **The total number of Ethernet end nodes with which the node will communicate must not exceed the value specified for the MAXIMUM BROADCAST NONROUTERS parameter.** For example, in the network shown in Figure 2-1, suppose that node FINANC has the parameter set to 20 and node PURCHS has it set to 10. In this network, the total number of end nodes on Ethernets 1 and 2 cannot exceed 20 (FINANC's value), and the total number of end nodes on Ethernets 2 and 3 cannot exceed 10 (PURCHS's value). If this guideline is ignored, the end nodes that would be reachable at any given time would be unpredictable.
- **The total number of routers on all Ethernet circuits of a node cannot exceed the MAXIMUM BROADCAST ROUTERS parameter for the node.** This value should be equal to the sum of all circuit MAXIMUM ROUTER values for the node (see next guideline). On DECnet-RSX nodes, the MAXIMUM BROADCAST ROUTERS parameter is automatically calculated during NETGEN and set to the sum of all the circuit MAXIMUM ROUTER values specified.
- **The number of routers on any single Ethernet circuit cannot exceed the value specified for the MAXIMUM ROUTERS parameter for that circuit.** In Figure 2-1, if node FINANC had the MAXIMUM ROUTERS parameter for Ethernet 1 set to 2, the number of routers allowed on Ethernet 1 would be limited to 2, in addition to the executor node. The sum of all individual circuit MAXIMUM ROUTERS parameter values should not exceed the MAXIMUM BROADCAST ROUTERS parameter for a node (see preceding guideline).
- **The number of routers on a single Ethernet should be kept to a minimum.** Routing nodes generate traffic among themselves (especially when nodes are in the process of becoming unreachable). To keep this traffic to a minimum, the number of routers on a single Ethernet should not exceed 10.

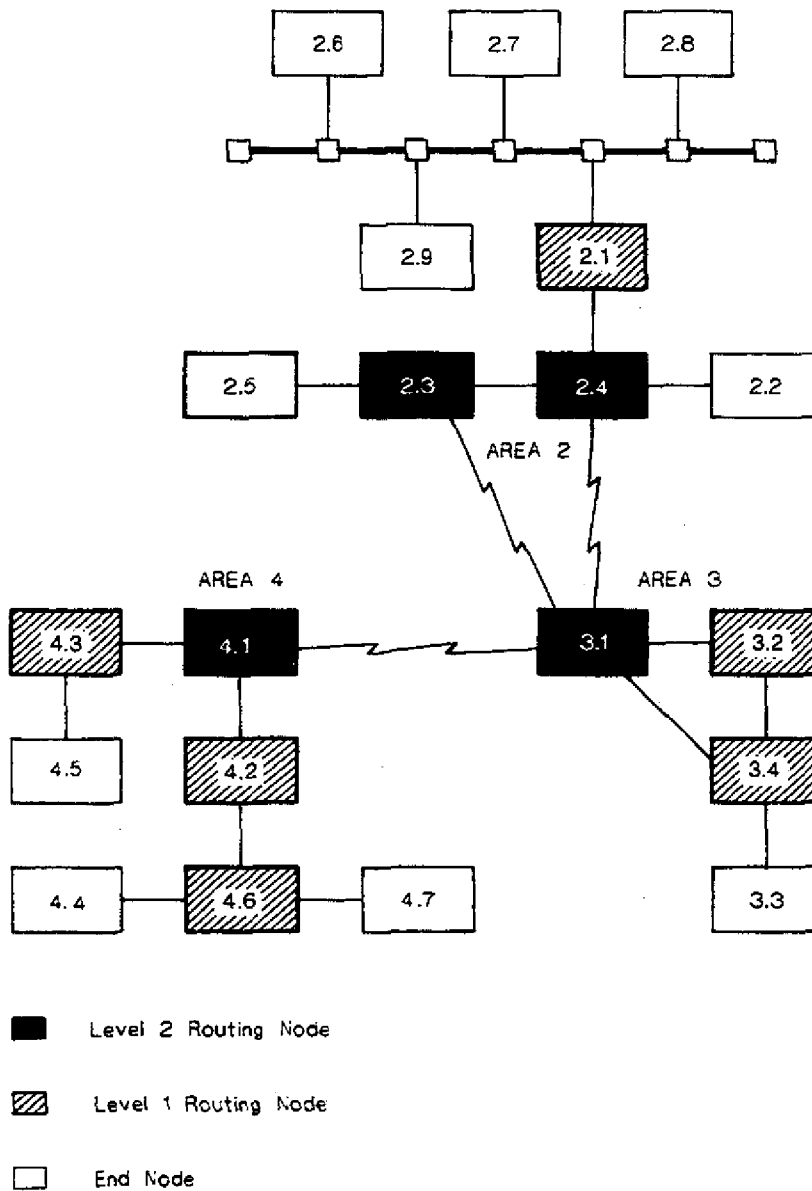
**Figure 2-1: A Sample Ethernet Configuration**



### **2.2.3 Areas and Area Configuration Guidelines**

DECnet-RSX Phase IV implementations can support networks consisting of many more nodes than Phase III implementations could support. Networks with thousands of nodes can now be supported using the concept of areas. If your network consists of more than 1023 nodes you must use the area network features of Phase IV. Even if your network consists of fewer than 1023 nodes, you can, in many cases, benefit by splitting your network into areas. A network containing three areas is shown in Figure 2-2.

**Figure 2-2: A Multiarea Network**



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In designing a network that implements the area concept, the network manager partitions the network into smaller networks called areas. Partitioning can be based on physical proximity, common function, or both. If you choose to partition your network into areas, you must view your entire network on two levels. Level 1 is equivalent in many ways to older Phase III/Phase IV networks. Level 1 routing nodes in Phase IV networks with area support, however, must maintain a routing database only the size of the area of which they are a member. All nodes in the same area have the same area parameter value.

In a Phase IV network consisting of more than one area, at least one of the nodes in each area is also a member of the level 2 network. This node (called a level 2 routing or area routing node) must maintain two routing databases: one for the local level 1 network and one for the network-wide level 2 network. Each node in the level 2 network is a member of the network-wide level 2 network and one of the level 1 networks.

Communication between nodes in the same area occurs exactly as it occurred in Phase III. When the source and destination nodes are in the same area, the level 1 routing nodes forward the request using their local routing databases.

When access to a node outside a local area is desired, the source node sends the request to the nearest level 2 router. The level 2 routing node will route the packet to a level 2 router at the correct destination area. The packet is then routed from that level 2 router to the destination node in that area.

In designing a network that supports area routing, several guidelines must be followed to ensure proper network operation.

- **Every level 1 routing node must be in one area only.** It is illegal for a level 1 router to have a circuit connected to a node outside its area.
- **Each area (level 1 network) must be physically intact.** All nodes within an area must be connected in some way to all other nodes within the same area. The nodes need not be physically adjacent; however, all nodes in the area must be connected by a physical path that lies totally within the area. This path can involve level 2 routing nodes in the same area.
- **The level 2 network must be physically intact.** All level 2 routing nodes must be connected in some way to all other level 2 nodes. This connection must involve level 2 nodes only. Level 1 nodes or Phase III nodes cannot form a part of the path between level 2 routing nodes.

- **All Phase III routing nodes are treated as level 1 routing nodes, with some important restrictions:**
  - All Phase III nodes (both routing nodes and end nodes) can communicate only with nodes within the same area as themselves.
  - All Phase III routing nodes can support communication only with nodes for which they can maintain routing information. Phase IV DECnet networks can have more nodes than Phase III networks (Phase III's limit was 255). For this reason, any Phase IV node with an address above 255 is "invisible" to all Phase III nodes in the area. This is a good reason to configure a network into areas, each consisting of 255 or fewer nodes.
  - A Phase III node cannot be in the path of two high address Phase IV nodes. Because of the Phase III address limitation, a Phase III node must not be in the path of two Phase IV nodes with addresses higher than the Phase III node can handle (255).
  - A Phase III node must not be in the path of any interarea communication. Because Phase III nodes do not know about areas, they cannot handle interarea packets correctly.
- **Areas should reflect expected traffic flow.** Observing this guideline will greatly improve overall network performance. Routing within an area is less costly than routing between areas. Try, therefore, to include within the same area nodes that are logically or functionally related. Area bounds should reflect a combination of geographical and logical node location.
- **Areas should not be used to enforce protection.** Although at first glance the concept of areas seems to offer penetration protection across areas, the DNA architecture does not specify protection guarantees for areas. No assumption about such guarantees should be made when setting up areas. Areas were not designed to be used as an accounting or security tool.

Additional information about areas and area parameters can be found in the *DECnet-RSX Network Management Concepts and Procedures* manual.

#### 2.2.4 Guidelines for Specifying Routing Parameters

If you are generating a routing node, you must specify certain routing parameters in response to questions that NETGEN displays. The values of some other routing parameters are calculated for you by the NETGEN process.

Routing parameter values that you must specify are conditioned by whether your network consists of a single area or multiple areas.

- If your network consists of a single area, you must specify the highest node number in the network.
- If your network consists of multiple areas, you must specify the highest node number in the area in which the node that you are generating will be located.
- If you are generating a level 2 routing node, you must specify the maximum area parameter.

The highest node number determines the size of the routing database. Any node with a number exceeding the highest node number value is unreachable. In networks without area support, the highest node number is for the entire network; in networks with area support, this value is for the area.

The maximum area parameter defines the size of the node's level 2 routing database.

The routing values that NETGEN calculates for you are:

- Maximum hop count
- Maximum path cost
- Line/circuit cost
- Maximum area hop count
- Maximum area path cost

NETGEN assigns a maximum hop count of 10, a maximum path cost of 1022, and calculates a line/circuit cost based on device type and speed. For level 2 routing nodes, NETGEN assigns a maximum area hop count of 10 and a maximum area path cost of 1022.

You can change these values using CFE, NCP, and VNP commands. For more information on routing parameters and how to change them, see the *DECnet-RSX Network Management Concepts and Procedures* manual.

## 2.3 Selecting DECnet Components

This section presents information that will help you select optional components that perform DECnet and PSI functions. Certain components are always built even though they may not be required. For a description of all required components, refer to the explanatory text accompanying the NETGEN question descriptions in Chapters 5, 6, 7, and 8.

Table 2-3 identifies the individual components that you can select for your system. The table indicates

- components that are required (RQD)
- components that are always built (A/B) but which are not required
- components that are optional (OPT)
- components that are never used (N/U)

Notes are provided to clarify exceptions for some components.

RQD and N/U components do not require you to make a decision. However, you do need to decide whether you want to select certain optional components, or use components that are always built but not required. The information in this chapter should help you make these decisions.

**Table 2-3: Component Selection Summary for NETGEN**

Component	System			
	-11M	-11M+	-11S	PreGEN
<b>Communications Executive Components</b>				
Communications Executive (CEX)	RQD	Note 1	RQD	Note 1
Auxiliary Process (AUX)	RQD	RQD	RQD	RQD
Device Driver Modules (DDM)	RQD	RQD	RQD	RQD
<b>NET Communications Executive Support Components</b>				
Network Initializer (NTINIT)	RQD	RQD	RQD	RQD
Network Loader (NTL)	RQD	RQD	N/U	RQD
General Microcode Loader (MLD)	Note 2	Note 2	Note 2	Note 2
Network Event Logger (EVL/EVC)	OPT	OPT	OPT	A/B
Direct Line Access Controller (DLX)	Note 3	RQD	Note 3	RQD

**Table 2-3 (Cont.): Component Selection Summary for NETGEN**

Component	System			
	-11M	-11M +	-11S	PreGEN
<b>NET System Management Utilities</b>				
Network Control Program (NCP)	RQD	RQD	OPT	RQD
Network Management Device Driver (NMDRV)	RQD	RQD	Note 4	RQD
Network Management Volatile ACP (NMVACP)	RQD	RQD	N/U	RQD
Configuration File Editor (CFE)	A/B	A/B	A/B	A/B
Network Crash Dump Analyzer (NDA)	A/B	A/B	A/B	Note 5
Virtual Network Processor (VNP)	A/B	A/B	RQD	A/B
Loopback Tester (LOO)	A/B	A/B	N/U	A/B
Event File Interpreter (EVF)	OPT	OPT	N/U	OPT
<b>DECnet Communications Components</b>				
End Communications layer driver (ECL)	RQD	RQD	RQD	RQD
Routing layer process (XPT)	RQD	RQD	RQD	RQD
Network ACP (NETACP)	RQD	RQD	RQD	RQD
Digital Communications Process (DCP)	Note 6	Note 6	Note 6	Note 6
Ethernet Protocol Manager (EPM)	Note 7	Note 7	Note 7	Note 7
NETFOR.OLB and NETLIB.MLB	OPT	OPT	OPT	A/B
<b>DECnet Network Management Support Components</b>				
Network Information and Control Exchange (NICE)	OPT	OPT	OPT	A/B
Event Logging Receiver (EVR)	OPT	OPT	OPT	A/B
Network Display utility (NTD)	OPT	OPT	OPT	A/B
Network Display server (NTDEMO)	OPT	OPT	OPT	A/B
Link Watcher (LIN)	OPT	A/B	N/U	A/B
Loopback Mirror (MIR)	A/B	A/B	A/B	A/B
Routing Control Processor (RCP)	Note 8	Note 8	Note 8	N/U
Network Verification Program (NVP)	OPT	OPT	N/U	A/B
<b>DECnet Satellite Support Components</b>				
Down-Line System Loader (DLL)	OPT	OPT	N/U	OPT
Up-Line System Dumper (DUM)	OPT	OPT	N/U	OPT
Console Carrier Requester (CCR)	OPT	OPT	N/U	OPT
Host Task Loader (HLD)	OPT	OPT	N/U	OPT
Satellite Task Loader (SLD)	N/U	N/U	OPT	N/U
<b>DECnet File Utilities</b>				
Network File Transfer utility (NFT)	OPT	OPT	N/U	OPT
File Transfer Spooler (FTS)	OPT	OPT	N/U	A/B
File Access Listener (FAL)	OPT	OPT	OPT	A/B
Command File/Batch File Submission task (MCM)	OPT	OPT	N/U	A/B

(continued on next page)

**Table 2-3 (Cont.): Component Selection Summary for NETGEN**

Component	System			
	-11M	-11M+	-11S	PreGEN
<b>DECnet Network Terminal and Control Utilities</b>				
Remote Terminal utility RMTACP (RMT/RMTACP)	OPT	OPT	OPT	A/B
Remote Terminal Host ACP HTDRV (RMHACP/HTDRV)	OPT	OPT	OPT	A/B
Network Control Terminal task (NCT)	OPT	OPT	OPT	A/B
Remote Command Terminal Host (RTH)	OPT	OPT	OPT	A/B
Terminal Communications utility (TLK)	OPT	OPT	OPT	A/B
Listen utility (LSN)	OPT	OPT	OPT	A/B
Phone Communications utility (PHO)	N/U	OPT	N/U	A/B
Remote Task Control utility (TCL)	OPT	OPT	OPT	A/B
<b>Required PSI Communications Components</b>				
LAP-B Protocol process (LAB)	RQD	RQD	N/U	N/U
Packet Level Interface (PLI)	RQD	RQD	N/U	N/U
NW: device driver (NW)	RQD	RQD	N/U	N/U
Ancillary Control Processor for NW (X25ACP)	RQD	RQD	N/U	N/U
PSI Device Driver Modules (PSI DDM)	RQD	RQD	N/U	N/U
<b>Optional PSI Components</b>				
Data Link Mapping process (DLM)	Note 9	Note 9	N/U	N/U
Trace Capture task (TRA)	OPT	OPT	N/U	N/U
Trace Interpreter task (TRI)	OPT	OPT	N/U	N/U
X.29 Terminal Access ACP with HTDRV (X29ACP)	OPT	OPT	N/U	N/U
KMX/KMY/KMV Microcode Dumper (DUK)	OPT	OPT	N/U	N/U
KMX/KMY/KMV Microcode Dump Analyzer (KDA)	OPT	OPT	N/U	N/U
PSI high level language library (PSIFOR.OLB)	OPT	OPT	N/U	N/U
PSI MACRO library (PSI.MLB)	OPT	OPT	N/U	N/U
Host-based PAD (PSIPAD)	OPT	OPT	N/U	N/U
<b>LAT Components</b>				
LAT process	N/U	OPT	N/U	OPT
LAT Control Program (LCP)	N/U	OPT	N/U	OPT

**Notes:**

1. Part of the RSX-11M-PLUS Executive.
2. MLD is required for all nodes with devices that need microcode to be loaded.
3. DLX is required if you specify certain operations (see Section 2.3.1.3).
4. NMDRV is required for RSX-11S only if EVL is specified.
5. Supplied on kit, but not moved by NETGEN procedure.
6. DCP is required for all nodes if you specify devices that require software DDCMP support.
7. EPM is required for all nodes if you specify Ethernet devices.
8. RCP is required only for routing nodes.
9. DLM is a required component for nodes that use DECnet software over a Packet Switching Data Network. No other nodes use DLM.

### **2.3.1 Optional DECnet Components**

The following paragraphs describe optional components for a DECnet-RSX node. Note, however, that some of these components are selected for you as a result of another selection you have made. For example, when you specify DLL for your target system, DLX is automatically generated. On pregenerated RSX-11M-PLUS end nodes, only the satellite support components are optional.

#### **2.3.1.1 Microcode Loader (MLD)**

The Microcode Loader (MLD) loads devices with the proper microcode. Currently these devices include the UNA and the KMC/KMS devices. KMC devices are KDP and KDZ. KMS devices are KMX, KMY, and KMV.

#### **2.3.1.2 Event Logger/Collector (EVL/EVC)**

The Event Logger (EVL) creates records of network events, such as circuit state changes, node state changes, and unusual network occurrences. Records of these events are sent to the event collector (EVC). Specify event logging to facilitate tuning the network and isolating problems.

If you specify EVL, EVC is automatically included. It collects network events and sends them to the proper terminal, file, or monitor task.

#### **2.3.1.3 Direct Line Access Controller (DLX)**

The Direct Line Access Controller (DLX) is necessary for services that must bypass normal network data channels. DLX is required if you specify down-line system loading, up-line system dumping, NCP loop line/circuit testing, console carrier requester support, or user-written programs that use the DLX QIO interface.

#### **2.3.1.4 Network Control Program (NCP)**

The Network Control Program (NCP) is the primary program for controlling network operations and is required for RSX-11M and RSX-11M-PLUS nodes. NCP is optional for RSX-11S nodes. NCP allows the RSX-11S network manager to perform on-line network management functions at a local terminal, or at a remote terminal using RMT.

#### **2.3.1.5 Network Management Device Driver (NMDRV)**

If you specify event logging for an RSX-11S node, the network management device driver (NMDRV) is always built. NMDRV is required for RSX-11M/M-PLUS nodes.

### **2.3.1.6 Event File Interpreter (EVF)**

The Event File Interpreter (EVF) provides many of the same services for network event logging that the RSX-11 Report Generator (RPT) provides for error logging. EVF allows you to get a formatted report from the event file you set up using the NCP SET LOGGING command. The EVF command interface allows you to specify which events you wish formatted based on such parameters as the date on which the event occurred, the event type, and the event entity. EVF is not available for RSX-11S nodes.

### **2.3.1.7 Digital Communications Process (DCP)**

The Digital Communications Process (DCP) is the DDCMP line protocol process that provides an error-free data path over a physical device channel. DCP is required if you specify devices that require software DDCMP support.

### **2.3.1.8 Ethernet Protocol Manager (EPM)**

The Ethernet Protocol Manager (EPM) controls access to the Ethernet. EPM is required if you specify devices that support access to the Ethernet (DEUNA, DEQNA, DELUA, DELQA).

### **2.3.1.9 NETFOR.OLB and NETLIB.MLB**

The DECnet high level language library (NETFOR.OLB) allows user-supplied tasks, written in FORTRAN, COBOL, and BASIC-PLUS-2, to interface to the DECnet software. The DECnet Macro library (NETLIB.MLB) allows user-written MACRO-11 tasks to interface to the DECnet software. If you want to code tasks using these languages, request the language libraries.

### **2.3.1.10 Network Information and Control Exchange (NICE)**

The Network Information and Control Exchange (NICE) allows a privileged user (usually a system or network manager) at any other node in the network to perform network management functions on the node you are generating.

### **2.3.1.11 Event Logging Receiver (EVR)**

The event-logging receiver (EVR) receives event notification messages from other nodes and logs those messages to either a local terminal, a file, or a monitor task. Specify EVR if you wish the local node to receive events from other nodes.



#### **2.3.1.12 Network Display Utility and Server (NTD/NTDEMO)**

The Network Display utility (NTD) allows you to monitor the current state of a node. NTD sends requests to the Network Display Server task, NTDEMO, to obtain information from a local or remote RSX node. NTD requests and displays the information on the local node.

NTDEMO provides the information to the NTD that requested it.

#### **2.3.1.13 Link Watcher (LIN)**

The Link Watcher (LIN) determines what is to be done with an automatic service request. LIN is required to perform down-line system loading, up-line system dumping, and loop circuit testing. LIN is always built for RSX-11M-PLUS nodes, is optional on RSX-11M nodes, and is not available on RSX-11S nodes.

#### **2.3.1.14 Network Verification Program (NVP)**

The Network Verification Program (NVP) verifies accounting data for incoming connect requests against the system account file. NVP is generated for all RSX-11M and RSX-11M-PLUS systems that have multiuser protection.

#### **2.3.1.15 Down-Line System Loader (DLL)**

The down-line system loader (DLL) resides on the host node and is used to down-line load remote systems. The host node must be directly connected by a physical link to the system to be loaded and must be able to access the target system's image file. DLX is automatically included if you specify DLL.

#### **2.3.1.16 Up-Line System Dumper (DUM)**

The up-line system dumper (DUM) resides on the host node and is used to dump memory upline from a remote system to a DECnet-11M or DECnet-11M-PLUS system. DUM services dump requests issued by LIN in response to a dump request message received from an adjacent system.

#### **2.3.1.17 Console Carrier Requester (CCR)**

The console carrier requester (CCR) provides access to console functions on an Ethernet remote system. If you have an Ethernet line on your host node, you can specify CCR. CCR is not available on RSX-11S nodes.

### **2.3.1.18 Host Task Loader (HLD)**

The Host Task Loader (HLD) resides on a host node and is used to load task images into a target RSX-11S node's memory. HLD communicates with SLD to down-line load a task, up-line checkpoint a task, or down-line overlay a task segment. HLD is used only on the host node and is not available on RSX-11S nodes.

### **2.3.1.19 Satellite Task Loader (SLD)**

The satellite task loader (SLD) resides on an RSX-11S satellite node and is used to communicate with HLD on a host node. SLD requests loading support from HLD for RSX-11S tasks. You must specify SLD for the RSX-11S node in order to down-line load task images, up-line checkpoint a task, or down-line overlay a task segment. SLD is available only for RSX-11S nodes.

### **2.3.1.20 Network File Transfer Utility (NFT)**

The Network File Transfer utility (NFT) allows users to access files on other nodes in the network. NFT operations include file transfer, file deletion, directory listing, and command/batch file submission. NFT communicates with FAL on the remote node.

### **2.3.1.21 File Transfer Spooler (FTS)**

The File Transfer Spooler (FTS) allows users to access files on other nodes in the network. Spooled access indicates operations may execute immediately, operations may wait for a specific time, or operations may be queued until the local or target node becomes available.

The File Transfer Spooler Dequeueer (FTSDEQ) removes requests one by one, creates a logical link to the FAL on the appropriate remote node, and executes the file transfer requests. If you specify FTS, FTSDEQ is automatically included.

### **2.3.1.22 File Access Listener (FAL)**

The File Access Listener (FAL), the network file access server, performs file operations requested by users on other nodes. FAL operations include transferring and concatenating files, deleting files, submitting and executing batch or command files, listing directories, and accessing sequential records.

RSX-11S FAL supplies support for unit record equipment. FAL with RMS provides RMS-11 record access capabilities as well as normal file access. This allows RMS on a remote node to perform record access to sequential, relative, and indexed files on your node.

#### **2.3.1.23 Command File/Batch File Submission Task (MCM)**

The command file/batch file submission task (MCM) allows an NFT user on a remote node to submit an indirect command file or batch file for execution on the node you are generating. MCM receives requests from the local FAL on behalf of the remote node. On RSX-11M/M-PLUS nodes, MCM submits the file for execution by requesting the indirect command file task (...AT). For RSX-11M-PLUS only, MCM can optionally submit batch files to the BATCH queue.

#### **2.3.1.24 Remote Terminal Utility RMTACP (RMT/RMTACP)**

The Remote Terminal utility RMTACP (RMT/RMTACP) resides on the user's local node and allows the user's terminal to connect to any other RSX node in the network that supports the remote network terminal driver and ACP, HT: and RMHACP.

#### **2.3.1.25 Remote Terminal Host ACP and HTDRV (RMHACP/HTDRV)**

The remote terminal host ACP (RMHACP) and Host Terminal Device Driver (HTDRV) allow users on remote RSX nodes to connect to the local node.

#### **2.3.1.26 Network Command Terminal Server Process (NCT)**

The Network Command Terminal Server process (NCT) allows the user's terminal to be logically connected to any node in the network that supports network command terminals.

#### **2.3.1.27 Remote Command Terminal Host (RTH)**

The remote command terminal host (RTH) is the remote command terminal host support process. It resides on the user's local node and allows users on other nodes to logically connect their terminals to the local node through the network command terminal facility.

#### **2.3.1.28 Terminal Communications Utility (TLK)**

The Terminal Communications utility (TLK) allows you to engage in an interactive dialog with, or send single line messages to, another user on a remote DECnet-RSX, DECnet-IAS, or DECnet-RSTS node. The remote node must have the Listen utility (LSN) installed.

#### **2.3.1.29 Listen Utility (LSN)**

The Listen utility allows a remote user running TLK to communicate with a terminal user on your node. LSN is automatically included for all DECnet-RSX nodes on which TLK is specified.

### **2.3.1.30 Phone Communications Utility (PHO)**

The Phone Communications utility (PHO) allows you to engage in an interactive dialog with another user on a remote DECnet-RSX, DECnet-VAX, DECnet-Micro/R SX, or PRO/DECnet node. PHO provides many advanced features not included in the TLK utility (such as connect by name). The advanced features of PHO require the use of accounting information not available on RSX-11M or RSX-11S systems. PHO, therefore, is available only on RSX-11M-PLUS and VAX/VMS systems.

### **2.3.1.31 Remote Task Control Utility (TCL)**

The Remote Task Control utility (TCL) is the remote task control server task. TCL allows FORTRAN programs running on other nodes to control task execution on the node where TCL is installed. TCL accepts requests to run a task immediately or at some specified time, abort the current running of a task, or cancel requests for future execution of a task. Routines to connect to TCL and issue task requests are contained in the DECnet FORTRAN object library.

## **2.3.2 Optional PSI Components**

The following paragraphs describe the optional PSI components that you can specify for your DECnet-RSX/PSI node.

### **2.3.2.1 Data Link Mapping (DLM)**

The data link mapping process (DLM) lets DECnet nodes communicate with each other over a Packet Switching Data Network (PSDN). DLM converts the PSI protocols and DECnet protocols to allow the nodes to communicate.

### **2.3.2.2 Trace Capture Task (TRA)**

The trace capture task (TRA) determines what types of packets are being transmitted and received on a line, and monitors the line's performance. TRA writes the information it has gathered to a disk file.

### **2.3.2.3 Trace Interpreter Task (TRI)**

The trace interpreter task (TRI) interprets the data in the file created by TRA and prints a file containing this information.

#### **2.3.2.4 X.29 Terminal Access ACP with HTDRV (X29ACP)**

The X.29 Ancillary Control Processor (X29ACP) task allows a user at a remote X.29 terminal connected to a packet assembly/disassembly (PAD) facility to communicate with the DECnet-RSX/PSI software as if the terminal were locally connected. X29ACP is implemented as an RSX-11M/M-PLUS pseudodevice named HT: (which has a device driver HTDRV) and the associated ACP (X29ACP). When a remote X.29 user issues a command to connect to your node, a single unit of this HT: device is allocated to the user.

#### **2.3.2.5 KMX/KMY/KMV Microcode Dumper (DUK)**

The DUK microcode dumper is required if you have a KMX, KMY, or KMV device. DUK dumps the KMX/KMY/KMV microcode to a disk.

#### **2.3.2.6 KMX/KMY/KMV Microcode Dump Analyzer (KDA)**

The KDA microcode dump analyzer formats and prints the KMX/KMY/KMV microcode dumped by DUK.

#### **2.3.2.7 PSI High Level Language Library (PSIFOR.OLB)**

The PSI high level language library (PSIFOR.OLB) allows you to write network tasks in FORTRAN. If you want to code tasks using FORTRAN, include this library in your target node.

#### **2.3.2.8 PSI MACRO Library (PSI.MLB)**

The PSI MACRO library (PSI.MLB) allows you to write network tasks in MACRO-11. If you want to code tasks using MACRO-11, include this library in your target node.

#### **2.3.2.9 Host-Based PAD Task (PSIPAD)**

The host-based PAD task (PSIPAD) provides X.29 PAD emulation. This allows local terminal users to make outgoing X.29 calls to a remote DTE that supports X.29 terminal operation.

### **2.4 The Next Step**

You should now have some idea of what type of information is required to do a NETGEN and what decisions you are going to have to make along the way. The reading path for the rest of the manual depends on the type of distribution kit you purchased. If you received a pregenerated RSX-11M-PLUS end node kit, you can skip to Chapter 8. All other readers should proceed to Chapter 3.



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## Getting Ready for RSX-11M/M-PLUS NETGEN

This chapter discusses the requirements for performing an RSX-11M/M-PLUS NETGEN procedure. These requirements vary, depending on the target system:

- Read Section 3.1 and skip Section 3.2 if the target system is RSX-11M-PLUS.
- Skip Section 3.1 and read Section 3.2 if the target system is RSX-11M or RSX-11S.
- Read Section 3.3 for all RSX systems. This section describes the PREGEN procedure that may be necessary before NETGEN.

### 3.1 RSX-11M-PLUS System Requirements

This section describes the pre-NETGEN requirements for RSX-11M-PLUS systems. RSX-11M-PLUS systems require very little advance preparation for network generation. Section 3.1.1 describes the considerations for pre-SYSGENned RSX-11M-PLUS systems. The considerations for SYSGENned RSX-11M-PLUS systems are discussed in Section 3.1.2.

#### 3.1.1 Pre-SYSGENned RSX-11M-PLUS Systems

These pre-NETGEN considerations on pre-SYSGENned RSX-11M-PLUS systems are described in the sections that follow.

- Hardware CSR selection
- System selection

- Customizing the start-up command procedure
- Possible device reconfiguration
- Possible PREGEN

#### **3.1.1.1 Hardware CSR Selection**

You must have the "floating" device control and status registers (CSRs) at the proper addresses on the target processor. The proper addresses for floating devices are determined according to the standard UNIBUS/Q-bus device rankings. A command file, [200,200]FLOAT.COMD, is provided on the distribution kit to aid you in determining the device CSR address.

#### **3.1.1.2 System Selection**

There are two system images on the RSX-11M-PLUS pre-SYSGENned distribution kit. One system (the Kernel I-space system) runs on a PDP-11/23-PLUS or a PDP-11/24 processor. The other system (the Kernel D-space system) runs on the PDP-11/44, PDP-11/70, PDP-11/53, PDP-11/73, PDP-11/83, and PDP-11/84 processors. Before doing a NETGEN, use the procedure provided with the RSX-11M-PLUS distribution kit to delete the system that you will not be using. If you do not use this procedure, some unwanted libraries may remain on the target system disk and NETGEN may give you the option of using them (for example, supervisor mode FCS or supervisor mode RMS libraries).

#### **3.1.1.3 Customizing the Start-Up Procedure**

The RSX-11M-PLUS pre-SYSGENned systems come with a start-up procedure that will deallocate the Communications Executive (CEX) space needed by DECnet-RSX. In order to prevent this, the file [1,2]SYSPARAM.DAT must be modified. You must modify the line "DECNET = NO" to read "DECNET = YES". The system must be rebooted after this change in order for the change to take effect.

If you have properly modified the file, you will see the following lines during system start-up:

```
Step 2 - Deallocating DECnet Communications Executive
         System configuration includes DECnet
```

The presence of the second line indicates that the CEX space has not been deallocated.



#### 3.1.1.4 Device Reconfiguration

The start-up file will automatically configure the devices on the system so that they can be used by the Executive and not by the network. To release a device for DECnet use, observe the following procedures:

- Check the CON ONLINE ALL = *parameter* in your [1,2]SYSPARAM.DAT file to be sure that it is set to YES.
- Enter CON OFFLINE commands for the devices that you want the DECnet software to use. You can enter commands individually or build a command file that executes the commands automatically after the start-up procedure completes. To use a command file, you must specify the command file name in the STARTFILE = *parameter* of [1,2]SYSPARAM.DAT. See the *RSX-11M-PLUS System Management Guide* for instructions on how to use the CON OFFLINE command.

#### 3.1.1.5 PREGEN

Depending on the type of kit you received, you may have to perform a PREGEN procedure. Proceed to Section 3.3 to see if your kit type requires a PREGEN.

#### 3.1.2 SYSGENned RSX-11M-PLUS Systems

The RSX-11M-PLUS SYSGEN procedure displays questions that must be answered (as described in the following sections) to configure the RSX-11M-PLUS operating system properly for DECnet support. These questions specify the inclusion of:

- Support for DECnet, PSI, or LAT software
- Support for LAT terminal servers
- DECnet communication devices
- Queued file access

After reading the following subsections, proceed to Section 3.3 to determine if your type of kit requires a PREGEN procedure.

### 3.1.2.1 Including Support for DECnet, PSI, or LAT Software

To create the proper support for DECnet, PSI, or LAT software, answer YES to the following question in the Executive Options section of SYSGEN:

>\* CE120 Do you want support for communications products  
(such as DECnet, PSI and LAT)?[Y/N D:N]:

### 3.1.2.2 Including Support for LAT Terminal Servers

If you want to support LAT terminal servers, answer YES to the following question in the Executive Options section of SYSGEN:

>\* CE122 Do you want host support for LAT terminal servers? [Y/N D:N]:

If you answer NO to this question you will generate a system that cannot be used with DECnet.

### 3.1.2.3 RSX and DECnet Communications Devices

Because the RSX-11M-PLUS Executive does not need to know anything about hardware that will be used as DECnet communications devices, and because no communication device can be shared between DECnet and the Executive, do not specify any DECnet communications devices when answering questions in the Target Configuration section of SYSGEN.

However, when you generate your RSX system, you must specify how much space is to be allocated for interrupt vectors on your target system, and the space must be sufficient to include the interrupt vectors belonging to DECnet devices.

To specify properly, answer the following question with the highest vector address of devices on your system, including the DECnet communications hardware.

>\* CP9632 What is the highest interrupt vector address?

These vector addresses are available as a result of hardware installation.

For this question, do not specify the default, since the value that SYSGEN computes in this case would not take into account DECnet communications devices. In answering this question for your operating system, be sure to leave enough space for devices you have or will soon have.

If your DECnet system includes any of the following character interrupt devices — DUP, DU, DUV, DL, DLV, or DPV — you must add 20 octal bytes to the highest interrupt vector address.

The highest interrupt vector address you can specify is 774. This value, which includes the 20 additional octal bytes required for DUP, DU, DUV, DL, DLV and DPV, allows enough space for any devices you may choose.

### 3.1.2.4 Queued File Access Requests

FTS allows file access requests (file transfers, and so forth) to be queued and processed in sequence. If you want FTS, you need the RSX-11M-PLUS queue manager (QMG); answer YES to the following question:

>\* CE180 Do you want to include the queue manager? [Y/N D:N]:

For more information on FTS, see the *DECnet-RSX Guide to User Utilities*.

## 3.2 RSX-11M/S System Requirements

This section describes the pre-NETGEN considerations necessary for RSX-11M and RSX-11S systems. These considerations include:

- Partition layout decisions (see Section 3.2.1)
- Pool usage considerations (see Section 3.2.2)
- Avoiding DECnet loading problems (see Section 3.2.3)
- Special considerations for NMVACP (see Section 3.2.4)
- RSX-11M/S SYSGEN considerations (see Section 3.2.5)
- RSX-11S system considerations (see Section 3.2.6)

Before running NETGEN, you must decide how you want to lay out the partitions in your system. Partition layout determines what tasks are installed in what partitions. You must then perform a system generation (SYSGEN) to configure your system for DECnet and for your own requirements.

For the most part, there is considerable flexibility in the order in which you perform these operations. The following steps, however, are fixed:

- NETGEN follows SYSGEN. If you perform a new SYSGEN, you must perform a new NETGEN.
- The size of the Executive address space (16K or 20K words) is determined during SYSGEN (see Section 3.2.5.9), and cannot be changed without a new SYSGEN.

- You must specify the starting address and the size of the partition for the Communications Executive (CEXPAR) during NETGEN. Changing the starting address requires a new NETGEN. Changing the size of CEXPAR does not require a new NETGEN, but if the size is reduced, the new size must be large enough to contain the Communications Executive.

### 3.2.1 Determining Partition Layout

NETGEN builds the Communications Executive for the CEXPAR partition. You must add this partition (see Section 3.2.5.10).

With the exception of the Communications Executive, NETGEN builds all tasks to run in one partition, GEN. Depending on your system size and requirements for the network, you may need to add or modify partitions to obtain optimum performance. The partition layout is defined by editing the SYSVMR command file (see Section 3.2.5.10) and then modifying the NETINS.CMD command file so that the network tasks are installed in the desired partitions (see Chapter 9). This section describes how you can determine the proper partition layout for your system.

The way you configure your network depends on your system memory size. For NETGEN purposes, your system size can be classified into small, medium, and large:

- Small = Under 80K words of memory
- Medium = 80K to 124K words of memory
- Large = Over 124K words of memory

These definitions are based on light network loading, are somewhat arbitrary, and serve only as a guide. What counts most is available memory, and this quantity is subject to the requirements imposed by the specific complement of network components you select and by your other software and application programs.

To determine the available room in the GEN partition, you may need to perform a NETGEN, inspect the size of components selected, and compute the amount of remaining space. Based on this computation, you may then need to reconfigure partitions.

It is possible to approximate the size of GEN by totaling the estimated size of non-GEN components and subtracting that from the memory size. Table 3-1 gives the sizes of certain key components. These sizes are merely estimates and can vary due to individual system requirements and to future patches. Final sizes should be determined by examining the map for each individual component.

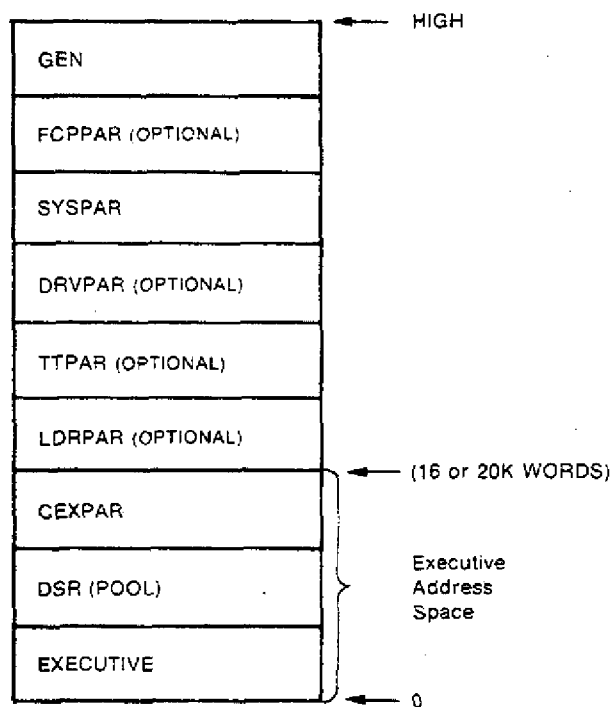
In estimating the size of GEN, you also need to know the size of other partitions, as shown in Figure 3-1. You can obtain this information after SYSGEN by executing a VMR PAR command. If you need information on how to do this, see your system generation manual.

For large RSX-11M systems, use of the single partition GEN produces satisfactory performance. For small to medium size systems, you may need to add partitions. There are two areas where problems may occur — applications requirements and loading.

The applications problem occurs when user applications take so much of the system resources that network performance is degraded. In special cases it may be necessary to load network tasks in special partitions to ensure that they have sufficient memory in which to run. Any such situation would need to be handled on an individual basis.

The loading problem may occur when using NCP to load the network in systems where memory is at a premium. This problem is discussed in Section 3.2.3.

**Figure 3-1: Partition Layout after SYSGEN (CEXPAR Added)**



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**Table 3-1: Approximate Sizes of Key Components**

DECnet Components	Size *
RSX-11M Executive	Varies (see Note 1)
DSR pool	Varies (see Note 1)
Communications Executive	1K-1.5K (see Note 1)
F11ACP	2K-9K (see Note 2)
NETACP	4K-5K (see Note 3)
NMVACP	6K (see Note 4)
NTINIT	2.0K

**Table 3-1 (Cont.): Approximate Sizes of Key Components**

<b>DECnet Components</b>	<b>Size *</b>
NCP	12K
NTL	9K
Minimum network	12K (see Note 5)
<b>PSI Components</b>	<b>Size *</b>
PLI	4K
NW	1.5K
X25ACP	4K
DLM	2K
LAB	3.5K
SDP/SDV	0.75K
KMX	2.75K
KMY	2.75K
KMV	2.75K
PSIPAD	4.5K plus 2.0K per user
X29ACP	8K
HT:	0.75K
Minimum DECnet/PSI system	20K-22K (see Note 6)
* Approximate number of decimal words	

(continued on next page)

**Table 3-1 (Cont.): Approximate Sizes of Key Components**

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**Notes:**

1. RSX Executive, Dynamic Storage Region (DSR) pool, and Communications Executive together total 16K or, if you choose the large Executive, 20K. You can change this figure somewhat depending upon your needs and resources (see Section 3.2.5.9). The Communications Executive varies from 1 to 1.5K, depending upon what lines and options you have selected.
2. Files 11 ACP (F11ACP) is available in four sizes ranging from approximately 2K to 9K. If you put F11ACP in a partition with other larger components (for example, NETACP), use of the smaller two F11ACPs is not recommended. The smallest F11ACP does not provide full functionality, and the next larger is heavily overlaid. The small F11ACPs are optimized for minimum memory size, not performance, and since the memory is already allocated, a higher performance F11ACP is recommended. The third F11ACP in order of size is 5K, provides full functionality, and is moderately overlaid. (See the *RSX-11M System Generation Manual* for more information on F11ACP.)
3. NETACP comes in two sizes, 4K and approximately 5K. The smaller version does not support network command terminals and layered products.
4. NMVACP is initially built for GEN as a 4K word task. In that size, it can handle only one user. However, when additional requests come in, it extends itself to a larger size. You can also install it with an increment to handle more users, thus eliminating the need for it to extend itself. In this case, the formula for determining the decimal word size of NMVACP is:

$$4K + (170 \times u)$$

The variable  $u$  is the number of users that NMVACP can service (it starts with a base of 2). See Section 3.2.4 for more information on NMVACP.

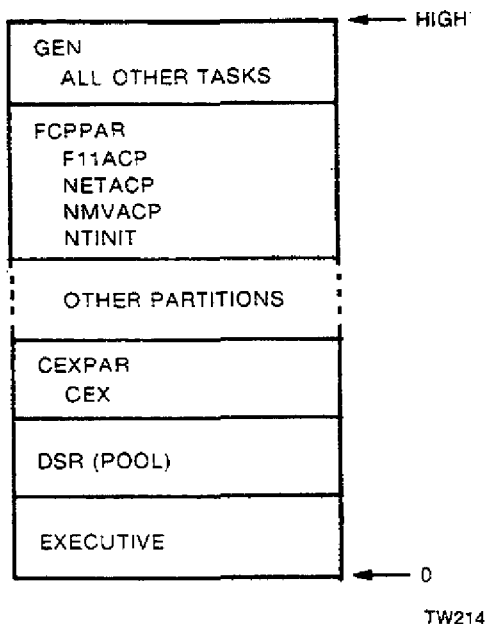
5. The minimum required network software (in addition to CEX) consists of AUX, ECL, XPT, NETACP, network pool, at least one DDM, and RCP (for a full routing node). Excluding NETACP, which you may wish to load in a separate partition as shown here, these components total approximately 12K words (14K for DECnet-11M-PLUS).
  6. The minimum DECnet/PSI system is 20K words (22K for DECnet-11M-PLUS). This minimum is for a node with a single DLM circuit. The minimum DECnet/PSI system consists of AUX, ECL, XPT, DLM, PLI, one DDM (KMX, KMY, KMV, SDP, or SDV), LAB (only when the DDM is SDP or SDV), and DLX (required on DECnet-11M-PLUS).
-



### 3.2.1.1 Small RSX-11M Systems

For small systems, the partition layout shown in Figure 3-2 is recommended as a way of solving loading problems.

**Figure 3-2: Partition Layout for Small RSX-11M Systems**



Here, NETACP, NMVACP, and NTINIT are installed in FCPPAR, where they run along with F11ACP, the Files 11 ACP. NETACP must be generated as checkpointable. You should set the size of FCPPAR to accommodate the largest task in the partition. This will often be NETACP. You can arbitrarily choose a size for FCPPAR that is too large (say 7K words) and then reduce the size appropriately after NETGEN, when you know actual sizes. All other network and user tasks are installed in GEN.

This layout ensures that NMVACP and NTINIT do not tie up space in GEN that is required for loading. Putting NETACP in FCPPAR also helps reduce fragmentation.

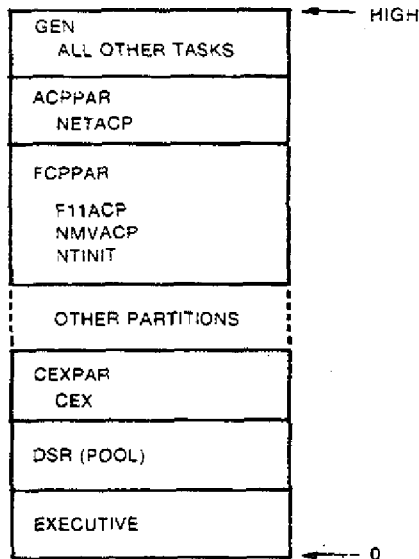
## NOTE

This layout provides satisfactory performance if GEN is approximately 32K or larger. For smaller systems, it is recommended that you avoid using NCP to load the network. Instead, use VNP to prepare a suitable system image and then boot the system directly. The smaller your GEN partition, the more important this recommendation. For information on VNP, see the *DECnet-RSX Guide to Network Management Utilities*.

### 3.2.1.2 Medium RSX-11M Systems

For medium size RSX-11M systems, the partition layout in Figure 3-3 is recommended.

**Figure 3-3: Partition Layout for Medium RSX-11M Systems**



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Here NETACP has been removed from the FCPPAR partition and placed in its own partition, ACPPAR. (You can name this partition anything you like; in the examples in this manual, it is ACPPAR.)

There is an advantage in splitting NETACP out from the FCPPAR partition. Since both NETACP and F11ACP can be very active tasks, this layout avoids needlessly swapping them in and out of memory. The result is improved performance. This layout has all the other advantages recommended for small RSX-11M systems.

### 3.2.1.3 Large RSX-11M Systems

For large RSX-11M systems, performance is satisfactory when all tasks are placed in the partition GEN. However, if the system performs a great deal of network I/O or if you wish to make NETACP non-checkpointable, the partition layout shown for medium size RSX-11M systems (Figure 3-3) may produce improved performance.

### 3.2.2 Pool Usage Considerations

Along with the issue of partition layout, there is the additional consideration of pool usage. In large systems this will probably not be a problem. In small and medium systems, you may want to reduce the amount of pool used by the network software. The general breakdown of pool requirements for various DECnet features that follows can help in minimizing pool usage.

Installing a task on RSX-11M or RSX-11S systems takes about 24,000 words of pool (depending on exact Executive configuration). From 6 to 30 DECnet tasks can be installed depending on your NETGEN answers. If you have limited pool, you want to edit the NETINS.CMD file to limit the number of installed tasks (see Chapter 9).

Other network use of pool includes:

Control Buffers	18,000 words for each control buffer
Incoming remote terminal links	30,000 words for each allowed link for HT: and RT: driver data structures
Logical links	2,000 words for each allowed logical link
Circuits	21,000 words for each defined circuit

Loading and starting the network can use a wide range of values of system pool. During network load and start-up, control buffers and common areas for DECnet processes are allocated.

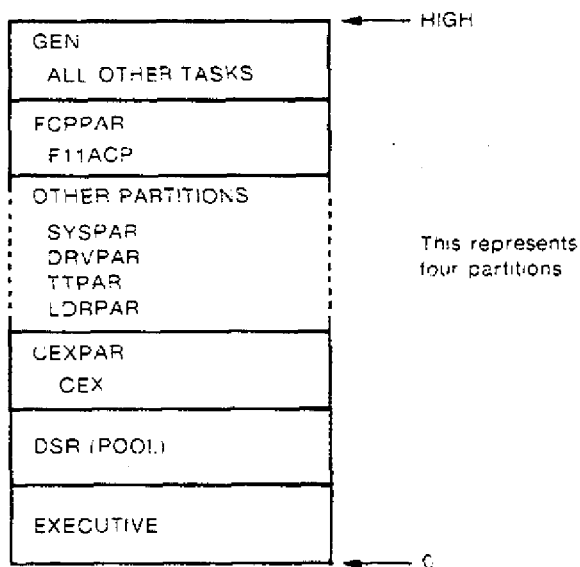
When running network tasks, the first logical link adds 18. words to pool usage and each additional link adds 11. words. These do not include the pool usage associated with QIOs on the logical links.

In general, minimizing the number of installed tasks and the number of active logical links per task is the best way to cut down on pool usage.

### 3.2.3 Avoiding DECnet Loading Problems

In order to understand the loading of RSX-11M DECnet, consider Figure 3-4. This figure is a version of Figure 3-1. The partitions SYSPAR, DRVPAR, TTPAR, and LDRPAR are combined in **OTHER PARTITIONS**.

**Figure 3-4: Typical Partition Layout**



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This example assumes that you decided to put F11ACP, the Files 11 ACP, in its own partition, FCPPAR. This is the SYSGEN default. All DECnet tasks run in the system-controlled partition GEN.

When you load the network by using the NCP SET SYSTEM command, a series of actions are initiated:

1. The Executive loads NCP in GEN.
2. NCP makes an I/O request to NMDRV, the network management device driver.
3. The driver calls NMVACP, the network management volatile ACP.
4. NMVACP in turn calls NTINIT, the Network Initialization task.
5. After performing initialization, NTINIT calls NTL, the Network Loader, to load the network.

Thus, the entire sequence is as follows:

**NCP → NMDRV → NMVACP → NTINIT → NTL → NETWORK**

Each task is loaded into GEN in the sequence indicated. Each task can checkpoint the task that precedes it in the calling sequence, if it needs memory in which to run. However, because NCP has an I/O request outstanding, it cannot be checkpointed by other tasks; it remains in memory until the entire cycle is completed. Likewise, when NTL loads the network, it cannot checkpoint other tasks in order to make room for the network tasks. This is due to certain technical features of NTL.

Generally, the loading procedure just described proceeds satisfactorily. However, consider the following example. Suppose this loading procedure occurs and NCP, NMDRV, NMVACP, NTINIT, and NTL are all in memory at the same time. No checkpointing occurs because there is enough memory for all; there is even, say, 10K of memory left over. NTL then tries to load the network. The load fails because the network requires a minimum of 12K to load and there is only 10K available. NTL tries to load the network software in the existing space, but since it is incapable of checkpointing other tasks, it fails and prints an error message.

This problem can occur only when attempting to load the network and, depending upon the size of your system, can be prevented in a variety of ways, including:

- Removing extraneous application tasks
- Loading the network prior to booting the system, using the VNP SET SYSTEM command, to ensure maximum memory space.
- Rearranging partition layout (see Sections 3.2.1.1 and 3.2.1.2).

### 3.2.4 Special Considerations for NMVACP

The network management volatile ACP task (NMVACP) may require special treatment during NETGEN. A brief explanation of NMVACP should make this clearer.

