DECnet–20 Network Generation and Installation Procedures

AA–K905A–TM

December 1982

This manual describes the procedures for generating and installing DECnet–20 software on DECSYSTEMs–2040S/2060.

OPERATING SYSTEM:	TOPS–20 V5.1 GALAXY V4.2
SOFTWARE:	DECnet–20 V3.0 RJE–20 V2.0

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PREFACE

This manual describes the configuration of DECnet-20 nodes in a DECnet network and details all generation, verification, and installation steps. It describes the DECnet-20 configuration tools, the procedures to generate DN20 and DN200 subsystems, the NETGEN (NETwork GENeration) and NIPGEN (Network Installation Procedure GENerator) program commands and parameters, and illustrates a sample system configuration.

Audience Requirements

Before reading this manual, you should be familiar with the network concepts, monitor commands, and utility programs described in the following TOPS-20 companion manuals:

- TOPS-20 Commands Reference Manual (AA-5115B-TM) and its update
- TOPS-20 Operator's Command Language Manual (AA-H600A-TM) and its update
- TOPS-20 User Utilities Guide (AA-D850A-TM) and its update
- TOPS-10/TOPS-20 Batch Reference Manual (AA-H374A-TK)
- DECnet-20 User's Guide (AA-J579A-TM)
- DECnet-20 System Manager's and Operator's Guide (AA-J678A-TM)
- TOPS-20 DN200 Remote Station Guide (AA-H786A-TM)

Organization

If you have never performed a network generation and installation procedure, be sure to read this manual. Even if you have previously done a DECnet-20 installation, the procedures have changed so much that you should reread the entire manual. The chapters of this manual are summarized below:

- Chapter 1 provides an overview of the entire system configuration procedure, describes the distribution tapes, and presents hints for performing a successful configuration.
- Chapter 2 provides an overview of NETGEN, its commands, their parameters, and help and recognition features.

- Chapter 3 has an installation overview, with sections on the configuration of your DN20 and DN200 processors.

- Chapter 4 contains an overview of the checkout procedures you will use to verify the parts of your network. It describes the NIPGEN program, which generates the command and control files used in verifying the system. After successfully following the procedures, you will have created the files needed for system verification. This chapter ends with procedures for editing your system files and for bringing up your new monitor and your new network software.

- Chapter 5 presents procedures for checkout of the software in each node. After completing these procedures, your network should be up and running.

- Appendix A summarizes the error messages that may be displayed during the system build procedure.

- Appendix B provides a glossary of hardware and software terms.

Graphic Conventions

The following conventions are used in this manual in command descriptions and examples:

Convention/Symbol	Meaning
UPPER CASE	Upper case letters indicate actual input required in a command string. You must type an upper case element in full or with an abbreviation acceptable to the system.
Lower Case	Lower case letters in a command string indicate an input variable type (name, number, for example), not the actual variable determined by the operation.
Spaces	Spaces separate elements of a command. Tabs or multiple spaces may also be used. Spaces must be input where shown.
Red	Red characters indicate information that you specify in typing the command.
Black	Black characters indicate system-supplied information.
RET	Indicates the place where you press the KEY labelled RETURN or CR.
ESC	Indicates the place where you press the key labelled ESC, ALT, or SEL.

CHAPTER 1

INTRODUCTION

DECnet-20 V3.0 is a software product that extends the capabilities of TOPS-20 operating systems so that they may be interconnected with other DIGITAL operating systems to form networks. The protocols that govern message communication under DECnet-20 allow any task running under the TOPS-20 operating system to communicate with any other task in the network.

Tasks communicate with each other through nodes in the network. Within a network, each node has a name and a unique identifying address. You configure your network node by identifying the nodes in the network and describing the hardware and software characteristics of the nodes.

Network configuration is a semi-automated procedure that consists of the following steps:

- Creating the directories and data structure needed for network generation, and restoring the distribution tapes to disk.
- Running the NETGEN (NETwork GENeration) program to describe the DN20 front-end node and the DN200 remote job entry nodes in your network.
- Submitting DN20SYS.CTL and DN200SYS.CTL to complete node generation. These batch jobs use files output by NETGEN.
- Running the NIPGEN (Network Installation Procedure GENerator) program. NIPGEN creates the command and control files used to build the network database and to verify and install the DN20 and DN200 nodes configured by NETGEN, as well as the KL host node and the remote nodes described to NIPGEN.
- Verifying the connectivity between the configured nodes and the adjacent nodes in the network.

1.1 HARDWARE/SOFTWARE ENVIRONMENT

This manual assumes that you will be running DECnet-20 on a DECSYSTEM-2040S/2060. The same procedure is followed for each of these machines. To run DECnet-20, the Version 5.1 monitor of the TOPS-20 operating system must be available. You can either install Version 5.1 first and have it running as you do this installation, or, if you are upgrading from a previous TOPS-20 or TOPS-20/DECnet-20 release, you can do your installation with the previous release and bring up Version 5.1 when you reboot the system during your installation. You may be running in either time-sharing or stand-alone mode.

Network configuration files are provided on two distribution tapes:

- DECnet-20 Distribution Tape
- DN200 Remote Job Entry (RJE) Distribution Tape

The RJE tape is supplied only if your installation supports remote job entry stations. The distribution tapes are DUMPER tapes. The contents of these tapes are discussed in Section 1.3.1 and 1.3.2.

You must create directories on disk for storage of the generation and installation files as discussed in Section 1.2. You will need the following space allocations:

For DECnet-20 software:

3750 pages for working storage

3750 pages for permanent storage

For RJE-20 software:

1750 pages for working storage

1750 pages for permanent storage

For RJE dump files:

1000 pages for working storage

1000 pages for permanent storage

Be sure you have enough space before you begin the generation procedures.

You use the following programs to perform the system generation and installation:

- DUMPER, a TOPS-20 file copy utility, which is used to copy files from tape to disk.
- NETGEN, an interactive software generation program, which allows you to describe the hardware and software characteristics of your DECnet-20 front end (DN20) and, optionally, any remote job entry stations (DN200s). NETGEN generates the appropriate .MAC files.

- DNMAC, a cross-assembler for PDP-11 macro source files.
- TKB36, a PDP-11 Task Builder, which builds the files used to generate the system.
- VNP36, a Virtual Network Program, which generates the DN20 or DN200 system image.
- NIPGEN, an interactive network installation program, which generates command and control files used to verify your generated system and define your node database.

These programs are collectively known as the DECnet-20 "configuration tools."

1.2 OVERVIEW OF CONFIGURATION PROCEDURES

To perform a system configuration, you must follow the steps described in this manual. These steps are illustrated in the flow charts in this chapter.

If your installation is to support the remote job entry (RJE) capability, you must use the RJE generation procedures. The RJE procedure generates the RJE software for the DN200. The DN200 is a remote station based on a PDP-11/34A connected by a synchronous line to a DN20. The DN200 provides an operator's console and may also include a line printer, a card reader, or both. The software that runs on the DN200 is called RJE-20.

Note that you must run the DN20 generation procedures before you run the RJE generation procedures.

1.2.1 Overview of Procedure:

1. Log into TOPS-20 with OPERATOR or WHEEL privileges.
2. If you are already a DECnet-20 user, verify that <NEW-SYSTEM> and <NEW-SUBSYS> are on your system. If they are not, create them. Be sure that <NEW-SYSTEM> and <NEW-SUBSYS> are empty when you begin, and remember to use <NEW-SYSTEM> for <SYSTEM> and <NEW-SUBSYS> for <SUBSYS> where necessary.
3. Create the following directories on disk:
   - PS:<DN20> for generation files
   - PS:<DxxxxA> for customized files; DxxxxA is a user-specified name and you can use any name you like, but as a convention, it is recommended that you specify the 4-digit serial number of your TOPS-20 KL system, preceded by "D" and followed by "A" to specify the DN20 front end.

- PS:<DECNET>, or PS:<NEW-DECNET> if you are upgrading, for documentation and source files
- PS:<DECNET-SOURCES> for source files
- PS:<DECNET-TOOLS> for DECnet tools

4. Restore the generation files from the distribution tape to the appropriate directories.

5. Read the Beware file.

1.2.2 Generating a DN20 Node:

6. Connect to <DxxxxA>.

7. Run the interactive NETGEN program to describe the hardware and software characteristics of your DN20 node. Note that you must rerun NETGEN whenever you change your configuration - for example, when you add a line. The specifications you enter to NETGEN must reflect the hardware at your site.