NMVACP works in conjunction with the Network Control Program (NCP) task and the network management device driver (NMDRV) to execute NCP commands. NCP scans user commands and determines what action is required. It then passes this information on to NMDRV, which performs certain preliminary processing. NMDRV, in turn, calls NMVACP to execute the NCP command. These components are described in Section 2.3.

NMVACP can also execute Network Information and Control Exchange (NICE) commands that originate at a remote system.

NMVACP can handle a number of requests simultaneously by maintaining a record of the status of each request in its own buffer space. If it receives more requests than it has buffer space for, it makes a request to the RSX Executive to be checkpointed. Then it may be brought back into memory as a larger task.

In large systems, this presents no problem. In small to medium RSX-11M systems, however, the possibility of deadlock arises. (This is one reason why the partition layouts shown in Sections 3.2.1.1 and 3.2.1.2 are recommended.) When NMVACP asks the Executive to be checkpointed, if there is not sufficient space to come in as a larger task, a deadlock may occur: the NCP commands SET SYS and SET EXE STA ON will never be executed. The problem is compounded by the fact that NCP cannot be checkpointed while it has an I/O request outstanding — that is, until the NCP command is completed.

To handle this problem, you can do either of the following:

- Place NMVACP in the FCPPAR partition, along with F11ACP. This provides extra memory in the partition GEN, as the memory in FCPPAR is already allocated. Adding NMVACP so that it shares this partition does not require extra space. The layouts suggested for small and medium RSX-11M systems take this approach.
- Modify the installation command file NETINS.CMD so that NMVACP is installed with a memory increment to provide space for additional requests. NETINS.CMD is described in Chapter 9. The line that installs NMVACP should be modified to read

```
INS NMVACP/INC=size/CKP=NO
```

Here *size* is the octal byte increase in size and can be computed by multiplying 524 octal bytes by the number of simultaneous users that you wish to support. (NMVACP is originally built to handle 2 users.) The /CKP = NO switch eliminates the possibility of deadlock, since NMVACP can never be checkpointed.

### 3.2.5 RSX-11M/S SYSGEN Considerations

Prior to running NETGEN, you must perform a SYSGEN that prepares the RSX operating system to accommodate the DECnet software you are creating. The following areas affect DECnet-RSX software:

- SYSGEN support for DECnet (Section 3.2.5.1)
- RSX and DECnet communications devices (Section 3.2.5.2)
- Standard function system (RSX-11M only) (Section 3.2.5.3)
- Network command terminal support (Section 3.2.5.4)
- System-controlled partitions (Section 3.2.5.5)
- Checkpointing support (RSX-11M only) (Section 3.2.5.6)
- Terminal driver support (Section 3.2.5.7)
- Queued file access requests (RSX-11M only) (Section 3.2.5.8)
- Large or small Executive (Section 3.2.5.9)
- Editing SYSVMR.COM (Section 3.2.5.10)
- Adding CEXPAR (Section 3.2.5.11)
- Adding other partitions (Section 3.2.5.12)

Some of the SYSGEN questions that follow may not be displayed because the support required may be automatically included as a result of a previous question. For details on running SYSGEN, see the system generation manual for your system.

RSX-11S systems have additional SYSGEN considerations for SLD and NETPAN support. These are covered in Sections 3.2.6.2 and 3.2.6.3.

### 3.2.5.1 Including Support for DECnet

To create the proper support for DECnet on the RSX-11M/S system you are generating, answer YES to the following question in the Executive Options section of SYSGEN:

>\* 32. Include support for communications products (such as DECnet)?  
[Y/N D:N]:

If you answer NO to this question, you will generate a system that will not support DECnet.

### 3.2.5.2 RSX and DECnet Communications Devices

Because the RSX-11M/S Executive does not need to know anything about hardware that will be used as DECnet communications devices, and because no communication device can be shared between DECnet and the Executive, do not specify any DECnet communications devices when answering questions in the Target Configuration section of SYSGEN.

However, when you generate your RSX system, you must specify how much space is to be allocated for interrupt vectors on your target system, and the space must be sufficient to include the interrupt vectors belonging to DECnet devices.

To specify properly, answer the following question with the highest vector address of devices on your system, including the DECnet communications hardware.

>\* 14. Highest interrupt vector [0 R:0774 D:0]::

These vector addresses are available as a result of hardware installation.

For this question, do not specify the default, since the value that SYSGEN computes in this case would not take into account DECnet communications devices. In answering this question for your operating system, be sure to leave enough space for devices you have or will soon have.

If your DECnet system includes any of the following character interrupt devices — DUP, DU, DL, DUV, DLV, or DPV — you must add 20 octal bytes to the highest interrupt vector address. The highest interrupt vector address you can specify is 774. This value, which includes the 20 additional octal bytes required for DUP, DU, DUV, DL, DLV and DPV, allows enough space for any devices you may choose.



### 3.2.5.3 Standard Function System (RSX-11M Only)

For RSX-11M systems, Question 8. at the beginning of SYSGEN displays:

>\* 8. Do you want a Standard Function System? [Y/N]:

If you answer this question YES and select the standard function system, you will automatically build the following options into your system (others may be included as well):

- Network command terminal support
- System-controlled partitions
- Checkpointing (but without the system checkpointing file)
- Full duplex terminal driver (with all options)
- Large (20K) Executive

If you choose the standard function system, you will not be able to change your maximum node address dynamically because the standard function system does not support the required system checkpointing file. The options in the list are discussed in the following sections. If you do not want all features of the standard function system, answer the question NO and specify the features you do want.

### 3.2.5.4 Network Command Terminal Support

If you want to support network command terminals, answer YES to Question 32A of the Executive Options section of SYSGEN:

>\* 32A. Include DECnet Network Command Terminal support? [Y/N]:

### 3.2.5.5 System-Controlled Partitions

As a general rule, you should specify system-controlled partitions. You can do so by answering YES to Question 33 of the Executive Options section of SYSGEN:

>\* 33. System controlled partitions? [Y/N]:

System-controlled partitions allow most network tasks to be loaded into one partition (GEN), and automatically swapped in and out of memory. The only situation in which you might not want to use system-controlled partitions is in a dedicated system in which one task is loaded into each partition, thus ensuring that the task is always in memory. Each such partition should be sized exactly for the particular task. Such a system would save the small amount of memory used by the Executive to handle system-controlled partitions.

### 3.2.5.6 Checkpointing Support (RSX-11M Only)

The following parameters that you specify in SYSGEN will affect the performance of specific DECnet components only.

>\* 49. Checkpointing [Y/N]:

Answering YES enables checkpoint support. You should select checkpointing in some form.

If you want to be able to change the number of nodes in your network without rebuilding the routing control process (RCP), select dynamic checkpoint allocation support. Question 50 in the Executive Options section of SYSGEN displays:

>\* 50. Checkpointing with system checkpoint file [Y/N]:

Answer YES if you want dynamic checkpoint support. If you select dynamic checkpointing support and you execute the CFE DEFINE EXECUTOR MAXIMUM NODE ADDRESS command, RCP will automatically extend itself to the required size when it is loaded. See the *DECnet-RSX Guide to Network Management Utilities* for more information on this CFE command.

### 3.2.5.7 Terminal Driver Support

TLK, RMT, and X.29 will provide different capabilities depending on the options selected for the terminal driver. The following section discusses these options.

**Support for TLK:** The Terminal Communications utility (TLK) allows you to exchange messages between terminals at different nodes in a network. There are two modes of TLK — dialog mode and single message mode.

Question 1 of the Terminal Driver Options section of SYSGEN displays:

>\* 1. Terminal driver desired (A/B/C/D, \* prints table) [S]:

If you enter an asterisk (\*), SYSGEN prints the following table:

Terminal drivers:	A- Tailorable half duplex
	B- Tailored half duplex (user oriented)
	C- Full duplex
	D- Baseline half duplex

Answering A, B, or C produces satisfactory results. (If you are a PSI X.29 user, however, see **Support for PSI X.29**, which follows.) Answering B automatically provides the necessary support for both versions of TLK. If you answer A or C, you must select the specific driver features desired. In either case (A or C), if you want either mode of TLK, you must answer YES to the following question:

>\* 8. Breakthrough write? [Y/N]:

Additionally, if you want the dialog mode of TLK, you must answer YES to the following question:

>\* 17. Read after prompt? [Y/N]:

If you want the video dialog mode of TLK, and if you answered A or C to Question 1, you must also answer YES to the following question in the same section of SYSGEN:

>\* 6. Unsolicited input character AST? [Y/N]:

Asynchronous system traps (ASTs) are software interrupts. Answering this question YES allows your terminal to process characters entered on the keyboard at the same time characters are being printed on the screen. Support for unsolicited input character ASTs is automatically included if you answer B to Question 1. For more information on TLK, see the *DECnet-RSX Guide to User Utilities*.

**Support for RMT:** The Remote Terminal utility (RMT) works with any of the terminal drivers noted under TLK. However, it is recommended that you choose A, B, or C. Performance varies depending upon which terminal drivers are installed on the source and the host nodes. For more information, see the discussion of RMT in the *DECnet-RSX Guide to User Utilities*.

**Support for PSI X.29:** If you want support for PSI, answer C to the terminal driver question (Question 1) noted under **Support for TLK**. PSI's X29ACP and PSIPAD require the full duplex driver. PSIPAD also requires Unsolicited input character support (TT driver option 6), Get multiple characteristics support (TT driver option 11), and NCT support (Executive option 32A).

You must also respond YES to Question 12:

>\* 12. Set multiple characteristics? [Y/N]:

in order to create MCR support for SET commands relating to terminals, such as:

SET /VT100 = TI:

or

SET /TERM = TI:VT2xx

### 3.2.5.8 Queued File Access Requests (RSX-11M Only)

FTS allows file access requests (file transfers, and so forth) to be queued and processed in sequence. If you want FTS, the RSX-11M Queue Manager (QMG), you must answer YES to the following question in the Executive Options section of SYSGEN.

>\* 35. Queue Manager and queued print spooler? [Y/N]:

For more information on FTS, see the *DECnet-RSX Guide to User Utilities*.

### 3.2.5.9 Large or Small Executive

The RSX Executive can be built in either 16K or 20K of address space. SYSGEN displays the following question in the Executive Option section of Phase 1:

>\* 22. Large (20K) Executive? [Y/N]:

If you answer NO to this question, you will get the 16K Executive.

Your response to this question determines the amount of Executive address space allocated to the Executive plus DSR (pool). The size of the Executive itself is determined solely by your answers to questions about Executive options. The remaining space is allocated to pool. This allocation, however, can be altered by editing the SYSVMR.CMD file (see Section 3.2.5.10).

Deciding which size Executive to choose must take into account your type of system, its size, and its intended use. In general, for medium to large systems you want the 20K Executive. The extra pool is useful, and you have enough memory so that the 4K allocated to pool does not significantly affect your ability to run tasks.

On small systems, you must decide between need for pool and need for extra task space. You may decide to use the smaller Executive, since task space is often at a greater premium than pool.

These tradeoff decisions depend upon network loading, types of programs being run, and user program load. For example, if a node is being used only as a routing node, the entire pool may not be used. In such a case, performance would be improved by using the 16K Executive, since there is less checkpointing of network tasks. You can also reduce the Executive-plus-pool size to less than 16K (Section 3.2.5.11).

### 3.2.5.10 Editing SYSVMR.CMD

It is necessary to add at least one partition, CEXPAR, to the system in order to run DECnet. For medium size systems, you may also want to add another partition as well (see Section 3.2.1.2). These partitions are added by editing the SYSVMR.CMD command file.

In Phase 2 of SYSGEN, VMR Question 1 displays:

>\* 1. Edit SYSVMR.CMD? [Y/N]:

If you answer this YES, SYSGEN will pause and allow you to edit the file. If you answer NO or press RET, you can edit the file later.

SYSVMR.CMD is an indirect command file used as input to the Virtual Monitor Console Routine (VMR). VMR allows you to change the system image file used to boot the operating system. VMR commands are similar in format to those of MCR; the SYSVMR.CMD file contains commands such as SET, LOA, and INS. When VMR executes these commands, it simulates their effect on the system image file. Thus, when the system is booted, the commands have effectively been performed. (For more information on VMR, see the SYSGEN manual for your system. Also, the *RSX-11M/M-PLUS System Management Guide* contains reference information on VMR.)

The SYSVMR.CMD file is found on UIC [1,54] for RSX-11M. For RSX-11S systems, you must create a copy on UIC [1,64] (see Section 3.2.5.11). The first line of the file is the name of the system image file that SYSVMR.CMD modifies. SET commands that define partitions follow that line.

### 3.2.5.11 Adding CEXPAR

The necessary partition (CEXPAR) is incorporated by adding a SET /MAIN = CEXPAR line to the SYSVMR.CMD file.

The beginning of a typical SYSVMR.CMD file from an RSX-11M system follows. (A sample RSX-11S SYSVMR.CMD file, with the appropriate lines to create CEXPAR, is at the end of this section.)

```
RSX11M
SET /POOL=*
SET /MAIN=EXCOM1*:200:COM
INS EXCOM1
SET /MAIN=EXCOM2*:200:COM
INS EXCOM2
SET /MAIN=LDRPAR*:26:TASK
INS LDR
FIX LDR...
```

```
SET /MAIN=TPAR:*:400:TASK
LOA TT:
SET /MAIN=DRVPAR:*:*:SYS
```

Add a line to the SYSVMR.CMD file between the SET /POOL = \* command and the SET /MAIN command for the first partition shown. To reflect the base address at which CEXPAR loads, change the value of the SET /POOL = \* line. These changes cause CEXPAR to load immediately above the RSX Executive and pool. The format for the two lines is:

```
SET /POOL=base-address
SET /MAIN=CEXPAR:*:size:COM
```

The asterisk (\*) here means, load at the next available location. The word COM signifies that this is a common block partition.

If VMR has previously been run, you must make a new copy of the system image before running VMR to add CEXPAR. To do so, enter one of the following commands:

```
PIP RSX11S.SYS/CO/BL:n.=[1,64]RSX11S.TSK
PIP RSX11M.SYS/CO/BL:n.=[1,54]RSX11M.TSK
```

If, in NETGEN, you specified the *default* values given in NET Section 4, Questions 1.00 and 1.01, use the base address values and size values given in Table 3-2. If you did not specify the *default* values, make sure the values you use coincide with your response to Questions 1.00 and 1.01.

**Table 3-2: CEXPAR Base Addresses and Sizes**

Executive (in words)	CEX Size *	Base Address **	Par Size **
20K	large	1130	50
20K	small	1135	43
16K	large	730	50
16K	small	735	43

\* CEX size is determined as follows: CEX is automatically generated in one of two sizes by NETGEN. For a DECnet-only (non-DECnet/PSI) system with only one line, NETGEN generates a small CEX. In all other cases, NETGEN generates a large CEX.

\*\* The base address and size are shown in octal bytes. Note that the final 2 digits of the address and size are omitted in this table and in the discussion that follows, because that is the convention employed by VMR. Thus, an octal byte address of 112000 is expressed as 1120. (In NETGEN, however, you must express the last 2 digits.)

These sizes fill the Executive address space, using 20K or 16K words. The size of 43 or 50 (that is, 4300 or 5000 octal bytes) is an estimate of CEX size, which varies somewhat depending upon your configuration. Extra space is not wasted, but is used for Communications Executive pool.

For RSX-11M systems, these values are usually adequate. For very small RSX-11S systems, or systems in which there is a strong need for DSR pool, you may want to make the size of CEXPAR even smaller. To do so, specify a higher base address and a smaller size for the CEXPAR partition (NET Section 4 Questions 1.00 and 1.01). You can run NETGEN in restore mode to simplify this procedure.

In addition, for both RSX-11M and RSX-11S systems, you can choose to load CEXPAR at a lower base address. This causes other partitions to be loaded at correspondingly lower base addresses. Loading other partitions below the defined end of the Executive (16K or 20K) in this way is appropriate for single-user systems or for dedicated applications where a limited amount of pool is sufficient.

For an RSX-11S system, you must create a SYSVMR.CMD file on UIC [1,64]. For more information about the RSX-11S SYSVMR.CMD file, see the *RSX-11S System Generation and Installation Guide*. The following is a sample of an RSX-11S SYSVMR.CMD file that creates CEXPAR.

```
RSX11S
SET /POOL=730
SET /MAIN=CEXPAR*:50:COM
SET /MAIN=TTPAR*:400:TASK
SET /MAIN=SYSPAR*:40:TASK
SET /MAIN=MCRPAR*:140:TASK
SET /MAIN=RSDV52*:400:TASK
SET /MAIN=GEN*:*:SYS
LOA TT:
INS TKN/FIX=YES
INS BASMCR/FIX=YES
PAR
TAS
```

After invoking VMR, you should still enter the time and date after running SYSVMR.CMD as an indirect command file. The command PAR prints out a list of partitions, and the command TAS prints out a list of tasks.

### 3.2.5.12 Adding Other Partitions

You may have chosen, after reading the information provided in Section 3.2.1.2, to put NETACP in its own partition, here called ACPPAR. To create the ACPPAR partition, edit SYSVMR.COMD and insert a SET /MAIN command just before the SET /MAIN command that defines the partition GEN. The line to insert takes the following form:

```
SET /MAIN:ACPPAR:*.size: [SYS  
                        TASK]
```

Here the asterisk (\*) indicates that ACPPAR is loaded in the next available space, and *size* specifies the size of the largest task to occupy the partition. SYS indicates that this is a system-controlled partition. If you did not select system-controlled partitions, use the word TASK instead.

A size of 270 is generally adequate (again, the final 2 octal digits are implied).

### 3.2.6 RSX-11S System Considerations

Because RSX-11S systems are often dedicated systems, it is difficult to establish specific rules for determining partition layout. The following are required procedures:

- You must have the “floating” device CSRs at the proper addresses on the processor to be loaded. The proper addresses are determined by the standard UNIBUS/Q-bus device rankings. A command file, [200,200]FLOAT.COMD, is provided on the kit to aid in determining the CSR addresses.
- You must add the partition CEXPAR (see Section 3.2.5.11).
- It is recommended that you use system-controlled partitions. The host system can load all required tasks into GEN with system-controlled partitions and standard partition layout.
- Determine whether all desired tasks will fit in memory. Examine the maps to determine sizes. Tasks that are not required all the time can be down-line loaded. This allows several tasks to share the same partition. Refer to Section 3.2.1 to determine minimum network requirements.



### 3.2.6.1 Down-Line Loading to a DMP/DMV Tributary

When down-line loading an RSX-11S system image from a multipoint master to a DMP/DMV tributary, the tributary address must be set in the switches on the DMP/DMV device on the target system. Once the RSX-11S system is down-line loaded, it will continue to use the tributary address that is set in the switches on the device. This allows many tributaries to be down-line loaded from the same system image, while each retains its unique tributary address. If you want the down-line loaded system to override the tributary address on the device, then — prior to NETGEN — you must edit the [137,10]DECPRM.CMD file. The value \$DOVER must be changed to TRUE.

### 3.2.6.2 Support for SLD

To use the satellite task loader (SLD) to perform down-line task loading on RSX-11S systems, you must edit two files at SYSGEN time:

- Add the symbols D\$\$ISK and C\$\$CKP to the RSXMC.MAC file. D\$\$ISK includes task loader support; C\$\$CKP creates checkpointing support.
- Change the TKTN partition size in the RSX-11S TKTN task build command file.

SYSGEN Phase I includes the following Question 1 in the section "Create Executive Build Files":

>\* 1. Do you wish to edit any of the Executive files? [Y/N]:

Answer YES. SYSGEN then pauses to let you edit any file, using the editor of your choice.

Edit the file RSXMC.MAC on UIC [11,10]. Search for the symbol A\$\$CPS. Below it, add the following symbols:

```
C$$CKP=0                                ;CHECKPOINTING
SUPPORT
D$$ISK=0                                ;TASK  LOADER
SUPPORT
```

SYSGEN Phase II includes the following question:

>\* Do you have to edit the task build command file for TKTN? [Y/N]:

Answer YES, and then edit the following line in the command file:

```
PAR=SYSPAR:0:3700
```

Change the partition size to 4000 bytes, which is usually sufficient. However, since the task length can vary, you may need to build the task once to learn its actual length. You can then edit the command file again to increase or decrease the partition length as necessary.

After editing the files, follow the SYSGEN instructions on continuing.

### **3.2.6.3 Including NETPAN (Up-Line Panic Dump)**

NETPAN allows a DECnet-11S node to dump the contents of its memory to an adjacent DECnet-11M/M-PLUS node. If you intend to include NETPAN in your node, and if your hardware configuration meets the specifications outlined in Appendix B, Section B.1.2, you must edit the RSXMC.MAC file to define one or more symbols. If your up-line dump device is an Ethernet device, you must define N\$\$NI; if you want the system to restart from the system boot ROM, you must define R\$\$BOT. See Appendix B for details on the SYSGEN requirements that must be satisfied in order to include NETPAN in your node.

## **3.3 PREGEN**

PREGEN is a preliminary procedure you may have to perform before generating a network. It merges your required and optional distribution media so they can be used by the NETGEN procedure. PREGEN can include the following distribution kits (disks or magnetic tapes):

- Network kit
- DECnet kit
- RSX-11 PSI kit (optional)

Each kit contains command files and object files. The command files become the corresponding parts of NETGEN: NET, DEC, and PSI. The object files are used to build the appropriate NET, DEC, or PSI components.

PREGEN copies the command files from each distribution kit to the NETGEN disk. This disk becomes the input to NETGEN, and allows NETGEN, once started, to display the NETGEN questions. PREGEN copies the files listed in Table 3-3.

**Table 3-3: PREGEN Files**

File	Contents
NETGEN command files	Command files from all available kits
Network object files	Object files for the NET procedure of NETGEN
DECnet object files	Object files for the DEC procedure of NETGEN
PSI object files	Object files for the PSI procedure of NETGEN

The type of media you have purchased and the type of system you are generating determine whether or not you have to perform the PREGEN procedure.

### **3.3.1 Who Must Perform PREGEN**

If you have purchased an RL02, RK06, or RK07 distribution kit and you are generating a DECnet-only system, PREGEN is not required. Your distribution kit contains all the files you will need to run NETGEN (1 disk). In addition, if you have purchased an RL02, RK06, or RK07 distribution kit for a combined DECnet/PSI system but want to generate a DECnet-only system, PREGEN is not required. If you do not have to perform PREGEN, you should make a copy of your distribution media and run the NETGEN procedure from this copy. If you do not have to perform PREGEN, you can skip ahead to Chapter 4.

PREGEN is required if any of the following conditions apply:

- You have purchased a magnetic tape distribution kit.
- You have purchased an RL01 distribution kit.
- You are generating a combined DECnet and PSI system.
- You are generating a PSI-only system.

### **3.3.2 Two Types of PREGEN**

PREGEN can be run for either a standard system or a small dual-disk system. A standard PREGEN is performed for systems other than small dual-disk systems. A small dual-disk PREGEN is performed for a system that has only two small disk drives (drives such as RL01s, RL02s, RK06s, or RK07s), one of which serves as a system disk. A standard PREGEN and a small dual-disk PREGEN are started the same way (see Section 3.3.6).

### 3.3.3 Overview of Standard PREGEN Operation

PREGEN first asks if you want to see the PREGEN notes, and if you do, displays them. PREGEN then asks if you are running on a small dual-disk system. If you answer YES, you get the small dual-disk PREGEN. If you answer NO, you get the standard PREGEN. The remainder of PREGEN is performed once each for the network, DECnet, and (optionally) PSI distribution kits. For each pass through the standard PREGEN procedure, the following occurs:

- PREGEN asks if you want to copy the distribution kit. It does not ask you this question for the first kit, because you must copy the network distribution kit. Answer the question YES for each distribution kit you have.
- PREGEN then displays several questions about the distribution kit disk or tape.
- PREGEN asks for the device on which the NETGEN disk is loaded and then asks several related questions.
- PREGEN copies the command files from the distribution kit to the NETGEN disk.
- PREGEN asks if you also want to place the object files on the NETGEN disk (Question 7.00). If you answer YES, PREGEN copies the object files and then skips ahead to the next pass.
- If you answer NO to Question 7.00, PREGEN asks you to specify the disk to which the object files should be moved. PREGEN then asks several questions about the object disk.
- PREGEN copies the object files to the object disk, and then goes on to the next pass.

### 3.3.4 Overview of Small Dual-Disk PREGEN Operation

There is not enough space on a small dual-disk system to copy all the object files from the distribution kits to other disks. Each kit is used for the build phase of NETGEN. Mount each distribution kit during PREGEN, then mount each kit again during NETGEN.

For a small dual-disk system, PREGEN first asks if you want to see the PREGEN notes and, if you do, displays them. PREGEN then asks if you are running on a small dual-disk system. If you answer YES, you get the small dual-disk PREGEN. If

you answer NO, you get the standard PREGEN. The following is repeated once each for the network, DECnet, and (optionally) PSI distribution kits. For each pass through the procedure, the following occurs:

- PREGEN asks if you want to copy the distribution kit. It does not ask you this question for the first kit, because you must copy the network distribution kit. Answer the question YES for each distribution kit you have.
- PREGEN then displays several questions about the distribution kit disk.
- PREGEN copies the command files for each distribution kit to the system disk.

When this process is completed, PREGEN asks for the device on which the NETGEN disk is loaded and then asks several related questions. Finally, PREGEN copies the command files from the system disk to the NETGEN disk, and then deletes the command files from the system disk.

### 3.3.5 Copying Distribution Media to Disks

If you have purchased distribution media in magnetic tape form, you need the following:

Drives	Media
1 system disk drive	System disk
1 magnetic tape drive	NET kit DEC kit PSI kit (optional)
1 free disk drive	1 free disk (NETGEN disk) or multiple disks

You cannot use tape distribution media for a small dual-disk PREGEN.

If you have purchased distribution media in disk form and you are on a system that is not a small dual-disk system, you need the following for a standard PREGEN:

Drives	Media
1 system disk drive	System disk
1 free disk drive	NET kit DEC kit PSI kit (optional)
1 free disk drive	1 free disk (NETGEN disk) or multiple disks

If you have purchased distribution media in disk form and you are on a system that is a small dual-disk system, you need the following for a small dual-disk PREGEN:

Drives	Media
1 system disk drive	System disk
1 free disk drive	NET kit DEC kit PSI kit (optional) 1 free disk (NETGEN disk)

With any output disk (except those with very large capacity such as RP05 or RP06), it is recommended that PREGEN initialize the disk to ensure that the maximum capacity is available for the distribution kit files. If you want PREGEN to initialize the disk, do not mount it but make sure you run the Bad Block Locator utility (BAD) on any disks initialized by PREGEN before running PREGEN. If you do not want PREGEN to initialize the disk, it does not matter whether you mount it or not.

### 3.3.6 Starting PREGEN

Depending upon the type of distribution kit you purchased, use one of the two procedures described here to start PREGEN. To run the PREGEN procedure under VAX/VMS you need the same privileges and terminal characteristics required to perform a NETGEN — see Section 4.2.2.

### 3.3.6.1 Disk Distribution Media

For distribution kits in the form of disks, use the following procedure to start PREGEN:

1. Allocate the disk drive for the NETKIT (network kit) disk:  
> ALL *ddx*:
2. Mount the NETKIT disk:  
> MOU *ddx*:NETKIT
3. Using PIP, copy the PREGEN command file from the NETKIT disk (*ddx*:) to a disk that will be available throughout PREGEN:  
> PIP *tdu*:/NV = *ddx*:{137,10}PREGEN.CMD
4. Allocate all other disk drives to be used:  
> ALL *ddu*:
5. Execute PREGEN:  
> @*tdu*:PREGEN

### 3.3.6.2 Magnetic Tape Distribution Media

For distribution kits in the form of magnetic tapes, use the following procedure:

1. Allocate the NETKIT (network kit) tape drive:  
> ALL *mmu*:
2. Mount the NETKIT tape:  
> MOU *mmu*:/FOREIGN
3. Create the UIC [137,10] on a disk that will be available throughout PREGEN:  
> UFD *tdu*:{137,10}
4. Using FLX, copy the PREGEN command file from the NETKIT tape to the disk:  
> FLX *tdu*:/UI = *mmu*:{137,10}PREGEN.CMD/RW[/DNS:*n*]  
where *n* is either 800 or 1600, depending on which density tape you are using. The default is 800, so if your tape density is 800, you can omit /DNS:*n*.

5. Allocate all other disk drives to be used:

> ALL *dax*:

6. Execute PREGEN:

> @tdu.PREGEN

### 3.3.7 Understanding the PREGEN Dialog

The following sections present the PREGEN dialog. Your response to Question 2.00 determines whether you will run a standard PREGEN or a small dual-disk PREGEN.

#### NOTE

The explanatory text after each question in the following, is a word-by-word representation of what you will see on your screen when you perform a PREGEN. It may not, however, be a line-by-line representation of what appears on your screen.

```
>; =====  
>; PREGEN - RSX-11M/S/M-PLUS CEX System Pre-Generation Procedure  
>; Started at time on date  
>; =====
```

```
>; Copyright (C) 1981, 1982, 1983, 1985, 1987 by
```

```
>; Digital Equipment Corporation, Maynard, Mass.
```

```
>* 01.00 Do you wish to see the PREGEN notes? [Y/N]:
```

Answer this question YES if you are not familiar with running PREGEN.

- . Before starting PREGEN, you must have allocated all required disk and/or tape drives which are not public devices.
- . If an output disk is already mounted, PREGEN will use the disk as is. If it is not mounted, PREGEN will provide the option of mounting the disk either with or without re-initializing it.
- . The following tasks may be required:
  - PIP (if using disk distribution media).
  - FLX (if using magtape distribution media).
  - UPD (if any necessary UTCs do not already exist).



- . If you are running on a system with only one free disk drive (other than the drive used for your system disk), and you are using disk distribution media, your system disk must have at least 5000 free blocks.
- . To obtain help for any question, type <ESC>. To exit or to temporarily stop PREGEN execution, type <CTRL/Z>.
- . The disk in *ddu*: must remain mounted throughout the entire PREGEN procedure.
- . For questions that can be answered YES or NO, the default is NO unless otherwise specified. For questions with defaults, the default is produced by pressing a carriage return <RET> in response to the question.

In the notes, *ddu*: refers to the disk drive from which you are running this procedure. If PIP, FLX, and UFD are not installed, PREGEN installs them and displays a message to indicate this.

>\* 02.00 Are you running on a small dual-disk system [Y/N]:

A small dual-disk system is one which has only two small disk drives, such as RL01s, RL02s, RK06s or RK07s.

If you are running on a small dual-disk system, answer this question YES.

If your system has two free disk drives (other than the drive used for your system disk), or if you are using magtape distribution media, answer this question NO.

If you are running on a dual-disk system which has a large system disk with at least 25000 free blocks, you may answer either NO or YES. If you answer NO, all network generation command files and object files will be placed on your system disk. If you answer YES, the network generation command files will be placed on some disk other than your system disk (the object files will remain on the distribution kits, which must be swapped with the NETGEN disk during the network generation).

If you answer NO and you are generating a DECnet-only system (a DECnet-RSX system without PSI), 20,000 free blocks is sufficient.

If you answer YES, approximately 5000 blocks of free space are required for temporary storage on your system disk. UIC [137,10] will be used for this purpose, and should not be used for user files. If you do not have 5000 free blocks, create a copy of your system disk and delete files such as maps, listings, command files, sources (other than RSXMC.MAC), and unnecessary task images.

If you answer YES and you are generating a DECnet-only system (a DECnet-RSX system without PSI), 3000 free blocks is sufficient.

In addition, if you answer YES, your distribution kit disks will contain the object files used during the task build phase of NETGEN, and must be loaded as appropriate objects are needed to build network tasks. For this reason, it is suggested that you back up the distribution kits prior to performing the generation.

#### NOTE

If you answer NO to Question 2.00, the dialog shown in Section 3.3.8 appears. If you answer YES to Question 2.00, the dialog shown in Section 3.3.9 appears.

### 3.3.8 Standard PREGEN

PREGEN displays Question 3.00 for all kits except NETKIT because NETKIT is always required.

>\* 03.00 Copy the *network* distribution kit? [Y/N]:

Answer this question YES if you have this distribution kit, and you will be generating a *network* network.

>\* 04.00 Where is the *network* distribution kit loaded? [S]:

Specify the disk or tape drive where the distribution kit is or will be loaded (e.g. DK1 or MMO).

>\* 04.01 Is the *disk (or tape)* already loaded in *ddu*:? [Y/N]:

Answer this question YES when the distribution kit is loaded and ready to be mounted. PREGEN will actually mount the *disk (or tape)*.

>\* 04.02 Is the tape 1600 BPI? [Y/N]:

Answer this question YES if the distribution tape is encoded with 1600 BPI (bits per inch). Answer NO if the tape is 800 BPI.

>\* 05.00 Where is the NETGEN disk loaded [S]:

The NETGEN disk, created by PREGEN, is the primary disk used during a network generation. It will contain all command files, from all distribution kits, which are necessary during the question/answer phase of the generation.

If there is enough room on this disk, the data files, object files, and task images which will be used during the task build phase of the generation may also be placed on this disk.

Specify the disk drive where the NETGEN disk is or will be loaded (e.g. DMO).

>\* 05.01 Is the disk already loaded in *ddu: (netgen-disk-drive)*? [Y/N]:

Answer this question YES when the NETGEN disk is loaded and ready to be mounted. PREGEN will actually mount the disk if it is not already mounted.

>\* 06.00 Should the NETGEN disk be initialized? [Y/N]:

Answer this question YES if the disk should be initialized. This will place an initial file system on the disk, and destroy any files that may have been on the disk previously. If the disk has already been properly initialized, answer NO.

If you answer YES, the disk will be given the label "NETGEN".

PREGEN displays Question 6.00 only if the NETGEN disk has not already been mounted. It displays the following statement if you answer YES to Question 6.00.

The disk will be initialized with the label "NETGEN".

>\* 06.01 What is the label used to mount the NETGEN disk [S]:

Specify the label PREGEN is to use when mounting the previously initialized NETGEN disk. This should be from 0 to 12 alphanumeric characters.

PREGEN displays Question 6.01 if you answer NO to Question 6.00. At this point, the command files are copied to the NETGEN disk.

>\* 07.00 Should the *network* object files be moved to the NETGEN disk?[Y/N]

The object files are those files which are used by NETGEN only during the build phase, when all of the generation questions have been answered, and the processes and tasks are going to be built.

If the object files are on the NETGEN disk, they are immediately available for use by NETGEN. If they are on a separate Object disk, NETGEN will have to wait until that disk is ready to be mounted before it can build the tasks for that product. For systems with a limited number of disk drives, this may also involve dismounting and unloading some other disk (such as the NETGEN disk).

If the NETGEN disk has enough free space, you may wish to move all of the object files to the NETGEN disk in order to minimize the time needed to perform a network generation. If so, answer this question YES. If there is not enough free space or if you are not sure, answer NO.

The number of free blocks on the NETGEN disk is:

*free-block-information*

PREGEN will display information such as the following.

DMO: has 24080. blocks free, 3046. blocks used out of 27126.  
Largest contiguous space = 11160. blocks  
1652. file headers are free, 16. headers used out of 1668.

During this time, PREGEN executes a PIP *ddu*:/FR command, where *ddu* is the NETGEN disk drive.

The approximate number of blocks needed for the *network* objects is:

*number*

If you answer Question 7.00 YES, PREGEN copies the files to the NETGEN disk and skips the remaining questions in this pass. If you answer NO, PREGEN displays the remaining questions.

For DECnet-only systems (RSX-DECnet without PSI), all initialized disks have sufficient capacity to hold all of the object files. For DECnet/PSI systems, all initialized disks have sufficient capacity (except RL01).

When performing an RL01 PREGEN for a DECnet/PSI system, it is recommended that you place the network object files on the NETGEN disk and place the DECnet and PSI object files on a separate disk.

>\* 08.00 Where is the *network* Object disk loaded? [S]:

This Object disk, created by PREGEN, will contain all object, data and task files which are necessary during the phase of the network generation which builds the *network* product.

This Object disk may be a separate disk, or it may be a disk which already holds other object files (or any other files).

Specify the disk drive where the Object disk is or will be loaded (e.g. DMO).

>\* 08.01 Is the disk already loaded in *ddu*?[Y/N]:

Answer this question YES when the Object disk is loaded and ready to be mounted. PREGEN will actually mount the disk if it is not already mounted.

In Question 8.01, *ddu*: refers to the Object disk drive specified in Question 8.00.

>\* 09.00 Should the Object disk be initialized? [Y/N]:

Answer this question YES if the disk should be initialized. This will place an initial file system on the disk, and destroy any files that may have been on the disk previously. If the disk has already been properly initialized, answer NO.

If you answer YES, the disk will be given the label "*netobj*".

PREGEN displays Question 9.00 only if the disk has not already been mounted. In successive passes, PREGEN replaces *netobj* with *decobj* and *psobj*.

PREGEN displays the following statement if you answer Question 9.00 YES.

The disk will be initialized with the label "*netobj*".

>\* 09.01 What is the label used to mount the Object disk? [S]:

Specify the label PREGEN is to use when mounting the previously initialized Object disk. This should be from 0 to 12 alphanumeric characters.

PREGEN display Question 9.01 if you answer Question 9.00 NO.

At this point, the object files are copied to the Object disk. This completes one pass of PREGEN. If all distribution kits are complete, PREGEN stops here and displays the following statement. If not, PREGEN returns to Question 3.00 and displays questions for the next distribution kit.

```
> ; =====  
> ; PREGEN - Stopped at time on date  
> ; =====
```

### 3.3.9 PREGEN for a Small Dual-Disk System

If you answer YES to Question 2.00, PREGEN displays the following dialog.

>\* 03.00 Copy the DECnet distribution kit? [Y/N]:

Answer this question YES if you have this distribution kit, and you will be generating a DECnet network.

>\* 04.00 Where is the *network* distribution kit loaded? [S]:

Specify the disk or tape drive where the distribution kit is or will be loaded (e.g. DK1 or MMO).

>\* 04.01 Is the disk already loaded in *ddu*? [Y/N]:

Answer this question YES when the distribution kit is loaded and ready to be mounted. PREGEN will actually mount the disk.

At this point, PREGEN copies the command files from the current distribution kit to the system disk, which serves as a temporary storage device. If the kit just copied was the network or the DECnet distribution kit, PREGEN returns to Question 3.00 to display the same questions for the next distribution kit. When all required kits are copied, PREGEN displays Question 5.00.

>\* 05.00 Where is the NETGEN disk loaded? [S]:

The NETGEN disk, created by PREGEN, is the primary disk used during a network generation. It will contain all command files, from all distribution kits, which are necessary during the question/answer phase of the generation.

Specify the disk drive where the NETGEN disk is or will be loaded (e.g. DMO).

>\* 05.01 Is the disk already loaded in *ddu*: (*netgen-disk-drive*)? [Y/N]:

Answer this question YES when the NETGEN disk is loaded and ready to be mounted. PREGEN will actually mount the disk if it is not already mounted.

>\* 06.00 Should the NETGEN disk be initialized? [Y/N]:

Answer this question YES if the disk should be initialized. This will place an initial file system on the disk, and destroy any files that may have been on the disk previously. If the disk has already been properly initialized, answer NO.

If you answer YES, the disk will be given the label "NETGEN".

PREGEN displays Question 6.00 only if the NETGEN disk has not already been mounted; it displays the following statement if you answer YES to Question 6.00.

The disk will be initialized with the label "NETGEN".

>\* 06.01 What is the label used to mount the NETGEN disk [S]:

Specify the label PREGEN is to use when mounting the previously initialized NETGEN disk. This should be from 0 to 12 alphanumeric characters.

PREGEN displays Question 6.01 if you answer NO to Question 6.00.

At this point, the command files stored on the system disk are copied to the NETGEN disk and then deleted from the system disk. This completes PREGEN.

```
>; =====
>; PREGEN - Stopped at time on date
>; =====
```

### 3.3.10 Sample Standard PREGEN

The following is a sample of a standard PREGEN. Not all of the COPY commands will be executed for all systems. Where no response is indicated to PREGEN questions, the default value has been selected by pressing **RET**.

```
>SET /UIC=[137,10]
> * PREGEN
>;
>; =====
>; PREGEN - RSX-11M/S/M-PLUS CEX System Pre-Generation Procedure
>; Started at time on date
>; =====

>;
>; Copyright (C) 1981, 1982, 1983, 1985, 1987 by
>; Digital Equipment Corporation, Maynard, Mass.
>;
> 01.00 Do you wish to see the PREGEN notes? [Y/N]:
> 02.00 Are you running on a small dual-disk system? [Y/N]:
> 04.00 Where is the Network distribution kit loaded? [S]: DL:
> 04.01 Is the disk already loaded in DL:? [Y/N]: Y
> 05.00 Where is the NETGEN disk loaded? [S]: DM1:
> 05.01 Is the disk already loaded in DM1:? [Y/N]: Y
> 06.00 Should the NETGEN disk be initialized? [Y/N]: Y
>;
>; The disk will be initialized with the label "NETGEN".
>;
>; Copying UIC "[137,10]".
>; Copying UIC "[1,2]".
```

>;  
> 07.00 Should the Network object files be moved to the NETGEN disk? [Y/N]: Y

Copy commands and UICs for all Network Object Files are listed in the following format:

Copying UIC "[uic]"

>;  
>;  
DMO -- TTD: dismounted from DLO: Final dismount initiated  
16:13:28 DLO: -- Dismount complete  
>;  
> 03.00 Copy the DECnet distribution kit? [Y/N]: Y  
> 04.00 Where is the DECnet distribution kit loaded? [S]: DL:  
> 04.01 Is the disk already loaded in DL:? [Y/N]: Y  
>;  
>; Copying UIC "[137,10]".  
>;  
> 07.00 Should the DECnet object files be moved to the NETGEN disk? [Y/N]: Y

Copy commands and UICs for all DECnet Object Files are listed in the following format:

Copying UIC "[uic]"

>;  
>;  
DMO -- TTD: dismounted from DLO: Final dismount initiated  
16:27:52 DLO: -- Dismount complete  
>;  
>;  
> 03.00 Copy the PSI distribution kit? [Y/N]: Y  
> 04.00 Where is the PSI distribution kit loaded? [S]: DL:  
> 04.01 Is the disk already loaded in DL:? [Y/N]: Y  
>;  
>; Copying UIC "[151,10]".  
>;  
> 07.00 Should the PSI object files be moved to the NETGEN disk? [Y/N]: Y

Copy commands and UICs for all PSI Object Files are listed in the following format:

Copying UIC "[uic]"

>;  
>;  
DMO -- TTD: dismounted from DLO: Final dismount initiated  
time DLO: -- Dismount complete  
>;  
>;



```

DMO -- TTO: dismounted from DM1: Final dismount initiated
time DM1: -- Dismount complete
>;
>;
>; =====
>; PREGEN - Stopped at time on date
>; =====
>;
>; <EOF>

```

### 3.3.11 Sample Small Dual-Disk PREGEN

The following is a sample of a small dual-disk PREGEN:

```

>SET /VIC=[137,10]
> PREGEN
>;
>; =====
>; PREGEN - RSX-11M/S/M-PLUS CEX System Pre-Generation Procedure
>; Started at time on date
>; =====
>;
>; Copyright (C) 1981, 1982, 1983, 1985, 1987 by
>; Digital Equipment Corporation, Maynard, Mass.
>;
> 01.00 Do you wish to see the PREGEN notes? [Y/N]:
> 02.00 Are you running on a small dual-disk system? [Y/N]: Y
> 04.00 Where is the Network distribution kit loaded? [S]: DLO
> 04.01 Is the disk already loaded in DLO:? [Y/N]: Y
>;
>; Copying VIC "[137,10]".
>;
DMO -- TT51: dismounted from DLO: Final dismount initiated
>;
> 03.00 Copy the DECnet distribution kit? [Y/N]: Y
> 04.00 Where is the DECnet distribution kit loaded? [S]: DLO
> 04.01 Is the disk already loaded in DLO:? [Y/N]: Y
>;
>; Copying VIC "[137,10]".
>;
DMO -- TT51: dismounted from DLO: Final dismount
initiated
>;
> 03.00 Copy the PSI distribution kit? [Y/N]:
> 05.00 Where is the NETGEN disk loaded? [S]: DLO
> 05.01 Is the disk already loaded in DLO:? [Y/N]: Y
> 06.00 Should the NETGEN disk be initialized? [Y/N]: Y
>;
>; The disk will be initialized with the label "NETGEN".
>;
DMO -- TT51: dismounted from DLO: Final dismount
initiated

```

```

>;
>; Copying Network files
>;
>; Copying UIC "[137,10]".
>;
>; Copying DECnet files
>;
>; Copying UIC "[137,10]".
>;
>;
DMO --TT51: dismounted from DLO: Final dismount initiated
>;
>; =====
>; PREGEN - Stopped at time or date
>; =====
>;
># <EOF>
>

```

---

## Using The RSX-11M/M-PLUS NETGEN Procedure

This chapter describes how to use the RSX-11M/M-PLUS NETGEN procedure.

### 4.1 NETGEN Parameter Defaults

During NETGEN, you can select default values for many component parameters. In most cases you should select these default values. Later, you can modify most parameter values using NCP or CFE commands. If, however, the parameter value you wish to change cannot be modified by the NETGEN process, by NCP or CFE commands, you must edit the parameter file ([137,10]DECPRM.CMD) **prior** to doing a NETGEN. This file is found on the NETGEN disk. It contains documentation describing the parameters included in the file and information about changing these parameters. Values changed by editing this file will be applied appropriately during the NETGEN procedure.

### 4.2 Starting NETGEN

In order to run NETGEN, you must have access privilege to the target disk and you must have your target disk mounted.

#### NOTE

NETGEN requires the large indirect command file processor. NETGEN will not function properly with the small indirect command file processor.

#### 4.2.1 Running NETGEN on an RSX-11M/M-PLUS System

On an RSX-11M/M-PLUS system, there are two ways to gain the required access privilege:

- Log in as a privileged user
- Allocate the target disk for your exclusive use

In performing a NETGEN, you may prefer to use a hardcopy terminal to generate a clear, permanent record.

To start NETGEN, make sure the NETGEN disk is mounted. To do this, enter the following if a PREGEN was performed.

```
> ALL dduu:  
> MOU dduu: NETGEN
```

If PREGEN was not required, enter:

```
> ALL dduu:  
> MOU dduu: DECKIT
```

NETGEN is performed by executing an indirect command file. Invoke NETGEN as follows:

```
> * dduu: [137,10]NETGEN
```

where *dduu* is the NETGEN disk you just mounted. All sections of the NETGEN procedure are then automatically invoked in turn.

#### 4.2.2 Running NETGEN on a VAX-11 RSX System

If you are doing a NETGEN on a VMS system with VAX-11 RSX Version 2.3 software, you should have access to the following required privileges:

- Change mode to kernel privilege (CMKRN). This allows you to change default UICs and directories. You must have this privilege before you can set the remaining privileges.
- Logical I/O Privilege (LOG\_IO). This privilege permits RSX-11M VMR to do logical I/O on task image files.
- System Protection Privilege (SYSPRV). This privilege allows you to create files in directories not owned by the current UIC.

If you have the SETPRV privilege, you can establish the required privileges with the following MCR command:

```
> SET PROC/PRIV={privilege[,...]}
```

To find out what privileges you have, use the following MCR command:

```
> SHO PROC/PRIV
```

For more information on using these privileges, see the *VAX/VMS System Manager's Guide*.

In addition, you must use MCR as your command language interpreter (CLI) for NETGEN. If MCR is not your command language interpreter, then you must change to MCR. To do this, log in using the /CLI = MCR qualifier. For example:

```
Username: SYSTEM/CLI=MCR
```

```
Password:
```

Finally, you must have your terminal set to the /NOLINE\_\_EDITING characteristic. To verify that your terminal is set properly, use the SHOW TERMINAL command. If the terminal has LINE\_\_EDITING enabled, change the characteristic using the command shown below:

```
SET TERMINAL/NOLINE_EDITING
```

If your terminal has LINE\_\_EDITING enabled, NETGEN will abort if you request an explanation for a question by pressing ESC.

In performing a NETGEN, you may prefer to use a hardcopy terminal to generate a clear permanent record.

To start NETGEN, make sure the NETGEN disk is mounted. To do this, enter the following if a PREGEN was performed.

```
> ALL dduu:  
> MOU dduu: NETGEN
```

If PREGEN was not required, enter:

```
> ALL dduu:  
> MOU dduu: DECKIT
```

NETGEN is performed by executing an indirect command file. Invoke NETGEN as follows:

```
> • dduu: [137,10]NETGEN
```

where *dduu*: is the NETGEN disk you just mounted. All sections of the NETGEN procedure are then automatically invoked in turn.

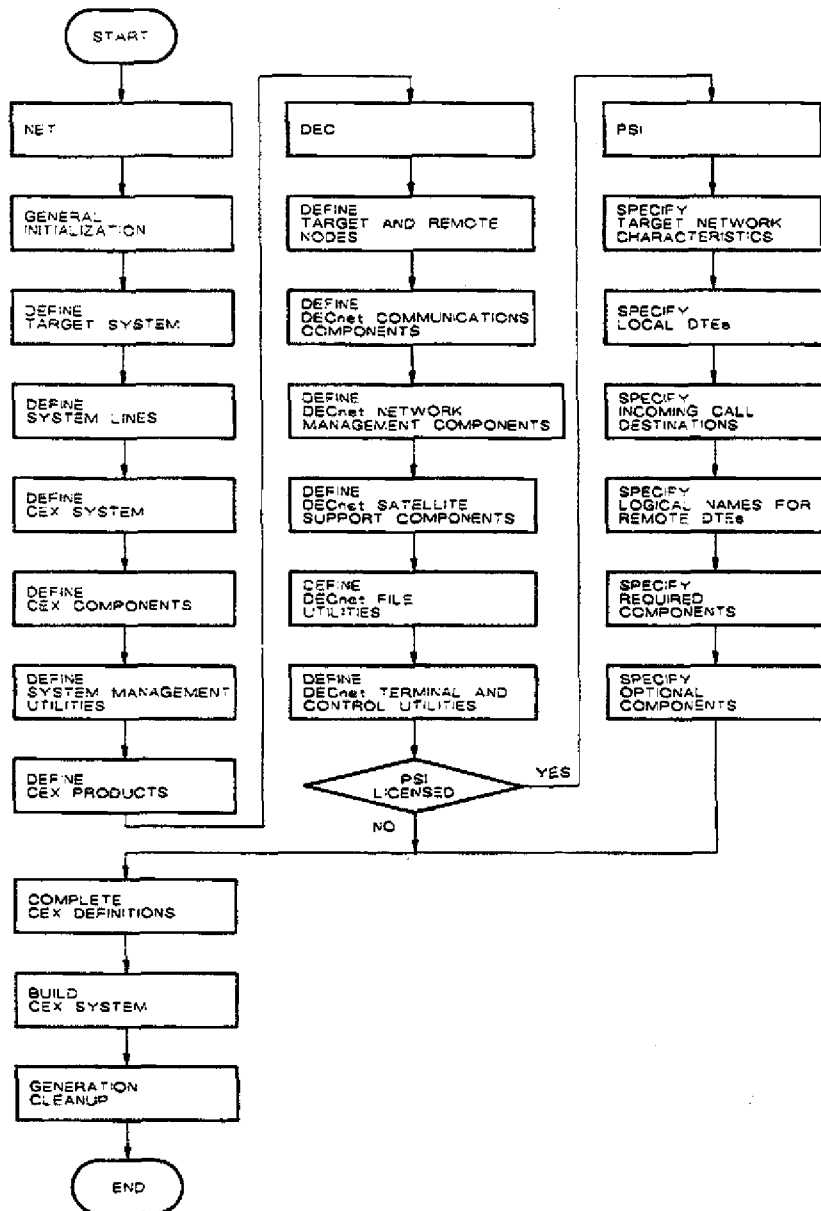
### 4.3 NETGEN Organization

NETGEN is organized into three main parts — NET, DEC, and PSI.

- NET displays questions relating to common components and the Communications Executive (CEX). NET contains the general routines that support both DECnet and PSI.
- DEC displays DECnet-specific questions. When combined with NET, NETGEN builds the routines that allow DECnet to run.
- PSI displays questions specific to the Packetnet System Interface (for licensed users). PSI allows you to access an X.25 Packet Switching Data Network (PSDN).