8. Check the output from NETGEN, using NETGEN's INFORMATION and LIST commands, and change parameters if necessary until the node configuration information is correct. When the information is correct, give the NETGEN SAVE and FINISH commands to create your configuration files.

9. Use a SUBMIT command with the DN20SYS.CTL file to build the DN20 software. This also creates the DN20SYS.LOG file.

10. Check the log file produced by the batch job for any errors in the build process. Correct any errors and rerun NETGEN if necessary.

11. Copy DxxxxA.SYS to <SUBSYS>, or, if upgrading, <NEW-SUBSYS>.

1.2.3 Generating DN200 Nodes:

12. To support RJE stations, create directories:

    - PS:<DN200>, or PS:<NEW-DN200> if upgrading
    - a directory for each RJE station named <DN200A>, <DN200B>, and so on. (You can use any name you like; <DN200x> is only suggested.)
    - a directory called <nodename-DUMPS> to receive dump files from each RJE station.
    - a directory called PS:<DN200-SOURCES> for source files.

13. Restore files from tape.

14. Connect to <DN200x>.

15. Run NETGEN. Note that the DN200 supports 1 DMR11 or 1 DMC11 only.

16. Check its output. When your configuration information is correct, give the NETGEN FINISH command to create your configuration files.

17. Submit the DN200SYS.CTL file to build the RJE software.

18. Check the log file, correct any errors and rerun NETGEN if necessary. You must repeat the RJE generation for each station your system supports.