NET, DEC, and PSI are divided into sections with a logical grouping of related questions. Figure 4-1 illustrates the organization of the NETGEN process.

**Figure 4-1: Sections Within the NETGEN Process**



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## 4.4 NETGEN Operating Modes and Saved Response Files

NETGEN can be run in any of the following operating modes:

- Question and Answer Mode
- Dry Run Mode
- Restore Mode
- Component Mode

The mode you select remains in effect throughout the entire generation procedure, unless you select question and answer mode.

In all modes except component mode, as you answer the questions, NETGEN saves your responses in a saved response file. This file is described in Section 4.4.5.

### 4.4.1 Question and Answer Mode

NETGEN begins in question and answer mode. By answering the NETGEN questions, you define and build your system. In question and answer mode, you can invoke dry run mode, restore mode, or component mode; or you can stay in question and answer mode.

### 4.4.2 Dry Run Mode

Dry run mode is a special case of question and answer mode. A dry run allows you to answer all the NETGEN questions without defining or building your system; no processing is done to create a system that will run. Only the saved response file is created. This file can later be used to perform a restore mode generation. If you want to proceed through the NETGEN dialog without actually generating a network, invoke dry run mode.

### 4.4.3 Restore Mode

If you have performed a NETGEN in question and answer mode or dry run mode, your responses were saved in a saved response file. You can run NETGEN in restore mode to use these responses to perform a new network generation, correct inappropriate answers, or make minor changes. Restore mode builds or rebuilds all components. If the saved answer file does not contain a complete set of answers (due to a system crash or early exit), restore mode will use the available answers and then switch to question and answer mode for the remainder of the NETGEN.



#### **4.4.4 Component Mode**

After you have defined and built your system, you can add or modify specific components by invoking component mode. For example, if you did not include NTDEMO in your network generation, you can add it by running NETGEN in component mode. The questions displayed are restricted to those required for the particular component(s) you want to add or change. While restore mode rebuilds all components, component mode cannot build all components. For example, it cannot rebuild the Communications Executive or the device drivers. (See Appendix C.) No saved response file is created for component mode NETGENs.

#### **4.4.5 Saved Response Files**

For all modes except component mode, a saved response file is created for each part (NET, DEC, PSI) of NETGEN. NETGEN creates these various saved response files as you answer questions. At the beginning of your second generation, NETGEN will give you the option of using your saved responses from your first NETGEN.

At the beginning of your third or any succeeding NETGEN, you will be given the option of using saved responses from your two previous generations. You can use either set of saved response files as input files for your next generation, or you can answer all the questions again. If you use one of these files, the set you choose will be saved and the other set will be deleted. If you do not use either file, the newer version will be saved and the older version will be deleted and replaced with a file containing your current answers.

#### **CAUTION**

Do not attempt to edit the saved response files. They are coded in a form unique to NETGEN, and any attempt to change them directly can result in a defective network generation.

#### **4.4.6 Duplicating Network Generations**

You may want more than one network generation version, either exact versions or versions with slight differences between generations. The procedure for this type of generation differs from the usual restore mode generation.

In a restore mode generation, NETGEN overwrites any former generation and creates a new version. If you want to keep separate versions, the necessary procedure is as follows: keep the old generation intact at the old disk location, then create a new UIC on your target disk and move the saved response files from the old

UIC to the new UIC, and run the NETGEN procedure in restore mode. When restore mode asks for your UIC group code, respond with your new UIC. The files you want to copy are all the files in [xxx,1], where xxx is the group code of your old generation.

If there is not sufficient space on your target disk, create a new target disk, copy the saved answers from the old target disk to the new target disk, and run NETGEN in restore mode.

In either case, NETGEN performs a new network generation based on your former answers. As with any restore mode NETGEN, you can change your answers.

## 4.5 NETGEN Dialog Format

The NETGEN dialog format consists of sections with questions, optional explanatory text, formats for user responses, default values, and responses for end-of-section questions and break questions.

Each section is introduced with a header, as shown in the following example:

```
> ; =====  
> ; NET - Section 2 - Define the target system  
> ; =====
```

The header identifies a specific part of NETGEN (NET) and the section number within that part (Section 2) and then describes the purpose of the section (Define the target system).

### 4.5.1 Explanatory Text

During the NETGEN dialog, you can read expanded information for a question. You elicit this text on a question by question basis by pressing the ESCAPE key after the question is displayed. This causes the NETGEN command file to issue an explanation and then reissue the question. For example, if you press **ESC** in response to the question:

```
> 08.00 Is this generation to be a dry run? [D=N] [Y/N]:
```

NETGEN prints the following explanatory text and then repeats the question:

If you answer YES to this question, the system you specify will not actually be built. Your responses will be saved, however, and a real generation may be performed later, using these saved responses.

## NOTE

The explanatory text after the preceding question, and after the questions in the entire NETGEN dialog as presented in Chapters 5, 6, and 7, is a word-by-word representation of what you will see on your screen when you perform a NETGEN. It may not, however, be a line-by-line representation of what appears on your screen.

### 4.5.2 Response Formats

Your response to NETGEN questions will be one of three types:

- YES/NO [Y/N]
- Numeric [N]
- Character string [S]

NETGEN's default answer for a YES/NO question is NO unless otherwise stated.

## NOTE

If you respond to most NETGEN questions using default answers, you will generate a working system.

Numeric responses are octal or decimal. In the example [O R:1-377 D:5], O indicates the octal number, R indicates the range, and D indicates the default. In the example [D R:1.-16. D:1.], the first D indicates the decimal number, R indicates the range, and the second D indicates the default. You do not need to include a decimal point after the number you enter; it is assumed.

Character string responses can include letters, numbers, and special characters. In the example [*aduu*,D=DB01:][S], *dd* refers to two letters for the device, *uu* refers to two numbers for the unit; D refers to the default; and S refers to a string that can include letters, numbers and special characters. See Table 4-1 for a summary of NETGEN responses.

**Table 4-1: Summary of NETGEN Responses**

Response Type	NETGEN displays:	You enter:
YES/NO	[D = N] [Y/N]:	Y to indicate YES, N to indicate NO, or press <b>(RET)</b> for default NO.
Numeric Octal	[O R:m-n]:	An octal number in the range of <i>m</i> through <i>n</i> .
	[O R:m-n D:d]:	An octal number in the range of <i>m</i> through <i>n</i> or press <b>(RET)</b> to indicate that the default <i>d</i> should be used.
Numeric Decimal	[D R:m-n.]:	A decimal number in the range of <i>m</i> through <i>n</i> .
	[D R:m-n. D:d.]:	A decimal number in the range of <i>m</i> through <i>n</i> or press <b>(RET)</b> to indicate that the default <i>d</i> should be used. You do not need to include a decimal point after the number you enter.
Character String	[S]:	A character string of any length.
	[f, D:d][S]:	A character string in the form <i>f</i> (such as <i>ddu:</i> ), or press <b>(RET)</b> to indicate that the default <i>d</i> should be used.
	[S R:m-n.]:	A character string from <i>m</i> through <i>n</i> characters in length.

#### NOTE

Certain NETGEN questions may specify a string response in the range of 0-*n*. In such cases, the 0, specifying the low end of the range, represents the **(RET)** response that is used to accept a value previously specified in a saved response file.

#### 4.5.3 Responses for End-of-Section and Break Questions

Each NETGEN section ends with an end-of-section question, as shown in the following example:

```
>; <EOS> Do you want to:
>*      <RET>-Continue, S-Skip, R-Repeat Section, P-Pause,
        E-Exit
```

Respond by entering one of the following options:

- (RET)** to continue on to the next section. Responses are saved.
- S** to skip a section or sections. The skip option is provided in restore mode only. Use it when you have chosen to change your answers. Choosing Skip causes NETGEN to resume using your saved responses and prevents you from making any further changes to the remaining sections.
- R** to repeat the section you just completed. Responses are discarded and the entire section is repeated.
- P** to pause. This response temporarily suspends the indirect command file and gives you direct access to the operating system to perform a task. The system displays one of the following messages:
- AT.--PAUSING. TO CONTINUE, TYPE "RES *string*"
- or
- AT.--PAUSING. TO CONTINUE, TYPE "UNS *string*"
- After you have completed your task, you can continue processing by entering :
- RES *string*
- or
- UNS *string*
- Enter RES or UNS, depending upon which message is displayed, and enter the same *string* contained within that message. The end-of-section question is then repeated.
- E** to exit from NETGEN. Responses are saved, allowing you to terminate the generation, and later return to the dialog using restore mode. Entering **(CTRUZ)** in response to an EOS question is identical to entering E.

If you want to perform one of these functions in the middle of a section, enter **(CTRUZ)**. This interrupts normal processing and displays the following break question:

```
>; <BRK> Do you want to:  
>      <RET>-Continue; R-Repeat Section, P-Pause, E-Exit[S]:
```

If you enter E in response to a break question, your responses to the current section are lost, but responses to previous sections are saved. Entering **CTRL/Z** in response to a break question is identical to entering E.

## **4.6 Abnormal NETGEN Termination**

If the indirect command file processor, AT., encounters a disk error, NETGEN terminates abnormally with an error message (such as "AT. — File read error") or stops prematurely with an end-of-file (@<EOF>) on the command file. In this case, restart NETGEN from the beginning using a different disk drive.

---

## NETGEN Dialog: NET

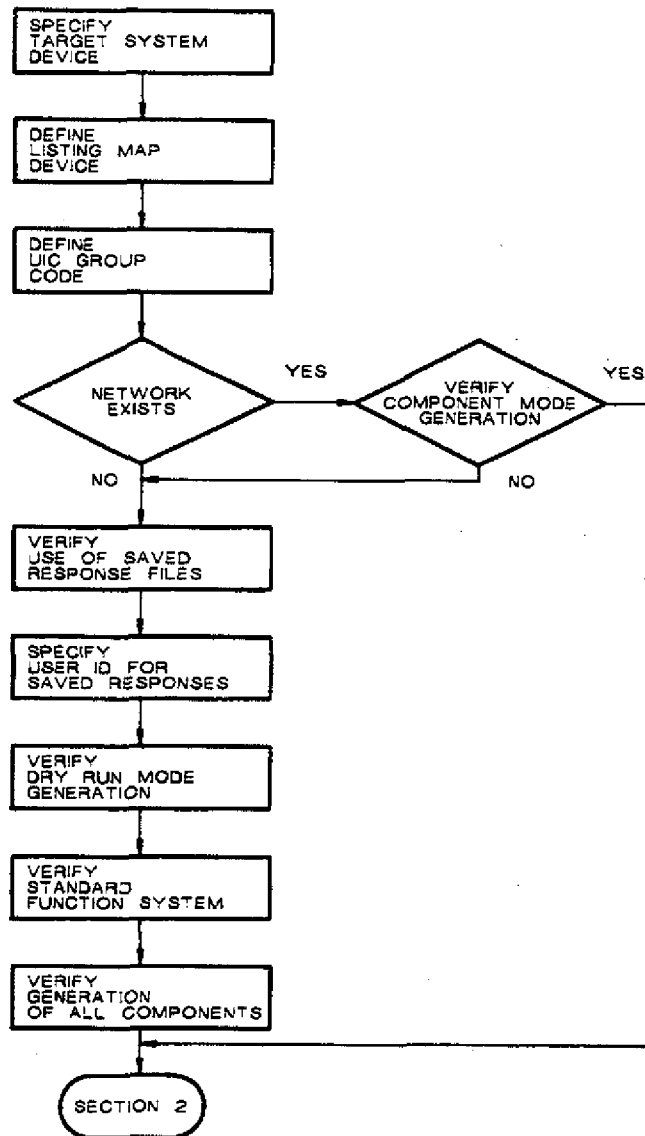
This chapter presents the questions you will be asked in the first part of NETGEN. The first part of the NETGEN dialog is NET. NET displays a series of questions concerning the Communications Executive (CEX) and other common components.

The following NET dialog represents the text NETGEN displays when performing an initial generation in question and answer mode. A component mode or a restore mode generation sometimes displays a slight variation in the wording of specific questions. For example, the defaults displayed sometimes vary from those displayed in this dialog. Your responses should always be guided by the question and text displayed on your terminal.

### 5.1 Initialization Questions

In any mode, the following initialization questions are displayed. Figure 5-1 illustrates the sequence of questions for general initialization.

Figure 5-1: NET - Section 1 - General Initialization



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```
>; =====
>; NET - RSX-11M/S/M-PLUS CEX System Generation Procedure
>;   Started at time on date
>; =====
```

```
>; Copyright (C) 1985, 1987 by
>; Digital Equipment Corporation, Maynard, Mass.
Generate a CEX System, version version-num, for your
RSX-11M/S/M-PLUS target system.
```

The following CEX Products may be generated

```
DECnet
PSI
```

The distribution kits must be up to the current patch level. If necessary, you should stop the generation and apply the necessary patches.

The logical device name LB: should already be assigned to the device which contains the library files for the system you are generating. These files are EXELIB.OLB, EXENC.MLB, RSXMAC.SML, SYSLIB.OLB, and, for RSX11S, 11SLIB.OLB.

The logical device names IN:, OU:, LS: and MP: should not be assigned to any devices before starting the generation. These logical device names are used by NETGEN to refer to various disks used during the generation.

```
>;<EOS> Do you want to:
>*   <RET>-Continue, E-Exit [S]:
<RET>- Continue with normal processing  E  - Terminate the generation
```

```
>; =====
>; NET - Section 1 - General Initialization
>; =====
```

The notes/cautions describe the prerequisite conditions for starting the NETGEN procedure.

01.00 Do you want to see the NETGEN notes/cautions? [D=N] [Y/N]:

NETGEN displays the following text if you answer Question 1.00 YES.

Note the following:

```
-----
```

. If you have not already performed a SYSGEN for your target system, you must do so before continuing.

- . The privileged tasks generated during NETGEN use configuration dependent parameters produced by SYSGEN. For RSX-11M/S/M-PLUS systems, the RSXMC.MAC file and the RSX11M.STB (or RSX11S.STB) file for the target system are necessary. If they are not already on the target device under the proper UIC, NETGEN will move them from the user's system device to the target device.
- . According to RSX system conventions, the default UIC for RSXMC.MAC is LB:[11,10]. The default UIC for RSX11M.STB is LB:[1,54]. The default directory for both files on a pregenerated RSX-11M-PLUS system is LB:[1,54] for a non-I/D space system, or LB:[2,54] for an I/D space system.
- . If your target device contains useful files, it is recommended that you back it up before continuing, as the device will be write enabled during the NETGEN sequence.
- . The proper system libraries for the target system must be on the logical device LB: under the UIC [1,1] while you are performing your NETGEN. These libraries are:  
EXELIB.OLB, EXEMC.MLB, RSXMAC.SML, and SYSLIB.OLB.

In addition, for an RSX-11S NETGEN, the 11SLIB.OLB file is required.

- . If your target system supports the Queue Manager (QMG), and you wish to generate network tasks which may use this facility, the Queue Manager object library must be on the logical device LB: under UIC [1,24] while you are performing your NETGEN. This file is:

QMG.OLB

- . If you wish to generate network tasks which require support for RMS file access, you must have the RMS files on your logical LB: device prior to performing your NETGEN. NETGEN will look for these files under the UIC determined by SYSGEN. The following are the files that NETGEN will look for:

RMSLIB.OLB, RMS11X.ODL and RMS12X.ODL.  
RMSRES.TSK and RMSRES.STB (if resident libraries are supported).

- . If your target system supports a memory resident or a supervisor mode FCS library, and you wish the network tasks to use this library, the FCS library files must be on the logical device LB: under UIC [1,1] while you are performing your NETGEN. These files are:

FCSRES.TSK and FCSRES.STB (memory resident FCS library files).

FCSFSL.TSK and FCSFSL.STB (supervisor Mode FCS  
library files).

- . The following installed tasks are required on your host system while you are performing your NETGEN:

PIP, LBR, MAC, and TKB for RSX-11M/S/M-PLUS NETGENs.

If these tasks are not already installed, and you are logged in as a privileged user, NETGEN will install them automatically. If TKB and MAC are installed, you may want to remove them and reinstall them with an increment of 3000. to 15000. bytes so the build section of NETGEN will run faster.

- . The following installed tasks are required on your host system while you are performing your NETGEN, under the following conditions:

LOA and UNL if device drivers require loading.  
MOU and DMO if disks require mounting.  
UFD if the required UICs do not already exist.

If these tasks are not already installed, and you are logged in as a privileged user, NETGEN will install them automatically.

- . NETGEN will not work with the small indirect command processor. If you have rebuilt the indirect command processor and specified the ODL for the small indirect command processor, you must install the indirect command processor that was provided as output from your SYSGEN.
- . If you are generating more than one network onto the same target disk, the network help file ([1,2]NETHLP.ULB) and the language libraries ([1,1]NETFOR.OLB and [1,1]NETLIB.MLB) will be replaced each time NETGEN is run. You may want to save these files before doing the next NETGEN. This is of particular interest if one of the networks is for RSX-11S and the other network is for RSX-11M or RSX-11M-PLUS.
- . For questions that can be answered YES or NO, the default is NO unless otherwise specified. For questions with defaults, the default is produced by pressing a carriage return (<RET>) in response to the question.
- . Additional explanatory text for each question may be obtained by hitting the <ESCAPE> key.

- . Unless otherwise specified, it is possible to interrupt a series of questions by typing <CTRL/Z>. You will then be given the options of either restarting the section from the top, temporarily stopping the generation, or terminating the generation.

02.00 Target system device [*dduu*, D=SY00:] [S]:

This device will contain all files required to run the network being generated. This includes all task files, databases, command files, and generation work files. This must be a Files-11 disk device. The trailing colon (e.g. SY:) is optional. The default device is SY:.

NETGEN displays Questions 2.01 and 2.02 only if the device has not been mounted. If you answer YES to Question 2.01, NETGEN will mount the device.

>\* 02.01 Is *dduu* ready? [D=N] [Y/N]:

Load the disk into drive *dduu*: and start the drive before answering YES to this question.

>\* 02.02 Volume label for *dduu*: [D=None] [S R:0.-12.]

A volume label is required for all mountable devices. This volume label was set when the volume was initialized.

The following error message and Question 2.03 appear only if the device could not be properly mounted.

An error occurred when the volume was mounted. Possibly the volume is not properly loaded, the volume label was incorrectly supplied, the volume was not initialized to Files-11, or the "MCU" task was not installed.

>\* 02.03 Do you wish to specify a different device? [D=N] [Y/N]:

If you answer YES, you will be asked for a different device name.

>\* 03.00 Listing/map device? [*dduu*, D=None] [S]:

This device will contain all list files and map files generated by the assembler and task builder. This must be either a Files-11 disk device, or the LP: or NL: devices. The trailing colon (e.g. SY:) is optional. If no maps and listings are desired at all, respond with a carriage return.

If you want maps and listings on a device other than a target device, use another available device. Approximately 3000 blocks are required for maps and listings, depending on the optional components you specify. If you specify a device in Question 3.00 that you have not yet defined to the system, you will be asked a series of questions similar to Questions 2.01 through 2.03.

>\* 04.00 UIC Group Code for NETGEN output? [0 R:1-377 D:5] [S]:

Specify the UIC Group Code under which all generated files will reside. Work files, source files, library and object files, listing files, map files, and task and database files will all appear under various user codes within this group (e.g. [5,\*]). Files which already exist under these UICs may be deleted or purged.

Note that the user must have privileges to create, write, read, and delete all files under the chosen UIC Group Code.

When you do your first NETGEN, you can choose any UIC. However, if you do another NETGEN and you want to make use of your previous answers, then you must specify the same UIC you specified in your first NETGEN. Similarly, specify the same UIC if you do a NETGEN in component mode.

NETGEN displays Question 5.00 only if you have previously performed a full NETGEN.

>\* 05.00 Do you want to perform a component mode generation? [D=N] [Y/N]:

If a CEX system has already been generated on [x,\*], you may wish to generate only components for that system. Components are those tasks and/or databases which do not change the previously defined network configuration. If you wish to generate only components, answer YES, and only component questions will be asked.

Once you specify component mode, NETGEN runs in component mode throughout; responses are not saved, and the NETINS.CMD file is not updated (see Chapter 9).

NETGEN displays the following text and Question 6.00 only if you have performed one previous NETGEN.

Saved responses were detected. These were compiled on *date* at *time* with a User ID of "*user-id*".

>\* 06.00 Do you wish to use these saved responses? [D=N] [Y/N]:

Answer this question YES if you wish to use the responses from *date* at *time*, User ID "*user-id*".

If you answer YES, these saved responses will be used to answer as many of the questions as possible, for the new system you are generating. If these saved responses are incomplete, NETGEN will use the responses it finds and prompt you for the remainder of the responses. If you answer NO, your previous responses will be ignored.

NETGEN displays the following text and Question 6.01 if you have previously performed two or more NETGENs.

Saved responses were detected. These were compiled on *date* at *time* with a User ID of "*user-id*".

An earlier set of saved responses was compiled on *date* at *time* with a User ID of "*user-id*".

>\* 06.01 Do you wish to use the later set of saved responses? [D=N] [Y/N]:

Answer this question YES if you wish to use the responses from *date* at *time*, User ID "*user-id*".

If you answer YES, these saved responses will be used to answer as many of the questions as possible, for the new system you are generating, and the earlier set of saved responses (from *date* at *time*, User ID "*user-id*") will be lost.

If these saved responses are incomplete, NETGEN will use the responses it finds and prompt you for the remainder of the responses.

If you answer NO, you will be asked about the earlier set of saved responses.

>\* 06.02 Do you wish to use the earlier set of saved responses? [D=N] [Y/N]:

Answer this question YES if you wish to use the responses from *date* at *time*, User ID "*user-id*".

If you answer YES, these saved responses will be used to answer as many of the questions as possible, for the new system you are generating, and the later set of saved responses (from *date* at *time*, User ID "*user-id*") will be lost.

If these saved responses are incomplete, NETGEN will use the responses it finds and prompt you for the remainder of the responses.

If you answer NO, these saved responses (from *date* at *time*, User ID "*user-id*") will be lost.

>\* 06.03 Do you want to display these saved responses? [D=N] [Y/N]:

If you answer YES to this question, when the saved responses are used, the data restored via these saved responses will be displayed on the terminal.

It is recommended that you answer Question 6.03 YES.

>\* 06.04 Do you want to change these saved responses? [D=N] [Y/N]:

If you answer YES to this question, when each section is finished, you will be given the option of repeating the section. If you choose to repeat the section, all questions will be asked again, and you answer the section anew. This allows you to change your previous responses.

When possible, previous responses are displayed as defaults, so that typing <RET> will cause the original response to be used again. Note that for some questions this is not possible. Responses to these questions must always be fully specified, each time. For example, all of the questions in NET Section 3 are of the type which must always be completely respecified.

If you answer NO to this question, your previous responses are used as they stand, and you are given no option for changing them.

>\* 06.05 Have you performed a SYSGEN since your last NETGEN? [D=N] [Y/N]:

Answer this question YES if you have performed a new SYSGEN since the NETGEN being restored was done. Answer NO if a new SYSGEN has not been done. This will determine whether or not new RSXMC.MAC and RSX11M.STB files are needed.

If you answer YES, several sections may be automatically repeated, in order to reset answers or values which were based on the old system files. If you answer NO, sections will be repeated only at your request.

**NETGEN does not display Question 7.00 in component mode.**

>\* 07.00 User ID for saving new responses? [D=None] [S R:0.-30.]:

The responses given during this generation will be saved for later reference or re-use. You should provide some ID (up to 30 characters) by which you will be able to tell, at some future time, whether or not these saved responses are usable.

Note that this string must not contain any single-quote (') or double-quote (") characters.

It is advisable that you do not use a default here. You do not need to code in the date and time; they are stored. Any characters, including spaces and punctuation marks, can be used, such as LARRY DAY: DRY RUN 2.

NETGEN does not display Questions 8.00, 9.00, or 10.00 in component mode.

>\* 08.00 Is this generation to be a dry run? [D=N] [Y/N]:

If you answer YES to this question, the system you specify will not actually be built. Your responses will be saved, however, and a real generation may be performed later, using these saved responses.

>\* 09.00 Do you want a standard function network? [D=N] [Y/N]:

Answering YES to this question will result in NETGEN asking a minimum number of questions. A full complement of components will be generated and most optional parameters will be filled in with predefined values. If a value has not been defined for a parameter, NETGEN will ask the required questions.

If you answer YES to Question 9.00, NETGEN does not display Question 10.00.

>\* 10.00 Should all components be generated? [D=N] [Y/N]:

If you answer YES to this question, your system will be generated with the full complement of components but you will still have to specify the values for all optional parameters. If you answer NO, you will be asked on an individual basis whether or not each component is to be generated.

#### NOTE

Certain components, such as the network management components NTL and NTINIT, are always generated regardless of your response to Question 10.00.

Question 11.00 is not displayed in dry run mode.

>\* 11.00 Should old files be deleted? [D=N] [Y/N]:

If this question is answered YES, all old files on the target, listing and map devices under the target UICs (except those files which will be needed during this generation) will be deleted.



This is recommended if the target UICs contain files from a previous generation, or if saved responses are being used to recover from a system crash.

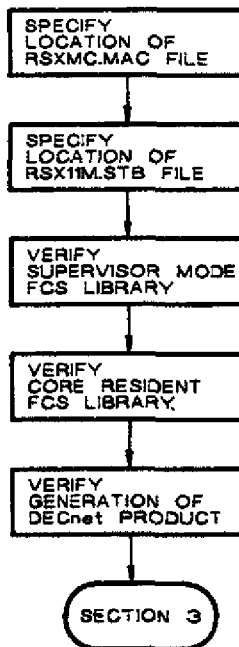
>,<EOS> Do you want to:

>\* <RET>-Continue, R-Repeat section, P-Pause, E-Exit

## 5.2 Defining the Target System

This section defines a number of characteristics for your target system. These characteristics define a DECnet-only system, a DECnet/PSI system, and operating system characteristics. Figure 5-2 illustrates the sequence of questions for defining the target system.

**Figure 5-2: NET – Section 2 – Define the Target System**



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>; NET - Section 2 - Define the Target System
>; =====
```

>\* 01.00 Use the RSXMC.MAC on *dduu:[uic]*? [D=N] [Y/N]:

RSXMC.MAC is the file which defines the features built into the target operating system. A copy of this file has been found on the Target Device/UIC. If this is a correct copy, answer the question YES.

NETGEN displays Question 1.00 if the RSXMC.MAC file is found on the target disk and under the network UIC.

NETGEN displays Question 2.00 if NETGEN cannot locate this file on the target disk and under the network UIC or if you answer NO to Question 1.00.

>\* 02.00 RSXMC.MAC location? (dduu:[g,m], D=*target-device*:*[uic]*)[S]:

RSXMC.MAC is the file which defines the features built into the target system. This file must be moved from its present location to *dduu:[uic]*. The present location must be specified as a device and UIC, in any of the following formats.

```
dduu:[ggg,mmm] Specify both device and UIC
dduu: Specify device, with UIC of default uic
[ggg,mmm] Specify UIC, on device target-device:
```

After you specify its location, NETGEN moves RSXMC.MAC to the correct location. This file is customarily stored on LB:[11,10]. If you do not know the location of the file, you may need to press CTRL-Z to get a break question and then pause to gain access to the operating system in order to search for it. Enter its location in one of the indicated formats.

## NOTE

If you specify a device in response to this question, and if the device you specify is unknown to NETGEN, NETGEN will ask a series of questions similar to Questions 2.01 and 2.02 in Section 1.

*dduu:[uic]*RSXMC.MAC is being scanned to define your target system. This may take up to several minutes.

The target is an RSX-11M-PLUS system with  
 A 20K-Executive  
 Kernel data space enabled  
 Extended memory support (more than 124K words of memory)  
 Multi-user protection

Extended instruction set (EIS)  
Powerfail recovery support  
Dynamic task checkpoint allocation  
PLAS support  
No Queue Manager (QMG) support

This list represents the information NETGEN obtained from the RSXMC.MAC file. Your system may display a different list.

NETGEN displays Question 3.00 if the RSX11M.STB file is found on the target disk and under the network UIC. For RSX-11S systems, NETGEN displays the file name, RSX11S.STB.

>\* 03.00 Use the RSX11M.STB on *dduu*:*[uic]* [D=N]? [Y/N]:

RSX11M.STB is the file which defines the global symbols for the target operating system. A copy of this file has been found on the target device/UIC. If this is a correct copy, answer the question YES.

NETGEN displays Question 4.00 only if NETGEN cannot locate this file on the target disk and under the network UIC. For RSX-11S systems, NETGEN displays the file name RSX11S.STB.

>\* 04.00 RSX11M.STB location (*dduu*:*[g,m]*, D=*dduu*:*[uic]*) [S]:

RSX11M.STB is the file which defines the global symbols for the target system. This file must be moved from its present location to *dduu*:*[uic]*. The present location must be specified as a device and UIC, in any of the following formats.

*dduu*:*[ggg,mmm]* Specify both device and UIC  
*dduu*: Specify device, with UIC of default UIC  
*[ggg,mmm]* Specify UIC, on device *dduu*:

After you specify its location, NETGEN moves RSX11M.STB to the correct location. This file is customarily stored on LB:[1,54] for RSX-11M/M-PLUS systems and on LB:[1,64] for RSX-11S systems. If you do not know the location of the file, you may need to press **CTRLZ** to get a break question, and then pause to gain access to the operating system in order to search for it. Enter its location in one of the indicated formats.

#### NOTE

If you specify a device in response to this question, and if the device you specify is unknown to NETGEN, NETGEN displays a series of questions similar to Questions 2.01 and 2.02 in Section 1.

NETGEN displays Question 5.00 only for RSX-11M-PLUS systems, if you specified the supervisor mode FCS library during SYSGEN.

>\* 05.00 Should tasks link to the supervisor mode FCS library? [D=N] [Y/N]:

If you have a supervisor mode FCS library and you would like the network tasks to link to it, answer this question YES.

Note that this library must be located as follows:

LB00:[1,1]FCSFSL.TSK

LB00:[1,1]FCSFSL.STB

Answering this question YES causes tasks that link to this library to be smaller.

NETGEN displays Question 6.00 only for RSX-11M/M-PLUS systems, if you specified the memory resident FCS library during SYSGEN.

>\* 06.00 Should tasks link to the memory resident FCS library? [D=N] [Y/N]:

If you have a memory resident FCS library and you would like the network tasks to link to it, answer this question YES.

Note that this library must be located as follows:

LB00:[1,1]FCSRES.TSK

LB00:[1,1]FCSRES.STB

Answering this question YES causes tasks that link to this library to be smaller.

The following statement appears in question and answer mode or restore mode for a DECnet-only system. It is not displayed in component mode.

The DECnet CEX Product will be generated.

Depending on the type of kit you purchased, NETGEN displays one of the following statements.

- Routing or nonrouting nodes can be generated from your distribution kit.
- Nonrouting nodes can be generated from your distribution kit.

NETGEN displays Question 7.00 in component mode only.

>\* 07.00 Generate CEX system components? [D=N] [Y/N]

If you want to include the indicated CEX Product in your network system, answer the question YES.

NETGEN displays Questions 7.01 and 7.02 in question and answer mode only if your NETGEN disk contains the software required to generate the combined DECnet/PSI product. NETGEN displays similar questions in component mode if you are modifying a DECnet-only system or a DECnet/PSI system.

>\* 07.01 Generate the DECnet product? [D=N] [Y/N]:

If you want to include the indicated CEX Product in your network system, answer the question YES.

To add or change specific PSI components of an existing DECnet/PSI system without supplying DECnet components, answer NO. To add or change specific DECnet components to an existing DECnet system, answer YES.

To include the DECnet components in your original DECnet/PSI generation, answer YES.

>\* 07.02 Generate the PSI product? [D=N] [Y/N]:

If you want to include the indicated CEX Product in your network system, answer the question YES.

>;<EOS> Do you want to:  
>\* <RET>-Continue, S-Skip, R-Repeat section, P-Pause,  
E-Exit

### 5.3 Defining the System Lines

To define your system lines, NETGEN asks you to specify a device driver module (DDM) process name. The DDM identifies a process that controls an I/O device. DECnet includes DDCMP devices, EPM (the Ethernet Protocol Manager) devices, and DLM (data link mapping) pseudodevices. PSI includes X.25 devices.

- DECnet DDMs support devices that allow DECnet users to communicate with other DECnet users using the DECnet DDCMP protocol.
- EPM DDMs support Ethernet devices that allow DECnet users to communicate with other DECnet users using the Ethernet protocol.
- DLM DDMs are pseudodevices that allow DECnet users to communicate with other DECnet users using X.25 circuits over a Packet Switching Data Network (PSDN). DLM circuits are referenced as if they were circuits on a multipoint tributary.
- PSI DDMs support devices that are connected to a PSDN.

DLM and PSI circuits are available only if you have purchased a license for the Packetnet System Interface.

In Questions 2.00 through 5.00, NETGEN displays the variable *dev*. Device names (*dev*) can have different forms. In each case, NETGEN will display the correct form for the specific communications device you specify in Question 1.00. For example, KDP-2-1.3 would be displayed on-line using the following format. This is the longest form a device name can take.

*dev-x-y.z*

where:

*dev* is the current device driver module.

*x* is the number of this controller.

*y* is the number of this line on the controller.

*z* is the number of this multipoint tributary on the current line.

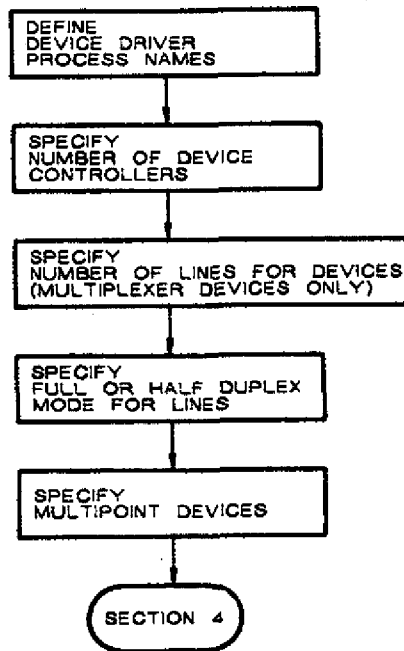
#### NOTE

Some devices, such as DMCs and DMRs, do not support multiple lines or tributaries. For example, DMC supports one line, which has the format, *dev-x*.

Figure 5-3 illustrates the sequence of questions for defining the system lines.

**Figure 5-3: NET - Section 3 - Define the System Lines**

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>; NET - Section 3 - Define the System Lines
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```

>\* 01.00 Device Driver Process name? [<RET>=Done] [S R:0-3]:

The Device Driver Module (DDM) Process name identifies a process which controls an I/O device. Enter a carriage return when there are no more devices to support.

The legal DECnet device driver process names for UNIBUS processors:

Name	Physical device	Name	Physical device
----	-----	----	-----
DMC	DMC11 or DMR11	DL	DL11
DMP	DMP11	DZ	DZ11
DU	DU11	DHU	DHU11
DUP	DUP11	KDZ	KMC11/DZ11
DV	DV11	PCL	PCL11
KDP	KMC11/DUP11		
UNA	DEUNA or DELUA		
DLM	PSI Data Link Mapping		

The legal DECnet device driver process names for Q-bus processors:

Name	Physical device	Name	Physical device
----	-----	----	-----
DMV	DMV11	DLV	DLV11
DPV	DPV11	DZV	DZV11 or DZQ11
DUV	DUV11	DHV	DHV11 or DHQ11
DLM	PSI Data Link Mapping		
QNA	DEQNA or DELQA		

Not all of these devices may be available to you. The following devices are available for DECnet/PSI systems other than those that use the Q-bus:

The legal PSI device driver process names are:

Name	Physical device
----	-----
SDP	DUP11
KMX	KMS11-BD/BE
KMY	KMS11-PX/PY



If you have a Q-bus (LSI) processor, NETGEN displays the following list for DECnet/PSI systems:

The legal PSI device driver process names are:

Name	Physical device
SDV	DPV11
KMV	KMV11-A

NETGEN displays Question 1.01 only if NETGEN does not recognize the device you entered.

>\* 01.01 Do you have a user written *dev* Device Driver? [D=N] [Y/N]:

NETGEN does not have a Device Driver (DDM) Process for the *dev*. If a user written Device Driver Process exists, NETGEN will create the necessary command files to build a device driver for your device.

If you answer YES to this question, NETGEN displays a series of questions (not shown in this manual) to help you specify the parameters for the particular device.

>\* 02.00 How many *dev* controllers are there? [D R:1.-16 D:1.]:

Enter the number of *dev* controllers that are installed on the target system. Do not include any of the controllers which were specified during the target system's SYSGEN, since devices cannot be shared between the CEX system and the operating system.

If you have 3 DUP controllers, enter 3. For data link mapping (DLM), considered to be a multipoint controller, you can specify more than one "controller" in this question. This allows you to group lines logically.

NETGEN displays Questions 2.01 through 2.06 if you specified more than one device controller in Question 2.00.

>\* 02.01 Are all *devs* installed at the same device priority? [D=N] [Y/N]:

All peripheral interfaces on PDP-11 processors are installed with a hardware device priority in the range of 4 to 6. This, together with its position on the UNIBUS (or Q-bus), determines its priority in arbitrating for control of the BUS.

Answer this question YES if all DEVs have been installed at the same device priority.

If you answer Question 2.01 YES, NETGEN displays Question 2.02.

>\* 02.02 What is the *dev* device priority? [0 R:4-6 D:5]:

Enter the hardware device priority level for all *devs* on the target system.

Note that if the hardware device priority is later changed, the network value can be changed with NCP, VNP, or CFE on a per line basis.

>\* 02.03 Will all the *dev* lines run at the same line speed? [D=N] [Y/N]:

If all of the *dev* lines will run at the same line speed, then answer this question YES. If you answer this question NO, you will be asked for the line speed on a per line basis.

If you answer Question 2.03 YES, NETGEN displays Question 2.04.

>\* 02.04 Line speed for *dev* [D R:min-max D:default]:

Specify the line speed in bits per second. If the line speed is greater than 56000 bps, enter 56000. If the line speed is externally determined, enter the speed at which the line is expected to operate.

Note that this value can be changed with CFE.

Legal line speeds for synchronous and asynchronous devices

50	110	150	600	1800	2400	4800	9600
75	134	300	1200	2000	3600	7200	

Additional legal line speeds for synchronous devices

19200	For all synchronous devices, except the DUP11
56000	For the DMC, DMP, and DMV devices only

Not all of these speeds are available for each device. Consult instructions for the specific device. See additional text under Question 4.01 for information about the importance of setting the correct line speed.

>\* 02.05 Will all *dev* lines run as FULL duplex lines [D=N] [Y/N]:

If all the *dev* lines are to run as FULL duplex, then answer this question YES. If you answer this question NO, you will be asked if all *dev* lines will run as HALF duplex. If you answer both of these questions NO, you will be able to choose on a per line basis whether the line is HALF or FULL duplex.

Note that the duplex mode can later be changed with NCP, VNP, or CFE.

If you answer Question 2.05 NO, NETGEN displays Question 2.06.

>\* 02.06 Will all *dev* lines run as HALF duplex lines [D=N] [Y/N]:

If all the *dev* lines are to run as HALF duplex, then answer this question YES. If you answer this question NO, you will be able to choose on a per line basis whether the line is HALF or FULL duplex.

Note that the duplex mode can later be changed with NCP, VNP, or CFE.

### NOTE

In the dialog that follows, if no specific reference is made to the ability to change a parameter using NCP, VNP, or CFE, that parameter will require a new NETGEN.

NETGEN displays Question 3.00 only for multiplexer devices.

>\* 03.00 Number of lines used on *dev*? [D R:1.-max-allowed. D:1.]:

Specify the number of lines to be used on the multiplexer device controller.

>\* 03.01 CSR address for *dev* [O R:160000-177777 D:default-csr]:

Specify the Control/Status Register (CSR) address for the controller. Use 177777 if the address is unknown.

Note that the CSR address can later be changed with NCP, VNP, or CFE.

The CSR address and the vector address are set up in the hardware when the device is first installed.

>\* 03.02 Vector address for *dev* [O R:0-774 D:default-vector-address]:

Specify the interrupt vector address for the controller. Use 0 if the address is not known.

Note that the vector address can later be changed with NCP, VNP, or CFE.

If you specify more than one device and these devices have been installed with different device priorities, NETGEN displays Question 3.03.

> 03.03 Device priority for *dev* [O R:4-6 D:5]:

Specify the hardware device priority for the controller.

Note that if the hardware device priority is later changed, the network value can be changed with NCP, VNP, or CFE.

>\* 04.00 Is *dev* a FULL or HALF duplex line [D=FULL] [S]:

Specify the duplex mode the line is to run in. This should either be FULL or HALF (these may be abbreviated to F or H).

Note that the duplex mode can later be changed with NCP, VNP, or CFE.

>\* 04.01 Line speed for *dev* [D R:min-max D:default]:

Specify the line speed in bits per second. If the line speed is greater than 56000 bps, enter 56000. If the line speed is externally determined, enter the speed at which the line is expected to operate.

Note that this value can be changed with CFE.

Legal line speeds for synchronous and asynchronous devices

50	110	150	600	1800	2400	4800	9600
75	134	300	1200	2000	3600	7200	

Additional legal line speeds for synchronous devices

19200	For all synchronous devices, except the DUP11
56000	For the DMC, DMP, and DMV devices only

Not all of these speeds are available for each device. Consult instructions for the specific device.

The speed of a synchronous device is determined by the speed of the modem. The speed of an asynchronous device is determined by switch settings on the line device. The specified line speed is used to calculate timing criteria for the line and buffer requirements. If the specified speed is incorrect, the timing will be incorrect and the large buffer allocation (see the *DECnet-RSX Network Management Concepts and Procedures* manual) may be incorrect. If the specified line speed is higher than the actual line speed, there can be CRC errors on the data in the large data buffer or large data buffer allocation failures. If the specified line speed is lower than the actual line speed, there is a long delay on line timeouts. Be sure to use CFE to change the line speed on synchronous lines if the modem speed is changed. NETGEN displays Question 4.02 only for DL11 or DLV11 devices. For Q-bus systems DL11-E will be replaced with DLV-11E.

>\* 04.02 Is *dev* a DL11-E or equivalent device? [D=N] [Y/N]:

Answer the question YES only if the device is a DL11-E or equivalent device. These devices allow the Clear To Send signal to pass through the interface.

NETGEN must establish special handling for the Clear-to-Send signal for devices that do have this signal available. You should answer NO if the device is any of the following:

DL-11A,B,C,D  
DL-11WA,WB  
DLV-11FJ

NETGEN displays Question 4.03 for each secondary device controlled by a primary device. For example, the primary device might be a KDP that controls a number of secondary DUP devices.

>\* 04.03 Unit CSR address for *dev* [0 R:160000-177777 D:*default-addr*]:

Specify the Control/Status Register (CSR) address for the device which the *dev* is controlling. Use 177777 if the address is unknown.

Note that the unit CSR address can later be changed with NCP, VNP, or CFE.

If you specify a device that requires a modem control device, such as KMX, NETGEN displays Question 4.04.

>\* 04.04 Modem control CSR address for *dev* [0 R:160000-177777 D:*def*]:

Specify the Control/Status Register (CSR) address for the modem control unit associated with the DEV. Use 177777 if the address is unknown.

Note that the modem control CSR address can later be changed with NCP, VNP, or CFE.

NETGEN displays Questions 4.05 and 4.06 only for asynchronous devices that support a modem.

>\* 04.05 Is modem signal monitoring required for *dev*? [D=N] [Y/N]:

If the line is connected to a modem for a dial-up switched circuit service, you should select modem monitoring. Modem signal monitoring checks the Carrier Detect signal (CD or CAR) for asynchronous lines.

If this signal is missing for two consecutive samples, taken at one second intervals, the line will be declared "down" without waiting for a DECnet protocol to detect the failure.

If your modem supports this signal, and you want modem monitoring, answer this question YES.

Answer YES if you have PSI and are using either SDV or SDP DDMs.

>\* 04.06 Does the modem switch carrier with Request to Send? [D=N] [Y/N]:

It is necessary to distinguish asynchronous line modems which present continuous carrier once the connection is established, such as the BELL 103 or BELL 212, from those which switch carrier along with Request to Send, such as the BELL 202.

Answer the question YES if you are using a BELL 202 modem or the equivalent.

If the device is a DL11-E or DLV-11E and the modem (a Bell 202 or equivalent) switches carrier with Request-to-Send (RTS), you should answer NO to question 4.05. Answering YES would require the monitoring of data set ready (DSR), a signal that is not present on DL or DLV devices. If the modem does not switch carrier with RTS (such as Bell 103, Bell 113, or Bell 212 modems), answer YES to Question 4.05 and NO to Question 4.06, since carrier (CAR) will be monitored (a signal that is present on the DL and DLV devices). If you answer both Question 4.05 and 4.06 YES for DL or DLV devices, NETGEN automatically resets both answers to NO.

NETGEN displays Question 4.07 for every line/circuit having enough information available (for example, CSR and vector) to enable the line/circuit.

>\* 04.07 Set the state for *dev* ON when loading the network? [D=N] [Y/N]

If you answer this question YES, the DEV device driver (DDM) and all necessary databases will automatically be loaded into memory and the state set to ON at network initialization time.

If you want the state on during normal network operation, answering this YES will save the NCP or VNP command required to set the state. If *dev* is only to be used occasionally, answer NO.

Note that the state can later be changed with CFE so that it will be either ON or OFF at network initialization time.

Answer this question YES if you want your lines/circuits enabled at network initialization time.

If you specify devices that support multipoint capabilities, NETGEN displays Question 5.00.

>\* 05.00 Is *dev* multipoint? [D=N] [Y/N]:

Answer this question YES only if the line is a master or slave port on a multipoint line.

>\* 05.01 Is *dev* the multipoint master? [D=N] [Y/N]:

Answer this question YES if this line is the master, and NO if it is a slave. The multipoint master is the station that controls the line by polling the slave ports for activity.

NETGEN displays Question 5.02 if the device is a multipoint master.

>\* 05.02 How many tributaries should *dev* poll? [D R:1.-32. D:8.]:

Specify the number of tributaries to be connected to the multipoint line. This is the number of tributaries which will be polled by the master.

Each multipoint tributary on a line should be identified by a unique tributary address. The addresses used for the tributaries on this line will be 1 through "number of tributaries" specified.

Note that the tributary address can later be changed with NCP, VNP, or CFE.

NETGEN displays Question 5.03 if the device is a multipoint tributary.

>\* 05.03 What is the tributary address of *dev* [D R:1.-255. D:*def*]:

Specify the tributary address which is to identify this multipoint slave to the multipoint master. Each multipoint slave should be identified by a unique tributary address.

Note that the tributary address can later be changed with NCP, VNP, or CFE.

Questions 5.04, 5.05, and 5.06 are displayed only if you specified a PCL device in Question 1.00.

>\* 05.04 How many PCLs will communicate on the bus? [D R:1.-16. D:8.]:

The PCL11B provides full duplex communication between a number of systems on a parallel Time Division Multiplexed (TDM) bus.

If this system is to be a full DECnet routing node, specify the maximum number of PCLs which will communicate over this bus (no more than 16). Include this PCL (PCL-x.z) in this number.

If this system is to be a DECnet non-routing node, this number must be "1".

>\* 05.05 What is the TDM bus address for the local PCL?  
[D R:1.-31. D:def]:

Specify the address used by other PCLs to communicate with the local PCL. This is its address on the Time Division Multiplexed (TDM) bus. This address must be the same address that was set in the PCL hardware during installation.

PCL-x.z is always used to address the local PCL receiver. It can be used to provide a built-in loopback capability.

Note that the TDM bus address can later be changed with NCP, VNP, or CFE.

>\* 05.06 What is the TDM bus address for PCL-x.z [D R:1.-31. D:def]:

Specify the address used by the local PCL to communicate with the PCL on the other system. This is the PCL's address on the Time Division Multiplexed (TDM) bus. This address must be the same address that was set in the PCL's hardware during installation.

Note that the TDM bus address can later be changed with NCP, VNP, or CFE.

Based on the value you specified in Question 5.04, Question 5.06 will be repeated appropriately. NETGEN displays Questions 5.07 through 5.12 for DECnet/PSI systems, if you specified DLM in Question 1.00.

>\* 05.07 How many tributaries should DLM-x.y support?  
[D R:1.-32. D:1.]:

The DLM allows your DECnet system to access remote DECnet systems using a PSI circuit as the communications channel. It is implemented as a multipoint line, where each tributary connects through a distinct PSI circuit.

For the number of tributaries, specify the number of DECnet systems to which this system will connect using PSI circuits. For each DLM controller, you may specify up to 32 tributaries. As it will require a new NETGEN to change the number you specify you may wish to define extra tributaries to use for future expansion.



You need one tributary for each switched or permanent circuit. If you specified more than one DLM controller in Question 2.00, NETGEN displays this question for each controller, thus affecting the total number of tributaries you specify.

>\* 05.08 Does DLM-x define only Switched Virtual Circuits (SVC) [D=N]? [Y/N]:

A Switched Virtual Circuit (SVC) is an X.25 circuit which allows this node to dynamically define the circuit destination to the Packet Switching Data Network (PSDN). A Permanent Virtual Circuit (PVC) is a circuit that has the destination permanently defined upon subscribing to the PSDN.

Answer this question YES if you have subscribed to only SVC's. If you answer this question NO, you will be asked on a per circuit basis whether it defines an SVC.

Each X.25 circuit must be either an SVC or a PVC.

If you answer Question 5.08 NO, you will be asked 5.09.

>\* 05.09 Does DLM-x.y define a Switched Virtual Circuit (SVC) [D=N]? [Y/N]:

A Switched Virtual Circuit (SVC) is an X.25 circuit which allows this node to dynamically define the circuit destination to the Packet Switching Data Network (PSDN). An answer of NO will indicate that the circuit is to be a Permanent Virtual Circuit (PVC), and that the destination was permanently defined upon subscribing to the PSDN.

NETGEN displays Questions 5.10 through 5.12 only if you specified a Switched Virtual Circuit in Question 5.09 or 5.08.

An answer of YES indicates that this circuit will accept only incoming calls. An answer of NO indicates that this circuit will be used only to place outgoing calls.

Note that this attribute can later be changed with CFE.

All SVC circuits in X.25 must be classified as incoming only or outgoing only to establish who places the call. Once established, circuits are full duplex.

NETGEN displays Question 5.11 only if you defined this circuit as an outgoing circuit in Question 5.10.

>\* 05.11 DTE Address which DLM-x.y calls? [D=none]  
[S R:0.-16.]:

Specify the full address of the remote DTE to be called over this circuit. The full address consists of from 1 to 16 hexadecimal digits, and is comprised of the address which the Packet Switching Data Network (PSDN) assigned to the

remote DTE when it subscribed to the PSDN, followed by the subaddress as defined by the remote DTE system manager. The two are concatenated to form one string of characters. The number of characters for each field will vary depending upon the PSDN and the requirements of the remote DECnet node.

This SVC has been set up to use the default packet size and default window size that was set up upon subscribing to the PSDN. This packet size is independent of the segment size used by the DECnet Routing process. If a packet size or window size negotiation facility is available for this PSDN and if you have subscribed to it, you may make use of the negotiation facility by changing the default values with CFE.

Note that the DTE address can later be changed with CFE.

>\* 05.12 Address of the DTE that may call DLM-x.y [S]:

Specify the address of the remote DTE that this circuit will accept calls from. If a zero is specified, this circuit will accept calls from any remote DTE. An incoming call must still have a valid destination subaddress. The remote DTE address consists of from 1 to 16 hexadecimal digits, and is the address which the Packet Switching Data Network (PSDN) assigned to the remote DTE when it subscribed to the PSDN. The number of digits in the DTE address will vary depending on the PSDN.

This SVC has been set up to use the default packet size and default window size that was set up upon subscribing to the PSDN. This packet size is independent of the segment size used by the DECnet Routing process. If a packet size or window size negotiation facility is available for this PSDN and if you have subscribed to it, you may make use of the negotiation facility by changing the default values with CFE.

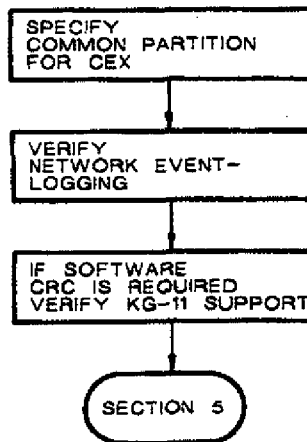
Note that the DTE address can later be changed with CFE.

>; <EOS> Do you want to:  
>\* <RET>-Continue, S-Skip, R-Repeat section, P-Pause,  
E-Exit [S]:

## 5.4 Defining the CEX System

This section defines the Communications Executive (CEX) and related components. Figure 5-4 illustrates the sequence of questions for defining the CEX system on RSX-11M and RSX-11S systems. For RSX-11M-PLUS systems, this section does not ask any questions; it just creates the build files for the device driver modules (DDMs).

Figure 5-4: NET - Section 4 - Define the CEX System



TWO172

```
> =====  
> NET - Section 4 - Define the CEX System  
> =====
```

Creating build files for CEX, the Communications Executive.

NETGEN displays Questions 1.00 and 1.01 for RSX-11M and RSX-11S systems only.

CEX is built for all systems, except in component mode. CEXPAR is the name of the system partition for CEX. This partition is created by using VMRC commands after SYSGEN but before you load the system. For more information see Section 3.2.5.11.

>\* 01.00 Base address for partition CEXPAR [0 R:14000-*range-top* D:*default*]:

Specify the base address for the CEX partition. This partition must reside entirely within the target system's RSX Executive address space (i.e. below 120000).

Specifying *range-top* provides the minimum amount of space for the CEX that supports the options that you have selected. Specifying *default* provides enough space for the CEX which will be generated for your system plus additional space to be used by CEX as a buffer pool.

The space that is left over after CEX is loaded into the partition is not wasted. This space will be used by CEX as a buffer pool. If CEX needs more buffer pool space than can be accommodated by the CEX partition, it will dynamically allocate space out of DSR.

Depending on the number of lines selected and the types of devices required for your system, the *range-top* displayed varies. This value will always reflect the base address required for the minimum partition size for your system.

The *default* displayed varies with the type of system. All systems are considered large unless they are DECnet only and have only one line, in which case they are considered small. The *default* values are:

Executive	CEX Size	Values
16K	Small	73500
16K	Large	73000
20K	Small	113500
20K	Large	113000

If you selected the *range-top* in Question 1.00, you will have just enough space for the smallest CEX that is legal for your system, and NETGEN will not display Question 1.01.

>\* 01.01 Length of partition CEXPAR [0 R:4300-*max-length* D:*default*]:

Specify the length of the CEX partition. Specify *max-length* if the CEX partition extends out to the end of the RSX Executive's address space. This is generally advisable, since any extra space at the end of the partition will be used by CEX as a buffer pool, and will not be wasted.

NETGEN displays the following question only if you answered NO to Questions 9.00 and 10.00 (standard function system option and all components option) in NET Section 1.

>\* 02.00 Do you want network event logging? [D=N] [Y/N]

Answer the question YES if events detected by the network software are to be logged. These events will be logged on the console terminal unless logging is changed using NCP, VNP, or CFE.

It is recommended that you answer this question YES in order to facilitate network fault detection/correction and network management.

The following statement and Question 3.00 are displayed in question and answer mode or restore mode, if you specified devices that require software DD CMP.

Creating build files for STCRC, the CRC-16 calculation routine.

>\* 03.00 Does the target system have a KG-11? [D=N] [Y/N]

Answer the question YES only if the target system has the KG-11 communications arithmetic option. The KG-11 option computes the cyclic redundancy check characters which are used by some CEX products for error detection in serially transmitted and received data. If you answer NO, a software algorithm will be used.

Cyclic redundancy check (CRC-16) characters are used to verify the correctness of information transmitted across the network.

Creating build files for CETAB, the CEX configuration tables.

#### NOTE

If you are performing a NETGEN for an 11/44 or 11/70 processor, you may not want to use the KG-11. On these processors, selecting the KG-11 will actually reduce your throughput below that of the software CRC routine. To use the software CRC routine, answer NO to Question 3.00.

The actual CETAB.MAC file is created in Section 8. The build files created here are used to assemble and build the CETAB.MAC file.

Creating build files for the DDMS, the device driver modules.

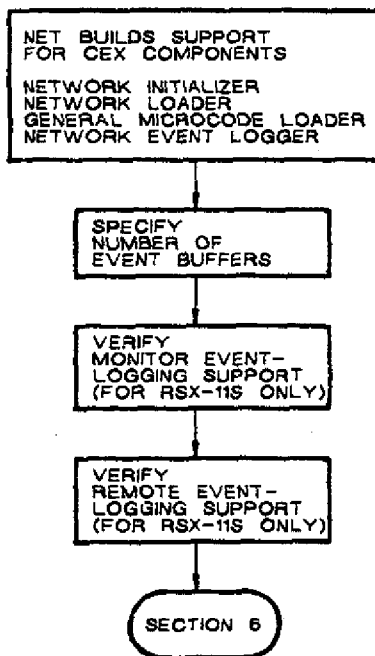
The device driver modules were defined in NET Section 3.

> ; <EOS> Do you want to:  
> \* <RET>-Continue, S-Skip, R-Repeat section, P-Pause,  
E-Exit [S]:

## 5.5 Defining the Communications Executive Support Components

This section defines the support components — NTINIT, NTL, MLD, and EVL/EVC. Figure 5-5 illustrates the sequence of questions for defining the Communications Executive support components.

**Figure 5-5: NET – Section 5 – Define the Comm Exec Support Components**



TW0173

```
>; =====  
>; NET - Section 5 - Define the Comm Exec Support Components  
>; =====
```

>\* 01.00 Do you want any of the Support Components? [D=N] [Y/N]:

The Communications Executive Support Components are:

- NTINIT - The network initializer.
- NTL - The network loader.
- MLD - The general microcode loader.
- EVL/EVC - The event logger and collector.

If you answer YES to this question, you will be asked about each component individually. In general, you should only answer YES when there is a clear reason to build or rebuild one or more of these components.

NETGEN displays Question 1.00 only in component mode. If you answer NO, you immediately jump to the end-of-section (EOS) question.

You should answer YES only when there is a definite reason to build or rebuild one of the components (for example, to add components not originally selected or to build a patched version of a component).

The following statement is displayed in question and answer mode.

Creating build files for NTINIT, the network initializer.

Question 2.00 is displayed in component mode.

>\* 02.00 Do you want NTINIT? [D=N] [Y/N]:

NTINIT is the network initialization task. It is responsible for performing all initialization which is required before the network is started.

If you wish to rebuild NTINIT, answer this question YES, otherwise answer NO.

In question and answer mode or restore mode, NTINIT is always built. In component mode, rebuilding NTINIT is optional. The following statement is displayed in question and answer mode.

Creating build files for NTL, the network loader.

Question 3.00 is displayed in component mode.

>\* 03.00 Do you want NTL? [D=N] [Y/N]:

NTL is the network loader task. It is responsible for loading and unloading the Comm Exec and all of the processes.

If you wish to rebuild NTL, answer this question YES, otherwise answer NO.

In question and answer mode or restore mode, NTL is built for RSX-11M/M-PLUS systems. In component mode, rebuilding NTL is optional. NTL is never built for an RSX-11S system.

The following statement is displayed in question and answer mode.

Creating build files for MLD, the general microcode loader.

NETGEN always displays Question 4.00 in component mode because it does not know if you have a device requiring MLD.

>\* 04.00 Do you want MLD? [D=N] [Y/N]:

MLD is the general microcode loader. It is responsible for loading UNA, KMC, KMS, and KMW devices with the proper microcode.

If your target system has these devices in its configuration, and you wish to generate a new version of the general microcode loader, then answer this question YES.

If your target system has none of these devices in its configuration, answer this question NO.

If you specified a device requiring microcode to be loaded, NETGEN displays Question 4.00.

The following statement is displayed in question and answer mode and restore mode if you specified event logging in Section 4, Question 2.00 or if the target system is RSX-11M-PLUS.

Creating build files for EVL/EVC, the event logger and collector.

Question 5.00 is displayed in component mode.

>\* 05.00 Do you want EVL/EVC? [D=N] [Y/N]:

EVL is the event logging process. It is responsible for detecting those events which are to be logged, and recording them.



EVC is the event collecting task. It is responsible for collecting the events logged by EVL, and for sending them to the appropriate sinks.

If your target system was generated with event logging, and you wish to generate new versions of EVL and EVC, then answer this question YES.

If your target system was not generated with event logging, answer this question NO.

In question and answer mode or restore mode, EVL and EVC are always built if you specified event logging in Section 4, Question 2.00 or if the target system is RSX-11M-PLUS. For RSX-11M/S systems, you cannot add or rebuild EVL and EVC in component mode if you did not specify event logging in the original NETGEN.

>\* 05.01 How many Event Buffers should EVL use? [D R:4.50. D:6.]:

The Event Logger Process (EVL) must be built with some number of internal event buffers which will be used to hold events detected by the Network. If events occur often enough so that there are sometimes more concurrent events than there are event buffers, some of the event information will be lost.

EVL may be rebuilt at a later time with more event buffers by performing a Component Generation.

Questions 5.02 and 5.03 are asked only when the generation is being performed for an RSX-11S system and EVL/EVC support has been chosen by answering YES to Question 6.00 (in component mode) or requesting event logging in Section 4, Question 2.00 (in question and answer mode). For RSX-11M/M-PLUS systems, monitor and remote event logging are always included if you chose EVL/EVC support.

>\* 05.02 Should EVC support monitor event logging? [D=N] [Y/N]:

If you answer this question YES, EVC will support the ability to send event records to a user written task.

If you answer NO, events will not be logged to a user task.

This support may be changed at a later time by performing a Component Generation.

>\* 05.03 Should EVC support remote event logging? [D=N] [Y/N]:

If you answer this question YES, EVC will support the ability to send event records to an Event Receiver task on a remote node.

If you answer NO, events will not be logged to remote nodes.

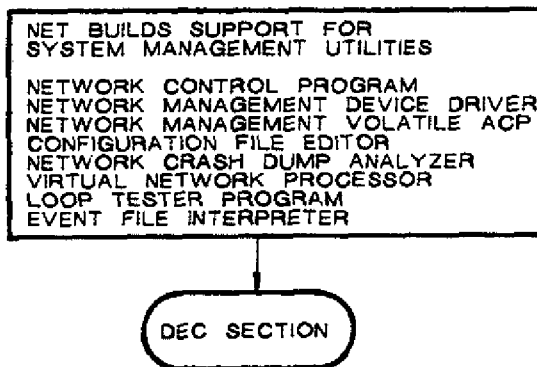
This support may be changed at a later time by performing a Component Generation.

```
>: <EOS> Do you want to:
>*      <RET>-Continue, S-Skip, R-Repeat section, P-Pause,
      E-Exit [S]:
```

## 5.6 Defining the System Management Utilities

This section defines the system management utilities — NCP, NMDRV, NMVACP, CFE, NDA, VNP, LOO, and EVF. Figure 5-6 illustrates the sequence of questions for defining the system management utilities.

**Figure 5-6: NET – Section 6 – Define the System Management Utilities**



TWO174

```
>; =====  
>; NET - Section 6 - Define the System Management Utilities  
>; =====
```

>\* 01.00 Do you want any of the System Management Utilities? [D=N] [Y/N]:

The System Management Utilities are:

NCP	- The network control program.
NMDRV	- The network management driver.
NMVACP	- The network management ACP.
CFE	- The configuration file editor.
NDA	- The network dump analyzer.
VNP	- The virtual network control program.
LOO	- The loop test sender task.

If you answer YES to this question, you will be asked about each component individually. In general, you should only answer YES when there is a clear reason to build or rebuild one or more of these components.

NETGEN displays Question 1.00 only in component mode. If you answer NO, you immediately jump to the end-of-section (EOS) question.

The following statement is displayed in question and answer mode.

Creating build files for NCP, the network control program.

Question 2.00 is displayed in component mode.

>\* 02.00 Do you want NCP? [D=N] [Y/N]:

NCP is the network control program. It allows the system manager to perform all on-line network management functions.

If you wish to rebuild NCP, answer this question YES, otherwise answer NO.

In question and answer mode or restore mode, NCP is required for RSX-11M/M-PLUS systems. For RSX-11S systems, it is optional.

In component mode, rebuilding NCP is optional. The following statement is displayed in question and answer mode.

Creating build files for NMVACP and NMDRV, the Network Management Volatile ACP and driver.

Question 3.00 is displayed in component mode.

>\* 03.00 Do you want NMVACP and NMDRV? [D=N] [Y/N]:

NMVACP and NMDRV are the Network Management Volatile ACP and its associated driver. They are responsible for performing many of the operations required by the various NCP commands.

If you wish to generate a new version of NMVACP and NMDRV, answer the question YES.

In question and answer mode or restore mode, NMVACP and NMDRV are required for RSX-11M/M-PLUS systems. In component mode, NMVACP and NMDRV are optional.

For RSX-11S systems, NMDRV is built only if you have specified event logging; NMVACP is never built.

The following statement is displayed in question and answer mode.

Creating build files for CFE, the configuration file editor.

Question 4.00 is displayed in component mode.

>\* 04.00 Do you want CFE? [D=N] [Y/N]:

CFE is the configuration file editor. It allows the system manager to make changes to the network's permanent database (CETAB.MAC).

If you wish to rebuild CFE, answer this question YES, otherwise answer NO.

In question and answer mode or restore mode, CFE is required for all systems. In component mode, rebuilding CFE is optional. The following statement is displayed in question and answer mode.

Creating build files for NDA, the network dump analyzer.

Question 5.00 is displayed in component mode.

>\* 05.00 Do you want NDA? [D=N] [Y/N]:

NDA is the network dump analysis program. It provides the system manager with a tool which can analyze a system crash dump and print the network databases in a user readable format in much the same way the RSX crash dump analyzer (CDA) does for the system databases.

If you wish to rebuild NDA, answer this question YES, otherwise answer NO.

In question and answer mode or restore mode, NDA is required for all systems. In component mode, rebuilding NDA is optional.

The following statement is displayed in question and answer mode.

Creating build files for VNP, the virtual network control program.

Question 6.00 is displayed in component mode.

>\* 06.00 Do you want VNP? [D=N] [Y/N]:

VNP is the virtual network control program. It allows the system manager to perform network management functions on a system image file, rather than on the running system.

If you wish to rebuild VNP, answer this question YES, otherwise answer NO.

In question and answer mode or restore mode, VNP is required for RSX-11S systems. For RSX-11M/M-PLUS systems, VNP is optional. NETGEN displays the following statement for RSX-11M and RSX-11M-PLUS systems in question and answer mode.

Creating build files for LOO, the loop test sender task.

Question 7.00 is displayed in component mode.

>\* 07.00 Do you want LOO? [D=N] [Y/N]:

LOO is the loop test sender task. It is responsible for performing both node and circuit level loopback tests, in response to an NCP LOOP command.

For loop node tests, LOO sends to the MIR server task. For loop circuit tests, LOO sends to the LIN server task.

If you wish to build LOO, answer this question YES, otherwise answer NO.

LOO is never built for RSX-11S systems.

If you are in question and answer mode and you answer Question 7.00 YES, NETGEN displays the following statement for RSX-11M systems. However, if you have selected other options that automatically include DLX, then the following statement is not displayed.

Note that to enable LOO to perform loop circuit tests, the DLX process must be selected in this generation.

The following statement is displayed in question and answer mode if you answered YES to Question 9.00 or 10.00 (the standard function system option or all components option) in NET Section 1.

Creating build files for EVF, the event file interpreter.

Question 8.00 is displayed in component mode or if you answered NO to Question 9.00 or 10.00 in NET Section 1. EVF is never built for RSX-11S systems.

>\* 8.00 Do you want EVF? [D=N] [Y/N]:

EVR and EVC can write events out to an event file. This utility interprets the event file, and displays the requested information.

If you wish to build EVF, answer this question YES, otherwise answer NO.

>; <EOS> Do you want to:  
>\* <RET>-Continue, S-Skip, R-Repeat section, P-Pause,  
E-Exit [S]:

## 5.7 Defining the CEX Products

This section displays questions that are specific to DECnet and PSI if you are including PSI components in your DECnet system.

```
>; =====  
>; NET - Section 7 - Define the CEX Products  
>; =====
```

Questions concerning the following CEX Products will now be asked.

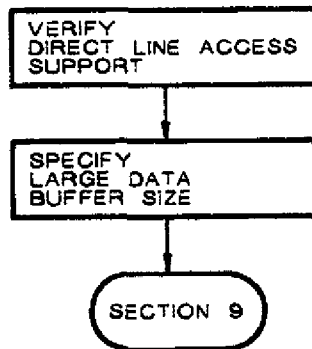
DECnet  
PSI

At this point, network generation continues with the text for the DEC portion of NETGEN (Chapter 6), followed by the PSI portion of NETGEN (Chapter 7) if you have purchased a PSI license. After completion of these two procedures, NETGEN continues with NET Section 8. Complete the CEX system definitions.

## 5.8 Completing the CEX System Definitions

This section defines the Direct Line Access Controller (DLX) and creates the CETAB.MAC file. Figure 5-7 illustrates the sequence of questions for completing the CEX system definitions.

**Figure 5-7: NET - Section 8 - Complete the CEX System Definitions**



TWO175

```
> ; =====  
> ; NET - Section 8 - Complete the CEX System Definitions  
> ; =====
```

Creating build files for DLX, the Direct Line Access process.

If you have selected components that require DLX, the above statement is displayed in question and answer mode or restore mode.

If none of the components you selected require DLX, NETGEN displays Question 1.00 in question and answer mode. It is always displayed in component mode.

```
>* 01.00 Do you want DLX? [D=N] [Y/N]:
```

DLX, the Direct Line Access controller, provides a user interface to lines at the data link level. This is required for any services which must bypass the normal network data channels.

For DECnet, such services include down-line system loading, up-line system dumping, and NCP line loop tests. There is also a user QIO interface which allows user tasks to access lines via the data link protocol (usually DDCMP).

If no such services have been selected during this generation, but you plan on adding these services at a later date by performing a Component mode generation, you must select DLX for your system now.

>\* 02.00 What is the Large Data Buffer (LDB) size?  
[D R:192.-1484, D:292.]:

Large Data Buffers (LDBs) are used to transmit and receive messages across the network. The LDB size determines the largest segment which can be transmitted or received. This does not affect the size of the largest user data transfer request, but it can affect performance.

Specify the size of the Large Data Buffers (LDBs) as a number of bytes. The size chosen for LDBs should be the same throughout the network.

A size of 292 is large enough for all normal network traffic.

The default for this question is usually 292. The default provides satisfactory performance for normal network traffic. A value of 292 accommodates 1/2 disk block (256 bytes) of user data. This allows space for data and DECnet protocols. For systems that have a high volume of file transfers, a size of 548 allows a full disk block (512 bytes) to be transferred at a time.

The following factors can affect optimum LDB size:

- Large LDBs are good for bulk data transfers, providing you have sufficient available memory.
- Large LDBs have a higher probability of an error due to line noise for a given packet, and longer retransmission times. For high speed lines, this may not be significant.
- If you choose to have large LDBs for efficient file transfers, you may have only a small number of buffers, depending on the amount of memory available. Consequently, processes may have to wait for buffers.

>;<EOS> Do you want to:  
>\* <RET>-Continue, S-Skip, R-Repeat section, P-Pause,  
E-Exit [S]:



## 5.9 Building the CEX System

This section actually builds the system you have specified. It is repeated three times, once each for NET, DEC, and PSI. If all object kits were placed on the NETGEN disk during PREGEN, this section proceeds to completion without user intervention.

```
>; =====  
>; NET - Section 9 - Build the CEX System at time on  
>; date  
>; =====
```

All questions have now been asked and the selected components will now be built. This may take from one to three hours, depending on the selection of components and the system you are running on.

If an operator's presence is required to switch disks during the build process, NETGEN displays the following statement.

Note that if the NETGEN disk does not contain all of the required object files, an operator must be present to mount each object disk as it is required.

```
>* 01.00 network object disk device? [dduu:, D=def] [S]:
```

Specify the disk drive where the object disk is loaded.  
This may be the same drive as is used for the NETGEN disk,  
or it may be a different drive.

If the disk has not yet been mounted, NETGEN will mount it. If another disk is currently mounted in the drive, that disk will be dismounted.

This disk must contain the *network* objects.

If you plan to use a disk drive on which another disk is mounted, do not replace the disk until you have answered Question 1.00. If the second disk is spun up before you answer Question 1.00, problems will result. After you answer Question 1.00, NETGEN displays the following statement.

Dismounting *device*. Please remove the disk and replace it with the proper *network* object disk.

```
>* 01.01 Is device ready? [D=N] [Y/N]:
```

Load the disk into drive *device* and start the drive before answering YES to this question.

If the *device* has not been mounted, NETGEN displays Question 01.02.

>\* 01.02 Label for *device*? [D=default-label] [S R:0-12]:

Specify the label to be used when mounting *device*. If the disk was an object disk created by PREGEN to hold only the *network* objects, the label will be *default*. If not, the label will have been user defined.

Mounting *device*.

NETGEN now mounts the *device* specified. Where *network* is shown, NETGEN displays either Network, DECnet, or PSI.

## 5.10 Generation Cleanup

This section performs final NETGEN processing.

```
> ; =====
> ; NET - Section 10 - Generation Clean-up
> ; =====
```

Creating NETCFG.TXT, the network configuration description file.  
Creating NETCFE.CMD, the network configuration command file.  
Creating NETINS.CMD, the network installation command file.  
Creating NETREM.CMD, the network removal command file.

The network HELP file library has been placed on your target disk, as:

DB01:[1,2]NETHLP.ULB

This file should be moved to your target system's library device (LB:).

```
> ; =====
> ; NET - RSX-11M/S/M-PLUS CEX System Generation Procedure
> ; Stopped at time on date
> ; =====
```

At this point you have completed the NETGEN procedure. You should now proceed to install your network using the NETINS.CMD file generated by NETGEN. This procedure is described in Chapter 9.

---

## NETGEN Dialog: DEC

DEC is the second part of the NETGEN dialog. NETGEN displays a series of questions relating to DECnet components immediately following NET Section 7.

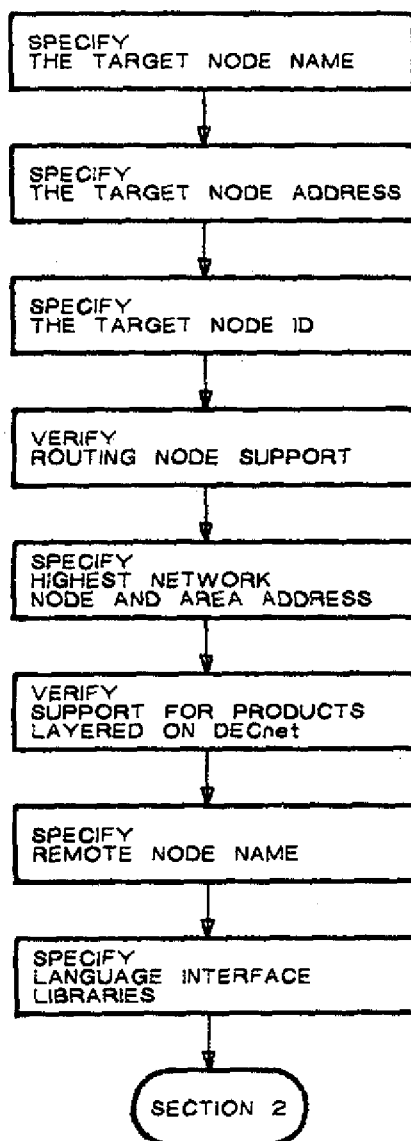
The DEC dialog represents the text NETGEN displays when performing an initial *generation in question and answer mode*. A *component mode* or a *restore mode* generation sometimes displays a slight variation in the wording of specific questions. For example, the defaults sometimes vary from those displayed in this dialog. Your responses should always be guided by the *question and text* displayed on your terminal.

### 6.1 Defining the Target and Remote Nodes

In this section of NETGEN, you are expected to specify sets of information that *identify the node you are generating and the nodes with which it will communicate*. In addition, you will supply information about certain node and routing characteristics. Figure 6-1 illustrates the sequence of questions for defining the target and remote nodes.

**Figure 6-1: DEC - Section 1 - Define the Target and Remote Nodes**

---



TWO176

```
> ; =====
> ; DEC - DECnet CEX Product Generation Procedure
> ; Starting questions at time on date
> ; =====
```

```
> ; Copyright (C) 1985, 1987 by
> ; Digital Equipment Corporation, Maynard, Mass.
```

Generate the DECnet CEX Product for your RSX-11M/S/M-PLUS target system.

```
> ; =====
> ; DEC - Section 1 - Define the Target and Remote Nodes
> ; =====
```

If you are in component mode, NETGEN displays the following statement and then displays Question 6.00.

*dduu*:*[x,54]*CETAB.MAC is being scanned to define your target node.

#### NOTE

To change most parameters defined in this section, you can use NCP, VNP, or CFE. You must do a component mode generation to change the parameters defined in Questions 6.00 and 8.00. To change parameters defined in Question 4.00, you must do a complete new generation or a restore mode generation.

>\* 01.00 What is the target node name? [S R:0-6]:

Enter the node name for the DECnet node being generated. This must be 1 to 6 alphanumeric characters, at least one of which must be an alphabetic (A-Z).

Although it is not required, it is highly recommended that this name be used by all other nodes in the network to identify this node.

Note that the node name can later be changed with CFE.

>\* 02.00 What is the target node address? [S R:0.-8.]:

Enter the node address that has been assigned for the node being generated. The format is:

AREA.NODE\_NUMBER (Example: 3.17)

An AREA value must be entered if you want to specify the area in which the node being generated will be located. If no value is specified for AREA, a value of 1 is assigned. AREA, therefore, must be specified for nodes that you do not want to include in area 1. AREA is a decimal value in the range of 1-63. NODE\_NUMBER specifies the address of the node within a given area. It must be a unique decimal value within the area, in the range of 1-1023.

The node address, consisting of the AREA and NODE\_NUMBER fields, will be the address of this node within the network. If you are entering values in both the AREA and NODE\_NUMBER fields, you must also enter the dot between the fields.

Note that the node address can later be changed with CFE.

>\* 03.00 Target node ID? [D=None] [S R:0.-32.]:

Enter the ID string for the node being generated. This string may be from 0 to 32 characters. Note that this string must not contain any single-quote ('), double-quote (") or comma (,) characters.

The node ID may be any arbitrary string which is useful in identifying the node.

Note that the node ID can later be changed with CFE.

The node ID is not passed on to other nodes via routing messages.

If you have purchased a full function DECnet kit, NETGEN displays Question 4.00 in question and answer mode. This question is not displayed in component mode.

>\* 04.00 Do you want to generate a routing node? [D=N]:

A routing node maintains routing databases and sends and receives routing messages. It can support multiple DECnet lines and circuits.

A non-routing node can provide access to a network through an adjacent routing node while maintaining no routing databases of its own. Because it does not maintain any routing databases and does not send or receive routing messages, it requires fewer system resources.

When generating a non-routing node, the following should be noted:

- It is recommended that only one DECnet line be generated. If more than one line is generated, only one line may be enabled at a time.
- If the line is a multipoint master, it is recommended that it has only one drop. If more than one drop is generated, only one drop may be enabled at a time.

Answer this question YES if you wish to generate a routing node, and NO if you wish to generate a non-routing node.

NETGEN displays Question 4.01 if you specified a routing node.

>\* 04.01 Do you want to generate a level 2 routing node?  
[D=N] [Y/N]

A level 2 routing node maintains a routing database for all areas in the network as well as a routing database for all nodes in its local area. It allows nodes in its local area to access nodes in the network that are outside of the local area.

A level 1 routing node maintains a routing database for all nodes in its local area but does not have the ability to directly access nodes outside of its local area. To access nodes outside of its local area, it must route messages through a level 2 routing node.

Because a level 1 routing node does not allow direct access to other areas of the network, it requires less code and fewer databases.

Answer this question YES if you wish to generate a level 2 routing node, and NO if you wish to generate a level 1 routing node.

NETGEN displays Question 5.00 if you are generating a routing node. In Question 5.00, *n* is the node number that you specified in response to Question 2.00.

>\* 05.00 Highest node number in this area [D R:n.-1023. D:n.]:

Enter the highest node number used by any node in this area. This number affects the size of the internal routing database used by this node. It also controls the size of the routing messages exchanged between nodes.

More efficient operation can be obtained by setting the node numbers of the nodes in the area in the range 1 to the number of nodes in the area. You may wish to make the highest node number slightly greater than the number of nodes in the area, to allow for expansion of the network.

Note that all nodes in the area should use the same value for the highest node number.

The value for the highest node number can later be changed with CFE.

NETGEN asks Question 5.01 only if you are generating a level 2 routing node. The *n* in Question 5.01 is replaced by the area number used in Question 2.00.

>\* 05.01 Highest area number in network? [D R:n.-63. D:n]:

Enter the highest area number used by any node in the network. This number affects the size of the internal databases used by this node.

More efficient operation can be obtained by setting the area numbers of the areas in the network in the range 1 to the number of areas. The highest area number would then be equal to the number of areas in the network.

You may wish to make the highest area number slightly greater than the number of areas in the network, to allow for expansion of the network.

Note that all nodes in the network should use the same value for the highest area number.

The value for the highest area number can later be changed with CFE.

NETGEN displays the following statement, and displays Question 6.00 in question and answer mode if you answered NO to Questions 9.00 and 10.00 (the standard system option and all components option) in Section 1. If you included extended network support, NETGEN will not display Question 6.00 in component mode and will automatically include this support.

To include support for network command terminals, you must first include the required extended network support.

>\* 06.00 Do you want to include this extended network support? [D=Y]:

Answer this question YES, to include the extended network support for the following options:

- Network Command Terminal server (NCT)
- Remote Network Command Terminal host support (RTH)

If you do not include the extended network support, you will not be able to include these features in your network. Including this support will cause ECL and NETACP to increase in size by a total of 1300. words.



You may add the extended network support later by performing a Component Mode generation.

>\* 07.00 Remote node name? [<RET>=Done] [S R:0-6]:

You may, at this time, define a series of node names which correspond to nodes in your network. When the network is loaded, these node names will automatically be set. Enter a carriage return when you have no more remote node names to define.

Each node name will be assigned to a node address. Standard procedure is to start with the node name for the lowest node address used, and to progress from there to the highest node address.

It is recommended that each node in the network assign the same node name to each individual node, reducing the confusion of moving from node to node.

Remote node names can be added or deleted using NCP, VNP, or CPE.

Questions 7.00 and 7.01 are repeated until you indicate you are done by pressing

RET.

>\* 07.01 What is the remote node address? [S R:0.-8.]:

Enter the node address that *node-name* has been assigned in the network. The format is:

AREA.NODE\_NUMBER (Example: 3.18)

Where AREA is the area number within the network and NODE\_NUMBER is the node number within that area. The area must be a decimal number in the range of 1 to 1023. If only NODE\_NUMBER is specified, the area that was specified for the node being generated, will be used as the default area number. The node number within the area must be a decimal number in the range 1 to 1023. If you are entering values in both the AREA and NODE\_NUMBER fields, you must also enter the dot between the fields.

Each node address defines a unique node in the network, and must be assigned when the network is first set up.

The remote node address can be changed using NCP, VNP, or CPE.

The variable *node-name* refers to the name you specified in Question 7.00.

>\* 08.00 Do you want the language interface libraries? {D=N} [Y/N]:

The MACRO user interface allows user written MACRO11 tasks to interface to the DECnet software. The MACRO user library contains the macros which a programmer may use to code these tasks.

The FORTRAN/COBOL/BASIC+2 object library allows user tasks written in these high level languages to interface to the DECnet software. The object library contains the user interface routines and the Network File Access Routines (NFARs).

If you will be writing DECnet application programs that require either of these libraries, answer this question YES.

These libraries may be added at a later time by doing a Component Mode generation.

If you specified the language libraries in Question 8.00 and did not choose dry run mode, NETGEN displays the following statements. The variable, *dduu*., is your target disk.

The DECnet MACRO user library will be placed on your target disk as "*dduu*: [1,1]NETLIB.MLB".

The DECnet FORTRAN/COBOL/BASIC+2 object library will be placed on your target disk as "*dduu*: [1,1]NETFOR.OLB".

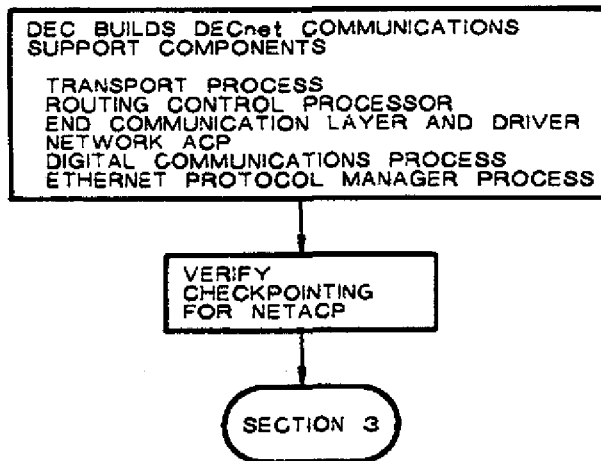
If necessary, please move them to the library disk (LB:) on your target system, if this is different from your target disk (*dduu*:).

> ; <EOS> Do you want to:  
>\* <RET>-Continue, S-Skip, R-Repeat section, P-Pause,  
E-Exit [S]:

## 6.2 Defining the DECnet Communications Components

This section defines the DECnet communications components. These components include XPT, RCP, ECL, NETACP, DCP, and EPM. Figure 6-2 illustrates the sequence of questions for defining the DECnet communications components.

**Figure 6-2: DEC - Section 2 - Define the DECnet Communications Components**



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```
>; =====  
>; DEC - Section 2 - Define the DECnet Communications Components  
>; =====
```

>\* 01.00 Do you want any of the Communications Components? [D=N] [Y/N]:

The DECnet Communications Components are:

- XPT - The routing process
- RCP - The routing event processing task
- ECL - The end communication layer and driver.
- NETACP - The network services ACP.
- DCP - The DDCMP line protocol process.
- EPM - The Ethernet protocol manager process.

If you answer YES to this question, you will be asked about each component individually. In general, you should only answer YES when there is a clear reason to build or rebuild one or more of these components.

NETGEN displays Question 1.00 only in component mode. If you answer NO, you will immediately jump to the end-of-section (EOS) question with one exception. NETGEN displays the following statement if you did not select extended network support in a previous generation and you are now selecting it in component mode.

ECL and NETACP will be rebuilt to add the extended network support for network command terminals and products layered on DECnet.

The following statement is displayed in question and answer mode. Question 2.00 is displayed in component mode.

Creating build files for XPT, the routing process.

>\* 02.00 Do you want XPT? [D=N] [Y/N]:

XPT is the routing process. It is responsible for transmitting and receiving packets from/to the local node and forwarding route-through packets.

If you wish to rebuild XPT, answer this question YES, otherwise answer NO.

If the node being generated is a routing node, the following statement is displayed whenever XPT is built or rebuilt. If you have generated a routing node and you are not rebuilding XPT, Question 3.00 is displayed in component mode.

Creating build files for RCP, the routing event processing task.

>\* 03.00 Do you want RCP? [D=N] [Y/N]:

RCP is the routing event processing task. It is responsible for managing the routing database.

If you wish to build RCP, answer this question YES, otherwise answer NO.

The following statement is displayed in question and answer mode. Question 4.00 is displayed in component mode.

Creating build files for ECL, the network services process and driver.

>\* 04.00 Do you want ECL? [D=N] [Y/N]:

ECL is the end communication layer and driver. It is responsible for all of the time critical network activities, and for handling all user task QIOs. When loaded, it appears to the CEX system as a process, and to the RSX system as a device (NS:) which can accept QIO requests.

If you wish to rebuild ECL, answer this question YES, otherwise answer NO.

The following statement is displayed in question and answer mode, and in component mode if you have chosen to rebuild ECL or XPT. Question 5.00 is displayed in component mode only if NETACP is not being automatically rebuilt for you.

Creating build files for NETACP, the network services ACP.

>\* 05.00 Do you want NETACP? [D=N] [Y/N]:

NETACP is the network services ancillary control process. It is responsible for performing all of the less time critical network activities. NETACP works in conjunction with the ECL process/driver.

If you wish to rebuild NETACP, answer this question YES, otherwise answer NO.

>\* 05.01 Should NETACP be checkpointable? [D=N] [Y/N]:

Making NETACP checkpointable will allow it to share partition space with other tasks. Checkpointing will increase the amount of time required for connect and disconnect processing.

If your target system is small (below 80K words) then it is advisable to install NETACP in the same partition as F11ACP. In this case, NETACP must be made checkpointable.

In medium to large target systems (above 80K words), NETACP may be installed either alone in its own partition or in a system controlled partition such as GEN. In either case, NETACP should be made non-checkpointable.

NETGEN displays Question 5.01 only for RSX-11M/M-PLUS systems.

If you are in question and answer mode and you have specified devices that require software DDCMP support, NETGEN displays the following statement. Question 6.00 is displayed in component mode.

Creating build files for DCP, the DDCMP line protocol process.

>\* 06.00 Do you want DCP? [D=N] [Y/N]:

DCP is the DDCMP line protocol process. It is responsible for providing an error-free data path over a physical device channel.

If you wish to generate a new version of the DCP process, then answer this question YES, otherwise answer NO.

If you are in question and answer mode and you have specified devices that require EPM, NETGEN displays the following statement. If you have specified devices that require EPM, Question 7.00 is displayed in component mode.

Creating build files for EPM, the Ethernet protocol manager process.

>\* 07.00 Do you want EPM? [D=N] [Y/N]:

EPM is the Ethernet protocol manager process. It is responsible for controlling access to the Ethernet.

If you wish to generate a new version of the EPM process, then answer this question YES, otherwise answer NO.

>; <EOS> Do you want to:

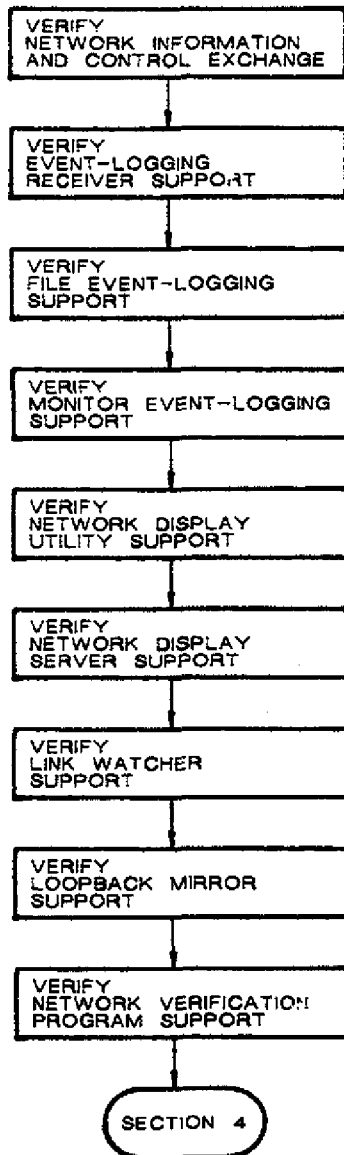
>\* <RET>-Continue, S-Skip, R-Repeat section, P-Pause,  
E-Exit [S]:

## 6.3 Defining the DECnet Network Management Components

This section defines components that perform network management functions. These components include NICE, EVR, NTD, NTDEMO, LIN, MIR, and NVP. Figure 6-3 illustrates the sequence of questions for defining the DECnet network management components.

**Figure 6-3: DEC - Section 3 - Define the DECnet Network Management Components**

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TWO178

```
> ; =====
> ; DEC Section 3-Define the DECnet Network Management Components
> ; =====
```

```
>* 01.00 Do you want any of the Network Management Components?
[D=N] [Y/N]:
```

The DECnet Network Management Components are:

NICE	- The network information and control task
EVR	- The network event receiver task
NTD	- The node state display task
NTDEMO	- The node state display server task
LIN	- The link watcher task
MIR	- The loop test mirror task
NVP	- The network connect verification task

If you answer YES to this question, you will be asked about each component individually. In general, you should only answer YES when there is a clear reason to build or rebuild one or more of these components.

If you are in component mode, NETGEN displays Question 1.00. If you answer NO, you immediately jump to the end-of-section (EOS) question. If you are in question and answer mode and you answered NO to Questions 9.00 and 10.00 (the standard system option and all components option) in NET Section 1, NETGEN conditionally displays the remaining questions in Section 3.

```
>* 02.00 Do you want NICE? [D=N] [Y/N]:
```

NICE is the network information and control server task. It allows a system manager to perform network management functions from any other node on the network.

If you wish to build NICE, answer this question YES, otherwise answer NO.

If you answer NO, you may add NICE later by performing a component mode generation.

Question 3.00 is always displayed for RSX-11S systems. It is displayed for RSX-11M/M-PLUS systems only if you answered NO to Questions 9.00 and 10.00 (the standard function option and all components option) in NET Section 1.

```
>* 03.00 Do you want EVR? [D=N] [Y/N]:
```

EVR is the network event receiver task. It is responsible for receiving event notification messages from other nodes, and for logging those messages appropriately.



If you wish to build EVR, answer this question YES, otherwise answer NO.

If you answer NO, you may add EVR later by performing a Component mode generation.

Question 3.01 is displayed only for RSX-11S systems and only if Question 3.00 was answered YES. For RSX-11M/M-PLUS systems, monitor and file event logging are always included.

>\* 03.01 Include monitor event logging? [D=N] [Y/N]:

Monitor logging allows EVR to hand event data to a user written task for later processing. Answer this question YES if you wish to include support for this option, and NO otherwise.

>\* 04.00 Do you want NTD? [D=N] [Y/N]:

NTD is the node state display task. It allows the user to monitor the current state of a node on a VT100 series, VT200 series, or VT52 video terminal. It uses the NTDEMO server task to obtain information about the node.

If you wish to build NTD, answer this question YES, otherwise answer NO.

If you answer NO, you may add NTD later by performing a Component mode generation.

If you specified NTD in Question 4.00, NETGEN displays the following statement in question and answer mode. If you did not specify NTD in Question 4.00, Question 5.00 is displayed in question and answer mode. Question 5.00 is always displayed in component mode.

Creating build files for NTDEMO, the node state display server task.

>\* 05.00 Do you want NTDEMO? [D=N] [Y/N]:

NTDEMO is the node state display server task. It provides information to NTD, the node display task, about the node on which it resides.

If you wish to build NTDEMO, answer this question YES, otherwise answer NO.

If you answer NO, NTDEMO may be added later by performing a Component mode generation.

NETGEN displays the following statement for RSX-11M-PLUS systems in question and answer mode. Question 6.00 is displayed in component mode for RSX-11M/M-PLUS systems. It is also displayed in question and answer mode for RSX-11M systems.

Creating build files for LIN, the link watcher task.

>\* 06.00 Do you want LIN? [D=N] [Y/N]:

LIN is the link watcher task. It is responsible for determining what is to be done with an automatic service request. The following types of request are recognized when received from another node on the network.

Down-line system load requests from adjacent nodes.  
Up-line system dump requests from adjacent nodes.  
Loop circuit test requests from adjacent nodes.

If you wish to build LIN, answer this question YES, otherwise answer NO.

If you answer NO, you may add LIN later by performing a Component Mode generation (to do this, you must select DLX during this generation).

Note that if you answer YES to this question, the DLX process will automatically be included in your target system.

If you are in question and answer mode and you answer Question 6.00 NO, NETGEN displays the following statement.

Note that to add LIN later, during a Component mode generation, the DLX process must be selected in this generation.

NETGEN displays the following statement in question and answer mode. Question 7.00 is displayed in component mode.

Creating build files for MIR, the loop test mirror task.

>\* 07.00 Do you want MIR? [D=N] [Y/N]:

MIR is the loop test mirror task. It accepts loop node messages from the LOO task (or the equivalent), and reflects the messages back, providing a logical link loopback test.

If you wish to build MIR, answer this question YES, otherwise answer NO.

If you are in question and answer mode and your system is a multiuser system, the following statement is displayed. Question 8.00 is displayed in component mode.

Creating build files for NVP, the network connect verification task.

>\* 08.00 Do you want NVP? [D=N] [Y/N]:

NVP is the network connect verification task. It is responsible for verifying accounting data provided with a connect request against the system accounting file. Verification may be enabled or disabled on a per object basis.

If you wish to build NVP, answer this question YES, otherwise answer NO.

>; <EOS> Do you want to:

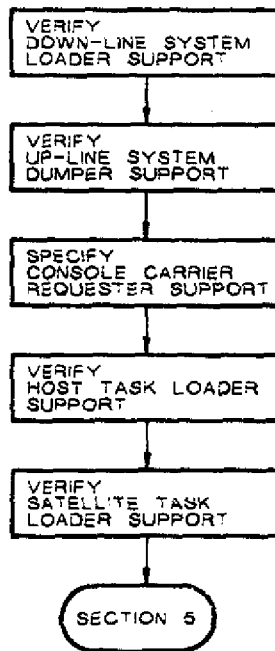
>\* <RET>-Continue, S-Skip, R-Repeat section, P-Pause,  
E-Exit [S]:

## 6.4 Defining the DECnet Satellite Support Components

This section defines the DECnet satellite support components DLL, DUM, CCR, HLD, and SLD for RSX-11S systems. Figure 6-4 illustrates the sequence of questions for defining the DECnet satellite support components.

Before answering the questions in this section of the NETGEN procedure it may be useful to read the chapter in the *DECnet-RSX Network Management Concepts and Procedures* manual that describes the support available for remote RSX-11S systems.

**Figure 6-4: DEC - Section 4 - Define the DECnet Satellite Support Components**



TWO179

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v; =====  
v; DEC-Section 4-Define the DECnet Satellite Support Components  
v; =====
```

>\* 01.00 Do you want any of the Satellite Support Components? [D=N] [Y/N]:

The DECnet Satellite Support Components are:

DLL	- The down-line system loader, host component
DUM	- The up-line system dumper, host component
CCR	- The Console Carrier Requester, host component
HLD	- The down-line task loader, host component
SLD	- The down-line task loader, satellite component

If you answer YES to this question, you will be asked about each component individually. In general, you should only answer YES when there is a clear reason to build or rebuild one or more of these components.

If you are in component mode, NETGEN displays Question 1.00. If you answer NO to this question, you immediately jump to the end-of-section (EOS) question. The escape text will display the components your system will support. It will not display all the components listed in Question 1.00.

If you are in question and answer mode, and you answered YES to Questions 9.00 and 10.00 (the standard function option and all components option) in NET Section 1, NETGEN displays Question 2.00. The escape text will display the components your system will support. It will not display all the components listed in Question 2.00. If you are in question and answer mode and you answered NO to Questions 9.00 and 10.00 in NET Section 1, NETGEN conditionally displays the remaining questions in Section 4.

>\* 02.00 Do you want the Satellite Support Components? [D=N] [Y/N]:

The DECnet Satellite Support Components are:

DLL	- The down-line system loader, host component
DUM	- The up-line system dumper, host component
CCR	- The console carrier requester, host component
HLD	- The down-line task loader, host component
SLD	- The down-line task loader, satellite component

If you answer YES to this question, all of the Satellite Support Components will be generated. If you answer this question NO, you can add these components by doing a Component Mode Generation.

If you are in question and answer mode or component mode and LIN was specified, NETGEN displays Question 3.00 for RSX-11M and RSX-11M-PLUS systems. This question is never displayed for RSX-11S systems.

>\* 03.00 Do you want DLL? [D=N] [Y/N]:

DLL is the down-line system loader task. It resides on a host system, and is responsible for loading an adjacent node with the proper operating system. The host system must be adjacent to the system to be loaded, and must be able to access the target system's image file.

DLL determines the proper system image file to load from information contained in the load request, from the circuit over which to load the target system, and from a database set up by the system manager.

DLL may be invoked via the NCP load command, or it may be invoked automatically by a load request which has been received over a network circuit. To be invoked automatically, the LIN task must have been generated. DLL uses the DLX interface.

If you wish to build DLL, answer this question YES, otherwise answer NO.

If you answer NO, you may add DLL later by performing a Component mode generation (to do this, you must select DLX during this generation).

Note that if you answer YES to this question, the DLX process will automatically be included in your target system.

If you are in question and answer mode or component mode and LIN was specified, NETGEN displays Question 4.00 for RSX-11M and RSX-11M-PLUS systems. This question is never displayed for RSX-11S systems.

>\* 04.00 Do you want DUM? [D=N] [Y/N]:

DUM is the up-line system dumper task. It resides on a host system, and is responsible for dumping memory on an adjacent node to a file. The host system must be adjacent to the system to be dumped, and must be able to access the file into which the target system memory is to be dumped.

DUM determines the proper file to dump to from information contained in the dump request, from the circuit over which to dump the target system, and from a database set up by the system manager.

DUM can only be invoked automatically by a dump request which has been received over a network circuit. For this reason, the LIN task must have been generated. To make sure an RSX-11S system may be up-line dumped, the user must have replaced the RSX-11S PANIC module with the DECnet NETPAN module when the RSX-11S system was initially SYSCENed. DUM uses the DLX interface.

If you wish to build DUM, answer this question YES, otherwise answer NO.

If you answer NO, you may add DUM later by performing a Component mode generation (to do this, you must select DLX during this generation).

Note that if you answer YES to this question, the DLX process will automatically be included in your target system.

**NETGEN displays Question 5.00 only if you have selected Ethernet devices.**

**>\* 05.00 Do you want CCR? [D=N] [Y/N]:**

CCR is the console carrier requester task. It resides on a host system, and communicates with the console carrier server (CCS) which resides on a remote server node. The console carrier requester in conjunction with the console carrier server provide access to console functions on a server system that does not have a console of its own. The console carrier requester provides the user interface to the console functions that will be available for the remote system.

If you wish to build CCR, answer this question YES, otherwise answer NO.

If you answer NO, you may add CCR later by performing a Component mode generation (to do this, you must select DLX during this generation).

Note that if you answer YES to this question, the DLX process will automatically be included in your target system.

**If you are in question and answer mode or component mode, NETGEN displays Question 6.00 for RSX-11M and RSX-11M-PLUS systems. This question is never asked for RSX-11S systems.**

**>\* 06.00 Do you want HLD? [D=N] [Y/N]:**

HLD is the host down-line task loader. It resides on a host system, and is responsible for sending task images over a connection to be loaded into the target system's memory. The host system must have access to the target system's task image files.

HLD determines the task image file to load from information contained in the connect request, from the node which requested the connection, and from a database set up by the system manager. HLD may only be invoked automatically by a connect request.

To down-line load task images into an RSX-11S system, SLD must have been selected for the RSX-11S system during its NETGEN.

If you wish to build HLD, answer this question YES, otherwise answer NO.

If you answer NO, you may add HLD later by performing a Component mode generation.

If you answered Question 6.00 YES, NETGEN displays the following statement.

To generate the HLD database which describes the tasks to down-line load, you may execute the HLDDAT.CMD command procedure at any time after your network generation is complete. This command file will be located as follows.

*dduu:* [x,1]HLDDAT.CMD

The HLDDAT.CMD command procedure for generating the HLD database is described in the *DECnet-RSX Network Management Concepts and Procedures* manual.

>\* 06.01 Number of incoming connections to support? [D R:1.-32. D:4.]:

Enter the number of simultaneous incoming connections that HLD should accept. This will limit the number of down-line task loads which can be performed at the same time.

If you are in question and answer mode or component mode, NETGEN displays Question 7.00 for RSX-11S systems built with remote task loading support. Question 7.00 is never asked for RSX-11M/M-PLUS systems.

>\* 07.00 Do you want SLD? [D=N] [Y/N]:

SLD is the satellite down-line task loader. It resides on a satellite system, and is responsible for connecting to HLD on a host system and for requesting the task images for it to load into memory.

SLD determines the task to load. SLD may only be invoked automatically by a run, overlay or checkpoint request.

Note that certain SYSGEN requirements must be met before SLD can be properly added to an RSX-11S system.

If you wish to build SLD, answer this question YES, otherwise answer NO.

If you answer NO, you may add SLD later by performing a Component Mode generation.

If your RSX-11S system was generated without remote task loading support, NETGEN displays the following statement:

SLD cannot be built for the target RSX-11S system. The target system was generated without remote task loading support.