19. Copy any DN200x.SYS files to <SUBSYS>, or <NEW-SUBSYS>, if upgrading.

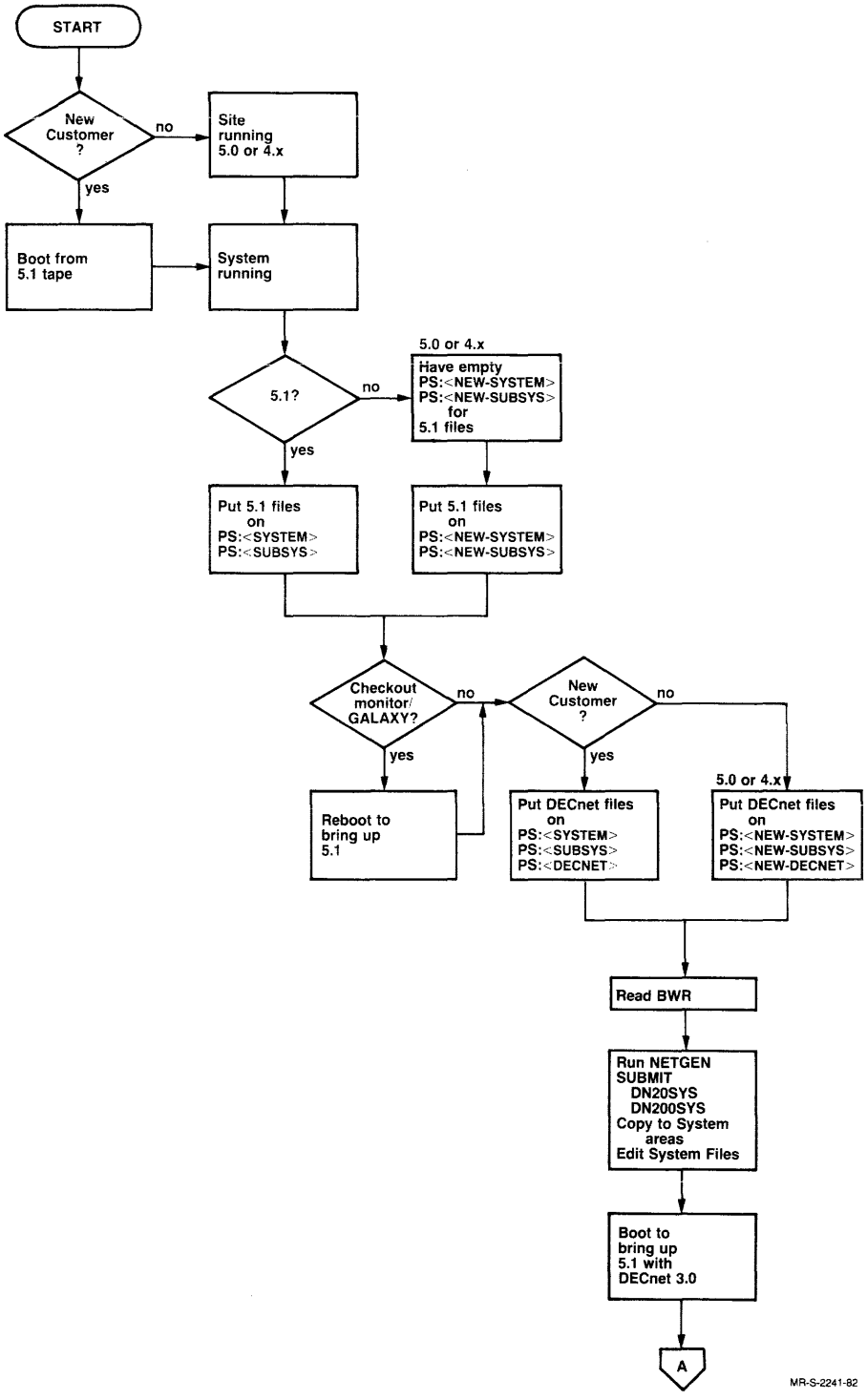


Figure 1-1 General Outline of Configuration Procedures

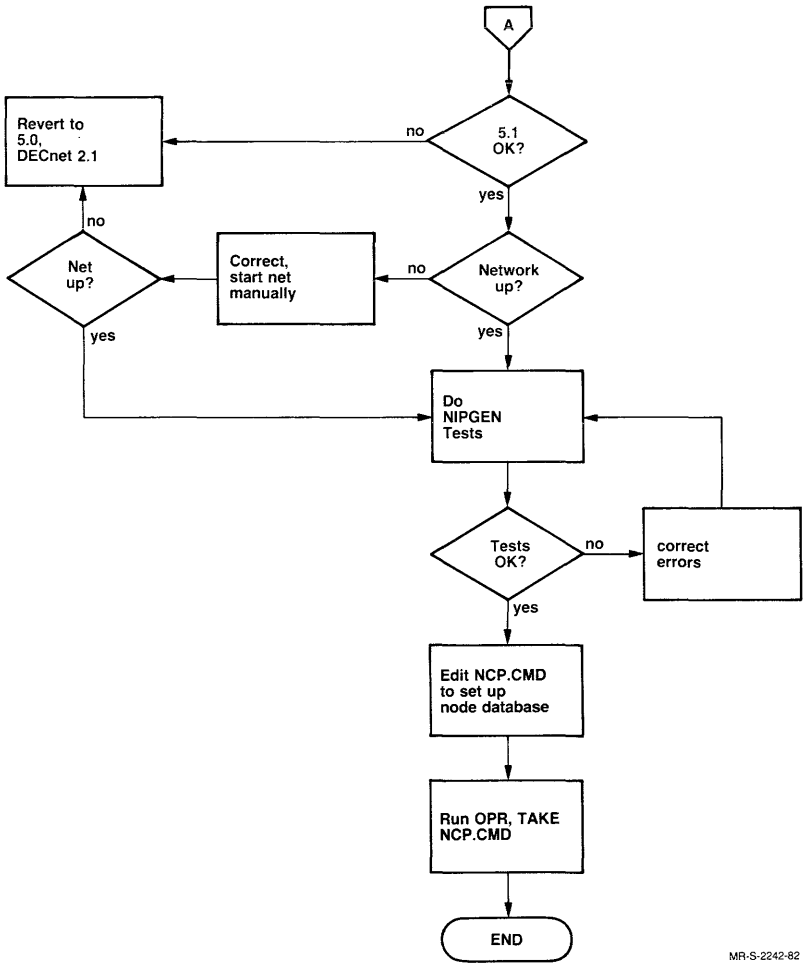


Figure 1-1 General Outline of Configuration Procedures (Cont.)

1.2.4 Running NIPGEN:

20. Run the interactive NIPGEN program (described in Chapter 4) to create the command and control files used to verify and load your generated system.