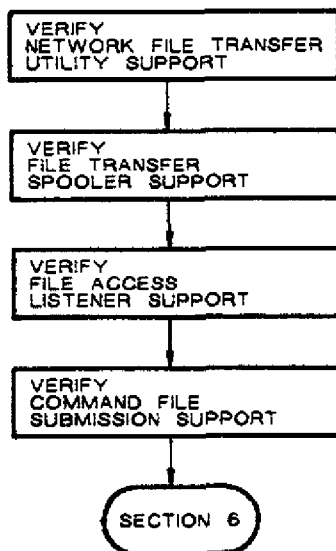
>; <EOS> Do you want to:  
>\* <RET>-Continue, S-Skip R-Repeat section, P-Pause,  
E-Exit [S]:



## 6.5 Defining the DECnet File Utilities

This section defines components that perform file transfers and remote file operations. These components include NFT, FTS, FAL and MCM. Figure 6-5 illustrates the sequence of questions for defining the DECnet file utilities.

Figure 6-5: DEC - Section 5 - Define the DECnet File Utilities



TWO180

```
> ; =====
> ; DEC - Section 5 - Define the DECnet File Utilities
> ; =====
```

```
>* 01.00 Do you want any of the File Utilities? [D=N] [Y/N]:
```

The DECnet File Utilities are:

- NFT - The network file access user task.
- FTS - The network file access spooler user task.
- FAL - The network file access server.
- MCM - The network command file submission server.

If you answer YES to this question, you will be asked about each component individually. In general, you should only answer YES when there is a clear reason to build or rebuild one or more of these components.

NETGEN displays Question 1.00 in component mode. If you answer NO, you immediately jump to the end-of-section (EOS) question.

If you are in question and answer mode or component mode, NETGEN displays Question 2.00 for RSX-11M and RSX-11M-PLUS systems. Question 2.00 is never displayed for RSX-11S systems.

>\* 02.00 Do you want NFT? [D=N] [Y/N]:

NFT is the network file access user task. It allows users to access files on other nodes in the network. The types of file operations allowed include file transfer, file deletion, directory listing, and command/batch file execution.

If you wish to build NFT, answer this question YES, otherwise answer NO.

If you answer NO, you may add NFT later by performing a Component Mode generation.

Question 03.00 is asked only if the Queue Manager was included when the SYSGEN was performed and the file, LB:[1,24]QMG.OLB, has not been deleted.

>\* 03.00 Do you want FTS? [D=N] [Y/N]:

FTS is the network file access spooler user task. It allows users to access files on other nodes in the network in a spooled fashion. That is, file access operations may execute immediately, may wait for a specific time, or may wait for the source or target node to become available on the network. The types of file operation allowed include file transfer, file deletion, and command/batch file execution.

When FTS is selected, the queue management tasks, FTQ and FTSDEQ, are automatically included.

If you wish to build FTS, answer this question YES, otherwise answer NO.

If you answer NO, you may add FTS later by performing a Component mode generation.

>\* 04.00 Do you want FAL? [D=N] [Y/N]:

FAL is the network file access server. It is responsible for performing all of the file operations requested by users residing on other nodes.

If you wish to build FAL, answer this question YES, otherwise answer NO.

If you answer NO, you may add FAL later by performing a Component mode generation.

NETGEN displays Question 4.01 for RSX-11M systems only. For RSX-11M-PLUS systems, a multicopy version of RMS FAL will be generated. For RSX-11S systems, the 11S version of FCS FAL is used.

>\* 04.01 Should FAL support RMS file access? [D=Y] [Y/N]:

Answer this question YES if you wish to allow network access to RMS file services on your node. Answer this question NO if you wish to allow only FCS file access.

In order to include RMS support, you must have previously placed the proper RMS files on your LB: device under the proper UIC's. If you wish to use the RMS routines (not memory resident RMS library), these files and UIC's are:

```
LB:[1,1]RMSLIB.OLB
LB:[1,1]RMS11X.ODL
LB:[1,1]RMS12X.ODL
LB:[1,1]VMLIB.OLB
```

If you wish to use the memory resident RMS library, these files and UIC's are:

```
LB:[1,1]RMSRLX.ODL
LB:[1,1]RMSRES.TSK
LB:[1,1]RMSRES.STB
LB:[1,1]VMLIB.OLB
```

If the proper files are not present on LB: under the proper UIC, you may pause and move them now.

NETGEN displays Question 4.02 only for RSX-11M systems (for FCS and RMS versions of FAL). RSX-11M-PLUS and RSX-11S versions are never overlaid.

>\* 04.02 Should FAL be overlaid? [D=N] [Y/N]:

Answer this question YES if FAL should be overlaid. This will reduce the size of FAL by approximately 4000 words but will also reduce the performance.

Note that if FAL is going to support RMS file access, and if the RMS routines are to be included directly in the FAL task image (i.e. a memory resident RMS library is not supported), then the RMS routines will always be overlaid. This question only controls the overlaying of the FAL mainline code.

NETGEN displays Question 4.03 only for RSX-11M systems if the RMS memory-resident library is found. For RSX-11M-PLUS systems, the RMS memory-resident library will always be used if present. If RMSRES is not found, you will be given the option of building the FCS FAL.

>\* 4.03 Do you want to use the memory resident RMS library? [D=N] [Y/N]:

A memory resident RMS library has been found on LB:[1,1].  
Answer this question YES if you wish FAL to link to this library.

Using a memory resident RMS library will result in better performance and will reduce task memory requirements. Using this option will, however, require that the RMSRES library be permanently installed and loaded on your system (this library is shareable between all tasks which use RMS, so the extra memory required by the library matters only if there is only one RMS task).

After you do a component mode generation, you may need to update the NETINS.CMD file. For example, if you specified memory resident RMS in a previous generation, NETINS.CMD will automatically check to see if the memory-resident RMS library was installed. If you are generating a version of FAL that does not require the memory resident RMS library, you should remove this automatic checking process by editing the NETINS.CMD file.

NETGEN displays Question 4.04 for RMS FAL on RSX-11M systems only if you answered NO to Question 4.03.

>\* 04.04 Do you want the minimum size RMS? [D=N] [Y/N]:

Answer this question YES if you wish the RMS portion FAL to be as small as possible, and NO otherwise.

Requesting the minimum size RMS will reduce FAL's memory requirements, but will also result in reduced performance. Use of the minimum size RMS will save 3K bytes of FAL task space.

If you answer this question YES, the RMS portion of FAL will be built using the RMS11X.ODL overlay description file. If you answer this question NO, the RMS portion of FAL will be built using the RMS12X.ODL overlay description file. These files are distributed with your RSX kit.

NETGEN displays Question 4.05 for RSX-11M and RSX-11S systems.

>\* 04.05 Number of incoming connections to support?  
[D R: 1.-10. D:4.]:

Enter the number of simultaneous incoming connections that FAL should accept. This will limit the number of network file access requests which can be serviced at the same time.

Question 4.06 is displayed for all systems.

>\* 04.06 User data buffer size? [D R:260.-2048. D:1024.]:

Specify the size of the buffer to be used for user data transfers. The buffer must be large enough to hold the largest record that FAL will ever have to transfer. For task image files, a buffer of 512 bytes is sufficient.

Note that the data buffer size affects the efficiency of the data transfers and the size of FAL's dynamic memory pool.

If your system does not have multiuser protection, NETGEN displays Questions 4.07 through 4.09 for RSX-11M and RSX-11M-PLUS systems. For RSX-11S systems, only Question 4.07 is displayed, and only the first line of the explanatory text is displayed.

>\* 04.07 What is the privileged password?  
[D=PRIV] [S R:0.39.]:

Enter the password to use to check for privileged access to files.

This password is required since the target system does not have multi-user protection but DECnet must provide access protection.

Use of this password with any UIC will allow network file access to any files which could be accessed by a local user logged onto that UIC.

>\* 04.08 What is the non-privileged password?  
[D=GUEST] [S R:0.-39.]:

Enter the password to use to check for non-privileged access to files. The UIC associated with this password is defined in the next question.

This password is required since the target system does not have multi-user protection but DECnet must provide access protection.

Use of this UIC and password will allow network file access to any files which could be accessed by a local user logged onto the UIC.

>\* 04.09 What is the guest UIC? [D=200,200] [S R:0.-9.]:

Enter the guest UIC for network file access. The format for entering a UIC is either "[grp,mem]" or "grp,mem".

This UIC is associated with the password defined in the previous question.

Use of this UIC and password will allow network file access to any files which could be accessed by a local user logged onto the UIC.

If you are in question and answer mode or component mode and you have specified NFT or FAL, NETGEN displays Question 5.00 for RSX-11M and RSX-11M-PLUS systems. Question 5.00 is always asked in component mode and is never asked for RSX-11S systems.

>\* 05.00 Do you want MCM? [D=N] [Y/N]:

MCM is the network command or batch file submission server. It receives file submission requests from NFT or FAL, and submits the indicated command or batch files for execution on the system on which it resides.

Note that MCM uses the RSX-11 send data mechanism, rather than DECnet connections, to receive requests. For this reason either NFT or FAL or both must have been selected for the target system.

If you wish to build MCM, answer this question YES, otherwise answer NO.

If you answer NO, you may add MCM later by performing a Component Mode generation.

Question 5.01 is displayed for RSX-11M-PLUS systems only.

>\* 05.01 Should requests be queued to Batch? [D=N] [Y/N]:

If you answer this question YES, NFT SUBMIT (/SB) and EXECUTE (/EX) requests will be entered into the Batch queue for execution.

If you answer NO, the requests will be sent to the Indirect Command File processor (AT.).

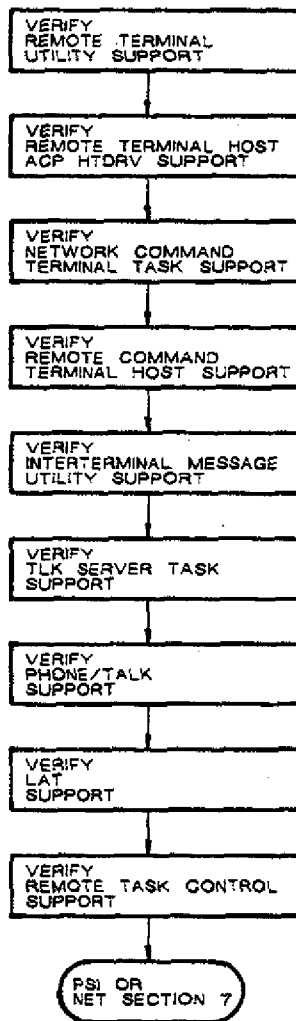
>; <EOS> Do you want to:  
>\* <RET>-Continue, S-Skip R-Repeat section, P-Pause,  
E-Exit [S]:

## 6.6 Defining the DECnet Terminal and Control Utilities

This section defines the DECnet terminal and control utilities — RMT (with RMTACP), HT: (with RMHACP), NCT, RTH, TLK, LSN, PHO, LAT, and TCL. These tasks allow you to establish a remote terminal, establish a network command terminal, carry on a dialog between nodes, and control a task on a remote node. Figure 6-6 illustrates the sequence of questions for defining the DECnet terminal and control utilities.

**Figure 6-6: DEC - Section 6 - Define the DECnet Terminal and Control**

---



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```
>; =====
>; DEC - Section 6 - Define the DECnet Terminal
                        and Control Utilities
>; =====
```

>\* 01.00 Do you want any of the Terminal and Control Utilities? [D=N] [Y/N]:

The DECnet Terminal and Control Utilities are:

RMT/RMTACP	- The remote network terminal task and ACP.
HT:/RMHACP	- The remote network terminal driver and ACP.
NCT	- The network command terminal server.
RTH	- The remote command terminal host support task.
TLK	- The remote talk user task.
LSN	- The remote talk server task.
PHO	- The inter-terminal conversational task.
LAT	- The Local Area Transport terminal services process.
TCL	- The remote task control server task.

If you answer YES to this question, you will be asked about each component individually. In general, you should only answer YES when there is a clear reason to build or rebuild one or more of these components.

NETGEN displays Question 1.00 in component mode. If you answer NO, you immediately jump to the end-of-section (EOS) question. The escape text associated with question 01.00 will display the components your system will support. It may not display all the components shown in Question 1.00.

>\* 02.00 Do you want RMT/RMTACP? [D=N] [Y/N]:

RMT and RMTACP are the remote network terminal task and ACP. They reside on the user's local system, and allow the user's terminal to be logically connected to any other RSX node in the network which supports the HT: device and its ACP, RMHACP.

If you wish to build RMT and RMTACP, answer this question YES, otherwise answer NO.

If you answer NO, you may add RMT and RMTACP later by performing a Component Mode generation.

>\* 02.01 Maximum number of simultaneous RMT users? [D R:1.-15. D:4.]:

Enter the maximum number of simultaneous RMT users that you wish your system to support.

>\* 03.00 Do you want HT:/RMHACP? [D=N] [Y/N]:

HT: and RMHACP are the remote network terminal driver and ACP. They reside on a host system, and allow users on other nodes in the network to logically connect their terminals to the host system, through the host's HT: terminal devices.

If you wish to build HT: and RMHACP, answer this question YES, otherwise answer NO.

If you answer NO, you may add HT: and RMHACP later by performing a Component Mode generation.

>\* 03.01 Number of incoming connections to support? [D R:1.-16. D:4.]:

Enter the number of simultaneous incoming connections that RMHACP should accept. This will limit the number of network terminal users that can log onto your system at the same time.

NETGEN displays Question 3.02 for DECnet systems with PSI. The variable *n* is the value you specified in Question 3.01.

>\* 03.02 Number of HT: units to generate? [D R:n.-64. D:n.]:

Enter the number of HT: device units to generate. Each incoming RMHACP connection requires one HT: unit.

Note that if you plan to include the X29ACP remote terminal PSI component, you must specify enough HT: units for both RMHACP and X29ACP. These units will be dynamically allocated on an as-needed basis by these two components, so you need only allocate enough HT: units to satisfy their concurrent requirements.

NETGEN displays Questions 4.00 and 5.00 if you selected extended network support by answering YES to Question 6.00 in DEC Section 1.

>\* 04.00 Do you want NCT? [D=N] [Y/N]:

NCT is the network command terminal server. It resides on the user's local node, and allows the user's terminal to be logically connected to any other node in the network with the network command terminal facility.

If you wish to build NCT answer this question YES, otherwise answer NO.

If you answer NO, you may add NCT later by performing a Component Mode generation.

Question 05.00 is displayed for RSX-11M systems only if Network Command Terminal support was specified for inclusion during SYSGEN. (See Section 3.2.5.4.). RSX-11M-PLUS always includes support for Network Command Terminals. Question 05.00 is, therefore, always displayed if you are generating a DECnet-11M-PLUS node.

>\* 05.00 Do you want RTH? [D=N] [Y/N]:

RTH is the remote command terminal host support process. It resides on the user's local node and allows users on other nodes to logically connect their terminals to the local system through the network command terminal facility.

If you wish to build RTH answer this question YES, otherwise answer it NO.

If you answer NO, you may add RTH later by performing a Component Mode generation.

>\* 06.00 Do you want TLK? [D=N] [Y/N]:

TLK is the remote talk user task. It resides on the user's local system, and allows a user to hold a "conversation" with a user on an RSX node which supports the LSN task.

If you wish to build TLK, answer this question YES, otherwise answer NO.

If you answer NO, you may add TLK later by performing a Component Mode generation.

If you are in question and answer mode and you specified TLK, NETGEN displays the following statement. If you did not specify TLK, NETGEN displays Question 7.00. Question 7.00 is always displayed in component mode.

Creating build files for LSN, the remote talk server task.

>\* 07.00 Do you want LSN? [D=N] [Y/N]:

LSN is the remote talk server task. It resides on a target system, and allows a user on an RSX node which supports the TLK task to hold a "conversation" with a user on the system which supports the LSN task.

If you wish to build LSN, answer this question YES, otherwise answer NO.

If you answer NO, you may add LSN later by performing a Component Mode generation.

>\* 07.01 Number of incoming connections to support? [D R:1.-20. D:4.]:

Enter the number of simultaneous incoming connections that LSN should accept.

Question 8.00 is asked only for RSX-11M-PLUS systems because PHONE uses accounting information that is not available on RSX-11M and RSX-11S systems.

>\* 08.00 Do you want PHO? [D=N] [Y/N]:

PHO is the video terminal PHONE task. It resides on the user's local system, and allows a user to hold a "conversation" with a user on any node which supports the PHO task.

If you wish to build PHO, answer this question YES, otherwise answer NO.

Question 9.00 is asked only for RSX-11M-PLUS systems for which LAT terminal support was specified during SYSGEN.

>\* 09.00 Do you want LAT and LCP [D=N] [Y/N]:

The Local Area Transport (LAT) terminal service process resides on the user's local system and allows terminals on a LAT terminal server to connect to the local system as if they were directly connected to the system. LAT terminal service differs from other remote terminal facilities because it only communicates with terminal servers on the Ethernet and uses protocols that are optimized for Ethernet.

LCP is the LAT Control Program. It allows the system manager to perform all on-line LAT management functions (e.g. starting or stopping the LAT process).

If you wish to build the LAT terminal service process and LCP, answer this question YES, otherwise answer NO. If you answer this question NO, you may add LAT/LCP later by performing a Component Mode generation.

>\* 10.00 Do you want TCL? [D=N] [Y/N]:

TCL is the remote task control server task. It allows users on other nodes to control task execution on the node on which TCL is installed. TCL will accept requests over DECnet connections to run, abort and cancel tasks on its local node. Routines to connect to TCL and issue these requests are contained in the DECnet FORTRAN/COBOL/BASIC+2 object library.

If you wish to build TCL, answer this question YES, otherwise answer NO.

If you answer NO, you may add TCL later by performing a Component Mode generation.

If you selected TCL and your system does not have multiuser protection, NETGEN displays Questions 10.01, 10.02, and 10.03.

>\* 010.01 What is the privileged password? [<RET>=None]  
[S R:0.-39.]:

Enter the password to use to check for privileged access. Privileged access provides the ability to run tasks under any UIC, and to cancel or abort any task.

This password is required since the target system does not have multi-user protection but DECnet must provide access protection.

>\* 010.02 What is the non-privileged password? [<RET>=None]  
[S R:0.-39.]:

Enter the password to use to check for non-privileged access. Non-privileged access provides the ability to run tasks under the non-privileged UIC.

>\* 010.03 What is the non-privileged UIC? [<RET>=None]  
[S R:0.-9.]:

Enter the UIC under which non-privileged users may run tasks. If no UIC is specified, then nonprivileged users can run tasks under any UIC. Non-privileged users can abort or cancel only those tasks which they have initiated.

The format for entering a UIC is either "[grp,mem]" or "grp,mem".

>; <EOS> Do you want to:  
>\* <RET>-Continue, S-Skip R-Repeat section, P-Pause,  
E-Exit [S]:

```

>; =====
>; DEC - DECnet CEX Product Generation Procedure
>;      DECnet question/answer section completed at
>;      time on date
>; =====

```

If you are doing a component mode generation and you are adding extended network support, NCT, RTH, or LAT/LCP, NETGEN displays the following statement. This statement may vary based on what you added.

CETAB.MAC is being rebuilt to reflect the following new options:

- the addition of the extended network support for terminals and layered products.
- the addition of NCT (Network Command Terminal server)
- the addition of RTH (Remote Command Terminal host support)
- the addition of LAT (Local Area Transport terminal service process and LAT Control Program).

Adding NCT, RTH, or LAT/LCP will change the data structure used by your network. If you are currently running the network you are modifying, it is recommended that you reload the network as soon as this generation is done.

#### NOTE

If you are generating the RSX-11 PSI product, NETGEN proceeds with the PSI generation (Chapter 7). Otherwise, NETGEN proceeds with the remainder of the NET generation procedure, NET Section 8 - Complete the CEX System Definitions (Section 5.8).

---

## NETGEN Dialog: PSI

Chapter 7 presents the third part of the NETGEN dialog: PSI (the Packetnet System Interface). NETGEN displays a series of questions relating to PSI components if you purchased a license for the RSX-11 PSI product and you answered YES to Question 07.02 in Section 2 of the NET portion of NETGEN. The questions immediately follow DEC Section 6.

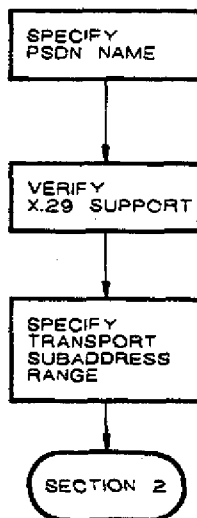
If you are not familiar with the Packet Switching Data Network (PSDN) terminology, refer to the *Introduction to RSX PSI*, the *RSX PSI User's Guide*, and the *RSX-11 PSI Network-Specific Information Manual*.

In PSDN terminology, Data Terminal Equipment (DTE) refers to your computer equipment that connects to the PSDN, while Data Communications Equipment (DCE) is the PSDN's equipment. Your DTE (computer or X.29 terminal) connects to a DCE on the PSDN.

### 7.1 Specifying Target Network Characteristics

This section defines the characteristics for the Packet Switching Data Network (PSDN) to which you will be connecting. Figure 7-1 illustrates the sequence of questions for specifying the target network characteristics.

**Figure 7-1: PSI - Section 1 - Specify Target Network Characteristics**



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```

> ; =====
> ; PSI - PSI CEX Product Generation Procedure
> ; Starting questions at time on date
> ; =====
> ;
> ;
> ; =====
> ; > ; PSI - Section 1 - Specify Target Network Characteristics
> ; =====
  
```

> \* 01.00 Packet Switching Data Network name? [S R:1. -8.]:

Enter the name of the Packet Switching Data Network (PSDN) to which you want to connect your DTEs. Refer to the PSI Reference Card for details of currently supported network names. Only specify alphanumeric characters in the network name, ignoring any other characters such as hyphens. The network name will be truncated to the first six characters.



If your PSDN *netnam* is not yet supported by RSX-11 PSI, NETGEN displays the following statement.

RSX-11 PSI does not yet support the network *netnam*. NETGEN will configure RSX-11 PSI for the default network. When NETGEN is complete, please contact your Software Specialist who will reconfigure RSX-11 PSI for *netnam*. This will not require another NETGEN.

Support for X.29 is always included in a standard function network. If, therefore, you answered YES to Question 9.00 in Section 1 of the NET portion of NETGEN, Question 2.00, following, is not asked.

>\* 02.00 Do you want X.29 support? [D=N] [Y/N]:

If you need support for remote X.29 terminals, answer YES to this question.

>\* 03.00 What is the transport subaddress range? [S R:0 -9.]:

The transport subaddress range is used to identify which calls are directed to DECnet and which calls are directed to PSI. Any calls within the range you specify will be passed to DECnet via DLM.

Specify the subaddress range using one of the following formats:

LLLL - HHHH where LLLL is the low end of the range and  
HHHH, the high end. LLLL and HHHH are in  
the range 0 - 9999.  
LLLL where HHHH defaults to LLLL.  
<RET> indicates there is no subaddress range.

Your response to Question 3.00 determines which incoming calls are routed to DLM. If you specify 0 in this range, all incoming calls are sent to DLM.

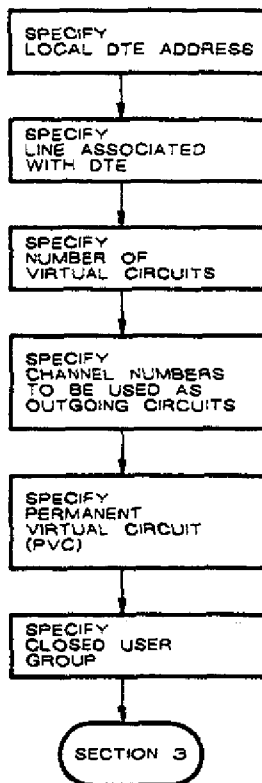
However, X.29 uses subaddress 0. If you have X.29 support make sure you do not specify 0 for DLM. Doing so will cause incoming X.29 calls to go to DLM.

>; <EOS> Do you want to:  
>\* <RET> - Continue, R - Repeat section, P - Pause,  
E - Exit.

## 7.2 Specifying Local DTEs

This section defines the characteristics of your local DTEs. Figure 7-2 illustrates the sequence of questions for specifying local DTEs.

**Figure 7-2: PSI – Section 2 – Specify Local DTEs**



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```
>; =====  
>; PSI - Section 2 - Specify Local DTEs  
>; =====
```

>\* 01.00 What is the local DTE address? [S R:0 -15.]:

The local DTE is connected to the PSDN, and gives you access to the network. The DTE address is the number assigned to the local DTE by the network vendor. See the PSI Reference Card for the format of the DTE address for this network.

Enter the address of the local DTE in the required format (up to 15 digits). If you have already specified all DTEs, answer <RET>.

>\* 02.00 Which line is associated with this DTE? [S R:1. -9.]:

Identify the line associated with this DTE. Use a line-id in the form ddd-cc[-uu], where:

ddd identifies the device.  
cc identifies the controller.  
uu optionally identifies the unit.

of this line.

The following lines have been generated:

*(list of PSI lines)*

When NETGEN displays the list of PSI lines, specify one of these lines. This list was created as a result of the devices you specified in NET Section 3, Question 1.00.

>\* 03.00 How many virtual circuits can be active at once? [D R:1.-255.]:

Specify the maximum number of virtual circuits that can be active simultaneously on this DTE. The number you specify is equivalent to the total number of calls, (incoming and outgoing), plus PVCs, that can be handled at any one time. Thus the number you specify should include X.29 circuits.

If you are defining more than one DTE, then the total number of active circuits in the system must not exceed 255.

>\* 04.00 What channels can be used for outgoing calls? [S]:

The logical channel numbers you specify here will be used for outgoing and maybe incoming calls for this DTE. Specify a list of channel numbers, separating the numbers by hyphens to indicate ranges, and commas to indicate individual numbers.

For example:

20-10,8,3

defines channel numbers 20 through 10, 8 and 3. Channel numbers are in the range 1 to 4095, and are assigned by the network vendor.

Note that channels will be used in the same order as they are specified. You must specify the high end of a channel range first, followed by the low end, otherwise the PSI software will not operate correctly.

If there are no channel numbers to be specified, answer with <RET>.

NETGEN displays the following statement before Question 5.00.

Specify permanent virtual circuits (PVCs) for this DTE.

Note that any DLM PVCs must also be included.

The following DLM circuits have been generated:

DLM-x.y S

DLM-x.y P

In the list of DLM circuits, the circuit ID is followed by an S or a P. An S refers to a switched virtual circuit (SVC) and a P refers to a permanent virtual circuit (PVC).

>\* 05.00 Enter a PVC used by this DTE. [S]

Each PVC that you have been allocated by the network vendor is identified by a logical channel number in the range 1 to 4095. You can give each PVC a name, when you associate the PVC with your local DTE.

Enter a PVC used by this DTE in the following format:

name,channel

where

name is the name you have chosen for the PVC  
(up to 6 characters long).

channel is the logical channel number supplied by  
the network vendor.

Answer with <RET> if you have specified all PVCs.

For DLM PVC names, enter the DLM circuit names.

The following DLM circuits have been generated:

*(list of DLM circuits)*

The same PVC name should not be used to identify more than one PVC.

>\* 06.00 Enter a closed user group for this DTE. [S]

A closed user group is an optional facility which allows a DTE belonging to the group to communicate with other members of the same group, but not with any other DTEs. A bilateral closed user group is a special case of this, where the group consists of only two DTEs.

A DTE may belong to one or more closed user groups. Each closed user group is identified by a name given it by the members of the group, and a group number given it by the network vendor.

Specify a closed user group for this DTE in the following format:

name,number[,BILATERAL]

where

name is the name of this group (up to 6 characters).

number is the number allocated to this group by the network vendor.

BILATERAL means that the group is bilateral.

If you have specified all closed user groups for this DTE, answer with <RET>.

>; <EOS> Do you want to:

>\* <RET> - Continue, R - Repeat section, P - Pause,  
E - Exit.

## 7.3 Specifying Incoming Call Destinations

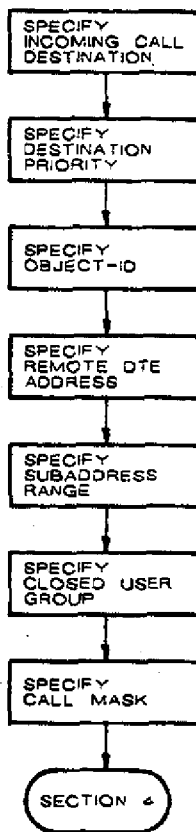
This section defines incoming call destinations. A destination contains a set of parameter values describing the calls the destination can accept. Each destination is associated with a task you have written to process a particular type of call.

When an incoming call arrives, the information it carries is compared with the parameter values for each destination. The call is processed by the task associated with the destination whose values match those of the call. If more than one destination can accept the call, it goes to the destination with the highest priority.

Figure 7-3 illustrates the sequence of questions for specifying incoming call destinations.

**Figure 7-3: PSI – Section 3 – Specify Incoming Call Destinations**

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>; =====  
>; PSI - Section 3 - Specify Incoming Call Destinations  
>; =====

Specify the X.25 destinations

NETGEN displays Questions 1.00 through 7.00 for each X.25 destination you want to specify. To indicate you are done, press **(RET)**. NETGEN then repeats the same questions for you to specify X.29 destinations instead of X.25.

>\* 01.00 Identify an incoming call destination. [S R:0 -6.]:

Each incoming call destination is identified by a destination name. You specify the parameters in the destination and these are used to decide if the incoming call will be accepted by the destination. One of the parameters in the destination also names the task that the call will be passed to, for processing.

You can specify a destination name up to 6 characters long.

If you have specified all destinations, answer with <RET>.

If you specified X.29 support, NETGEN automatically defines a destination so that X.29 calls use MCR as the command language interpreter. You do not need to specify such a destination for Question 1.00.

>\* 02.00 What is the priority? [D R:0 -255. D:127]:

All destinations are placed on the destination list in order of priority. When an incoming call arrives, the destination list is searched for a suitable destination. The call is sent to the first (i.e. highest priority) destination that can accept it. You can specify a priority in the range 0 to 255, where 0 is the lowest priority.

>\* 03.00 What is the object-id? [S R:1.-6.]:

The object-id identifies the task which will process the calls accepted by this destination. You can specify a task name, (up to 6 characters), or, if the object is a multicopy task, you must specify the object's number, (in the range 1 to 255).

A multicopy task can process as many calls at one time as there are copies of the task. If you are specifying a multicopy task here, you must select multicopy task support when you build the X25ACP component.

To indicate a multicopy task, you must specify an object number instead of an object name in Question 3.00.

NETGEN displays Question 3.01 if you specified a multicopy task in Question 3.00.

>\* 03.01 What is the task name for this object? [S]:

Specify the name of the multicopy task for this object. The name must be in the form:

AAAS\$\$

where

AAA denotes one to three alphanumeric characters.

>\* 04.00 What is the remote DTE address? [S R:0 -15.]:

If you specify a remote DTE address, only incoming calls from the specified remote DTE will be accepted by this destination.

Specify the address assigned to the remote DTE in the format required for this network, (see the PSI Reference Cards). Up to 15 digits are allowed. An asterisk in any position will match any digit in the corresponding position in the incoming call remote DTE address.

If the destination will accept calls from any remote DTE, answer with <RET>.

>\* 05.00 What is the subaddress range? [S R:0 -9.]:

If you specify a subaddress range, only incoming calls whose subaddresses are within the specified range will be accepted by this destination.

Specify the subaddress range using one of the following formats:

LLLL - HHHH	where LLLL is the low end of the range and HHHH is the high end. LLLL and HHHH are in the range 0 to 9999.
LLLL	where HHHH defaults to LLLL.
<RET>	where there is no subaddress range and thus the destination accepts calls with any subaddress.

>\* 06.00 What is the closed user group name? [S R:0 6.]:

Specify the name of the closed user group whose calls will be accepted by this destination. If the destination will accept calls from any user group, answer with <RET>.



>\* 07.00 What is the call mask? [S R:1. -32.]:

If you specify a call mask for this destination, the user data value in the incoming call is subjected to a logical-and operation. The value resulting from this masking operation is compared with the destination's call value. An incoming call will only be accepted by the destination if its masked call value is equal to the call value of the destination.

If the destination's call mask is longer than the user data in the incoming call, the call will only be accepted by this destination if the remainder of the call mask is zeroes.

Note that both call mask and call value are specified in hex.

If the destination has no call mask or call value, answer with <RET>.

>\* 07.01 What is the call value? [S R:1. -32.]:

Specify the call value that will be compared with the masked incoming call value to decide whether this destination will accept the call. The call value must be the same length as the call mask you have specified.

>; <EOS> Do you want to:

>\* <RET> - Continue, R - Repeat section, P - Pause,  
E - Exit.

## 7.4 Specifying Logical Names for Remote DTEs

This section defines the logical names for all remote DTEs accessed by your system.

```
>; =====  
>; PSI - Section 4 - Specify Logical Names for Remote DTEs  
>; =====
```

>\* 01.00 Identify a remote DTE. [S]:

A remote DTE is identified by its address, assigned by the network vendor. You can also associate a logical name with each remote DTE address.

Specify a remote DTE using the following format:

name,address

where

name is the logical name you have chosen for the DTE, (up to 6 characters).

address is the address assigned to the DTE by the network vendor.

If you have specified all remote DTEs, answer with <RET>.

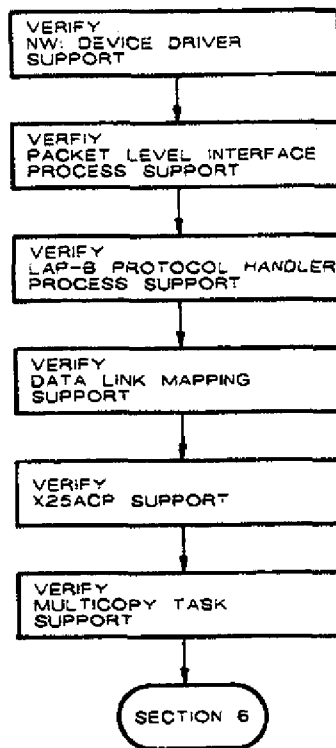
>; <EOS> Do you want to:

>\* <RET> -Continue, R - Repeat section, P - Pause,  
E - Exit.

## 7.5 Specifying Required Components

This section defines the required PSI components. NETGEN displays Questions 1.00 through 5.00 only in component mode. If you are building X25ACP, NETGEN displays Question 6.00. Figure 7-4 illustrates the sequence of questions for specifying required components.

**Figure 7-4: PSI - Section 5 - Specify Required Components**



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```

>; =====
>; PSI - Section 5 - Specify Required Components
>; =====
  
```

>\* 01.00 Do you want to build the NW process? [D=N] [Y/N]:

The NW process interfaces with the X.25 level 3 protocol, interfaces with user tasks via the QIO mechanism, validates user QIO requests, passes on non-data transfer requests to X25ACP, and provides for segmentation and recombination of data.

Answer Y if you want to build the NW process.

>\* 02.00 Do you want to build the PLI process? [D=N] [Y/N]:

The PLI process implements the X.25 level 3 protocol. It transmits and receives data packets, multiplexes many virtual circuits on one line, detects level 3 protocol errors, and controls allocation of logical channel numbers.

Answer Y if you want to build the PLI process.

If you have specified SDP and/or SDV device driver processes, NETGEN displays Question 3.00.

>\* 03.00 Do you want to build the LAB process? [D=N] [Y/N]:

The LAB process implements the X.25 level 2 protocol. It transmits and receives data, starts up and shuts down lines, detects and records errors, retransmits data if necessary, and traces frames that cross the level 2 and device driver boundary.

You require this process if you have chosen the SDP and/or SDV device drivers.

Answer Y if you want to build the LAB process.

Question 04.00 is asked only in component mode.

>\* 04.00 Do you want to build the X25ACP task? [D=N] [Y/N]:

The X25ACP task supports the NW process by processing functions that are not critical to system throughput. It connects and disconnects calls, requests tasks for incoming calls, and notifies tasks of network events.

Answer Y if you want to build the X25ACP task.

>\* 05.00 Do you want to build the DLM process? [D=N] [Y/N]:

The DLM process allows DECnet users to use X.25 to communicate with remote DTEs on a PSDN.

Answer Y if you want to build the DLM process.

Multicopy task support is always included in a standard function network. If, therefore, you are in question and answer mode and you answered YES to Question 09.00 in Section 1 of the NET portion of NETGEN, Question 06.00, following, is not displayed. NETGEN, however, will display Question 06.00 if you are building the X25ACP task in component mode.

>\* 06.00 Do you want multicopy task support? [D=N] [Y/N]:

Multicopy task support allows for multiple copies of a server task connected by object type to be spawned. This feature permits users to write single-threaded tasks that perform a network service and have more than one request serviced at a time. The multicopy attribute can be enabled/disabled on a "per object" basis with the SET OBJECT command under NCP, CFE or VNP.

>; <EOS> Do you want to:

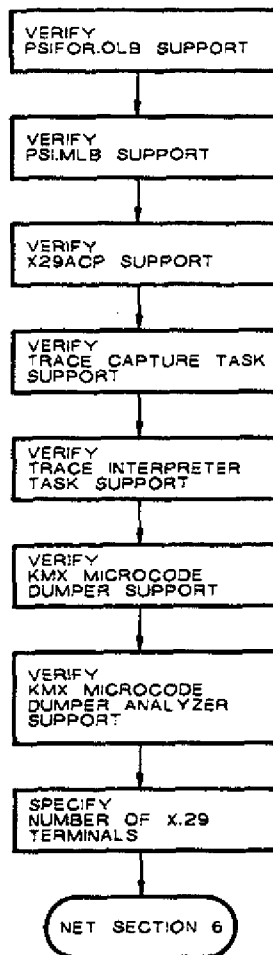
>\*       <RET> - Continue, R - Repeat section, P - Pause,  
          E - Exit.

## 7.6 Specifying Optional Components

This section defines the optional PSI components that you may want to build. Figure 7-5 illustrates the sequence of questions for specifying optional components.

**Figure 7-5: PSI - Section 6 - Specify Optional Components**

---



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---

> ; =====  
> ; PSI - Section 6 - Specify Optional Components  
> ; =====

>\* 01.00 Do you want to include the PSIFOR.OLB library? [D=N]  
[Y/N]:

If you want to write network tasks in FORTRAN, you must include the PSIFOR.OLB library in your target system, so answer Y to this question.

>\* 02.00 Do you want to include the PSI.MLB library? [D=N]  
[Y/N]:

If you want to write network tasks in MACRO-11, you must include the PSI.MLB library in your target system, so answer Y to this question.

If you chose X.29 support in PSI Section 1, Question 2.00, NETGEN displays Question 3.00.

>\* 03.00 Do you want to build the X29ACP task? [D=N] [Y/N]:

The X29ACP task supports the X.29 protocol. It handles incoming X.29 calls, and provides an interface with the CLI for unsolicited input data.

If you need support for remote X.29 terminals, answer Y to this question.

>\* 04.00 Do you want to build the TRA task? [D=N] [Y/N]:

The TRA task traces frames over a line and records the traced frames on a disk. This helps you to find out what types of packets are being transmitted and received on the line and thus to monitor its performance.

Answer Y if you want to build the TRA task.

>\* 05.00 Do you want to build the TRI task? [D=N] [Y/N]:

The TRI task interprets the data produced by the TRA task so that you can print the traced frames. If you want to write your own trace interpreter task you need not include TRI in the system you are building.

Answer Y if you want to build TRI.

>\* 06.00 Do you want to build the DUK task? [D=N] [Y/N]:

The DUK task dumps the KMX/KMY/KMV microcode onto a disk. You can then run the KDA task to convert the dump to a printable format. You require these tasks only if you have a KMX, KMY, or KMV device.

Answer Y if you want to build DUK.

>\* 07.00 Do you want to build the KDA task? [D=N] [Y/N]:

The KDA task converts a KMX/KMY/KMV microcode dump on a disk into a printable format. You require this task only if you have a KMX, KMY, or KMV device.

Answer Y if you want to build KDA.

>\* 08.00 How many X.29 terminals are supported [D R:1. -40.]:

Specify the maximum number of X.29 terminals that you want to operate simultaneously.

In response to Question 8.00, do not specify a value that exceeds the number of HT: units you specified in DEC Section 6, Question 3.02.

>\* 9.00 Do you want to include the PSIPAD task? [D=N] [Y/N]

The PSIPAD task provides X.29 PAD emulation. This allows logical terminal users to make outgoing calls to any remote DTE that supports the X.29 protocol.

Answer Y to include PSIPAD.

>; <EOS> Do you want to:

>\* <RET> -Continue, R - Repeat section, P - Pause,  
E - Exit.

>; =====  
>; PSI - PSI CEX Product Generation Procedure  
>; All questions answered at *time* on *date*  
>; =====

## NOTE

At this point, the network generation procedure proceeds to NET Section 8 (Chapter 5).



---

## Configuring a Pregenerated RSX-11M-PLUS End Node

This chapter applies only to users who are configuring a pregenerated RSX-11M-PLUS end node.

### 8.1 Preliminary Considerations

Before running the DECnet configuration procedure, it is recommended that you

- Make a copy of your target disk. The target disk will be write enabled during this procedure.
- Make sure you have enough free space (2200 blocks) to run this procedure.

### 8.2 Starting the NETGEN Procedure

To run the DECnet configuration procedure,

- Mount the DECnet-11M-PLUS distribution disk  
`MCR> MOU dduu:ENDNODEKIT`
- Invoke the NETGEN command file by entering:  
`@dduu: [137,10]NETGEN.CMD`

The variable *dduu* refers to the kit disk.

The following paragraphs describe the NETGEN dialog format, organization, and operating modes.

## 8.2.1 NETGEN Dialog Format

The NETGEN dialog format consists of questions, optional explanatory text, formats for user responses, default values, and responses for break questions.

### 8.2.1.1 Explanatory Text

During the NETGEN dialog, you can read expanded information for a question. You elicit this text on a question-by-question basis by pressing the ESCAPE key after the question is displayed. This causes the NETGEN command file to issue an explanation and then reissue the question. For example, if you press **ESC** in response to the question:

```
> 02.00 Target system device? [dduu, D=SY00:] [S]:
```

NETGEN prints the following explanatory text and then repeats the question:

This device will contain all files required to run DECnet. This includes all task files, databases, command files, and generation work files. This must be a Files-11 disk device. The trailing colon (e.g. SY:) is optional. The default device is SY:.

#### NOTE

The explanatory text above and after each question in Section 8.3 is a word-by-word representation of what you will see on your screen when you configure a pregenerated RSX-11M-PLUS end node. It may not, however, be a line-by-line representation of what appears on your screen.

### 8.2.1.2 Response Formats

Your response to NETGEN questions will be one of three types:

- YES/NO [Y/N]
- Numeric [N]
- Character string [S]

NETGEN's default answer for a YES/NO question is NO unless otherwise stated.

#### NOTE

If you respond to most NETGEN questions using default answers, you will generate a working system.

Numeric responses are octal or decimal. In the example [O R:1-377 D:5], O indicates the octal number, R indicates the range, and D indicates the default. In the example [D R:1.-16. D:1.], the first D indicates the decimal number, R indicates the range, and the second D indicates the default. You do not need to include a decimal point after the number you enter; it is assumed.

Character string responses can include letters, numbers, and special characters. In the example [*dduu*,D = DB01:][S], *dd* refers to 2 letters for the device, *uu* refers to 2 numbers for the unit, D refers to the default, and S refers to a string that can include letters, numbers and special characters. See Table 8-1 for a summary of NETGEN responses.

**Table 8-1: Summary of NETGEN Responses**

Response Type	NETGEN displays:	You enter:
YES/NO	[D = N] [Y/N]:	Y to indicate YES, N to indicate NO, or press <b>(RET)</b> for default NO.
Numeric Octal	[O R: <i>m-n</i> ]:	An octal number in the range of <i>m</i> through <i>n</i> .
	[O R: <i>m-n</i> D: <i>d</i> ]:	An octal number in the range of <i>m</i> through <i>n</i> or press <b>(RET)</b> to indicate that the default <i>d</i> should be used.
Numeric Decimal	[D R: <i>m.-n.</i> ]:	A decimal number in the range of <i>m</i> through <i>n</i> .
	[D R: <i>m.-n.</i> D: <i>d.</i> ]:	A decimal number in the range of <i>m</i> through <i>n</i> or press <b>(RET)</b> to indicate that the default <i>d</i> should be used. You do not need to include a decimal point after the number you enter.
Character String	[S]:	A character string of any length.
	[ <i>f</i> , D: <i>d</i> ][S]:	A character string in the form <i>f</i> (such as <i>ddu:</i> ), or press <b>(RET)</b> to indicate that the default <i>d</i> should be used.
	[S R: <i>m.-n</i> ]:	A character string from <i>m</i> through <i>n</i> characters in length.

## 8.2.2 Responses for End-of-Section and Break Questions

If you want to interrupt normal processing, enter **CTRLZ**. This displays the following break question:

```
>;<BRK> Do you want to:  
>      <RET>-Continue, R-Repeat Procedure, P-Pause,  
      E-Exit[S]:
```

Respond by entering one of the following options:

- RET** Continuing with the dialog.
- R** Repeating the dialog you just interrupted. Responses are discarded, and the entire dialog is repeated.
- P** Pausing from the dialog. This response temporarily suspends the indirect command file, and gives you direct access to the operating system to perform a task.

The system displays one of the following messages:

AT.--PAUSING. TO CONTINUE, TYPE "RES *string*"

or

AT.--PAUSING. TO CONTINUE, TYPE "UNS *string*"

After you have completed your task, you can continue processing by entering:

RES *string*

or

UNS *string*

Enter RES or UNS, depending on the system message you received, and enter the *string* displayed in the message. After the Pause, the break question is repeated.

- E** Exiting from NETGEN. No responses are saved. Entering **CTRLZ** in response to an EOS question is identical to entering E.

### 8.3 The Pregenerated RSX-11M-PLUS Dialog

The pregenerated RSX-11M-PLUS procedure displays the following dialog:

```
>; =====  
>; NETGEN - Installation Procedure For Pregenned RSX-11M-PLUS  
>;                               End Nodes  
>;           Started at time on date  
>; =====
```

```
>; 01.00 Do you want to see the NETGEN notes/cautions? [D=N]  
[Y/N]:
```

Note the following:

-----

- . This procedure installs the DECnet V3.0 software that will run with the pre-SYSGENned RSX-11M-PLUS V3.0 system. The software installed by this procedure will not run with earlier RSX-11M-PLUS systems.
- . It is recommended that you back up your target disk before continuing since the disk will be write enabled during the NETGEN sequence.
- . Your target disk must have a minimum of 4000 blocks free.
- . The following installed tasks are required on your host system while you are performing your NETGEN:

PIP is always required.  
LOA and UNL if device drivers require loading.  
MOU and DMO if disks require mounting.  
UFD if the required UICs do not already exist.

If these tasks are not already installed, and you are logged in as a privileged user, NETGEN will install them automatically. If NETGEN requires a task that it cannot install, it will pause to allow you to correct the situation.

- . For questions with defaults, the default may be selected by pressing a carriage return (<RET>) in response to the question.
- . Additional explanatory text for each question may be obtained by pressing the ESCAPE key.
- . It is possible to interrupt the network installation procedure by typing <CTRL/Z> in response to any question. You will then be given the options of either continuing, restarting the procedure from the beginning, temporarily pausing, or terminating the procedure.

>\* 02.00 Target system device? [dduu, D=SY00:] [S]:

This device will contain all files required to run DECnet. This includes all task files, databases, command files, and generation work files. This must be a Files-11 disk device. The trailing colon (for example, SY:) is optional. The default device is SY:.

>\* 03.00 UIC Group Code for DECnet? [O R:1-137 D:5] [S]:

Specify the UIC Group Code under which all DECnet files will reside. Work files, library files, object files, task files and database files will all appear under various user codes within this group (for example [5,\*]). Files which already exist under these UICs may be deleted or purged.

Note that the user must have privileges to create, write, read, and delete all files under the chosen UIC Group Code.

>\* 04.00 What is the target node name? [S R:0-6]: [S]:

Enter the node name for the DECnet node being generated. This must be 1 to 6 alphanumeric characters, at least one of which must be an alphabetic (A-Z).

Although it is not required, it is highly recommended that this name be used by all other nodes in the network to identify this node.

Note that the node name can later be changed with CFE.

>\* 04.01 What is the target node address [D R:1.-1023. D:1.]

Enter the node address that has been assigned for the node being generated. The format is:

AREA.NODE\_NUMBER (Example: 3.17)

An AREA value must be entered if you want to specify the area in which the node being generated will be located. If no value is specified for AREA, a value of 1 is assigned. AREA, therefore, must be specified for nodes that you do not want to include in area 1. AREA is a decimal value in the range of 1-63. NODE\_NUMBER specifies the address of the node within a given area. It must be a unique decimal value within the area, in the range of 1-1023.

The node address, consisting of the AREA and NODE\_NUMBER fields, will be the address of this node within the network. If you are entering values in both the AREA and NODE\_NUMBER fields, you must also enter the dot between the fields.

More efficient operation can be obtained by setting the node numbers of the nodes in the area in the range 1 to the number of nodes in the area. The highest node number would then be equal to the number of nodes in the area.

Note that the node address may later be changed with CFE.

>\* 04.02 Target node ID? [D=None] [S R:0.-32]:

Enter the ID string for the node being generated. This string may be from 0 to 32 characters. Note that this string must not contain any single-quote ('), double-quote (") or comma (,) characters.

The node ID may be any arbitrary string which is useful in identifying the node.

To enter a null node ID string, type a single space, followed by a RETURN.

>\* 05.00 Remote node name [<RET>=Done] [S R:0-6]:

You may, at this time, define a series of node names which correspond to nodes in your network. When the network is loaded, these node names will automatically be set. Enter a RETURN when you have no more remote node names to define.

Each node name will be assigned to a node address. Standard procedure is to start with the node name for the lowest node address used, and to progress from there to the highest node address.

It is recommended that each node in the network assign the same node name to each individual node, reducing the confusion of moving from node to node.

Remote node names can be added or deleted using NCP, VNP, or CFE.

>\* 05.01 What is the remote node address [D R:1.-1023. D:1]:

Enter the node address that *node-name* has been assigned in the network. The format is:

AREA.NODE\_NUMBER (Example: 3.18)

Where AREA is the area number within the network and NODE\_NUMBER is the node number within that area. The area must be a decimal number in the range of 1 to 63. If only NODE\_NUMBER is specified, the area that was specified for the node being generated, will be used as the default area number.

The node number within the area must be a decimal number in the range 1 to 1023. If you are entering values in both the AREA and NODE\_NUMBER fields, you must also enter the dot between the fields.

Each node address defines a unique node in the network, and must be assigned when the network is first set up.

The remote node address can be changed using NCP, VNP, or CFE.

The variable *node-name* refers to the name you specified in Question 04.00.

>\* 06.00 Device Driver Process name [S R:0-3]:

The Device Driver Module (DDM) Process name identifies a process which controls an I/O device.

The legal DECnet device driver process names for a UNIBUS processor are:

Name	Physical device	Name	Physical device
-----	-----	-----	-----
DMC DMC11 or DMR11	DL	DL11	
DMP DMP11	DZ	DZ11	
DUP DUP11	DH	DH11	
PCL PCL11			
UNA DEUNA			
UNA DELUA			

The legal DECnet device driver process names for a Q-bus processor are:

Name	Physical device	Name	Physical device
-----	-----	-----	-----
DMV DMV11	DLV	DLV11	
DPV DPV11	DZV	DZV11 or DZQ11	
QNA DEQNA	DHV	DHV11 or DHQ11	
QNA DELQA			

>\* 06.01 CSR address for *dev-x*? [O R:160000-177774]:

Specify the Control/Status Register (CSR) address for the controller.

Note that the CSR address can later be changed with NCP, VNP, or CFE.



>\* 06.02 Vector address for *dev-x* [0 R:4-774]:

Specify the interrupt vector address for the controller.

Note that the vector address can later be changed with NCP, VNP, or CFE.

Question 6.03 is displayed for DL11 devices only.

>\* 06.03 Is *dev-x* a DL11-E? [D=N] [Y/N]:

Answer the question YES only if the device is a DL11-E or DLV11-E. These are the only DL11 options that allow the Clear To Send signal to pass through the interface.

Questions 6.04 and 6.05 are displayed for asynchronous devices only.

>\* 06.04 Is modem signal monitoring required for *dev-x* [D=N]? [Y/N]:

If the line is connected to a modem for a dial-up switched circuit service, you should select modem monitoring. Modem signal monitoring checks the Carrier Detect signal (CD or CAR) for asynchronous lines.

If this signal is missing for two consecutive samples, taken at one second intervals, the line will be declared "down" without waiting for a DECnet protocol to detect the failure.

If your modem supports this signal and you wish modem monitoring, answer this question YES.

>\* 06.05 Does the modem switch carrier with Request To Send [D=N]? [Y/N]:

It is necessary to distinguish asynchronous line modems which present continuous carrier once the connection is established, such as the BELL 103 or BELL 212, from those which switch carrier along with Request To Send, such as the BELL 202.

Answer the question YES if you are using a BELL 202 modem or an equivalent.

>\* 06.06 Is *dev-x* a multipoint tributary [D=N]? [Y/N]:

Answer this question YES, only if the line is a tributary on a multipoint line.

If you answer Question 6.06 YES, the procedure displays Question 6.07.

>\* 06.07 What is the tributary address of *dev-x*? [Y/N]:

Specify the tributary address which is to identify this multipoint tributary to the multipoint master. Each multipoint tributary must be identified by a unique tributary address.

Note that the tributary address can later be changed with NCP, VNP, or CFE.

Question 06.08 is displayed for PCL devices only.

>\* 06.08 What is the TDM bus address for *dev-x*? [Y/N]:

Specify the address used by the local PCL to communicate with the PCL on the other system. This is the PCL's address on the Time Division Multiplexed (TDM) bus. This address must be the same address that was set in the PCL's hardware during installation.

Note that the TDM bus address can later be changed with NCP, VNP, or CFE.

>\* 07.00 Do you want the Satellite Support Components [D=N]

The DECnet Satellite Support Components are:

- DLL - The down-line system loader, host component
- DUM - The up-line system dumper, host component
- CCR - The Console Carrier Requester, host component
- HLD - The down-line task loader, host component

If you answer YES to this question, all of the Satellite Support Components will be generated. If you answer NO to this question, none of the Satellite Support Components will be generated.

CCR will be displayed here only if you specified an Ethernet device in Question 6.00 of this procedure.

```
>; =====
>; NETGEN - Installation Procedure For Pregenned RSX11-M-PLUS
>;      End-Nodes
>;      Question/answer section completed at time on date
>; =====
```

All the questions have been answered. The installation procedure will now move the required files onto your target disk. This may take from five to ten minutes to complete, depending on the system you are running on.

Copying the CEX Components  
 Copying the CEX Support Components  
 Copying the System Management Utilities  
 Copying the DECnet Communications Components  
 Copying the DECnet Network Management Components  
 Copying the DECnet File Utilities  
 Copying the DECnet Terminal Utilities  
 Copying the DECnet Satellite Support Components

Creating NETCFE.CMD, the Network Configuration Command file.  
 Creating NETCFG.TXT, the Network Configuration Description file.  
 Creating NETINS.CMD, the Network Installation Command file.  
 Creating NETREM.CMD, the Network Removal Command file.

```
> ; =====
> ; NETGEN - Installation Procedure For Pregenned RSX11-M-PLUS
> ;      End-Nodes
> ;      The file move phase completed at time on date
> ; =====
```

Your DECnet software should now be on your target disk. If there were any errors reported while the software was being moved to the target disk, correct the problem and rerun the installation procedure. Your system configuration is the following:

The line parameters are:

Device=*device-name*, *full-or-half-duplex*, *synch-or-asynch*  
 CSR=*csr*, Vector=*vector*, Priority=*device-priority*  
 Speed=*speed*, State=ON

The Executor parameters are:

Node name=*name*, Address=*node-address*  
 Maximum links=*max-links*, Maximum hops=*max-hops*

The System parameters are:

Maximum control buffers=*xxx*, Minimum receive buffers=*yyy*  
 Maximum large buffers=*zzz*, Large buffer size=*nnn*

If you want to change any of these parameters in the permanent database, use the following CFE commands:

```
DEFINE LINE      - will change the line parameters
DEFINE CIRCUIT   - will change circuit parameters (none were
                  listed above)
DEFINE EXECUTOR  - will change the executor parameters
DEFINE SYSTEM    - will change the system parameters
```

See the DECnet-RSX Guide to Network Management Utilities for more details on CFE or NCP commands.

The startup file that was provided with your RSX-11M-PLUS system may be set up to deallocate the DECnet Communications Executive.

If this is still in your startup procedure, change it so the DECnet Communications Executive is not deallocated, the next time your system is booted. The startup file also indicates how to install DAPRES. If you want RMS access to remote files, install DAPRES as indicated in the startup file.

To change the start-up file:

1. Use your favorite editor to access the start-up procedure's data file ([1,2]SYSPARM.DAT).
2. Change DECNET = NO to DECNET = YES.
3. If you want the resident DAP library, change DAPRES = NO to DAPRES = YES.

Once you are satisfied with the configuration, you may bring up your network by:

Setting up the network UIC with the SET /NETUIC=[xxx,54] command, then invoke dduu:[xxx,001]NETINS.CMD. The network UIC may also be permanently set with VMR.

```
> ;=====
> ; NETGEN - RSX-11M-PLUS Pregenned End Node Installation
> ; Procedure
> ; Stopped at time and date
> ;=====
> * <EOF>
```

You should now proceed to Chapter 9 for information on the use of the NETINS.CMD command procedure.

---

## Installing DECnet

This chapter tells you how to install and load DECnet on various host systems. It also tells you how to automate the installation procedure and how to modify the network installation command file (NETINS.CMD) to meet certain needs.

### NOTE

Before using the NETINS.CMD procedure to bring up the network, you should set the network UIC. Use the following VMR or MCR command:

```
SET /NETUIC=[x,54]
```

If you set the wrong UIC, NETINS.CMD will use the set UIC and may load the wrong network.

### 9.1 Steps Prior to Network Installation

To verify that you specified DECnet-RSX system information correctly during the NETGEN process, use one of the following procedures:

- Examine the network component parameters using the Configuration File Editor (CFE).
- List and examine NETCFE.CMD and NETCFG.TXT, both located under the network UIC [xxx,1].

These techniques are described in the following sections.

### 9.1.1 Use of the Configuration File Editor (CFE)

CFE can be used to examine the data for the network configuration. (For more information on CFE, refer to the *DECnet-RSX Guide to Network Management Utilities*.) Use the following CFE commands to determine how the component parameters were set during NETGEN:

LIST SYSTEM

LIST EXECUTOR

LIST KNOWN LINES

LIST KNOWN CIRCUITS

LIST KNOWN LOGGING

LIST KNOWN NODES

LIST KNOWN OBJECTS

The following CFE commands are useful only in DECnet-RSX networks that interface with a Packet Switching Data Network (PSDN) by means of the Packetnet System Interface (PSI) product:

LIST MODULE X25-ACCESS

LIST MODULE X25-PROTOCOL

LIST MODULE X25-SERVER

LIST MODULE X29-SERVER

### 9.1.2 Examination of NETCFE.CMD and NETCFG.TXT

The NETCFE.CMD file is a journal of all the commands entered and executed during NETGEN. This file also lists the CFE commands executed in the selection of any of the default values implicitly or explicitly specified during NETGEN.

The NETCFG.TXT file contains a narrative description of the system configuration as formed during NETGEN.

Both files are a product of network generation. They accurately reflect the configuration of the network at NETGEN. To use the information in these files, list one or both on a hard-copy device and verify that the results of the network generation reflect the options that you intended to specify.

## 9.2 Installing DECnet on RSX-11M/M-PLUS Systems

If you are ready to install and load the network tasks and components as produced by NETGEN, execute the network installation command file. To do this, enter:

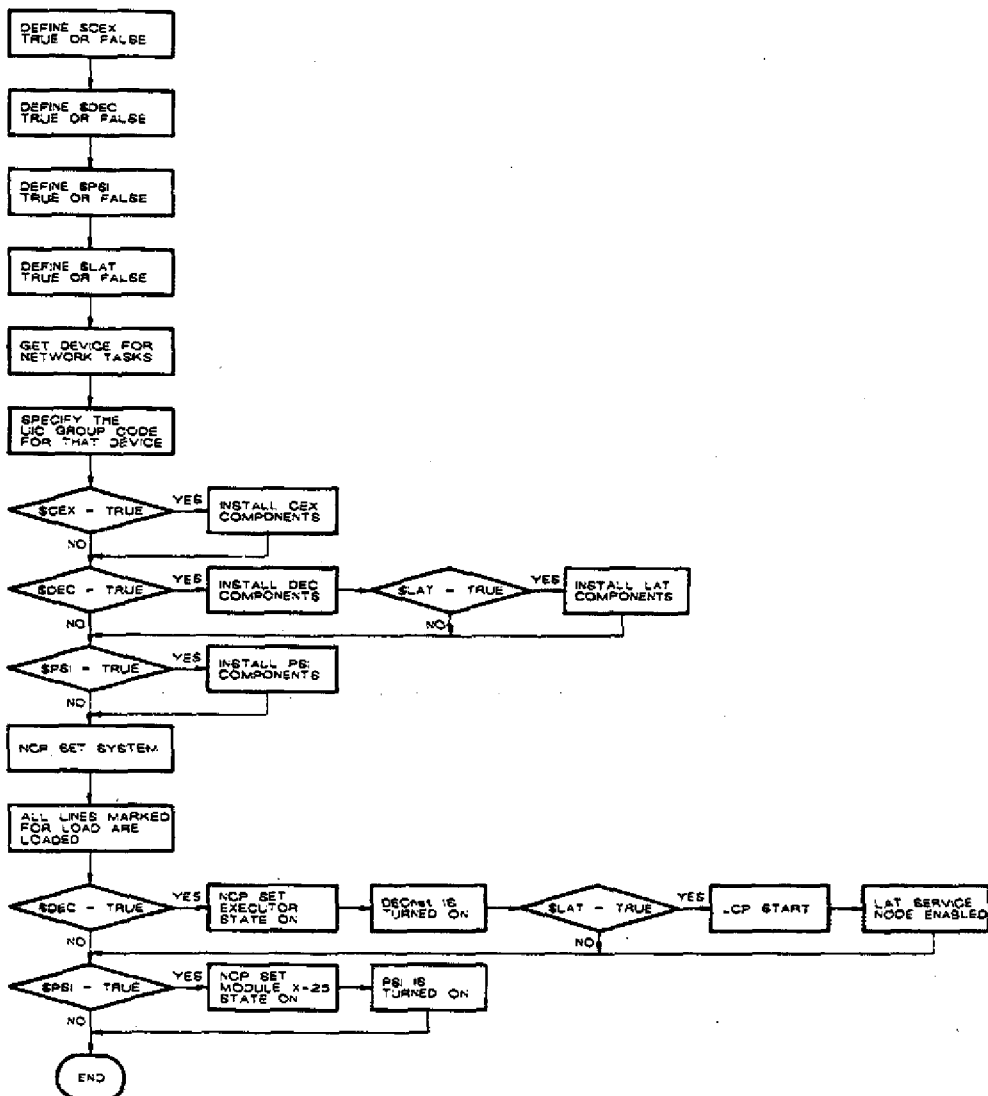
```
@dduu:[x,1]NETINS.CMD
```

The variable *dduu* refers to the target disk, and the variable *x* refers to the group code you specified in NETGEN.

If you do not want to execute the NETINS.CMD file produced by NETGEN because you want to automate the installation procedure, or because you want to modify this file to meet certain unique needs, refer to Section 9.2.1.

Figure 9-1 illustrates the installation procedure for an RSX-11M/M-PLUS system using the NETINS.CMD file as produced by NETGEN.

**Figure 9-1: Installation Procedure for an RSX-11M/M-PLUS System**



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NETINS.CMD displays the following six questions. If LAT is not included in your configuration, Question 3 is not displayed. If you do not have a license for PSI, Question 4 is not displayed.

1.. >\* Do you want to install and load the CEX system? [Y/N]

If you want to install all tasks and load the network partitions and Communications Executive that are common to both DECnet and PSI, answer this question YES.

2.. >\* Do you want to install and start DECnet? [Y/N]

If you want to install all DECnet-specific tasks, answer this question YES. This causes the network to be turned on. Any circuits marked for enable will be turned on. If you have already loaded DEC, answer this question NO.

For more information on setting circuit states, see the *DECnet-RSX Network Management Concepts and Procedures* manual.

3.. >\* Do you want to start LAT? [Y/N]

If you want LAT started, answer this question YES. This causes the LCP program to issue a START command which makes your service node available to LAT terminal server users. If you have already started LAT, answer this question NO.

4.. >\* Do you want to install and start PSI? [Y/N]

If you want to use DECnet with data link mapping (DLM) or you want to use the PSI User Interface, answer this question YES. Answering YES enables the PSI lines that have been previously marked for enable, and enables the X.25 Server. If you have already loaded PSI, answer this question NO.

5.. >\* On what device are the network tasks? [D=dduu:]

Enter the name of the device for the NETGEN target disk where the network tasks are located.

6.. >\* What is the network UIC group code? [D=xxx]

The variable xxx refers to the group code of the UIC you are currently in.

If you are bringing up the node for the first time and you want to make sure the node was generated properly, consult Chapters 10 and 11 for the proper testing procedure. For more information on the system management commands required to bring up a node, see the *DECnet-RSX Network Management Concepts and Procedures* manual.

### 9.2.1 Modifying NETINS.CMD

#### CAUTION

In the standard NETINS.CMD file generated by NETGEN, the installation of CFE and VNP has been disabled by placing a leading period and semicolon (.;) on the line installing each of these programs. CFE and VNP are privileged utilities that should be used only by system managers. If you modify these lines to allow CFE and VNP installation, any user can perform CFE and VNP operations.

You must edit the NETINS.CMD file to meet certain needs, such as:

- Adding a new component
- Installing a task in a different partition
- Saving DSR pool space
- Changing the way a task is installed
- Installing and starting the network automatically

**Adding a new component:** If you add a new component such as FAL, NFT, or TLK in component mode, you must add this component to the NETINS.CMD file. For example, to install TLK, enter a line like the following:

```
INS xx:[371,054]TLK
```

**Installing a task in a different partition:** If you want to install a task in a partition other than GEN, add /PAR = xxxxxx to the appropriate line. The variable xxxxxx refers to the new partition for the installed task. For example, to install NETACP in the partition ACPPAR, modify NETINS.CMD as follows:

```
INS xx:[371,054]NETACP/PAR=ACPPAR
```

In this case, the group code, 371, is a variable. For you, this group code number must be the value you specified in NETGEN.

**Saving DSR pool space:** If you want to save DSR pool space, you can prevent NETINS.CMD from installing certain tasks. To do this, place a semicolon (;) or a period and semicolon (.;) before the INS command on the line for that task. The semicolon (;) form causes the line to print, while the period and semicolon (.;)

form does not. This procedure is preferable to deleting the line because you will retain a record of the original NETINS.CMD version. You can install these tasks later by using the appropriate MCR commands.

**Changing the way a task is installed:** If you want to change the way a task is installed, you may need to edit the NETINS.CMD file. If you specified memory-resident RMS in an original network generation, NETINS.CMD will automatically check to see if the memory-resident RMS library was installed. If you did a component mode generation and you generated a version of FAL that does not require memory-resident RMS, you should remove this check by editing the NETINS.CMD file.

**Installing and starting the network automatically:** If you want to install and start the network automatically, you must edit the NETINS.CMD file and define the values \$CEX, \$DEC, \$LAT, and \$PSI. If \$CEX, \$DEC, \$LAT, or \$PSI are defined and set TRUE, NETINS.CMD automatically installs and loads these products. If \$CEX, \$DEC, \$LAT, or \$PSI are defined and set FALSE, NETINS.CMD does not install or load these products. After you define these values, you must also specify the device name for the disk where the network tasks are located and the network UIC.

If you define the products, the device name, and the network UIC, NETINS.CMD performs all functions without displaying any questions. If any of these are not defined, NETINS.CMD displays the appropriate questions.

To modify the NETINS.CMD file, add the following lines to the beginning of the file:

1. To define \$CEX, \$DEC, \$LAT, and \$PSI, enter:

```
.SETT $CEX  
.SETT $DEC  
.SETT $LAT  
.SETT $PSI
```

In this example, all values are defined TRUE. You can change these values (TRUE or FALSE) to meet your own needs. To assign a device name (xx:) for the target disk device (dduu:), add the following line:

```
ASN dduu:=xx:
```

The network task device (dduu:) is the target device you specified in NETGEN.

2. To define the network UIC group code, add the following line:

```
SET /NETUIC=x,54]
```

Or execute the following VMR command on the RSX-11M/M-PLUS system image:

```
VMR> SET /NETUIC=[x,54]
```

The variable *x* refers to the group code specified in NETGEN.

Finally, to invoke the NETINS.CMD file automatically, add the following line to the system start-up command file:

```
* dduu:[x,1]NETINS.CMD
```

The variable *x* refers to the group code specified in NETGEN.

If you follow this procedure, NETINS.CMD installs and loads the network software automatically.

After installing and loading the network for the first time, you should execute the testing procedures described in Chapters 10 and 11.

### 9.2.2 Using VMR to Install Network Tasks

An optional way of starting the network is to use the Virtual Monitor Routine (VMR) commands to install network tasks. You can use individual VMR commands and/or you can edit the SYSVMR.CMD file. (See Section 3.2.5.10 for information about SYSVMR.CMD.)

Using VMR has three advantages over using the NETINS.CMD file:

- VMR reduces start-up time because the system already contains the tasks in installed form when booted.
- Installing tasks with VMR minimizes fragmentation in the Dynamic Storage Region (DSR) pool.
- There is no possibility of the RSX-11M loading problem discussed in Section 3.2.3.

The commands for VMR are essentially the same as the MCR commands used in NETINS.CMD. There are two exceptions — the CLI command and the LOAD command. The CLI command and the /HIGH switch of the LOAD command are

not supported in VMR. Instead of the LOA NM:/HIGH command used by NETINS.CMD, use the following command:

LOA NM:

The CLI command in NETINS.CMD that deals with RMTACP (CLI/INIT = RMTACP...) should be deleted and issued as a command to MCR.

After making these two changes you should include the commands found in the NETINS.CMD file in the SYSVMR.CMD file.

### NOTE

On RSX-11M and RSX-11M-PLUS systems, you cannot use the VNP SET EXECUTOR STATE ON command. If you want the network to be loaded automatically, you must include the NCP SET EXECUTOR STATE ON command in your system start-up file.

For more information on Virtual Monitor Routine (VMR) commands, see the *RSX-11M/M-PLUS System Management Guide*.

## 9.3 Installing DECnet-11S Systems

To install DECnet on an RSX-11S system, use the virtual monitor routine with NETINS.CMD (see Section 9.3.1). Then use VNP to load the network into the RSX-11S system image (see Section 9.3.2). For a description of down-line system loading or down-line task loading, see the *DECnet-RSX Network Management Concepts and Procedures* manual.

### 9.3.1 Installing Tasks Using VMR Commands

To install tasks using VMR commands, perform the following procedures:

1. MCR> SET /UIC=[1,64]
2. Invoke the virtual monitor routine:  
  
MCR> VMR
3. VMR then prompts you to enter the RSX-11S system image file name:

Enter filename: RSX11S.SYS

#### 4. Invoke the NETINS.CMD file:

```
VMR> *dduu:[x,1]NETINS
```

The variable *dduu* refers to the target disk and the variable *x* refers to the group code you specified in NET Section 1, Question 4.00. VMR executes the NETINS.CMD file and produces a preinstalled, ready-to-be-booted system image, but the network will not be usable unless you load it and turn it on with VNP before booting.

Example 9-1 displays a NETINS.CMD file for an RSX-11S system generated with all optional components. NTINIT and NETACP are required tasks. If RCP1 and MLD appear in your command file, they are also required. Remaining tasks are optional. If you are installing EVC, you should load NM:. If you are installing SLD, you should load OV:.

#### **Example 9-1: Typical NETINS.CMD for an RSX-11S System**

---

```
SET /NETUIC=[xxxx,64]
INS NTINIT/FIX=YES
INS MLD/FIX=YES
INS EVC/FIX=YES
INS NCP/FIX=YES
LOA NM:
INS NETACP/FIX=YES
INS RCP1/FIX=YES
INS NICE/CKP=NO/FIX=YES
INS EVR/FIX=YES
INS NTD/CKP=NO/FIX=YES
INS NTDEMO/CKP=NO/FIX=YES
INS MIR/CKP=NO/FIX=YES
INS SLD/FIX=YES
LOA OV:
INS FAL/CKP=NO/FIX=YES
INS RMT/CKP=NO/FIX=YES
INS RMTACP/FIX=YES
LOA HT:
INS RMHACP/CKP=NO/FIX=YES
INS TLK/CKP=NO/FIX=YES
INS LSN/FIX=YES
INS TCL/CKP=NO/FIX=YES
```

---

If you want to change the way tasks are installed, you must either modify the NETINS.CMD command file before using it with VMR, or at a later time, modify the system image with VMR.

- If you are not installing SLD and loading OV:, you cannot down-line load or up-line checkpoint tasks. Tasks should be fixed in memory using the `FIX = YES` switch and installed as noncheckpointable. For example:

```
INS RMT/CKP=NO/FIX=YES
```

- If you are installing SLD and loading OV:, you can down-line load and/or up-line checkpoint tasks. In either case, do not use the `FIX` switch. `NETGEN` builds all tasks that can be checkpointed as checkpointable. If you want to install a task as checkpointable, do not specify a switch. For example:

```
INS RMT
```

If you want to install a task as noncheckpointable, specify `/CKP = NO`. For example:

```
INS RMT/CKP=NO
```

### 9.3.2 Loading the Network Using VNP Commands

After using `VMR` to install your tasks, use the Virtual Network Processor (VNP) commands to load the network. To load tasks using VNP commands, perform the following procedures:

1. Enter:

```
RUN dduu:[x,64]VNP
```

The variable *dduu*: refers to the target disk and the variable *x* refers to the group code you specified in `NET` Section 1, Question 4.00.

2. VNP then prompts you to enter the `RSX-11S` system image file name:

```
Enter filename: RSX11S.SYS
```

3. The following `SET` command will start the network and enable circuits that were requested to be enabled during `NETGEN`:

```
VNP> SET SYSTEM
VNP> SET EXECUTOR STATE ON
```

4. To load lines not previously set to ON, enter:

```
VNP> SET LINE line-id ALL
```

5. To enable circuits not previously set to ON, enter:

```
VNP> SET CIRCUIT circuit-id STATE ON
```

6. If you want to check the states of your lines and circuits, enter the following two commands:

```
VNP> SHOW LINE line-id  
VNP> SHOW CIRCUIT circuit-id
```

For more information on using these commands, see the *DECnet-RSX Guide to Network Management Utilities*.

After preparing the system image as just described, you have a ready-to-be-booted system image. If you need more information on how to boot or down-line load an RSX-11S system, refer to the *DECnet-RSX Network Management Concepts and Procedures* manual.

After installing and loading the network for the first time, you should execute the testing procedures described in Chapters 10 and 11. If you want to perform these tests you should also set up a loop node for the circuit(s) you will be testing. To set up a loop node for a circuit enter the following command:

```
VNP> SET NODE loop-name CIRCUIT circuit-id
```

where *loop-name* is the name of the loop node and *circuit-id* is the name of the circuit you will be testing. You must do this with VNP prior to running the loop tests because RSX-11S NCP does not support setting up a loop node. For more information on loop node testing, see the *DECnet-RSX Network Management Concepts and Procedures* manual.

## 9.4 Installing a DECnet-11S System on a VAX/VMS System

This procedure (intended for users who are installing DECnet-11S on a VMS Version 4.0 or later system) is very similar to the procedure described in Sections 9.3.1 and 9.3.2. There are three exceptions:

- You must have certain privileges set prior to running VMR or VNP.
- You must log in using MCR as your CLI.
- You must use a different command to set your UIC group code.



### 9.4.1 Establishing VAX/VMS Privileges

You must be logged in to the VAX/VMS system with certain privileges in order to set up and run the RSX-11S network generation. You should have access to the following required privileges:

- Change mode to kernel privilege (CMKRNL). This allows you to change default UICs and directories. You must have this privilege before you can set the remaining privileges.
- Logical I/O privilege (LOG\_IO). This privilege permits RSX-11M VMR to do logical I/O on task image files.
- System protection privilege (SYSPRV). This privilege allows you to create files in directories not owned by the current UIC.

If you have the SETPRV privilege, you can establish the required privileges with the following MCR command:

```
> SET PROC/PRIV=(privilege[,...])
```

To find out what privileges you have, use the following MCR command:

```
> SHO PROC/PRIV
```

For more information on using these privileges, see the *VAX/VMS System Manager's Guide*.

### 9.4.2 Installing Tasks Using VMR Commands

After you have set your privileges, you can install tasks using VMR commands. The following steps permit you to begin this procedure on a VAX/VMS system.

1. Log in using the /CLI = MCR qualifier so that you can use MCR — for example,

```
Username: SYSTEM/CLI=MCR  
Password:
```

2. Set up the required privileges (Section 9.4.1).
3. Mount the RSX-11S system disk and NETGEN target disk.

```
> MOUNT dauu: label
```

4. Set your default disk and UIC to [x,64] on the target disk — for example,

```
> SET DEF dduu: [1,64]
```

The variable *x* refers to the UIC group code you specified in NET Section 1, Question 4.00.

5. Invoke the virtual monitor routine:

```
> VMR
```

6. VMR then prompts you to enter the RSX-11S system image file name:

```
Enter filename: RSX11S.SYS
```

7. Invoke the NETINS.CMD file:

```
VMR> • dduu: [x,1]NETINS
```

The variable *dduu*: refers to the target disk, and the variable *x* refers to the group code you specified in NET. VMR then executes the NETINS.CMD file.

#### 9.4.3 Loading the Network Using VNP Commands

After setting up the required privileges and using VMR to install your tasks, use the Virtual Network Processor (VNP) commands to load the network. To load tasks using VNP commands, perform the following procedures:

1. Enter:

```
RUN dduu: [x,64]VNP
```

The variable *dduu*: refers to the target disk, and the variable *x* refers to the group code you specified in NET Section 1, Question 4.00.

2. VNP then prompts you to enter the RSX-11S system image file name:

```
Enter filename: RSX11S.SYS
```

3. The following SET command will start the network and enable circuits which were requested to be enabled during NETGEN:

```
VNP> SET SYSTEM  
VNP> SET EXECUTOR STATE ON
```

4. To load lines not previously set to ON, enter:

```
VNP> SET LINE line-id ALL
```

5. To enable circuits not previously set to ON, enter:

```
VNP> SET CIRCUIT circuit-id STATE ON
```

6. If you want to check the states of your lines and circuits, enter the following two commands:

```
VNP> SHOW LINE line-id  
VNP> SHOW CIRCUIT circuit-id
```

For more information on using these commands see the *DECnet-RSX Guide to Network Management Utilities*.

After preparing the system image as just described, you have a ready-to-be-booted system image. For a description on how to boot or down-line load an RSX-11S system, refer to the *DECnet-VAX System Manager's Guide*.

After installing and loading the network for the first time, you should execute the testing procedures described in Chapters 10 and 11. If you want to perform these tests, you should also set up a loop node for the circuit(s) you will be testing. To set up a loop node for a circuit, enter the following command:

```
VNP> SET NODE loop-name CIRCUIT circuit-id
```

where *loop-name* is the name of the loop node and *circuit-id* is the name of the circuit you will be testing. You must do this with VNP prior to running the loop tests because RSX-11S NCP does not support setting up a loop node. For more information on loop node testing, see the *DECnet-RSX Network Management Concepts and Procedures* manual.



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## Installation Testing

This chapter describes procedures you can use to check your RSX-11S, RSX-11M, or RSX-11M-PLUS node. Certain restrictions, as outlined throughout this chapter, apply to testing an RSX-11S node. The checkout procedures consist of three types of tests:

- The first test determines if your local node software is operational.
- The second test determines if your local DECnet node and communications hardware are functioning properly.
- The third test checks your local node's ability to communicate with a remote node (see Figure 10-1).

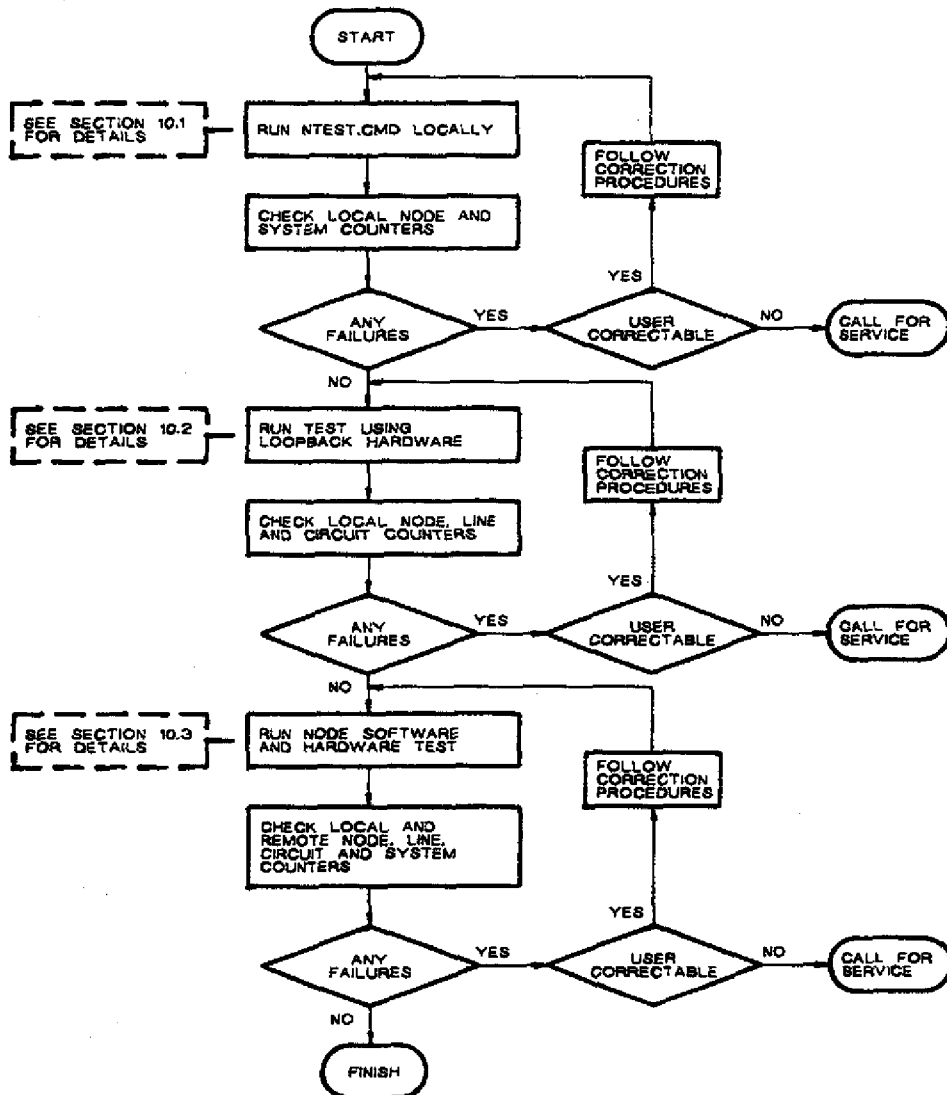
All procedures are designed to be initiated and executed from the local node. However, an operator should be available at each remote node to assist in problem isolation. If you selected event logging during NETGEN and have disabled event logging using CFE or NCP, you should enable console event logging prior to performing the tests described in this chapter. You can enable event logging by using the following command:

```
NCP>SET LOGGING CONSOLE STATE ON
```

For more information on the Network Control Program (NCP) commands mentioned in this chapter, refer to the *DECnet-RSX Guide to Network Management Utilities*.

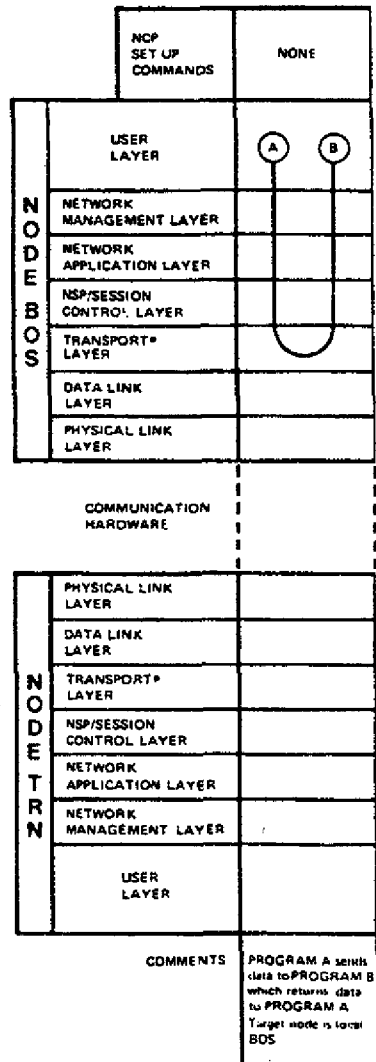
If you are testing an RSX-11S node you must have installed NCP and NICE in the RSX-11S system image using VMR. The procedure for installing the network software on an RSX-11S system is given in Chapter 9.

Figure 10-1: Installation Test Flowchart





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**Figure 10-2: Local Node Software Test**



Legend:

-  User program or DECnet module
-  Path travelled by test data

The Transport layer uses its routing algorithm to determine on which path to loop the test data.

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## 10.1 Local Node Software Testing

The local node test described in this section requires the use of the indirect command file processor. RSX-11S does not support this command file processor; for RSX-11S systems, skip ahead to Section 10.2.

This test determines whether the five layers of software are working: the User layer, the Network Management layer, the Network Application layer, the End Communications layer, and part of the Routing layer. This test does not check the device driver or the communications device. See Figure 10-2 for the path the test data travels. You may use other types of tests, but the NTEST.CMD procedure is preferred because it is automated. The NTEST.CMD procedure tests and installs the network tasks needed for testing and brings up the network.

If the requirements of Section 10.1.1 cannot be met (for example, a 16K-word system controlled partition), the TLK and LSN utilities can be substituted for the NTEST.CMD test.

NTEST.CMD executes two sets of programs: DECnet test sender (DTS) with DECnet test receiver (DTR), and Network File Transfer (NFT) with File Access Listener (FAL). DTS/DTR perform message transfer operations using task-to-task communication. NFT/FAL perform various file transfer operations. Details of the DTS/DTR programs are in Appendix D. Details of NFT and FAL are found in the *DECnet-RSX Guide to User Utilities*.

### 10.1.1 Preparing to Run the Test

The following conditions must be met before the local NTEST.CMD procedure is executed:

- The partition in which the network software and the software tools will run must be system controlled and at least 16K words in length.
- A NETGEN procedure must be completed.
- NETGEN must have moved the NTEST.CMD file onto your disk under the UIC [xxx,24], where xxx is the group code chosen during NETGEN.
- You must have installed the network using the NETINS procedure or NCP commands. For more information on installing the network, see Chapter 9.



- You must be logged into a privileged account (if your system supports multiuser protection).

When you have satisfied these conditions, proceed to the next section and run NTEST.CMD.

### 10.1.2 Running the Test

Invoke the command file by entering the following:

```
> @ [xxx,24]NTEST.CMD
```

where xxx is the network software UIC group code specified during NETGEN.

NTEST.CMD begins to execute and prompts you for any input it requires during execution. Example 10-1 is an example of the NTEST.CMD procedure.

Your answers to the questions displayed by the NTEST.CMD procedure may be different from those in the example. You may specify device names, YES and NO options, and group UIC codes that differ from those shown.

#### NOTE

The NTEST.CMD procedure is used twice in the testing procedures outlined in this chapter. For the test described in this section, answer YES to the question "Is this an internal node test?". This same procedure will be used in the test described in Section 10.3, at which time you should answer NO to this question.

## Example 10-1: NTEST.CMD Sample Listing

---

```
•NTEST.CMD
>SET /BUF=TI:80
>;
>; =====
>;          RSX-11M/M-PLUS Network Installation Procedures
>; =====
>;
>; Copyright (C) 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1987
>; by Digital Equipment Corporation, Maynard, Mass.
>;
>SET /UIC=[1,1]
>; Test procedure performed at 08:02:34 on 01-JAN-87
>;
>; This procedure is designed to allow a user to perform the following
>; tests on a DECnet-11M/M-PLUS system:
>;
>; . Internal node level -- Test the local node without using any
>;   communication circuits.
>; . Circuits level -- Test the local node with a communications line
>;   attached to a turnaround/loopback device or a modem with loopback
>;   capabilities.
>; . Remote node level -- Test the local node by attempting to communi-
>;   cate with a remote node.
>;
>;
>; The procedure will execute DTS/DTR tests and will use NFT/FAL to
>; transfer and execute files.
>;
>; Before running this procedure, you should have access to the following
>; information:
>;
>; . The device and group code of the UIC under which the network
>;   tasks are stored.
>; . The target node name (for local tests, this is the local node
>;   name).
>; . The necessary UIC and password to access files residing on the
>;   target node, for NFT tests.
>;
>* Do you want to: <RET>-continue E-exit P-pause [S]:
>;
```

```

>; =====
>;                               Test Parameters
>; =====
>;
>; If you do not choose long dialogue mode, explanatory text for each
>; question is available by hitting the "ESCAPE" key.
>;
>* Do you want long dialogue mode? [Y/N]: Y
>;
>; Enter the UIC group code under which the network files were stored
>; for this node's network.
>;
>* What group UIC is the network stored under? [0 R:1-377]: 100
>;
>; Specify the device on which the network files are stored. The default
>; device is "SY:".
>;
>* On what device are the network files (DDNN)? [S R:0-5]: DM1:
>;
>; Answer "YES" to the next question if this is an internal node test,
>; i.e. the test does not involve communications lines and/or
>; remote nodes.
>;
>* Is this an internal node test? [Y/N]: Y
>;
>; Enter the target node name (1-6 alphanumeric characters). This is the
>; node name of the remote node. If this is an internal level test, then
>; the local node name should be used. If this is a line level test, then
>; the loopback node name should be used.
>;
>* What is the local node name? [S R:1-6]: NODEA
>;
>; DTS will now be invoked to perform three tests:
>;   1.) DTS will issue a connect request to DTR causing
>;       DTR to be loaded, answer the request and task
>;       exit
>;   2.) DTS/DTR will execute a 1 minute pattern test
>;       using a 10 byte message size
>;   3.) DTS/DTR will execute a 1 minute pattern test
>;       using an 1100 byte message size.
>;
>; The 10 byte message size was selected because this size is smaller
>; than ECL's segment size...thus there will be 1 segment for each
>; message. The 1100 byte message size is larger than the segment size;
>; therefore, there will be multi-segments for each of these messages.

```

```

>NCP ZERO EXECUTOR COUNTERS
>NCP ZERO SYSTEM COUNTERS
>DTS *DTSTST
LOAD/EXEC DTR VIA CONNECT TEST
DTS -- Test finished at 8:03:30
PAT/MSG=10/TIME=1M
DTS -- Test started at 8:03:30
DTS -- Test finished at 8:04:30
    3013 Messages sent
    502 Characters/second
    4016 Baud
PAT/MSG=1100/TIME=1M
DTS -- Test started at 8:04:31
DTS -- Test finished at 8:05:31
    876 Messages sent
    16060 Characters/second
    128480 Baud

```

```

>;
>;
>;
>; In order to execute NFT file transfer tests, you must supply valid
>; access control information for the target node NODEA. This
>; information is
>; (1). A user identification (the format depends on what type of
>;      system NODEA is.
>; (2). The password for that user-id.
>;
>* What is the user-id for NFT tests on node NODEA [S R:1.-16.]: [200,200]
>* What is the corresponding password [S R:0.-8.]: PRIV
>PIP NFTTS1.ZZZ;/DE/NM,NFTTS2;,NFTTS3;,NFTTS4;,NFTTS5;
>;
>; NFT will now be invoked. A copy of the command file NTEST.CMD will be
>; transferred to node NODEA with the filename TMPNETTST.ZZZ using the
>; access control information you specified. NFT will then delete the
>; file.
>;
>NFT *NFTTS1.ZZZ/TR
NFT>NODEA/[200,200]/PRIV::TMPNETTST.ZZZ;1=DM1:[100,24]NTEST.CMD

>;
>; The file TMPNETTST.ZZZ will now be deleted using NFT.
>;
>NFT *NFTTS2.ZZZ/TR
NFT>NODEA/[200,200]/PRIV::TMPNETTST.ZZZ;1/DE
>;
>;

```

>NCP SHOW EXECUTOR COUNTERS

Node counters as of 01-FEB-87 09:24:12

```
Executor node = 14 (NODEA)
  308 Seconds since last zeroed
1009182 Bytes received
1009182 Bytes sent
 17658 Messages received
 17658 Messages sent
     8 Connects received
     8 Connects sent
     0 Response timeouts
     0 Received connect resource errors
     2 Peak logical links active
     0 Aged packet loss
     0 Node unreachable packet loss
     0 Node out-of-range packet loss
     0 Oversized packet loss
     0 Packet format error
     0 Partial routing update loss
     0 Verification reject
     2 Node maximum logical links active
     0 Total received connect resource errors
```

>NCP SHOW SYSTEM COUNTERS

System counters as of 01FEB87 09:25:03

```
  368 Seconds since last zeroed
     0 Control buffer allocation failed
     0 Small buffer allocation failed
     0 Large buffer allocation failed
     0 Receive buffer allocation failed
```

```
>;
>; If you have reached this point with no errors, then you can be
>; confident that the node has been created properly.
>;
>; End of test at 08:07:12
>;
>; =====
>;                      End of Installation Test
>; =====
>SET /UIC=[100,24]
> * <EOF>
```

The counter displays illustrated in Example 10-1 reflect an error-free test execution. Although the values of the counters you actually see may vary slightly, you should verify that the bytes sent counter equals the bytes received counter. Also verify that all counters shown as having a value of zero have a value of zero in your display. Note that on a non-routing node not all the executor counters shown will be displayed.

Check the counters displayed by NTEST for errors. If there are any errors, proceed to Section 10.1.3.

If there are no errors, proceed to Section 10.2, Node Level Hardware Loopback Circuit Testing.

### 10.1.3 NTEST.CMD Failure Conditions and Handling

The most common failure conditions that occur during this test are resource allocation failures or network tasks not installed. These are the most common symptoms of these failure conditions:

- Inability to execute the NCP SET SYSTEM command
- Inability to execute the NCP SET EXECUTOR STATE ON command
- Inability to establish a logical link

Identify which class of failure is occurring, take appropriate corrective action, and then repeat the test.

**Corrective action:** If, at any time, the operation appears to be hung, use the NCP SHOW SYSTEM COUNTERS command. If any of the buffer allocation failed counters are incrementing, there is a resource allocation problem. The network should be unloaded, and the resource allocations should be increased using CFE. Once the system resources have been increased, reload the network with the NCP SET SYSTEM command. Then set the executor state ON with the NCP SET EXECUTOR STATE ON command.

**Allocation failures:** Resource allocation failures include one or more of the following conditions:

- Insufficient number of large buffers (LDBs)
- Insufficient number of control buffers (CCBs)
- Insufficient number of small buffers (SDBs)
- Insufficient RSX system pool size (DSR)
- Insufficient number of logical links

**Other failures:** Other reasons for failure can include one or more of the following conditions:

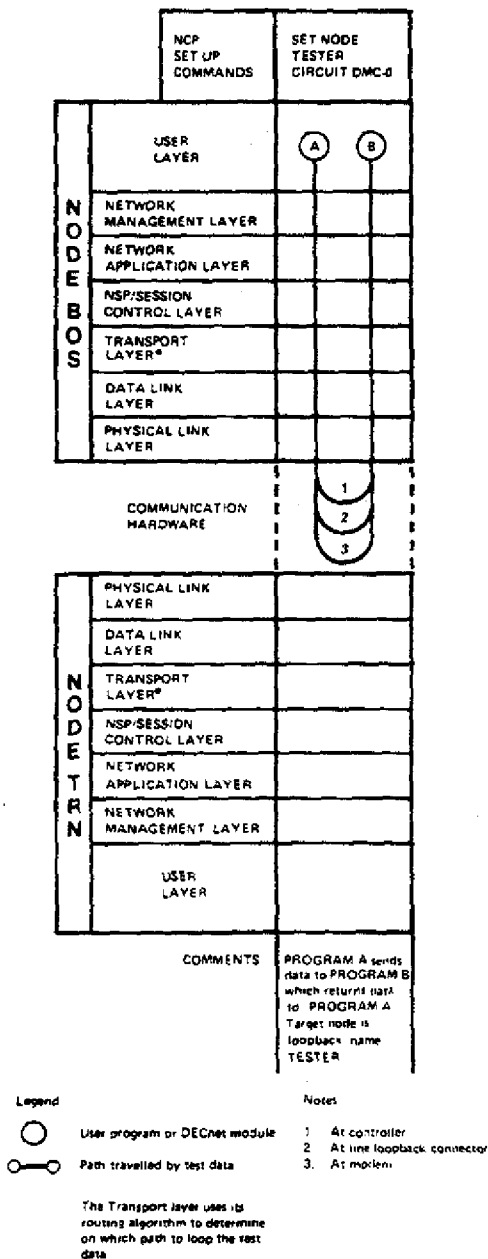
- Insufficient checkpoint space
- Fragmented system-controlled partition
- Hardware problems, including disk errors that can result in system behavior that cannot be reproduced

If there is insufficient checkpoint space, RCP1 (routing control process) may not be able to allocate space for its database. You would receive the following message:

RCP1 - Cannot allocate space for database

If NTEST.CMD fails while running DTS/DTR or NFT/FAL, refer to Appendix D (for DTS/DTR) or to the *DECnet-RSX Guide to User Utilities* (for NFT/FAL).

**Figure 10-3: Node Level Hardware Loopback Circuit Test**





## 10.2 Node Level Hardware Loopback Circuit Testing

This test verifies that the Routing layer, the device drivers, and the communications hardware are functioning properly. In addition to the layers previously tested by the local node software tests (Section 10.1), the Data Link and Physical Link layers and associated hardware are tested in this procedure.

This test transfers data over the communications circuit through the loopback connector to the associated loop node name. Figure 10-3 shows the path the test data travels. As illustrated in Figure 10-3, the test can be run to the controller, to a loopback connector, or to the local modem.

The following devices cannot perform the hardware loopback tests described in this section. You should observe the special instructions given for these devices.

- For UNA and QNA devices, proceed to Section 10.3.
- For DLM, run the PSI checkout procedures first (see Chapter 11), including NCP LOOP LINE; then proceed to Section 10.3.
- For multipoint devices (controller or tributary) using software DDCMP, proceed to Section 10.3.

The following devices must be used in a special manner. You should observe the special instructions given before performing the tests described in this section.

- For PCL, PCL-*n*.0 is assigned as the local TDM address. This circuit should be used for the tests specified in this section.
- For half duplex devices (point-to-point), temporarily set up for full duplex operation to perform the tests described in this section. If the tests are successful, switch back to half duplex and proceed to Section 10.3.

### 10.2.1 Preparing to Run the Test

You should perform four steps before running the test:

#### Step 1:

Perform one of these three actions (for more information, see the chapter entitled "Testing the Network" in the *DECnet-RSX Network Management Concepts and Procedures* manual):

- Install the hardware loopback connector using the correct connector.

- Use the analog loopback button on the modem.
- Set the device (DMC/DMR, or DMP) to controller loopback with the following NCP commands:

```
NCP>SET LINE DMC0
NCP>SET LINE DMC0 CONTROLLER LOOPBACK
```

### Step 2:

Use the following NCP commands to set the line and circuit on (assuming that the line is not already loaded). For example, enter

```
NCP>SET LINE DMC0 DUPLEX FULL
NCP>SET CIRCUIT DMC0 STATE ON
```

The event logger prints a message on the console if logging is enabled. The following is an example of a message:

```
Event type 4.10, Circuit up
Occurred 01FEB87 09:29:17 on node 14 (NODEA)
Circuit DMC0
Node address = 14 (NODEA)
```

### Step 3:

Use the NCP SHOW command to verify that the circuit state has changed to ON. Note that the executor node is now also the adjacent node on the test circuit.

```
NCP>SHOW CIRCUIT DMC0
```

This is an example of the summary display:

```
Circuit summary as of 01FEB87 09:42:56
```

```
Circuit = DMC0
```

```
State = On
Adjacent node = 14 (NODEA)
```

If the state of the circuit is still ON--STARTING, proceed to Section 10.2.4 (On-Starting Substate Error Handling).

### Step 4:

Zero all system, executor, and circuit counters using the NCP ZERO SYSTEM COUNTERS, ZERO EXECUTOR COUNTERS, and ZERO CIRCUIT COUNTERS commands.

### 10.2.2 Running the Loop Node Test

Use the SET NODE command with the CIRCUIT parameter to establish a loop node name. For example,

```
NCP>SET NODE TESTER CIRCUIT DMC-0
```

establishes circuit DMC-0 as the circuit over which loop testing takes place. The loop node name is necessary because, under normal operation, DECnet routing software decides what path to use. The loop node name overrides the routing function to route information over a specific circuit. For RSX-11S systems you must establish this loop node using the VNP SET NODE command before loading the system image.

Next, use the NCP command to loop messages over the line through the loopback device to the loopback node name TESTER.

```
NCP>LOOP NODE TESTER COUNT 10
```

Now show the circuit counters by entering:

```
NCP>SHOW CIRCUIT DMC-0 COUNTERS
```

This is an example of the counter's display:

Circuit counters as of 01-FEB-7 09:54:15

Circuit = DMC-0

```
226 Seconds since last zeroed
87 Terminating packets received
87 Originating packets sent
0 Transit packets received
0 Transit packets sent
0 Transit congestion loss
0 Circuit down
0 Initialization failure
4378 Bytes received
4378 Bytes sent
143 Data blocks received
143 Data blocks sent
0 Data errors inbound
0 Data errors outbound
0 Remote reply timeouts
0 Local reply timeouts
0 Local buffer errors
```

The last five counters are error counters and should be zero. If any of the last five counters show a nonzero value, see Section 10.2.5; otherwise enter the following command to show system counters:

NCP>SHOW SYSTEM COUNTERS

This is an example of the counters display:

System counters as of 01-FEB-7 09:56:42

```
1860  Seconds since last zeroed
0     Control buffer allocation failed
0     Small buffer allocation failed
0     Large buffer allocation failed
0     Receive buffer allocation failed
```

Errors indicated by the system counter summary can be corrected by increasing the number of buffers whose allocation failed. Use CFE to modify system buffer parameters.

Next, enter the command to show the executor node counters:

NCP>SHOW EXECUTOR COUNTERS

This is an example of the counters display for a routing node:

Node counters as of 01FEB87 09:56:23

Executor node = 14 (NODEA)

```
1862  Seconds since last zeroed
1011764 Bytes received
1011764 Bytes sent
17745  Messages received
17745  Messages sent
9      Connects received
9      Connects sent
0      Response timeouts
0      Received connect resource errors
2      Total maximum logical links active
0      Aged packet loss
0      Node unreachable packet loss
0      Node out-of-range packet loss
0      Oversized packet loss
0      Packet format error
0      Partial routing update loss
0      Verification reject
2      Node maximum logical links active
0      Total received connect resource errors
```

Check the executor node counters and the circuit counters. If the counters were properly zeroed before the test, then the counters should show equivalent values for the following counter pairs:

<b>Circuit Counter Pairs</b>	<b>Node Counter Pairs</b>
Terminating packets received	Bytes received
Originating packets sent	Bytes sent
Transit packets received	Messages received
Transit packets sent	Messages sent
Bytes received	Connects received
Bytes sent	Connects sent
Data Blocks received	
Data Blocks sent	

If counter pairs show equal values, proceed to restore your node as described in the next section. If you see unequal values for counter pairs, there is probably a hardware problem; follow the steps described in Section 10.2.5 for line and circuit error handling.