1.2.5 Loading and Verifying Nodes:

21. Copy the command files created by NIPGEN from your connected directory to <SYSTEM>, or, if upgrading, to <NEW-SYSTEM>.

22. Edit certain system files: SYSJOB.RUN (RJE only)
    SYSTEM.CMD (RJE only)
    5-1-CONFIG.CMD

23. Set up your PTYCON.ATO file from the distributed NETWRK.ATO file.

24. Use the latest version of OPR, NFT, FAL, and (for RJE stations) NURD.

25. Shutdown and reboot the KL.

26. If TOPS-20 5.1 and the network come up correctly, submit the batch file NIPLCL from NIPGEN to check out the host and the DN20. If the monitor does not come up, revert back to TOPS-20 5.0 and examine your procedures to find the error.

27. If the network does not come up, try to start it manually.

    - Use OPR's TAKE command to take SYSTEM:NCP to define the network nodes.
    - Load the DN20 node with the NCP LOAD NODE command.
    - If the DN20 comes up manually, test the host and DN20 network capabilities by submitting the NIPLCL control file generated by NIPGEN.
    - Check the log file and correct any errors before proceeding.

28. Load any DN200 nodes and verify that they are connected to the network and are working properly.

29. Test the network between the KL host processor, the DN20, and the Phase III nodes adjacent to the DN20.

    - Submit the NIPNM control file from NIPGEN.
    - Check the log file and correct any errors before proceeding.

30. Test network integrity between the KL processor and nodes that support Network File Transfer/File Access Listener (NFT/FAL).

    - Submit the NIPNFT control file.
    - Check the log file and correct any errors before proceeding.

31. Set up the complete network node database and make it known to Network Management through OPR.

32. When you are satisfied with TOPS-20 Version 5.1 and DECnet-20 Version 3.0, use the standard TOPS-20 method of making the new release the primary software. (See the TOPS-20 Software Installation Guide.)

    If you have cleared up all the errors found during the configuration procedure, DECnet-20 Version 3.0 will be fully installed at the end of these steps.

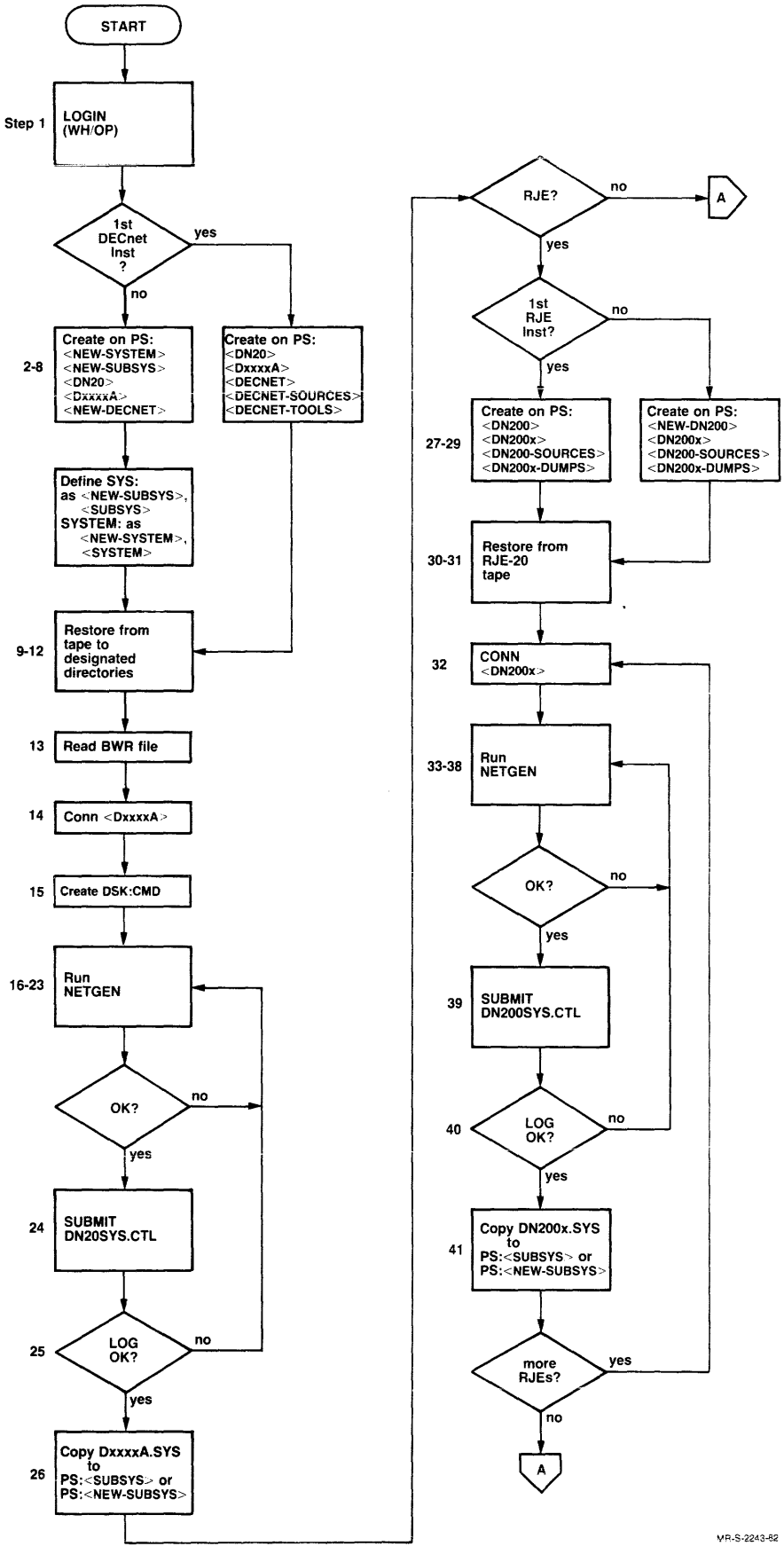


Figure 1-2 Installing DECnet-20 V3.0

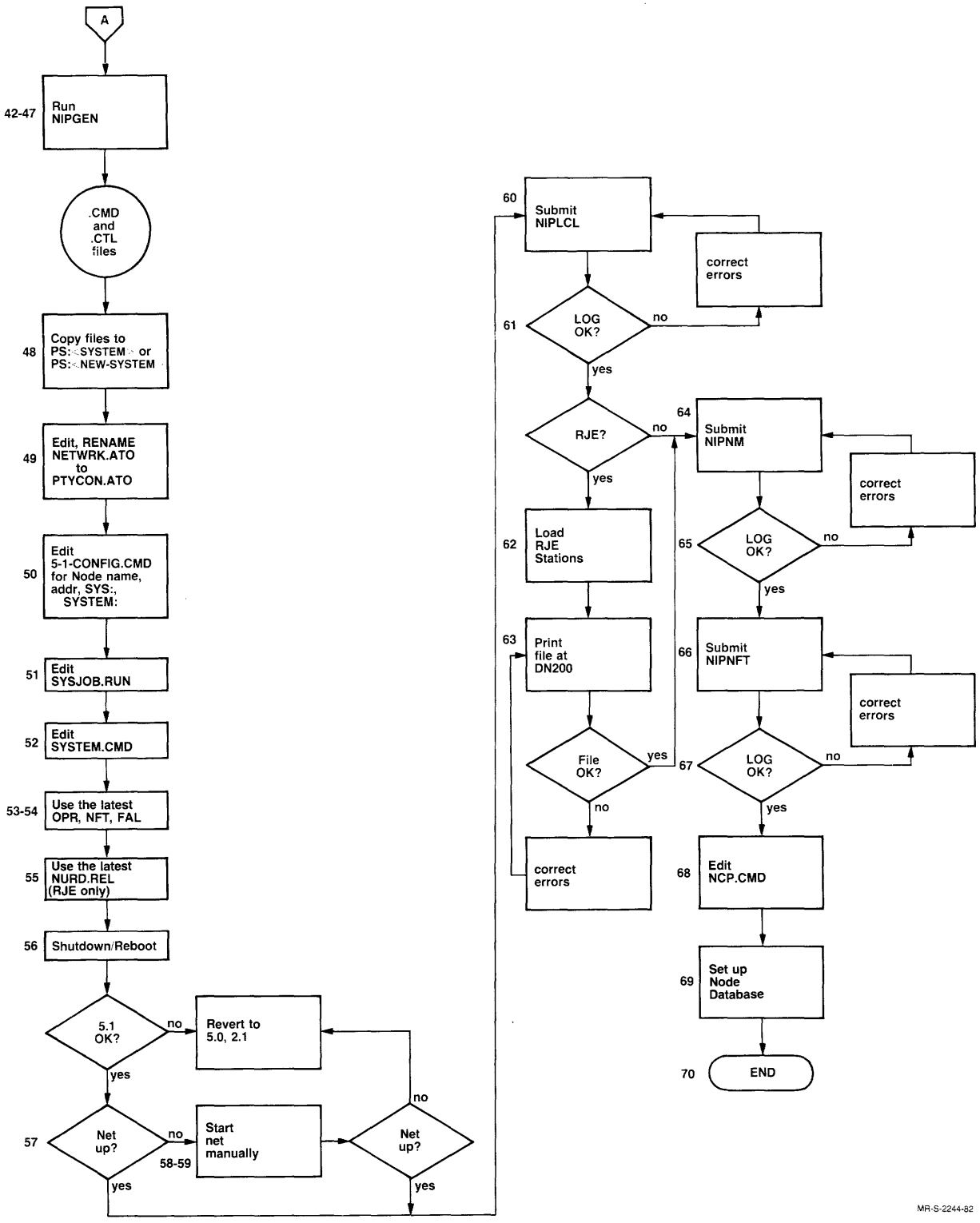


Figure 1-2 Installing DECnet-20 V3.0 (Cont.)

1.3 DISTRIBUTION TAPES

There are two distribution tapes. These contain a total of approximately 120 generation and installation files. The tapes are:

- DECnet-20 Distribution Tape, which contains all files needed to build DECnet-20 V3.0 for any configuration.
- DN200 Remote Job Entry (RJE) Distribution Tape, an optional purchase which contains all files needed to build RJE-20, V2.0, the remote job entry capability for any configuration.

These tapes contain the same information for all systems with the same unbundled options. If you have purchased the RJE option, remember that the DN20 tape must be used to set up your system for use of the task-to-task capability before you use the RJE tape. All tapes are DUMPER-formatted and may be copied to disk with the DUMPER utility.

1.3.1 DECnet-20 Distribution Tape

The DECnet-20 tape contains the following savesets:

- <DECNET> containing documentation files
- <SUBSYS> containing binary files
- <DN20> containing generation files
- <DECNET-SOURCES> containing source files
- <TOOLS> containing decnet tools

The documentation includes:

- .BWR (beware), .HLP (help) and .DOC (documentation) files associated with DECnet-20

The binary files include:

- Files needed to support the task-to-task, file transfer, and network command terminal capabilities for your configuration.