### 10.2.3 Restoring the Node

Now that the test is complete, the circuit must be restored to its normal state. This involves removing the loopback name and restoring the hardware to its normal state (removing the hardware loopback connector, setting the modem to normal, or setting the line to controller normal from controller loopback).

Use the NCP CLEAR NODE command to remove the loopback name. For RSX-11S systems, the loopback name must be left set or removed from the system image file with the VNP CLEAR NODE command. If the loopback name is TESTER, you enter:

```
NCP>CLEAR NODE TESTER CIRCUIT
```

Next, remove the hardware loopback connector or set the modem back to normal. Note that the circuit status returns to the ON-STARTING state. The time it takes to return to the ON-STARTING state depends on the listener time for the circuit. The default value specified in NETGEN is 30 seconds. This is an example of the displayed event message:

```
Event type 4.7, Circuit down - circuit fault
Occurred 01-FEB-87 10:05:16 on node 14 (NODEA)
Circuit DMC-0
Adjacent node listener receive timeout
```

If a DMC/DMR, DMP, or DMV device was previously set to controller loopback, you must set the device back to controller normal (the default state) with the following commands:

```
NCP>SET CIRCUIT DMC-0 STATE OFF
NCP>SET LINE DMC-0 CONTROLLER NORMAL
NCP>SET CIRCUIT DMC-0 STATE ON
```

The local node level communications circuit testing is now complete. You can be confident that the local software and hardware are functioning properly and can connect to a remote node. Proceed to Section 10.3.

#### 10.2.4 On-Starting Substate Error Handling

The test cannot be run if the circuit state is ON-STARTING. Examine the hardware loopback connector. Be sure it is properly installed and conforms to the specifications described in the *DECnet-RSX Network Management Concepts and Procedures* manual. If you are using a modem with the analog loopback capability, see if special strapping is required.

Next, use the NCP SHOW LINE *line-id* CHARACTERISTICS command (use VNP for RSX-11S nodes) to check that the line has been set to full duplex mode (even though you may have selected half duplex during NETGEN). Half duplex mode may have been specified in the network generation procedure. Use NCP commands (VNP commands for RSX-11S nodes) to change the controller. For example, the following NCP commands set up a DMC/DMR line for testing using the controller loopback capability of the DMC/DMR device:

```
NCP>SET CIRCUIT DMC-0 STATE OFF
NCP>CLEAR LINE DMC-0 ALL
NCP>SET LINE DMC-0 DUPLEX FULL
NCP>SET LINE DMC-0 CONTROLLER LOOPBACK
NCP>SET CIRCUIT DMC-0 STATE ON
```

If the circuit could not be set ON, check

- For resource allocation problems. NCP>SHOW SYSTEM COUNTERS should show no errors.
- That CSRs and vectors were properly specified during NETGEN. If they were not, correct them by means of NCP or CFE.
- If a device was included in the RSX system during SYSGEN and also included at NETGEN. If it was, the following message will appear when loading the network:

```
NIL-Vector not available
```

If this condition occurs, you must change the hardware vector and CSR of the device, and modify the network permanent database (or re-run the SYSGEN procedure). Otherwise check with field service.

- If you specified too low a value for the maximum vector parameter during SYSGEN, the following message will appear when loading the network:

NTL-Vector not in system

If this condition occurs, you need to change the hardware vector and CSR of the device, as well as modify the network permanent database (or re-run the SYSGEN procedure). Otherwise check with field service.

See Chapter 3 for detailed SYSGEN requirements. If the circuit is still in the ON-STARTING state, use the NCP SHOW CIRCUIT COUNTERS command. Check the summary. If bytes received and bytes sent are zero, the communications hardware is at fault. Have Digital field service verify that the device and connector have been properly installed.

Three common hardware failures that occur are:

- The communication device fails to interrupt.
- The modem and/or line corrupts the data being transmitted or received.
- Communication device addresses (CSR and vector) are improperly set on the interface.

Common symptoms of these failures are:

- Inability to turn on a circuit
- Inability to complete the transport initialization operation

Most other types of failures are documented by appropriate error messages. You can take advantage of the extensive status and error counters maintained by the DECnet-RSX system to aid in trouble shooting. Refer to the *DECnet-RSX Network Management Concepts and Procedures* manual for descriptions of the various counters and procedures for displaying them.

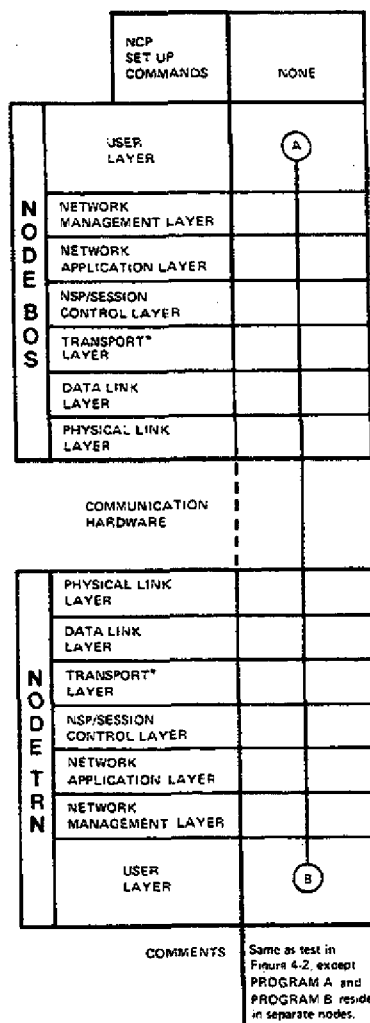
### **10.2.5 Line and Circuit Counter Error Handling**

The following errors indicate problems requiring Digital field service:

- Errors indicated by circuit counters with receive overrun error qualifiers can indicate that the communication device is installed at the wrong device priority. For example, a bus request plug may not be installed at BR5.
- Data errors inbound or outbound indicate a hardware device, modem, or line problem. If possible, verify the line quality by using standard modem test procedures (see the owner's documentation for your modem) before calling Digital field service.



**Figure 10-4: Remote Node Software Test**



**Legend:**

- User program or DECnet module
- Path travelled by test data

The Transport layer uses its routing algorithm, to determine on which path to loop the test data.

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## 10.3 Remote Node Software Testing

In this test, all the network layers are tested. Figure 10-4 depicts the path taken through the various layers. This test involves testing the software in your node against software in a remote node. Both nodes should have been verified locally before the tests described in this section are performed.

### 10.3.1 Preparing to Run the Test

You should perform these three steps before running the tests described in this section:

#### Step 1:

Verify that the circuit to be used for the test has been connected to a properly configured Phase III or Phase IV remote node. Verify that both the local and remote nodes are set up with the same line and circuit characteristics.

#### Step 2:

Use the `NCP SHOW KNOWN CIRCUITS` command. If your circuit is in the ON-STARTING substate, proceed to Section 10.3.3 for non-Ethernet devices and Section 10.3.4 for Ethernet devices. Follow the procedures in those sections to get the circuit state to ON. If the circuit state is ON, proceed to the following step. For Ethernet devices, you can perform the test to any adjacency (remote node on the Ethernet) that is reachable. Use the `NCP SHOW NODE node-id` command to determine if an adjacency is reachable.

#### Step 3:

Zero all the counters used in previous tests by entering the `NCP ZERO COUNTERS` commands, including system, executor, and circuit. If you are using the `NTEST.CMD` procedure to perform the test, the procedure will zero the counters for you.

#### NOTE

For the remote tests described in this section, both DTR and FAL must be installed on the remote node before you can run `NTEST.CMD`.

### 10.3.2 Running the Test

There are two methods of testing. One method uses the NTEST.CMD file (not available on RSX-11S), the other method uses DECnet utilities. If you are using the DECnet utilities, when testing is completed, display all counters using NCP SHOW commands. Be sure to include circuit, node, executor, and system counters. If you are using the NTEST.CMD procedure, the procedure will display the counters for you. Pairs of counters will no longer match on the local node, but errors should be noted and corrected. Refer to the *DECnet-RSX Network Management Concepts and Procedures* manual for information on correcting errors indicated by the network counters.

#### 10.3.2.1 Using the NTEST.CMD Procedure

This test (not available on RSX-11S nodes) is the same as the one described in Section 10.1.2, with one exception. Instead of answering the question, "Is this an internal node test?", with a Y, answer with an N. Then follow the procedures described in that section.

#### 10.3.2.2 DECnet Utility Tests

When all circuits have been verified to be in the ON state, run one of the DECnet utilities listed in Table 10-1. Utilities are listed in descending order of preference. The DTS/DTR test is more thorough than the others, which is why it is the preferred test. The table specifies the availability of each test on each of the DECnet products.

For RSX-11S systems, the TLK and NCP LOOP tests are the only tests available on the local node. However, you can use the NFT utility on another node to transfer files to and from RSX-11S unit record devices if you have installed FAL in the RSX-11S system image using VMR. In addition, you can install DTR on an RSX-11S system and perform the DTS/DTR test from another node to the RSX-11S system.

**Table 10-1: Utility Availability on DECnet Nodes**

Test	Remote Node Type					
	DECnet- RSX	DECnet- 20	DECnet- RT	DECnet- E	DECnet- VAX	DECnet- IAS
DTS/DTR	Yes	Yes*	Yes	Yes	Yes	Yes
NFT/FAL	Yes	Yes	Yes	Yes	Yes	Yes
TLK/LSN	Yes	No	Yes	Yes	No	Yes
PHO	Yes**	No	No	No	Yes	No
NCP LOOP	Yes	Yes	Yes	Yes	Yes	Yes

\* Available from software specialist

\*\* RSX-11M-PLUS and Micro/RSX only

**DTS/DTR.** In order for the DTS/DTR utility to run, DTR must be installed at the remote node. The general format of DTS commands is as follows, followed by an example:

**Format:**

DTS [*node-name* [*act*]]::[/TEST = *type*][[/PRINT = *choice*]

(*act* is optional access control information.)

**Example:**

```
>DTS REMNOD::/TEST=DATA
```

Full details on DTS/DTR are given in Appendix D.

**NFT/FAL.** In order for NFT to perform a file operation to a remote node, FAL must be installed at the remote node.

Use NFT to transfer a copy of the LB:[1,2]STARTUP.CMD file to the remote node and then back to the local node. Then, use PIP to output the file and determine whether the file was transmitted and received correctly, as in the following example:

```
>NFT
NFT>REMNOD/10,10/PASWD::=LB:[1,2]STARTUP.CMD
NFT>REMNOD/10,10/PASWD::STARTUP.CMD
CRTLZ
>PIP TI:=STARTUP.CMD
```

Note that the file is transferred from the local node's UIC[1,2] to the remote node's UIC[10,10]. The file is then returned to the local node's UIC. Access control information is given in the example, but can be defaulted if an alias node name is specified. You can use the CMP utility to compare the two versions of the file.

For more information on NFT, refer to the *DECnet-RSX Guide to User Utilities*. There may be special file considerations if the remote node is not RSX, because the syntax of the specified file can differ from that expected by NFT. Check the appropriate system documentation for details.

**TLK/LSN.** In order for the TLK/LSN utility to run, LSN must be installed at the remote node, and an operator must be present to respond to the message. To use TLK on an RSX-11S node, you must have installed TLK using VMR. The command syntax for single message mode is as follows, followed by an example:

**Format:**

TLK [*target-node-spec::*][*TTn:*]'*message*

(*TTn:* defaults to the console device.)

**Example:**

```
>TLK REMNOD::'IF THIS MESSAGE IS RECEIVED, WE HAVE SUCCEEDED.
```

For information on the use of TLK on RSX systems, refer to the *DECnet-RSX Guide to User Utilities*. When using TLK on other systems, check the appropriate system documentation.

**PHO.** In order for the Phone Communications utility to run, the phone utility must be installed on the remote node. This utility is available only on RSX-11M-PLUS and Micro/Rsx systems and only at video terminals.

Use PHO to display a list of phone users on a remote system. For example,

```
PHO DIRECTORY REMNOD
```

displays a list of phone users at the node REMNOD.

**NCP LOOP Command.** In order for the NCP LOOP command to work, the loop-back mirror task (MIR) must be installed on the remote system. The *DECnet-RSX Network Management Concepts and Procedures* manual contains a complete description of the use of the NCP LOOP command. An example of its use is as follows:

```
NCP>LOOP NODE REMNOD COUNT 100 LENGTH 200
```

The example causes a message 200 bytes in length to be looped 100 times.

### 10.3.3 Non-Ethernet Error Handling

The circuit state must be ON in order to run remote tests. If the circuit has a substate of STARTING, the remote operator should make sure that the remote node's corresponding circuit also has been set to the ON state. If the STARTING substate persists upon reexecution of the NCP SHOW KNOWN CIRCUITS command, use the NCP SHOW EXECUTOR CHARACTERISTICS command to see whether transmit and receive passwords have been set on the local system. If passwords have been set, make sure that the passwords are the same on the remote node. An example of using the executor node is as follows:

```
NCP>SHOW EXECUTOR CHARACTERISTICS
```

The command displays information like that in the following example:

```
Node characteristics as of 01-FEB-87 13:34:15
```

```
Executor node = 4.16 (BKLYN)
```

```
Identification = BKLYN DECNET SYSTEM, Management version = 4.0.0
Host = 4.16 (BKLYN), Loop count = 1, Loop length = 40
Loop with = Mixed, Incoming timer = 15, Outgoing timer = 10
NSP version = 4.0.0
Maximum links = 10, Delay factor = 1, Delay weight = 1
Inactivity timer = 30, Retransmit factor = 5
Routing version = 2.0.0, Type = Routing IV, Routing timer = 300
Broadcast routing timer = 40, Maximum address = 400, Maximum circuits = 6
Maximum cost = 1022
Maximum hops = 10, Maximum visits = 20
Maximum broadcast nonrouters = 32
Maximum broadcast routers = 10
Segment buffer size = 576, Verification state = On
```

If passwords have been set, they must have been set appropriately on both nodes. If the passwords are not identical, or if a password was set at one node and not at the other, the following event messages are generated at the two nodes (provided that the event logger has been enabled):

- **Message at node requesting password:**

Event Type 4.6 Verification Reject  
From Node 4.9 (HARTFD) Occurred 05-Feb-87 17:16:21

- **Messages at node with incorrect or missing transmit password:**

Event Type 4.10, Circuit Up  
From Node 4.4 (BOSTON) Occurred 05-Feb-87 17:16:55  
Circuit DMC-1

Event Type 4.7 Circuit Down, Circuit Fault  
From Node 4.4 (BOSTON) Occurred 05-Feb-87 17:17:12  
Circuit DMC-1

If a requesting node does not receive a password or receives an incorrect one, it restarts the node initialization process.

To ensure that passwords are set correctly, reset them on both the local and remote (RSX) nodes by using the following commands:

```
NCP>SET EXECUTOR TRANSMIT PASSWORD password  
NCP>SET EXECUTOR RECEIVE PASSWORD password
```

where *password* is 1 to 8 ASCII characters.

### NOTE

The transmit password on the local node must be identical to the receive password on the remote node. Some non-RSX operating systems may require a full 8-character ASCII password for connection to an RSX operating system. For VMS nodes, passwords are set on a per circuit basis.

If the circuit is still in the STARTING substate:

- Check that the hardware and software device line speed settings and duplex mode are the same on both nodes.
- On local coaxial cable links, check that the transmit cable is connected to the receive cable on the remote node.

- If a null modem cable is being used for EIA asynchronous communication, check to make sure the cable conforms to the null modem wiring diagram given in the chapter entitled "Testing the Network" in the *DECnet-RSX Network Management Concepts and Procedures* manual.
- If your device is a DL11 type, check the NETGEN specification for that device. If it was specified as a DL11-E/DLV11-E, that DL11 must have all EIA signals including request to send (RTS) and clear to send (CTS).
- For connecting DMP, DMV, or DMR devices to a DMC device, check that the non-DMC device is set to DMC compatibility mode. When connecting DMP, DMV, and DMR devices to other DMP, DMV, or DMR devices, both devices in the pair must have DMC compatibility mode enabled or disabled.
- Check the cabling installed in your node against the types listed in the chapter entitled "Testing the Network" in the *DECnet-RSX Network Management Concepts and Procedures* manual. If your cable is not listed, the network software will not function correctly.
- If your device supports switch settings that supersede software settings, check these options (for example, the mode switches on DMP and DMV devices).

When the nodes are physically connected and the hardware communications devices are functioning properly, the circuit counts (bytes sent and bytes received) increment. If the STARTING substate persists and the circuit count (bytes received) is not incremented, the hardware is probably at fault.

If DDCMP line communication has been established, the bytes sent and bytes received counters are incrementing, and line errors are not occurring, check other sources of possible software incompatibilities (for example, maximum node address or large data buffer sizes).

Local software resource allocation failures can cause line synchronization to be lost. Use the SHOW SYSTEM COUNTERS command to see if allocation failures have occurred. If they have, you can run CFE and use the DEFINE SYSTEM command to create more buffers. Either increase the maximum number of small buffers or increase both the maximum number of large buffers and minimum number of receive buffers.

It is important to note that the DECnet local node software and hardware verification procedures must have been followed on both nodes (see Sections 10.1 and 10.2).



Events logged on the console help locate the problem (provided console logging has been enabled).

When all lines have been verified to be in an ON state, return to Section 10.3.2 and run the test.

#### **10.3.4 Ethernet Error Handling**

The circuit state must be ON and the adjacency (the remote node on the Ethernet) must be reachable in order to run remote tests. If the adjacency is not reachable, the remote operator should make sure that the remote node's corresponding circuit has been set to the ON state.

##### **10.3.4.1 Problems Connecting to the Ethernet**

If the circuit is still in the STARTING substate,

- Check that the CSR and VECTOR set in the software match the CSR and VECTOR set in the hardware.
- Check that the transceiver cable is connected properly on local cable links.
- Perform one of the circuit-level loopback tests described in the *DECnet-RSX Network Management Concepts and Procedures* manual.

When the nodes are physically connected and the hardware communications devices are functioning properly, the circuit counts (bytes sent and bytes received) increment. If the STARTING substate persists and the circuit count (bytes received) is not incremented, the hardware is probably at fault.

Events logged on the console help locate the problem (provided the logging console has been enabled). The following event confirms when the connection to the Ethernet has occurred:

Event type 4.10, Circuit up  
Occurred 1-FEB-87 11:22:05 on node 4.16 (BKLYN)  
Circuit UNA-0

##### **10.3.4.2 Problems Connecting to the Adjacency**

If communication has been established, the bytes sent and bytes received counters are incrementing, and line errors are not occurring, check other sources of possible software incompatibilities (for example, maximum node address or large data buffer size).

Local software resource allocation failures can cause line synchronization to be lost. If this occurs, use the `SHOW SYSTEM COUNTERS` command to see if allocation failures have occurred. If they have, you can run CFE and use the `DEFINE SYSTEM` command to create more buffers. Either increase the maximum number of small buffers or increase both the maximum number of large buffers and minimum number of receive buffers.

It is important to note that the DECnet local node software procedures have been followed on both nodes (see Section 10.1). You should also perform the circuit-level loopback tests described in the *DECnet-RSX Network Management Concepts and Procedures* manual to help isolate hardware problems.

If passwords have been set for your local node as well as for the adjacency that you are trying to reach, you must verify that the passwords have been set appropriately on both nodes. See Section 10.3.3 for a discussion involving problems related to passwords.

The following event is notification that the adjacency is reachable:

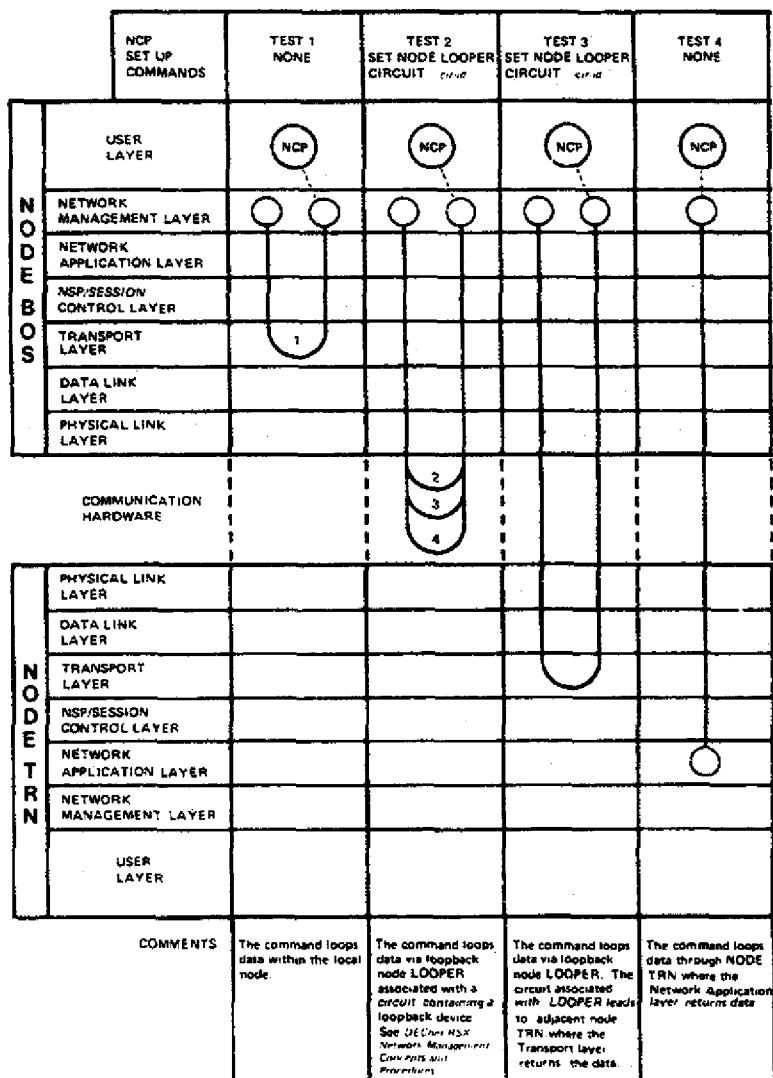
```
Event type 4.15, Adjacency up
Occurred 1-FEB-87 11:22:06 on node 4.16 (BOSTON)
Circuit UNA-0
Adjacent node = 4.19 (HARTFD)
```

## 10.4 Summary

Figures 10-5 and 10-6 illustrate and summarize the kinds of software and hardware tests that are available on a DECnet-RSX node. After performing the tests in this chapter, you have done Test 2 in Figure 10-5 and Tests 1, 2, 4, and 5 in Figure 10-6. Note that the tests can be run using network management utilities or software that runs at the User layer (such as NFT/FAL or DTS/DTR). For more information on running other node-level and circuit-level tests, see the *DECnet-RSX Network Management Concepts and Procedures* manual.

After performing the tests described in this chapter, you have verified your DECnet-RSX installation. For more information on monitoring, controlling, and testing your DECnet-RSX node, see the *DECnet-RSX Network Management Concepts and Procedures* manual. For more information about the use of the user utilities available, see the *DECnet-RSX Guide to User Utilities*. Information about the use of DECnet-RSX programming interfaces is contained in the *DECnet-RSX Programmer's Pocket Guide*.

**Figure 10-5: Node Level Loopback Tests Using DECnet-Supplied Software**



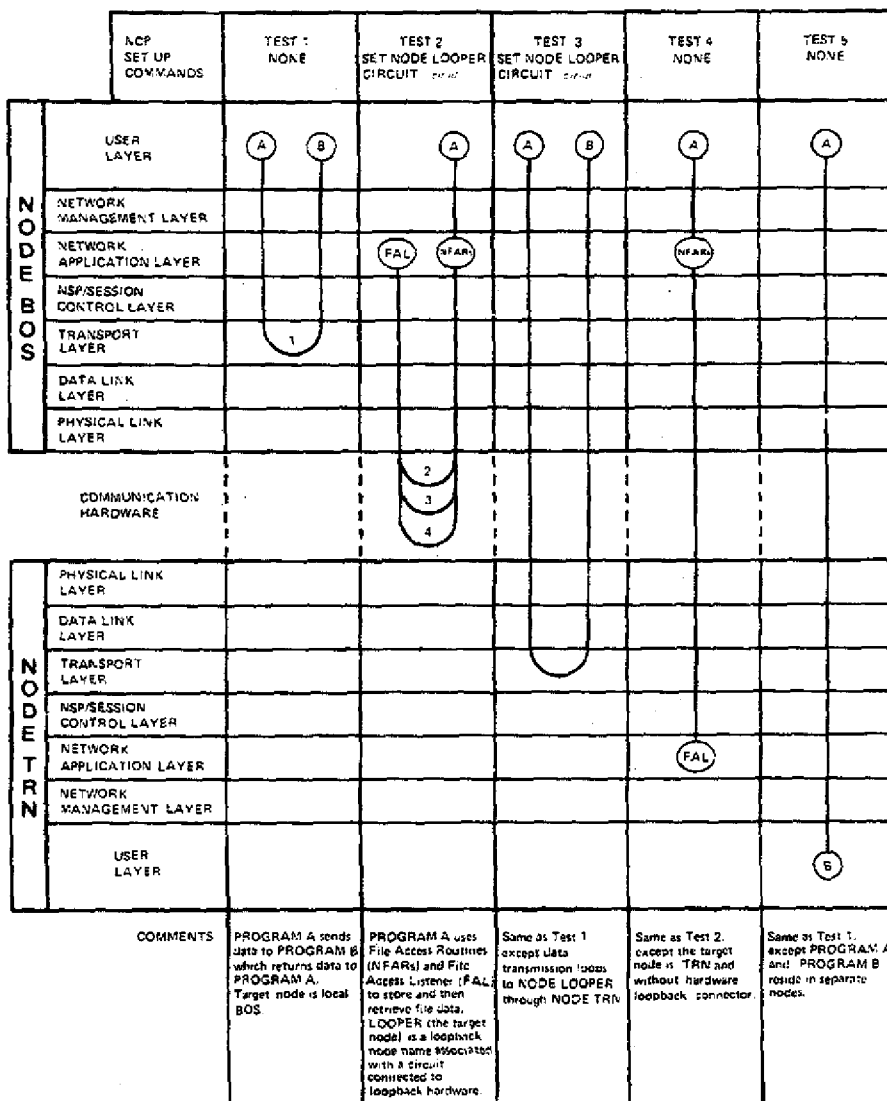
**Legend:**

- The module that accepts command inputs
- The module that loops or receives test data
- Path travelled by test data
- Interface between nodes




**Notes**

- 1 Test data is looped internally by Transport
- 2 At controller
- 3 At line loopback connector
- 4 At modem

**Figure 10-6: Node Level Loopback Tests Using User-Supplied Software**



**Legend:**

-  User program (such as DTS/DTR) or DECnet module
-  Path traveled by test data
-  Interface between nodes

**Notes**

1. The data is looped internally by Transport
2. At controller
3. At modem
4. At loopback connector

---

## Testing the RSX-11 PSI Installation

This chapter describes the procedure for testing a combined DECnet/PSI configuration. The procedure verifies that you correctly generated and installed the RSX-11 PSI system. The chapter also describes how to test the X.29 software to ensure that it has been installed correctly. Section 11.3 contains information on verifying data link mapping (DLM) circuits.

### 11.1 The Installation Checkout Procedure

The procedure uses two programs: XTR (X.25 test receiver) and SCPXTS (X.25 test sender). They verify that your PSI system can set up a call and transfer data between your local DTE and a remote DTE, or between your local DTE and itself. XTR and SCPXTS are prebuilt tasks. NETGEN copies them from your distribution kit to NETUIC on your NETGEN target disk. SCPXTS on your system communicates with XTR running on a remote system. SCPXTS can also communicate with a VAX PSI system running PSIXTR.EXE.

#### 11.1.1 Preparing to Run SCPXTS

Before you can run SCPXTS, you must generate and install your RSX-11 PSI system. These are the prerequisite steps:

- Run SYSGEN (if necessary)
- Run PREGEN
- Run NETGEN
- Install the system

For more information on these steps, refer to the *RSX-11 PSI Generation Guide*. When you complete these procedures, the RSX-11 PSI system is up and running. To run SCPXTS, your generated system must subscribe to the open user group and must have at least one switched virtual circuit (SVC). To run XTR on the local system, you need an additional SVC.

### 11.1.2 Running SCPXTS

If SCPXTS sets up calls with a remote site running XTR under the PSI product, telephone the site to make sure that XTS is up and running. Start SCPXTS by entering

```
> * dduu:[x,1]PSIICP
```

where

*dduu:[x,1]* is the location of PSIICP after NETGEN. Refer to the *RSX-11 PSI Generation Guide* for more information.

This command procedure displays the following:

```
>;  
>; This command file runs the PSI ICP. It assumes that at least one  
>; DTE is up and running.  
>;  
>* Do you want to run the ICP to the local DTE? [D=N] [Y/N]:
```

To run the ICP to XTR in the local DTE, looping the test through the network, answer YES. To run the ICP between your local DTE and a remote DTE, answer NO. The answer NO displays:

```
>* Do you want to run the ICP to a remote DTE? [D=N] [Y/N]:
```

The procedure then asks for the DTE address:

```
>* What is the DTE address? [S R:0.-15.]:
```

If you are running XTR locally, enter the address of the local DTE. If you are communicating with a remote DTE, enter the address of that DTE. The DTE address is a string of 1 to 15 digits.

Now you enter the subaddress:

```
>* What is the XTR subaddress? [S R:0.-4.]:
```

If you are running XTR locally, the procedure uses this subaddress to set up an X25-Server module destination for XTR. If you are communicating with a remote DTE, be sure to give the subaddress specified by the X25-Server destination for XTR (or PSIXTR on VAX PSI) on the remote system.

Before running SCPXTS, PSIICP displays the following:

```
>;  
>; Starting PSIICP test  
>;
```

SCPXTS will then run for 5 to 15 minutes, depending upon the configuration of your system and on any other tasks running at the same time. The procedure tests the installation of the RSX-11 PSI product by setting up a call between SCPXTS and XTR. These programs transmit and receive 500-byte long data packets continually for three minutes. When the tests stop, the call is cleared. When the tests have completed, SCPXTS produces a summary. This is an example of a summary from a normal run:

Test Finished

Test Statistics		
Number of transmits	=	180
Number of receives	=	180
Interrupts completed	=	0
Interrupts received	=	0
Interrupts confirmed	=	0
Resets completed	=	0
Resets received	=	0

SCPXTS and XTR can run at different speeds. Therefore, the number of transmits and receives reported by the SCPXTS summary may not be equal. However, the number of transmits and receives should always be approximately equal and should exceed 170. A summary showing fewer than 170 transmits and receives does not mean that the test procedure failed, but it could imply PSDN problems such as noisy lines or network congestion.

### 11.1.3 Error Messages

If your PSI system is not working correctly, SCPXTS prints error messages in the following format:

%ICP-E-Error *x* occurred

where *x* is an error number. The following errors can occur:

Number	Meaning
1	Error in address/user group  Information message. The address of the remote DTE was not specified correctly. Specify the remote DTE address and subaddress again, and retry the test.

<b>Number</b>	<b>Meaning</b>
2	<p>Could not send set-up message</p> <p>Fatal error. A data transmission error occurred, or SCPXTS failed to reach XTR. This error can occur if XTR is set up incorrectly. Retry the test in case the network was the cause of the error. If the error recurs, contact your Software Services Representative for help.</p>
3	<p>Set-up message was not same when polled</p> <p>Fatal error. A data transmission error occurred, or SCPXTS failed to reach XTR. This error can occur if XTR is set up incorrectly. Retry the test in case the network was the cause of the error. If the error recurs, contact your Software Services Representative for help.</p>
4	<p>Could not receive set up message</p> <p>Fatal error. There is a logic error in SCPXTS or XTR. Ask your Software Services Representative for help.</p>
5	<p>Could not poll set up message</p> <p>Fatal error. A data transmission error occurred, or SCPXTS or XTR contains a logic error. Check that the network is still accessible; if it is, contact your Software Services Representative for help.</p>
6	<p>Set up message not big enough/not qualified</p> <p>Fatal error. A data transmission error occurred, there is a logical error in SCPXTS or XTR, or SCPXTS failed to access XTR. Check that the network is still accessible; if it is, contact your Software Services Representative for help.</p>
7	<p>Could not assign network device</p> <p>Fatal error. This error can occur if XTR is set up incorrectly. Retry the test in case the network was the cause of the error. If the error recurs, contact your Software Services Representative for help.</p>



<b>Number</b>	<b>Meaning</b>
8	<p>Could not allocate I/O buffer</p> <p>Information message. SCPXTS or XTR has a logic error. Contact your Software Services Representative for help.</p>
9	<p>Could not receive message</p> <p>Information message. Network operation failure: the circuit was probably reset by XTR or the network. Contact your Software Services Representative for help.</p>
10	<p>Could not transmit message</p> <p>Information message. Network operation failure: the circuit was probably reset by XTR or the network. Contact your Software Services Representative for help.</p>
11	<p>Could not transmit interrupt</p> <p>Information message. Network operation failure: the circuit was probably reset by XTR or the network. Contact your Software Services Representative for help.</p>
12	<p>Could not send interrupt confirm</p> <p>Information message. Network operation failure: the circuit was probably reset by XTR or the network. Contact your Software Services Representative for help.</p>
13	<p>Could not reset circuit</p> <p>Information message. Network operation failure: the circuit was probably reset by XTR or the network. Contact your Software Services Representative for help.</p>
14	<p>Could not clear circuit</p> <p>Information message. The CLR<sub>x</sub> call failed. XTR has probably cleared the circuit already, since XTR often runs faster than SCPXTS. No remedial action is necessary.</p>
15	<p>Could not read incoming message</p> <p>Information message. The GNX<sub>x</sub> call failed. The circuit was probably reset by XTR or the network. Contact your Software Services Representative for help.</p>

<b>Number</b>	<b>Meaning</b>
16	<p>Accept switched virtual circuit failed</p> <p>Fatal error. Network operation failure. The network may no longer be accessible. Retry the test; if the error recurs, contact your Software Services Representative for help.</p>
17	<p>Reject virtual circuit failed</p> <p>Fatal error. Network operation failure. The network may no longer be accessible. Retry the test; if the error recurs, contact your Software Services Representative for help.</p>
18	<p>Redirect virtual circuit failed</p> <p>Fatal error. Network operation failure. Contact your Software Services Representative for help.</p>
19	<p>Received interrupt code not as expected</p> <p>Warning message. The consistency check on an interrupt failed. This means that the network generated the interrupt. No remedial action is necessary.</p>
20	<p>Received diagnostics code not as expected</p> <p>Warning message. The consistency check on a clear or reset diagnostics code failed. This means the clear or reset was generated by the network. No remedial action is necessary.</p>
21	<p>Received cause code not as expected</p> <p>Warning message. The consistency check on a clear or reset cause code failed. This means the clear or reset was generated by the network. Contact your Software Services Representative for help.</p>
22	<p>Data received not as expected</p> <p>Warning message. The consistency check on incoming data failed due to a data transmission error. Contact your Software Services Representative for help.</p>
23	<p>Clear data not as expected</p> <p>Warning message. The consistency check on the clear data failed. This means that the network generated the clear. Contact your Software Services Representative for help.</p>

Number	Meaning
--------	---------

- |    |   |
|----|---|
| 24 | <p>Failed to set up with XTR</p> <p>Fatal error. SCPXTS failed to reach XTR. This error can occur if XTR is set up incorrectly. Retry the test in case the network caused the error. If the error recurs, contact your Software Services Representative for help.</p>   |
| 25 | <p>More call accept data received than sent</p> <p>Information message. Set up procedure failure. This error can occur if XTR is set up incorrectly. Retry the test in case the network was the cause of the error. If the error recurs, contact your Software Services Representative for help.</p>                          |
| 26 | <p>Call accept data not call request data</p> <p>Fatal error. A data transmission error occurred or SCPXTS or XTR has a logic error. This error can occur if XTR is set up incorrectly. Retry the test in case the network caused the error. If the error recurs, contact your Software Services Representative for help.</p> |

Some of the previously described errors can occur in combination with one of the following:

%ICP-F-Could not set event flag. Error = *nnn*

Fatal error. A WTSE\$ (wait for single event flag) system directive failed. The value *nnn* represents the standard RSX error code.

%ICP-F-Could not mark time. Error = *nnn*

Fatal error. An MRKT\$ (marktime) system directive failed. The value *nnn* represents the standard RSX error code.

%ICP-F-Could not set timer. Error = *nnn*

Fatal error. A call to the RSX system WAIT routine failed. The value *nnn* represents the standard RSX error code.

%ICP-I-Termination of *xxx* Request - I/O Status Block = *n1 n2 n3*

Refer to the *RSX-11 PSI User's Guide* for information on the error. The description of the call represented by *xxx* has information on the errors that can occur with the call. If the first number (*n1*) in the I/O status block (IOSB) is -12, however, refer to the table of clearing cause codes for the meaning of *n2* and *n3*.

To help in diagnosing problems, RSX-11 PSI maintains extensive status and error counters. You can also use loopback tests to test the physical line and the tracing facility to trace frames. Refer to the *RSX-11 PSI System Manager's Guide* for information on all of these.

For more details on SCPXTS, see the *RSX-11 PSI Generation Guide*.

## 11.2 Verifying X.29 Installation

To verify that the X.29 terminal driver has been correctly installed, use a portable terminal and acoustic coupler. Perform the following steps:

1. Dial an X.29 PAD (packet assembly/disassembly) facility.
2. Log into an account on the local DTE.
3. Engage the DTE in a simple dialog by using a few standard commands, such as:  
    PIP/LI  
    EDI
4. Log out.

See the *RSX-11 PSI Network-Specific Information* manual for further details on these steps.

## 11.3 Verifying Data Link Mapping Installation

After you have established that your local DTE is fully operational by following the procedures described in Section 11.1, check any DLM circuits that may be in the network in the following manner:

1. Ensure that the DTE is ON. Enter the following NCP command:

```
NCP>SHOW MODULE X25-PROTOCOL DTE dte-address
```

The system response will show you whether the DTE you are testing for is ON or OFF. If it is OFF, turn it ON by means of the NCP command:

```
NCP>SET MODULE X25-PROTOCOL DTE dte-address STATE ON
```

2. For PVCs, ensure that the channel numbers, maximum window size, and maximum packet size defined are the same as that allocated to you by the PSDN. To determine this information, enter the following CFE command:

```
CFE>LIST CIRCUIT DLM-x.y CHARACTERISTICS
```

3. For SVCs, check that the usage parameters for the DLM circuits are consistent on each node (one side must be outgoing and the other side incoming). Enter the following CFE command for each circuit:

```
CFE>LIST CIRCUIT DLM-x.y CHARACTERISTICS
```

The node response will show whether the circuit is incoming or outgoing. If a correction is required, make it by means of the following CFE command for the appropriate circuit:

```
CFE>DEFINE CIRCUIT circuit-id USAGE usage
```

where *usage* = INCOMING or OUTGOING

For SVCs you should also verify whether or not the maximum packet size and maximum window size will be negotiated by the software. If the packet size and/or window size is a value other than zero, then either one (or both) of these will be negotiated. The default is zero (which implies no negotiation with the network). Therefore, if your network does not support negotiations, the values for the packet size and/or window size must be zero. Use the following commands to specify the maximum packet and window sizes:

```
CFE>DEFINE CIRCUIT DLM-x.y MAXIMUM DATA byte-count
```

```
CFE>DEFINE CIRCUIT DLM-x.y MAXIMUM WINDOW block-count
```

4. For outgoing circuits, the subaddress of the circuit must be within the range specified at the remote node in the PSI portion of NETGEN in response to the question

WHAT IS THE TRANSPORT SUBADDRESS RANGE?

If it is not, correct it by entering the CFE command

```
CFE>DEFINE CIRCUIT DLM-x.y NUMBER dte-address
```

The variable *dte-address* consists of up to 15 digits made up of two parts:

- The DTE's unique address within the network.
- Subaddress. The length of *dte-address* depends on the PSDN to which you are connecting. The subaddress is the low-order portion of the *dte-address*.

5. For incoming circuits, check that the DTE accepting the calls is properly set up to accept calls from the calling DTE. To determine this information, enter the following command:

```
CPE>LIST CIRCUIT DLM-x.y
```

If the DTE is improperly set up, change the information by using the following command:

```
CPE>DEFINE CIRCUIT DLM-x.y NUMBER dte-address
```

For more information about *dte-address*, see step 4.

6. In testing SVC circuits, be aware of the possibility of exceeding the maximum number of re-calls. If this number is exceeded, the circuit will go to the ON-FAIL state. This would be reported in response to the NCP command:

```
NCP>SHOW CIRCUIT circuit-id
```

If the circuit is ON-FAIL state, first turn it OFF and then ON by using the following NCP commands:

```
NCP>SET CIRCUIT circuit-id STATE OFF
```

```
NCP>SET CIRCUIT circuit-id STATE ON
```

When the circuit has been set to the ON state, run NTEST.CMD as a remote node test (see Section 10.3).

---

## **Sample NETGEN Dialog**

The following is a sample NETGEN for a combined DECnet-11M-PLUS/PSI system. If you do not have a license for the PSI product, the PSI section of the procedure is not displayed.

```

>@DL1:[137,10]NETGEN
>
> =====
> NET - RSX-11M-PLUS CEX System Generation Procedure
> Started at 15:00:13 on 14-JUL-87
> =====
>
> Copyright (C) 1981, 1982, 1983, 1985, 1987 by
> Digital Equipment Corporation, Maynard, Mass.
>
> Generate a CEX System, Version 04.00, for your RSX-11M-PLUS target system.
>
> The following CEX Products may be generated
>   DECnet
>   PSI
>
> The distribution kits must be up to the current patch level. If
> necessary, you should stop the generation and apply the necessary
> patches.
>
> The logical device name LB: should already be assigned to the device
> which contains the library files for the system you are generating.
> These files are EXELIB.OLB, EXEMC.MLB, RSXMAC.SML, SYSLIB.OLB, and
> for RSX-11S, 11SLIB.OLB.
>
> The logical device names IN:, OU:, LS: and MP: should not be assigned
> to any devices before starting the generation. These logical device
> names are used by NETGEN to refer to various disks used during the
> generation.
>
> <EOS> Do you want to:
>* <RET>-Continue, E-Exit [S]:
>
> =====
> NETGEN Disk contains NO DECNET AUTOPATCH corrections
> =====
>
> =====
> NET - Section 1 - General Initialization
> =====
>
>* 01.00 Do you want to see the NETGEN notes/cautions [D=N]? [Y/N]:
>* 02.00 Target system device [dduu, D=SY:] [S]: DL0:
>* 03.00 Listings/map device [dduu, I=None] [S]: DL0:
>* 04.00 UIC Group Code for NETGEN output [D R:1-377 D:5]: 333
>
> Checking for required library files, tasks, and UICs.
>
>
> Creating UFD for DL00:[333,001]
> Creating UFD for DL00:[333,010]
>
> 07.00 User ID to be used to identify your new responses
>* [D=None] [S R:0..30.]: DECNET_PSI
>* 08.00 Is this generation to be a dry run [D=N]? [Y/N]:
>* 09.00 Do you want a standard function network [D=N]? [Y/N]:
>* 10.00 Should all components be generated [D=N]? [Y/N]: Y
>* 11.00 Should old files be deleted [D=N]? [Y/N]:
>
> <EOS> Do you want to:
>* <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>
>

```



```

># =====
># NET - Section 2 - Define the target system
># =====
>#
># * 02.00 RSXMC.MAC location (ddu:[s,m], D=DL00:[011,010]) [S]:
>#
># DL00:[011,010]RSXMC.MAC is being copied to DL00:[333,010]RSXMC.MAC
>#
># DL00:[333,010]RSXMC.MAC is being scanned to define your target system.
># This may take up to several minutes.
>#
># INS LB:$TKB/TASK=TKRTO
># The target is an RSX-11M-PLUS system, with...
>#   A 20K-Executive
>#   Kernel data space enabled
>#   Extended memory support (more than 124K words of memory)
>#   Multi-user protection
>#   Extended instruction set (EIS)
>#   Powerfail recovery support
>#   Dynamic task checkpoint allocation
>#   PLAS support
>#   Queue Manager (QMG) support
>#
># Checkins for required library files and tasks.
>#
>#
># Creating UFD for DL00:[333,024]
># Creating UFD for DL00:[333,034]
># Creating UFD for DL00:[333,054]
>#
># * 04.00 RSX11M.STB location (ddu:[s,m], D=DL00:[001,054]) [S]:
>#
># DL00:[001,054]RSX11M.STB is being copied to DL00:[333,054]RSX11M.STB
>#
># * 05.00 Should tasks link to the Supervisor Mode FCS library [D=N]? [Y/N]: Y
># * 07.01 Generate the DECnet product [D=N]? [Y/N]: Y
>#
># Routing or non-routing nodes can be generated from your distribution kit.
>#
># * 07.02 Generate the PSI product [D=N]? [Y/N]: Y
>#
># <EBS> Do you want to:
>#   <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>#
>#
># =====
># NET - Section 3 - Define the system lines
># =====
>#
># * 01.00 Device Driver Process name [<RET>=Done] [S R:0-3]:
>#
># The Device Driver Module (DDM) Process name identifies a process
># which controls an I/O device. Enter a carriage return when there are
># no more devices to support.
>#
># The legal DECnet device driver process names for UNIRUS processors:
>#
># Name Physical device      Name      Physical device
># ----
># BMC  BMC11 or DMR11      DL        DL11
># DMP  DMP11               DZ        DZ11
># DU   DU11                DHU       DHU11
># DUP  DUP11               KDZ       KMC11/DZ11
># DV   DV11                PCL       PCL11
># KDP  KMC11/DUP11

```

```

>: UNA DEUNA or DELUA
>: DLM PSI Data link mapping
>:
>: The legal DECnet device driver process names for Q-BUS processors:
>:
>: Name Physical device      Name      Physical device
>: ----
>: DMV DMV11                  DLV      DLV11
>: DPV DPV11                  DZV      DZV11 or DZQ11
>: DUV DUV11                  DMV      DMV11 or DMQ11
>: QNA DEQNA or DELQA
>: DLM PSI Data link mapping
>:
>:
>: The legal PSI device driver process names are:
>:
>: Name Physical device
>: ----
>: SDF DUP11
>: KMX KMS11-BD/BE
>: KMY KMS11-PX/PY
>:
>: SDV DPV11 (Q-Bus device,e.g. 11/53, 11/83)
>: KMV KMV11 (Q-Bus device)
>:
>* 01.00 Device Driver Process name [<RET>=Done] [S R:0-3]: DMC
>* 02.00 How many DMC controllers are there [D R:1.-16, D:1.]: 1
>:
>* 03.01 CSR address for DMC-0 [D R:160000-177777 D:177777]: 160200
>* 03.02 Vector address for DMC-0 [D R:0-774 D:0]: 320
>* 03.03 Device priority for DMC-0 [D R:4-6 D:5]:
>:
>* 04.00 Is DMC-0 a FULL or HALF duplex line [D=FULL] [S]:
>* 04.01 Line speed for DMC-0 [D R:50.-56000, D:56000.]:
>* 04.07 Set the state for DMC-0 ON when loading the network [D=N]? [Y/N]:
>:
>: The line owner is DECnet
>:
>:
>* 01.00 Device Driver Process name [<RET>=Done] [S R:0-3]: UNA
>* 02.00 How many UNA controllers are there [D R:1.-16, D:1.]:
>:
>* 03.01 CSR address for UNA-0 [D R:160000-177777 D:174510]:
>* 03.02 Vector address for UNA-0 [D R:0-774 D:120]:
>* 03.03 Device priority for UNA-0 [D R:4-6 D:5]:
>:
>* 04.07 Set the state for UNA-0 ON when loading the network [D=N]? [Y/N]:
>:
>: The line owner is DECnet
>:
>:
>* 01.00 Device Driver Process name [<RET>=Done] [S R:0-3]: DLM
>* 02.00 How many DLM controllers are there [D R:1.-16, D:1.]:
>:
>* 04.07 Set the state for DLM-0 ON when loading the network [D=N]? [Y/N]: Y
>:
>: The line owner is DECnet
>:
>* 05.07 How many tributaries should DLM-0 support [D R:1.-32, D:1.]: 5
>* 05.08 Does DLM-0 define only Switched Virtual Circuits (SVC) [D=N]? [Y/N]: Y
>* 05.10 Will DLM-0.0 be used for incoming calls [D=N]? [Y/N]: Y
>* 05.12 Address of DTE that may call DLM-0.0 [D=None] [S R:0.-16.]:
>* 05.10 Will DLM-0.1 be used for incoming calls [D=N]? [Y/N]: Y
>* 05.12 Address of DTE that may call DLM-0.1 [D=None] [S R:0.-16.]: 311012345678

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>* 05.10 Will DLM-0.2 be used for incoming calls [D=N]? [Y/N]: N
>* 05.11 DTE Address which DLM-0.2 calls [D=None] [S R:0.-16.]: 31106081234507
>* 05.10 Will DLM-0.3 be used for incoming calls [D=N]? [Y/N]:
>* 05.11 DTE Address which DLM-0.3 calls [D=None] [S R:0.-16.]:
>* 05.10 Will DLM-0.4 be used for incoming calls [D=N]? [Y/N]: Y
>* 05.12 Address of DTE that may call DLM-0.4 [D=None] [S R:0.-16.]:
>
>* 01.00 Device Driver Process name [<RET>=Done] [S R:0-3]: KMV
>* 02.00 How many KMV controllers are there [D R:1.-2. D:1.]:
>
>* 03.00 Number of lines used on KMV-0 [D R:1.-2. D:1.]: 2
>* 03.01 CSR address for KMV-0 [D R:160000-177777 D:177777]:
>* 03.02 Vector address for KMV-0 [D R:0-774 D:0]:
>* 03.03 Device Priority for KMV-0 [D R:4-6 D:5]:
>
> The line owner is PSI
>
>
> The line owner is PSI
>
>
>* 01.00 Device Driver Process name [<RET>=Done] [S R:0-3]: SDP
>* 02.00 How many SDP controllers are there [D R:1.-16. D:1.]:
>
>* 03.01 CSR address for SDP-0 [D R:160000-177777 D:177777]:
>* 03.02 Vector address for SDP-0 [D R:0-774 D:0]:
>* 03.03 Device Priority for SDP-0 [D R:4-6 D:5]:
>
>* 04.05 Will SDP-0 use modem signal monitoring [D=N]? [Y/N]: Y
>
> The line owner is PSI
>
>
>* 01.00 Device Driver Process name [<RET>=Done] [S R:0-3]:
>
>
> <EOS> Do you want to:
>* <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>
>
=====
> NET - Section 4 - Define the CEX System
=====
>
> Creating build files for AUX, the CEX Auxillary routine.
>
> Creating build files for STCRC, the CRC16 calculation routine.
>
>* 03.00 Does the target system have a KB-11 [D=N]? [Y/N]:
>
> Creating build files for DETAB, the CEX configuration tables.
>
> Creating build files for the DDMS, the device driver modules.
>
> DMC
> UNA
> DLM
> Creating build files for DLM, the data link mapping process
>
> KMV
> Creating build files for KMV, the KMV11 driver
>
> SDP
> Creating build files for SDP, the DUP-11 HDLC/SDLC driver
>
>
>
> <EOS> Do you want to:
>* <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>
>

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>| =====
>| NET - Section 5 - Define the Comm Exec Support Components
>| =====
>|
>| Creating build files for NTINIT, the network initializer.
>|
>| Creating build files for NTL, the network loader.
>|
>| Creating build files for MLU, the general microcode loader.
>|
>| Creating build files for EVL/EVC, the event loader and collector.
>|
>| * 05.01 How many Event Buffers should EVL use [D R:4.-50, D:6.]:
>|
>|
>| <EOS> Do you want to:
>| * <RET>-Continue, R-Repeat section, P-Pause, E-Exit [SJ:
>|
>|
>| =====
>| NET - Section 6 - Define the System Management Utilities
>| =====
>|
>| Creating build files for NCP, the network control program.
>|
>| Creating build files for NMVACP and NMBRV, the Network Management
>| Volatile ACP and driver.
>|
>| Creating build files for CFE, the configuration file editor.
>|
>| Creating build files for NDA, the network dump analyzer.
>|
>| Creating build files for VNP, the virtual network control program.
>|
>| Creating build files for LOD, the loop test sender task.
>|
>| Creating build files for EVF, the event file interpreter program.
>|
>|
>| <EOS> Do you want to:
>| * <RET>-Continue, R-Repeat section, P-Pause, E-Exit [SJ:
>|
>|
>| =====
>| NET - Section 7 - Define the CEX Products
>| =====
>|
>| Questions concerning the following CEX Products will now be asked.
>|
>| DECnet
>| PSI
>|
>|
>| =====
>| DEC - DECnet CEX Product Generation Procedure
>| Starting questions at 15:31:12 on 14-JUL-87
>| =====
>|
>| Copyright (C) 1981, 1982, 1983, 1985, 1987 by
>| Digital Equipment Corporation, Maynard, Mass.
>|
>| Generate the DECnet CEX Product for your RSX-11M-PLUS target
>| System.
>|

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>| =====
>| DEC - Section 1 - Define the target and remote nodes
>| =====
>|
>| * 01.00 What is the target node name [S R:0-63]: NEWARK
>| * 02.00 What is the target node address [S R:0.-8.1]: 5.54
>| * 03.00 Target node ID [D=None] [S R:0.-32.1]: WELCOME TO NEWARK
>| * 04.00 Do you want to generate a routing node [D=N]? [Y/N]: Y
>| * 04.01 Do you want to generate a level 2 routing node [D=N]? [Y/N]: N
>| * 05.00 Highest node number in this area [D R:54.-1023.1 P:54.1]: 100
>|
>| Extended network support for network command terminals and products
>| layered on DECnet, will be included.
>|
>| * 07.00 Remote node name [<RET>=Done] [S R:0-63]: UTICA
>| * 07.01 What is the remote node address [D=5.11] [S R:0.-8.1]: 5.77
>|
>| * 07.00 Remote node name [<RET>=Done] [S R:0-63]: FEDRIA
>| * 07.01 What is the remote node address [D=5.78] [S R:0.-8.1]: 5.13
>|
>| * 07.00 Remote node name [<RET>=Done] [S R:0-63]: BOSTON
>| * 07.01 What is the remote node address [D=5.14] [S R:0.-8.1]: 5.23
>|
>| * 07.00 Remote node name [<RET>=Done] [S R:0-63]: BRONX
>| * 07.01 What is the remote node address [D=5.24] [S R:0.-8.1]: 5.98
>|
>| * 07.00 Remote node name [<RET>=Done] [S R:0-63]:
>|
>| The DECnet MACRO user library and FORTRAN/COBOL/BASIC+2 library will
>| be included.
>|
>| The DECnet MACRO user library will be placed on your target disk
>| as 'DL00:[1,1]NETLIB.MLB'.
>|
>| The DECnet FORTRAN/COBOL/BASIC+2 object library will be placed on your
>| target disk as 'DL00:[1,1]NETFOR.DLB'.
>|
>| If necessary, please move them to the library disk (LB:) on your
>| target system, if this is different from your target disk (DL00:).
>|
>|
>| <EOS> Do you want to:
>| * <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>|
>| =====
>| DEC - Section 2 - Define the DECnet Communications Components
>| =====
>|
>| Creating build files for XPT, the routing process.
>|
>| Creating build files for RCP, the routing event processing task.
>|
>| Creating build files for ECL, the network services process and driver.
>|
>| Creating build files for NETACP, the network services ACP.
>|
>| * 05.01 Should NETACP be checkpointable [D=N]? [Y/N]: Y
>|
>| Creating build files for EPM, the Ethernet protocol manager process.
>|
>| <EOS> Do you want to:
>| * <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>|
>|

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>| =====
>| DEC - Section 3 - Define the DECnet Network Management Components
>| =====
>|
>| Creating build files for NICE, the network information and control
>| server task.
>|
>| Creating build files for EVR, the network event receiver task.
>|
>| Creating build files for NTD, the node state display task.
>|
>| Creating build files for NTDEMD, the node state display server task.
>|
>| Creating build files for LIN, the link watcher task.
>|
>| Creating build files for MIR, the loop test mirror task.
>|
>| Creating build files for NVP, the network connect verification task.
>|
>|
>| <EOS> Do you want to:
>| <RET>-Continue, R-Repeat section, F-Pause, E-Exit [S]:
>|
>|
>| =====
>| DEC - Section 4 - Define the DECnet Satellite Support Components
>| =====
>|
>| * 02.00 Do you want the Satellite Support Components [D=N]? [Y/N]: Y
>|
>| Creating build files for DLL, the down-line system loader, host
>| component.
>|
>| Creating build files for DUM, the up-line system dumper, host
>| component.
>|
>| Creating build files for CCR, the console carrier requester, host
>| component.
>|
>| Creating build files for HLD, the down-line task loader, host
>| component.
>|
>| * 06.01 Number of incoming connections to support [D R:1.-32, D:4,]:
>|
>| To generate the HLD database which describes the tasks to down-line
>| load, you may execute the HLDDBAT.CMD command procedure at any time
>| after your network generation is complete. This command file will be
>| located as follows.
>|
>| DL00:[333,001]HLDDBAT.CMD
>|
>|
>| <EOS> Do you want to:
>| <RET>-Continue, R-Repeat section, F-Pause, E-Exit [S]:
>|
>|
>| =====
>| DEC - Section 5 - Define the DECnet File Utilities
>| =====
>|
>| Creating build files for NFT, the network file access user task.
>|
>| Creating build files for FTS, the network file access spooler
>| user task.
>|

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>: Creating build files for FAL, the network file access server.
>:
>: FAL will support RMS file access.
>: FAL will be a multi-copy object.
>: FAL will not be overlaid.
>: FAL will use the memory resident RMS library.
>:
>* 04.04 User data buffer size [D R:260.-2048. D:2048.]:
>:
>: Creating build files for HCM, the network command or batch file
>: submission server.
>:
>:
>* 05.01 Should requests be queued to Batch [D=N]? [Y/N]:
>:
>:
>: <EOS> Do you want to:
>* <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>:
>:
>: =====
>: DEC - Section 6 - Define the DECnet Terminal and Control Utilities
>: =====
>:
>: Creating build files for RMT and RMTACP, the remote network terminal
>: task and ACP.
>:
>* 02.01 Maximum number of simultaneous RMT users [D R:1.-14. D:4.]:
>:
>: Creating build files for HT: and RMHACP, the remote network terminal
>: driver and ACP.
>:
>* 03.01 Number of incoming connections to support [D R:1.-16. D:4.]:
>* 03.02 Number of HT: units to generate [D R:4.-64. D:4.]:
>:
>: Creating build files for NCT, the network command terminal server
>:
>: Creating build files for RTH, the network command terminal host
>: support.
>:
>: Creating build files for TLK, the remote talk user task.
>:
>: Creating build files for LSN, the remote talk server task.
>:
>: Creating build files for PHD, the inter-terminal conversation utility.
>:
>: Creating build files for LAT/LCP, the Local Area Transport terminal
>: service process and LAT Control Program
>:
>: Creating build files for TCL, the remote task control server task.
>:
>:
>: <EOS> Do you want to:
>* <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>:
>:
>: =====
>: DEC - DECnet CEX Product Generation Procedure
>: DECnet question/answer section completed at 15:44:25 on 14-JUL-87
>: =====
>:
>: =====
>: PSI - PSI CEX Product Generation Procedure
>: Starting questions at 15:44:33 on 14-JUL-87
>: =====
>:

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> Copyright (C) 1982, 1984, 1986, 1987 by
> Digital Equipment Corporation, Maynard, Mass.
>
> Generate the PSI CEX Product for your RSX-11M-PLUS target
> system.
>
> =====
> PSI - Section 1 - Specify target network characteristics
> =====
>
> * 01.00 Packet Switching Data Network name ? [S]: TELENET
> * 03.00 What is the transport subaddress range [S R:0.-9.]: 2-9
>
> <EOS> Do you want to:
> * <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>
> =====
> PSI - Section 2 - Specify local DTEs
> =====
>
>
> * 01.00 What is the local DTE address [S R:0.-15.]: 311023456789
> * 02.00 Which line is associated with this DTE [S R:1.-9.]: SDP-0
> * 03.00 How many virtual circuits can be active at once? [D R:1.-255.]: 15
> * 04.00 What channels can be used for outgoing calls [S]: 15-10
>
> Specify PVCs for this DTE.
>
> Note that any DLM PVCs must also be included.
>
> The following DLM circuits have been generated:
> DLM-0.0 S
> DLM-0.1 S
> DLM-0.2 S
> DLM-0.3 S
> DLM-0.4 S
>
> * 05.00 Enter a PVC used by this DTE [S]:
> * 06.00 Enter a closed user group for this DTE [S]:
>
>
> * 01.00 What is the local DTE address [S R:0.-15.]:
>
> <EOS> Do you want to:
> * <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>
> =====
> PSI - Section 3 - Specify incoming call destinations
> =====
>
> Specify the X25 destinations
>
>
> * 01.00 Identify an incoming call destination [S R:0.-6.]: JOE
> * 02.00 What is the Priority [D R:0.-255. B:127.]:
> * 03.00 What is the object-id [S R:1.-6.]: JOE
> * 04.00 What is the remote DTE address [S R:0.-15.]: 3110345678891
> * 05.00 What is the subaddress range [S R:0.-9.]: 10
> * 06.00 What is the closed user group name [S R:0.-6.]:
> * 07.00 What is the call mask [S R:0.-32.]: 1001
> * 07.01 What is the call value [S R:1.-32.]: 1001
>
>

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>* 01.00 Identify an incoming call destination [S R:0.-6.]:
>;
>; Specify the X29 destinations
>;
>;
>* 01.00 Identify an incoming call destination [S R:0.-6.]: STEVE
>* 02.00 What is the priority ID [R:0.-255, D:127.]:
>* 03.00 What is the object-id [S R:1.-6.]: STEVE
>* 04.00 What is the remote DTE address [S R:0.-15.]: 311045678912
>* 05.00 What is the subaddress range [S R:0.-9.]: 10
>* 06.00 What is the closed user group name [S R:0.-6.]:
>* 07.00 What is the call mask [S R:0.-32.]: 1110
>* 07.01 What is the call value [S R:1.-32.]: 1110
>;
>;
>* 01.00 Identify an incoming call destination [S R:0.-6.]:
>;
>; <EOS> Do you want to:
>* <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>;
>;
>; =====
>; PSI - Section 4 - Specify logical names for remote DTEs
>; =====
>;
>* 01.00 Identify a remote DTE [S]: SYS1,11111111
>* 01.00 Identify a remote DTE [S]: SYS2,22222222
>* 01.00 Identify a remote DTE [S]:
>;
>; <EOS> Do you want to:
>* <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>;
>;
>; =====
>; PSI - Section 5 - Specify required components
>; =====
>;
>;
>; Creating build files for NW, the PSI Network device
>;
>; Creating build files for PLI, the X.25 packet level interface
>;
>; Creating build files for LAR, the X.25 level 2 protocol handler
>;
>;
>; Creating build files for X25ACP, the X.25 server task
>;
>; <EOS> Do you want to:
>* <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>;
>;
>; =====
>; PSI - Section 6 - Specify optional components
>; =====
>;
>* 08.00 How many remote X.29 terminals are supported [D R:1.-140.]: 6
>;
>; Creating build files for X29ACP, the remote terminal support task
>;
>; Creating build file for PSIPAD, the host based PAD
>;
>; Creating build files for TRA, the trace capture task
>;
>; Creating build files for TRI, the trace interpreter task
>;

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> Creating build files for DUK, the KMX/KMY/KMV microcode dumper
>
> <EOS> Do you want to:
> * <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>
>
> =====
> PSI - PSI CEX Product Generation Procedure
> All questions answered at 15:57:25 on 14-JUL-87
> =====
>
>
> =====
> NET - Section 8 - Complete the CEX System Definitions
> =====
>
> Creating build files for DLX, the Direct Line Access Process.
>
> * 02:00 What is the Large Data Buffer (LDB) size [D R:576.-1484, I:576.]:
>
> <EOS> Do you want to:
> * <RET>-Continue, R-Repeat section, P-Pause, E-Exit [S]:
>
>
> =====
> NET - Section 9 - Build the CEX System at 17:18:13 on 14-JUL-87
> =====
>
> All questions have now been asked and the selected components will now
> be built. This may take from one to three hours, depending on the
> selection of components and the system you are running on.
>
> PIP DLOO:[333,054]CETAB.MAC/PU/NM
> PIP DLOO:[333,054]AUX.DAT/PU/NM
>
> SET /UIC=[1,2]
> PIP OU:[1,2]NETHLP.ULR=IN:[1,2]NETHLP.HLP
> PIP OU:[1,2]NETHLP.ULR/PU/NM
> SET /UIC=[333,024]
>
> PIP OU:[333,54]NV=IN:[3,54]RSXVEC.STB
> PIP OU:[333,54]NV/CO=IN:[131,54]AUX.TSK
> PIP OU:[333,54]NV=IN:[131,54]AUX.STB
> PIP OU:[333,54]AUX.TSK/PU/NM,AUX.STB
> TKB @OU:[333,24]STCRCRLD.CMD
> PIP OU:[333,54]STCRC.TSK/PU/NM,STCRC.STB
> MAC @OU:[333,24]CETABASH.CMD
> PIP OU:[333,24]CETAB.OBJ/PU/NM
> TKB @OU:[333,24]CETABRLD.CMD
> PIP OU:[333,54]CETAB.TSK/PU/NM,CETAB.STB
> PIP OU:[333,54]NV/CO=IN:[132,54]INIT.TSK
> PIP OU:[333,54]INIT.TSK/PU/NM
> PIP OU:[333,54]NV/CO=IN:[132,54]INTL.TSK
> PIP OU:[333,54]INTL.TSK/PU/NM
> PIP OU:[333,54]NV/CO=IN:[132,54]MLD.TSK
> PIP OU:[333,54]NV=IN:[132,54]MLD.STB
> PIP OU:[333,54]MLD.TSK/PU/NM,MLD.STB
> MAC @OU:[333,24]EVLASH.CMD
> PIP OU:[333,24]EVL.DAT.OBJ/PU/NM
> TKB @OU:[333,24]EVLRLD.CMD
> PIP OU:[333,54]NV=IN:[131,24]EVL.DAT
> PIP OU:[333,54]EVL.TSK/PU/NM,EVL.STB,EVL.DAT
> TKB @OU:[333,24]EVCRLD.CMD
> PIP OU:[333,54]EVC.TSK/PU/NM

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>PIP OU:[333,54]/NV/CO=IN:[135,54]NCPFSL.TSK
>PIP OU:[333,54]NCPFSL.TSK/PU/NM
>MAC @OU:[333,24]NMVACFASH.CMD
>PIP OU:[333,24]NMDRV.OBJ/PU/NM,NMTAR.OBJ
>TKB @OU:[333,24]NMVACFBLD.CMD
>PIP OU:[333,54]/NV/CO=IN:[135,54]NMVACP.TSK
>PIP OU:[333,54]/NV=IN:[135,54]NMVACP.STB
>PIP OU:[333,54]NMVACP.TSK/PU/NM,NMDRV.TSK,NMDRV.STB
>PIP OU:[333,54]/NV/CO=IN:[132,54]CFEFSL.TSK
>PIP OU:[333,54]CFEFSL.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[141,54]NDA.TSK
>PIP OU:[333,54]NDA.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[132,54]VNP.TSK
>PIP OU:[333,54]VNP.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[135,54]L00.TSK
>PIP OU:[333,54]/NV=IN:[135,54]L00.STB
>PIP OU:[333,54]L00.TSK/PU/NM,L00.STB
>PIP OU:[333,54]/NV/CO=IN:[135,54]EVFFSL.TSK
>PIP OU:[333,54]EVFFSL.TSK/PU/NM
>MAC @OU:[333,24]DLXASH.CMD
>PIP OU:[333,24]DLXTAB.OBJ/PU/NM
>TKB @OU:[333,24]DLXBLD.CMD
>PIP OU:[333,54]DLX.DAT/NV=IN:[131,24]DLX.DAT
>PIP OU:[333,54]DLX.TSK/PU/NM,DLX.STB,DLX.DAT
>PIP OU:[333,54]DLXTAB.TSK/PU/NM,DLXTAB.STB
>f
>TKB @OU:[333,24]DMCBLD.CMD
>PIP OU:[333,54]DMC.TSK/PU/NM,DMC.STB
>PIP OU:[333,54]/NV=IN:[131,24]DMC.DAT
>PIP OU:[333,54]DMC.DAT/PU/NM
>TKB @OU:[333,24]JUNABLD.CMD
>PIP OU:[333,54]JUNA.TSK/PU/NM,JUNA.STB
>PIP OU:[333,54]/NV=IN:[131,24]JUNA.DAT
>PIP OU:[333,54]JUNA.DAT/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[131,54]JUNAMC.TSK
>PIP OU:[333,54]JUNAMC.TSK/PU/NM
>SET /UIC=C1,11
>PIP OU:[1,1]NETLIB.MLB/NV=IN:[1,10]NETLIBU.MLB
>PIP OU:[1,1]NETLIB.MLB/PU
>LBR OU:[1,1]NETFOR.OBS=IN:[133,24]DAPFOR/EX
>LBR OU:[1,1]NETTMP.OBS=IN:[133,24]BAPTRC/EX
>LBR OU:[1,1]NETFOR/CO:1:320,1:192.=IN:[134,24]NETFOR.OLB
>LBR OU:[1,1]NETFOR/IN=OU:[1,1]NETFOR.OBS
>LBR OU:[1,1]NETFOR/IN/-EP=OU:[1,1]NETTMP.OBS
>LBR OU:[1,1]NETFOR/DG:$MELUN:$ASTBL:$ASTLU
Entry points deleted:
$MELUN
$ASTBL
$ASTLU

>PIP OU:[1,1]NETFOR.OBS;*/DE,NETTMP.OBS;*
>PIP OU:[1,1]NETFOR.OLB/PU
>SET /UIC=[333,024]
>PIP OU:[333,024]/NV=IN:[137,24]NTEST.CMD
>PIP OU:[333,024]NTEST.CMD/PU/NM
>SET /UIC=[333,054]
>PIP OU:[333,054]/NV/CO=IN:[133,54]DTS.TSK,DTR.TSK
>PIP OU:[333,054]DTS.TSK/PU/NM,DTR.TSK
>SET /UIC=[333,024]
>TKB @OU:[333,24]XPTBLD.CMD
>PIP OU:[333,54]XPT.DAT/NV=IN:[131,24]XPTBLM.DAT
>PIP OU:[333,54]XPT.TSK/PU/NM,XPT.STB,XPT.DAT
>TKB @OU:[333,24]RCF1BLD.CMD
>PIP OU:[333,54]RCF1.TSK/PU/NM
>MAC @OU:[333,24]ECLASH.CMD

```

```

>PIP OU:[333,24]ECLTAB.OBJ/PU/NM
>TKB @OU:[333,24]ECLBLD.CMD
>PIP OU:[333,54]ECL.DAT/NV=IN:[131,24]ECL.DAT
>PIP OU:[333,54]ECL.TSK/PU/NM,ECL.STB,ECLTAB.TSK,ECLTAB.STB,ECL.DAT
>PIP OU:[333,54]/NV/CO=IN:[135,54]PROXY.TSK
>TKB @OU:[333,24]NETACPBLD.CMD
>PIP OU:[333,54]NETACP.TSK/PU/NM,NETACP.STB
>TKB @OU:[333,24]EPMBLD.CMD
>PIP OU:[333,54]/NV=IN:[131,24]EPM.DAT,EPMST.DAT
>PIP OU:[333,54]EPM.TSK/PU/NM,EPM.STB,EPM.DAT,EPMST.DAT
>PIP OU:[333,54]/NV/CO=IN:[135,54]NICE.TSK
>PIP OU:[333,54]NICE.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[135,54]EUR.TSK
>PIP OU:[333,54]EUR.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[135,54]NTD.TSK
>PIP OU:[333,54]NTD.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[135,54]NTDEMO.TSK
>PIP OU:[333,54]NTDEMO.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[135,54]LIN.TSK
>PIP OU:[333,54]LIN.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[135,54]MIR.TSK
>PIP OU:[333,54]/NV=IN:[135,54]MIR.STB
>PIP OU:[333,54]MIR.TSK/PU/NM,MIR.STB
>PIP OU:[333,54]/NV/CO=IN:[132,54]NVFFSL.TSK
>PIP OU:[333,54]NVFFSL.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[135,54]DLFSL.TSK
>PIP OU:[333,54]/NV/CO=IN:[136,54]SEC*.SYS,TER*.SYS
>PIP OU:[333,54]DLFSL.TSK/PU/NM
>PIP OU:[333,54]SEC*.SYS/PU/NM,TER*.SYS
>PIP OU:[333,54]/NV/CO=IN:[135,54]DUM.TSK
>PIP OU:[333,54]DUM.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[135,54]CCR.TSK
>PIP OU:[333,54]CCR.TSK/PU/NM
>TKB @OU:[333,24]HLDBLD.CMD
>PIP OU:[333,54]HLDB.TSK/PU/NM
>PIP OU:[333,12]/NV=IN:[132,24]HLDDAT.CMD
>PIP OU:[333,12]HLDDAT.CMD/PU/NM
>SET /UIC=[333,10]
>LBR OU:[333,10]HLDLIR/CR:1:0:64:;MAC=IN:[130,10]HLDLIR.MAC
>PIR OU:[333,10]HLDLIR.MLB/PU
>TKB @OU:[333,24]NFTBLD.CMD
>PIP OU:[333,54]NFTFSL.TSK/PU/NM
>SET /UIC=[333,24]
>MAC @OU:[333,24]FTSASH.CMD
>TKB @OU:[333,24]FTSBLD.CMD
>PIP OU:[333,54]FTSFSL.TSK/PU/NM,FTSDEQFSL.TSK
>SET /UIC=[333,24]
>MAC @OU:[333,24]FALASH.CMD
>PIR OU:[333,24]FALPRM.OBJ/PU/NM
>TKB @OU:[333,24]FALBLD.CMD
>PIP OU:[333,54]FAL.TSK/PU/NM,FALRES.TSK,FALFSL.TSK
>TKB @OU:[333,24]MCHBLD.CMD
>PIP OU:[333,54]MCH.TSK/PU/NM
>MAC @OU:[333,24]RMTASH.CMD
>PIP OU:[333,24]RMTACP.OBJ/PU/NM
>TKB @OU:[333,24]RMTBLD.CMD
>PIR OU:[333,54]RMT.TSK/PU/NM,RMTACP.TSK
>MAC @OU:[333,24]RMHACFASH.CMD
>PIP OU:[333,24]RMHACF.OBJ/PU/NM,HTTAB.OBJ
>TKB @OU:[333,24]RMHACFBLD.CMD
>PIP OU:[333,54]RMHACF.TSK/PU/NM,HTDRV.TSK,HTDRV.STB
>PIP OU:[333,54]NCT.TSK/NV/CO=IN:[140,54]NCT.TSK
>PIP OU:[333,54]NCT.STB/NV=IN:[140,54]NCT.STB
>PIP OU:[333,54]/NV/CO=IN:[140,54]NCTCTL.TSK
>PIP OU:[333,54]/NV/CO=IN:[140,54]TRXCTL.TSK

```

```

>PIP OU:[333,54]/NV/CO=IN:[140,54]TRXCCL.TSK
>PIP OU:[333,54]NCT.DAT/NV=IN:[140,24]NCT.DAT
>PIP OU:[333,54]NCT.TSK/PU/NM,NCT.STB,NCT.DAT
>PIP OU:[333,54]NCTCTL.TSK/PU/NM
>PIP OU:[333,54]TRXCCL.TSK/PU/NM
>MAC @OU:[333,24]RTHASM.CMD
>TKB @OU:[333,24]RTHBLD.CMD
>PIP OU:[333,24]RTHTAB.OBJ/PU/NM
>PIP OU:[333,54]RTH.DAT/NV=IN:[140,24]RTH.DAT
>PIP OU:[333,54]RTH.TSK/PU/NM,RTH.STB,RTH.DAT
>PIP OU:[333,54]RHTAB.TSK/PU/NM,RHTAB.STB
>TKB @OU:[333,24]TLKBLD.CMD
>PIP OU:[333,54]TLKFSL.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[133,54]LSN.TSK
>PIP OU:[333,54]LSN.TSK/PU/NM
>PIP OU:[333,54]/NV/CO=IN:[133,54]PHONE.TSK
>PIP OU:[333,54]PHONE.TSK/PU/NM
>SET /UIC=[1,2]
>PIP OU:[1,2]/NV=IN:[133,103]PHONEHELP.HLP
>SET /UIC=[333,24]
>PIP OU:[333,54]/NV/CO=IN:[135,54]LCPFSL.TSK
>PIP OU:[333,54]/NV/CO=IN:[131,54]LAT.TSK,LAT.STB
>PIP OU:[333,54]/NV/CO=IN:[131,54]LAT1.TSK,LAT1.STB
>PIP OU:[333,54]LAT.DAT/NV=IN:[131,24]LAT.DAT
>PIP OU:[333,54]LAT.TSK/PU/NM,LAT.STB,LAT.DAT
>PIP OU:[333,54]LAT1.TSK/PU/NM,LAT1.STB
>PIP OU:[333,54]LCPFSL.TSK/PU/NM
>MAC @OU:[333,24]TCLASH.CMD
>PIP OU:[333,24]TCLPWD.OBJ/PU/NM
>TKB @OU:[333,24]TCLBLD.CMD
>PIP OU:[333,54]TCL.TSK/PU/NM
>
>TKB @OU:[333,24]DLMBLD.CMD
>PIP OU:[333,54]/NV=IN:[152,24]DLM.DAT,DLMSTA.DAT
>PIP OU:[333,54]DLM.TSK/PU/NM,DLM.STB,DLM.DAT,DLMSTA.DAT
>TKB @OU:[333,24]KXVBLD.CMD
>PIP OU:[333,54]/NV/CO=IN:[153,54]KXVAFW.TSK
>PIP OU:[333,54]/NV=IN:[152,24]KXV.DAT
>PIP OU:[333,54]KXV.TSK/PU/NM,KXV.STB
>PIP OU:[333,54]KXVAFW.TSK/PU/NM
>PIP OU:[333,54]KXV.DAT/PU/NM
>TKB @OU:[333,24]SDPBLD.CMD
>PIP OU:[333,54]SDP.DAT/NV=IN:[152,24]SDP.DAT
>PIP OU:[333,54]SDP.TSK/PU/NM,SDP.STB,SDP.DAT
>PIP OU:[333,001]/NV=IN:[151,010]*.PRF
>PIP OU:[333,001]*.CMD/RE/NV=OU:[333,001]*.PRF:*
>PIP OU:[333,001]*.CMD/PU
>MAC @OU:[333,24]NWTABASH.CMD
>TKB @OU:[333,24]NWBLD.CMD
>PIP OU:[333,54]/NV=IN:[152,24]NW.DAT
>PIP OU:[333,24]NWTAB.OBJ:*/*DE/NM
>PIP OU:[333,54]NW.TSK/PU/NM,NW.STB,NWTAB.TSK,NWTAB.STB,NW.DAT
>TKB @OU:[333,24]PLIBLD.CMD
>PIP OU:[333,54]KXVULN.DAT/PU/NM
>PIP OU:[333,54]PLI.TSK/PU/NM,PLI.DAT,PLI.STB
>TKB @OU:[333,24]LABBLD.CMD
>PIP OU:[333,54]LAB.TSK/PU/NM,LAB.STB,LAB.DAT
>TKB @OU:[333,24]X25BLD.CMD
>PIP OU:[333,54]X25ACP.TSK/PU/NM,X25ACP.STB
>PIP OU:[333,54]/NV/CO=IN:[153,54]SCFXTS.TSK
>PIP OU:[333,54]/NV/CO=IN:[153,54]XTR.TSK
>PIP OU:[333,54]SCFXTS.TSK/PU/NM,XTR.TSK
>TKB @OU:[333,24]X29BLD.CMD

```

```

>PIP OU:[333,54]/NV/CD=IN:[154,54]PSIPADFSL.TSK
>PIP OU:[333,54]PSIPADFSL.TSK/PU/NM
>TKB @OU:[333,24]TRABLD.CMD
>PIP OU:[333,54]TRA.TSK/PU/NM
>TKB @OU:[333,24]TRIBLD.CMD
>PIP OU:[333,54]TRI.TSK/PU/NM,TRAISP.TSK
>SET /UIC=[1,1]
>PIP DL00:[1,1]/NV=IN:[155,24]PSIFOR.OLB
>PIP DL00:[1,1]PSIFOR.OLB/PU/NM
>SET /UIC=[333,24]
>SET /UIC=[1,1]
>PIP DL00:[1,1]/NV=IN:[1,1]PSI.MLB
>PIP DL00:[1,1]PSI.MLB/PU/NM
>SET /UIC=[333,24]
>TKB @OU:[333,24]DUKBLD.CMD
>PIP OU:[333,54]DUK.TSK/PU/NM
>PIP OU:[333,54]/NV/CD=IN:[153,54]KDA.TSK
>PIP OU:[333,54]KDA.TSK/PU/NM
>
>; =====
>; NET - Section 10 - Generation Clean Up
>; =====
>;
>; Creating NETCFG.TXT, the network configuration description file.
>; Creating NETCFE.CMD, the network configuration command file.
>; Creating NETINS.CMD, the network installation command file.
>; Creating NETREM.CMD, the network removal command file.
>;
>;
>; The network HELP file library has been placed on your target disk, as:
>;
>;      DL00:[1,2]NETHLP.ULB
>;
>; This file should be moved to your target systems library device (LB:).
>;
>REM TKBT0
>;
>; =====
>; NET - RSX-11M-PLUS CEX System Generation Procedure
>;      Stopped at 16:04:06 on 14-JUL-87
>; =====
>;

```

---

## **How to Include NETPAN (Up-Line Panic Dump) in an RSX-11S System**

The NETPAN component of DECnet-RSX is activated when a detectable abnormal system crash occurs. Registers are saved automatically in a predefined place in memory and a copy of the entire system memory is sent up-line. CDA or NDA can then be used to analyze the problem.

The remainder of this appendix tells you how to include NETPAN in an RSX-11S system when you use a distribution kit consisting of an RL01 or larger disk pack.

### **B.1 How to Include NETPAN in an RSX-11S System**

The steps that you must take to include NETPAN in a system occur at the following points in the system generation process:

- In set-up operations prior to invoking SYSGEN
- In Phase I of SYSGEN
- In Phase II of SYSGEN

The operations that you must perform at these points in the system generation process are broken out in the example that follows.

### B.1.1 Preparing for SYSGEN

Issue the following set-up instructions before you initiate the SYSGEN process:

```
>SET /UIC=[11,10]
>PIP xx:PANIC.SAV/RE=XX:PANIC.MAC

>PIP xx:PANIC.MAC=yy: [136,10]NETPAN.MAC

>SET /UIC=[1,20]
>LBR xx:ddd.OBJ=yy: [136,24]BOOTS/EX:ddd
>DMO yy:
```

In the example command lines

*ddd* is the name of the physical line used for the up-line dump. The final three letters of *ddd* will always be DRV. For example, the physical line name for a DUP device will be DUPDRV.

*xx* is the RSX distribution device

*yy* is the DECnet distribution device

### B.1.2 SYSGEN Phase I Considerations

In the Executive Options section of SYSGEN, answer the following questions as indicated:

```
>* 50. DUMP ANALYSIS:      A- PANIC B- CRASH (CDA)      [S]: A
>* 53. Enter PANIC memory dump device CSR [O R:160000-177700 D:177564]:nnnnnn
```

where

*nnnnnn* is the CSR address of the physical line used for the up-line dump. This is the CSR address for the device you specified in *ddd*.

In the Assemble the Executive section of SYSGEN, you are asked whether you want to edit any of the Executive files. If you are using an Ethernet device for the up-line dump you must answer Y to the editing question and edit the Executive source file to add a line defining the N\$\$NI symbol. If you have an M9301 ROM set for bootstrapping over a DECnet device, Unit Number 0, or an M9312 ROM set for bootstrapping over a DECnet device, Unit Number 0 or 1, answer Y to the editing question and edit the Executive source file to add a line defining the R\$\$BOT symbol. These two symbols are mutually exclusive; you should never have both symbols defined in the same Executive source file. If you are not using



an Ethernet device and any of the following conditions apply, answer N to the edit question:

- You are not using an M9301 or M9312 ROM.
- You want to boot the system over a unit number greater than 0 using an M9301 or over a unit number greater than 1 using an M9312.
- You do not want to use the hardware bootstrap.

The following sequence shows an example of the edit question and the edit sequence.

```
>* 1. Do you wish to edit any of the Executive files? [Y/N]:Y
>;
>;      SGN - Pausing to allow editing of Executive source

AT. -- PAUSING. TO CONTINUE TYPE "RES ...AT."

>EDI RSXMC.MAC
[000NN LINES READ IN]
[PAGE 0]
*I
```

Now enter one of the following two lines:

```
N$$NI=0      ;UP-LINE DUMP DEVICE IS AN ETHERNET DEVICE
```

or

```
R$$BOT=0      ; AUTOMATIC REBOOT THROUGH THE M9312 OR M9301 ROM
```

Now exit the editor:

```
*EX [EXIT]

>RES ...AT.
```

#### NOTE

If you do not include the symbol `R$$BOT=0` in `RSXMC.MAC`, the `NETPAN` routine attempts a software automatic reboot of the system through the device associated with the up-line dump CSR address you specified in the Executive Options section of `SYSGEN`. If you do include `R$$BOT=0`, `NETPAN` jumps to the M9301 or M9312 ROM and allows the ROM to perform the automatic bootstrap operation.

### B.1.3 SYSGEN Phase II Considerations

At the beginning of Phase II, before building the Executive, you are asked whether you want to edit the Executive build file. Answer YES to the question and then edit the file as shown. If however, you are planning to reboot the system through an M9312 ROM, see the discussion that follows.

```
>* DO YOU WISH TO EDIT THE EXECUTIVE BUILD FILE? [Y/N]:Y
>EDI RSXBLD.CMD
[OOOONN LINES READ IN]
[PAGE 1]
*PL NLDRV
[1,20]RSX11S/LB:NLDRV
*I
  1,20] ddd
```

where

*ddd* is the name of the physical line used for the up-line dump. The final three letters of *ddd* will always be DRV. For example, the physical line name for a DUP device will be DUPDRV.

If you are planning to reboot the system through an M9312 ROM, you must do a more extensive edit of the Executive build file as shown:

```
>* DO YOU WISH TO EDIT THE EXECUTIVE BUILD FILE? [Y/N]: Y
>EDI RSXBLD.CMD
[OOOONN LINES READ IN]
[PAGE 1]
*PL NLDRV
[1,20]RSX11S/LB:NLDRV
*I
[1,20]ddd
*PL GBLDEF
GBLDEF=$USRTB:0
*I
GBLDEF=REBOOT:xxxxxxx

*EX
[EXIT]
```

In this sequence

xxxxxxx is one of the reboot addresses listed in Table B-1.

**Table B-1: Reboot Addresses for the M9312 ROM**

Option	Unit Number	CPU Diagnostics	Reboot Address
A	0	NO	173004
A	1	NO	173030
B	0	NO	173204
B	1	NO	173230

**NOTES:**

1. The reboot addresses contained in Table B-1 signify boot entry points that are independent of the device type used.
2. The M9312 has four ROM slots. Only three of these slots are needed for a DECnet bootstrap ROM. Therefore, the M9312 ROM can be inserted into either Slots 1, 2, and 3 or Slots 2, 3, and 4. (Option A in Table B-1 means that the ROM is inserted in Slots 1, 2, and 3. Option B means that the ROM is inserted in Slots 2, 3, and 4.)
3. When you define a reboot address using GBLDEF, the following TKB diagnostic message will appear during the Executive build:

\*DIAG\* - MODULE *ddd* MULTIPLY DEFINES SYMBOL REBOOT

where

*ddd* is the name of the physical line that you previously specified for the up-line dump.

Regardless of the type of ROM you use, exit from editing mode in the following manner:

\*ED  
[EXIT]

RSX-11S SYSGEN will then proceed to build the Executive with the up-line panic dump routine included.



---

## Rebuilding CETAB, CEX, and DDMS

This appendix tells you how to rebuild CETAB, CEX, and DDMS. These components cannot be rebuilt with a component mode generation. Rebuilding these components may be necessary because of accidental deletion or patches to the objects.

### C.1 Logical Device Assignments

Before executing any commands, you must make the following logical device assignments:

```
ASN ddu:=OU:    !The target device (where tasks will go)

ASN ddu:=LB:    !The system device (where system libraries are)

ASN ddu:=MP:    !The device where maps will go (may be NL:)

ASN ddu:=LS:    !The device where listings will go
                  !(needed for CETAB.MAC assembly only)

ASN ddu:=IN:    !The Network, DECnet or PSI Object
                  !Disk, created by PREGEN
```

### C.2 Rebuilding Commands

This section lists the command lines to use in rebuilding CETAB, CEX, and DDMS. These command lines are used in various combinations to rebuild specific components. For example, rebuilding the PCL DDM requires commands b,c, and d. The *xxx* in the command line is the name of the individual component (CETAB, CEX, and PCL.) The *x* in the UIC (such as [*x*,24]) indicates the group code chosen during NETGEN.

The next sections refer to these command lines to use in rebuilding NET, DEC, and PSI components:

- a) MAC \* [x,24]xxxASM.CMD
- b) TKB \* [x,24]xxxBLD.CMD
- c) PIP [x,54]/NV=IN:[131,24]xxx.DAT
- d) PIP [x,54]/NV=IN:[131,24]xxxST.DAT
- e) PIP [x,54]/NV=IN:[131,24]xxxLN.DAT
- f) PIP [x,54]/NV=IN:[131,54]xxxMOD.TSK
- g) PIP [x,54]/NV=IN:[131,54]xxxMC.TSK
- h) PIP [x,54]/NV=IN:[152,54]xxxSTA.DAT

### C.2.1 NET Components

To rebuild the following processes, IN: must be assigned to the Network object disk.

Process Name	Commands to Use
CETAB	a,b
CEX (and AUX)	b

### C.2.2 DEC Components

To rebuild the following device driver modules (DDMs), IN: must be assigned to the DECnet object disk.

DDM Name	Commands to Use
DL,DLV,DMC,QNA, DPV,DU,DUP,DUV	b,c
DMP,DMV,PCL	b,c,d
DZ,DZV,DHU,DHV	b,c,e
UNA	b,c,g
DV	b,c,e,f
KDP	b,c,e,g
KDZ	b,c,e,f,g

### **C.2.3 PSI Components**

To rebuild the following device driver modules (DDMs), IN: must be assigned to the PSI object disk.

<b>DDM Name</b>	<b>Commands to Use</b>
DLM	b,h
SDP,SDV	b
KMX,KMY,KMV	b





---

## **DTS/DTR Test Programs**

DTS and DTR are the DECnet-11M/M-PLUS transmitter and receiver test programs.

### **D.1 Types of Tests**

Four basic tests are provided by DTS and DTR:

- Connect test
- Data test
- Disconnect test
- Interrupt test

Each test is divided into a set of subtests. The following sections describe the tests and subtests.

#### **D.1.1 Connect Tests**

Connect tests verify the ability of the network software to process connect, connect accept, and connect reject requests with and without optional user data. Connect tests that the user can perform are:

- Connect reject without user data
- Connect accept without user data
- Connect reject with 16 bytes of standard user data

- Connect accept with 16 bytes of standard user data
- Connect reject with received user data used as reject user data
- Connect accept with received user data used as accept user data

### D.1.2 Data Tests

Data tests provide a full range of test capabilities from the very simple data sink operation through data integrity checking. Data tests the user can perform are:

- **Sink test.** DTR ignores all data received. No sequence or content validation is performed.
- **Sequence test.** Data messages transmitted by DTS to DTR include a 4-byte sequence number. If a message is received out of sequence, DTR aborts the logical link and the test.
- **Pattern test.** Data messages transmitted to DTR have both a sequence number and a standard data pattern. If either the sequence number or the received data does not match the expected data, DTR aborts the logical link and the test.
- **Echo test.** Data messages received by DTR are transmitted back to DTS. There is no sequence or data validity checking done by either DTR or DTS.

### D.1.3 Disconnect Tests

Disconnect tests are designed to determine whether DTS can detect the difference between disconnect and abort sequences generated by DTR as well as receive the proper optional user data. Disconnect tests that can be performed by the user are:

- Disconnect without data
- Abort without user data
- Disconnect with 16 bytes of standard user data
- Abort with 16 bytes of standard user data
- Disconnect with received connect user data used as disconnect user data
- Abort with received connect user data used as abort user data

#### D.1.4 Interrupt Tests

Interrupt tests provide a full range of test capabilities from very simple data sink operations through data integrity checking. Interrupt tests that the user can perform are:

- **Sink test.** DTR ignores all interrupt data received. No sequence or content validation is performed.
- **Sequence test.** Interrupt messages transmitted by DTS to DTR contain a 4-byte sequence number. If a message is received out of sequence, DTR aborts the logical link and the test.
- **Pattern test.** Interrupt messages transmitted to DTR have both a sequence number and a standard data pattern. If either the sequence number or the data pattern is not received with the expected data, DTR aborts the logical link and the test.
- **Echo test.** Interrupt messages received by DTR are transmitted back to DTS. There is no sequence or data validity checking done by either DTR or DTS.

#### D.2 Operational Characteristics

DTR functions as a slave to DTS. DTS initiates each test by issuing a connect request to DTR. Parameter information pertinent to the type of test requested is passed by DTS to DTR in the optional data of the connect request. DTS has a user interface that enables the user to specify the test to be performed. Sufficient parameters are available to allow for a variety of tests, including test duration, buffer size, and buffering level.

The version of DTR supplied on the kits supports a maximum of three logical links, thus allowing three concurrent tests. DTS can handle only a single test and logical link, but the user can invoke multiple copies of DTS.

The DTS command syntax allows for two types of buffer level options: BUFS and FLOW. BUFS is used by DTS only and FLOW is used by DTR only. The BUFS parameter specifies the transmit buffering level for DTS. This is the number of transmit requests that DTS attempts to keep outstanding to the network. In an echo test, the BUFS parameter also specifies the receive buffering level for DTS. The parameter of the FLOW option specifies the receive buffering level for DTR.

Both DTS and DTR have 512 bytes of buffer space built into each task. The buffer space is at the end of each task image. To increase the buffer space of either task, the user need only employ the /INC option at installation time. DTS requires at least (BUFSMSG) bytes of buffer space of a data test and ((BUFS + 1)MSG) bytes for an echo test. DTR requires (FLOWMSG) bytes of buffer space for each data test.

### D.3 DTS Command Syntax

The following conventions apply to the presentation and use of the DTS commands:

#### Syntax Conventions:

Brackets [ ]	Designate an optional parameter.
UPPERCASE	Designates the actual code that appears in the call.
<i>lowercase italic</i>	Designates a parameter that is replaced with an actual value when assembled.
No space	Do not use a space after the prompt > in a command string.
Default values	Values specified as defaults are valid only for the first test. Before the conclusion of each test, DTS updates the default values with the parameters of the next test, which become the default values for the next test. Thus, it is necessary to specify only those parameters that are to be changed in the next test.
Input	DTS accepts an indirect command file as input.

#### Command Format:

DTS > [*node-name*[*act*]]::[/TEST = *type*[/PRINT = *choice*]

#### Arguments:

*node-name* Name of the node where DTS resides; the default is the local node name. The name must be terminated by a double colon (::) or underscore (\_) for Version 2 compatibility.

*aci* Access control information, in the following format:

*[/user-id[/password[/account]]]*

For more information, refer to the *DECnet-RSX Network Management Concepts and Procedures* manual.

*type* Test type:

CON	Connect test
DIS	Disconnect test
DATA	Data test (default)
INT	Interrupt test

*choice* YES (default) or NO to indicate whether DTR messages are to be printed at the remote node as well as at the local node.

#### NOTE

DTR uses the print option either to display or suppress message output to the local console device. Messages include both test results and error messages. See Section D.3.5

### D.3.1 Connect Test

#### Format:

CONNECT TEST > *[type]* *[/DATA = data]*

#### Arguments:

*type* Type of connect test:

ACC	Connect accept test
REJ	Connect reject test (default)

*data* Type of user data:

NONE	No optional user data (default)
STD	Standard user data
RCVD	Return connect user data

### D.3.2 Disconnect Test

#### Format:

DISCONNECT TEST > [*type*][/*DATA* = *data*]

#### Arguments:

<i>type</i>	Type of disconnect test:	
	DSC	Disconnect test (default)
	ABT	Abort test
<i>data</i>	Type of user data:	
	NONE	No optional user data (default)
	STD	Standard user data
	RCVD	Return connect user data

### D.3.3 Data Test

#### Format:

DATA TEST > [*type*][/*MSG* = *mmm*][/*BUFS* = *bbb*][/*TIME* = *time*]  
[/*BAUD* = *nnnnnn*][/*FLOW* = *flow*]

#### Arguments:

<i>type</i>	Type of data test:	
	SINK	Sink test (default)
	SEQ	Sequence test
	PAT	Pattern test
	ECHO	Echo test
<i>mmm</i>	Data message length in bytes: <i>mmm</i> must be greater than 0 for a sink or echo test, greater than 4 for a sequence test, and greater than 5 for a pattern test. The maximum value is 1024 bytes. The default is the NSP segment size.	
<i>bbb</i>	DTS transmit buffering level, in the range of 1 to 16. The default is 1.	

*time*            Test duration:

<i>nnnS</i>	seconds
<i>nnnM</i>	minutes
<i>nnH</i>	hours (maximum is 18)
<i>nnn</i>	defaults to seconds

The default is 2M.

*nnnnnnn*      Line baud rate in bits per second (default is 0). If *nnnnnnn* is specified, the percentage of line bandwidth used by data transfers is calculated. This percentage is inaccurate for baud rates exceeding 64K bps.

*flow*            Flow control type or DTR receive buffering level, in the range of 1 to 16:

NONE	No flow control
SEG: <i>nn</i>	Segment flow control (invalid for RSX)
MES: <i>nn</i>	Message flow control

The default is MES:1. SEG:*nn* is invalid for RSX DTR because the network interface does not provide that capability.

### D.3.4 Interrupt Test

#### Format:

INTERRUPT TEST > [*type*][/*MSG* = *mm*][/*TIME* = *time*]

#### Arguments:

*type*            Type of interrupt test:

SINK	Sink test (default)
SEQ	Sequence test
PAT	Pattern test
ECHO	Echo test

*mm*            Interrupt message length in bytes: *mm* must be greater than 0 for a sink or echo test, greater than 4 for a sequence test, and greater than 5 for a pattern test. The maximum value (and the default) is 16 bytes.

*time*            Test duration:

*nnnS*        seconds  
*nnnM*        minutes  
*nnH*        hours (maximum is 18)  
*nnn*        defaults to seconds

The default is 2M.

### D.3.5 DTS/DTR Error Messages

Table D-1 lists the DTS and DTR test program error codes and their meanings.

**Table D-1: Error Codes**

Code	Word	Description
IE.BAD	177777	ABTS--The optional user data exceeds 16 bytes.
		ACCS--Either the temporary link address in the connect block is invalid or the optional user data buffer length exceeds 16 bytes.
		CONS--Either the optional user data buffer length exceeds 16 bytes or the field length count (access control) in the connect block is too large.
		REJS--Either the temporary link address in the connect block is not valid or the optional user data buffer exceeds 16 bytes.
		XMIS--The interrupt message exceeds 16 bytes.
IE.IFC	177776	ABTS--LUN not assigned to NS:.
		ACCS--LUN not assigned to NS:.
		CLSS--LUN not assigned to NS:.
		CONS--LUN not assigned to NS:.
		GLNS--LUN not assigned to NS:.
		GND\$--LUN not assigned to NS:.
		RECS--LUN not assigned to NS:.
		REJS--LUN not assigned to NS:.
		OPNS--LUN not assigned to NS:.



**Table D-1 (Cont.): Error Codes**

Code	Word	Description
IE.IFC	177776	SND\$-LUN not assigned to NS:. SPA\$-LUN not assigned to NS:. XMI\$-LUN not assigned to NS:.
IE.SPC	177772	ACC\$-Invalid buffer argument; either the pending connect block or the optional user data buffer is not word aligned, or one of them is outside the user task address space. CON\$-Invalid buffer argument; either the connect block is not word aligned, or the optional user data buffer (in or out) is outside the user task address space. GLN\$-The buffer specified to receive the network data is outside the user task address space. GND\$-The buffer assigned to receive network data is not word aligned or is outside the user task address space. REC\$-Either the data buffer is outside the user task address space or the buffer length exceeds 8192 bytes. REJ\$-Either the connect block or the optional user data buffer (out) is outside the user task address space or the connect block is not word aligned. SND\$-Either the data buffer is outside the user task address space or the buffer length exceeds 8192 bytes. XMI\$-The interrupt message buffer is outside the user task address space.
IE.WLK	177764	XMI\$-An interrupt message was transmitted before a previous interrupt message had been received by the target task.
IE.DAO	177763	CON\$-Connection rejected by user and some optional user data was lost. GLN\$-The network data was longer than the specified buffer. GND\$-The network data was longer than the mail buffer. REC\$-More message data was transmitted than requested.
IE.ABO	177761	ABT\$-The specified logical link has been aborted or disconnected.

(continued on next page)

**Table D-1 (Cont.): Error Codes**

<b>Code</b>	<b>Word</b>	<b>Description</b>
IE.ABO	177761	ACCS-The task that requested the connection has aborted or has requested a disconnect before the connection could complete.
		RECS-The logical link was disconnected during I/O operations.
		REJS-The task that requested the connection has aborted or has requested a disconnect before the rejection could complete.
		SNDS-The logical link was disconnected during I/O operations.
		XMIS-The logical link was disconnected during I/O operations.
IE.PRI	177760	CLS-The network is not accessed on the specified LUN.
		CONS-The local node is shutting down. No logical link can be established.
		GLNS-The network is not accessed on the specified LUN.
		GND\$-The network is not accessed on the specified LUN.
		OPNS-The network is being dismounted or the user task has already accessed the network.
		REJS-The network is not accessed on the specified LUN.
IE.RSU	177757	SPA\$-The network is not accessed on the specified LUN.
		ACCS-System resources needed for the logical link are not available.
		CONS-System resources needed for the logical link are not available.
IE.ALN	177736	GND\$-System resources needed for the network data queue are not available.
		ACCS-A logical link has already been established on the specified LUN.
		CONS-A logical link has already been established on the specified LUN.

**Table D-1 (Cont.): Error Codes**

Code	Word	Description
IE.NLN	177733	ABT\$—No logical link has been established on the specified LUN.
		SND\$—No logical link has been established on the specified LUN.
		XMI\$—No logical link has been established on the specified LUN.
IE.URJ	177667	CON\$—Connection rejected by remote user task.
IE.NRJ	177666	CON\$—Connection rejected by network. Refer to the Disconnect or Reject Reason Codes that follow.
IE.NDA	177662	GND\$—There is no data in the network data queue.
IE.NNT	177642	ABT\$—The issuing task is not a network task.
		ACC\$—The issuing task is not a network task.
		CLS\$—The issuing task is not a network task.
		CON\$—The issuing task is not a network task.
		GLN\$—The issuing task is not a network task.
		GND\$—The issuing task is not a network task.
		REC\$—The issuing task is not a network task.
		REJ\$—The issuing task is not a network task.
		SND\$—The issuing task is not a network task.
		SPA\$—The issuing task is not a network task.
		XMI\$—The issuing task is not a network task.

Table D-2 lists the disconnect or reject reason codes. The first three columns of the table list the reason code, its octal value, and its description. The fourth column lists the event type: C represents a connect reject and A represents a network abort.

**Table D-2: Disconnect or Reject Reason Codes**

Code	Value	Description	Event
NESRES	1	Insufficient network resources	C
NESNOD	2	Unrecognized node name	C
NESNSR	3	Remote node shutting down	C
NESUOB	4	Unrecognized object	C
NESFMT	5	Invalid object name format	C
NESMLB	6	Object too busy	C
NESABM	10	Abort by network management	A
NESNNF	12	Invalid node name format	C
NESNSL	13	Local node shutting down	C
NESACC	42	Access control rejected	C
NESABO	46	No response from object	C
		Remote node or object failed	A
NESCOM	47	Node unreachable	C/A

---

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