- Files needed to generate your front-end code, and to create control files to check out your installation.
- DNMAC.EXE, a cross-assembler for PDP-11 macro source files.
- NETGEN.EXE, a program that allows you to enter parameters for your site and to construct the configuration files NETPAR.MAC and CETAB.MAC, the system parameters and data base for the node you are configuring, and NMLACC.MAC, which defines access information that remote sites must furnish before they can issue certain commands to local DECnet-20 Network Management.
- NIPGEN.EXE, a program that enables you to generate files for verifying and loading your system.
- TKB36.EXE, a program that constructs PDP-11 formatted task images from object files.

- VNP36.EXE, a program that creates the front-end system image.

The generation files include:

- PDP-11 files for all modules needed for any configuration of the DN20; this includes task files, symbol tables, and memory maps.

- DN20SYS.CTL, a control file for building a DN20 front end for DECnet-20 systems. When the commands in this file have been executed, your front-end directory will contain the necessary .STB, .MAP, .TSK, .SYS, and MCBMAP.TXT files for the DN20.

The source files contain source and control files needed to build NFT.EXE, FAL.EXE, and NCPTAB.REL. The tools contain unsupported programs that may be useful.

1.3.2 DN200 Remote Job Entry (RJE) Distribution Tape

The RJE tape contains the following files:

- PDP-11 files for all modules needed for any configuration of the DN200; this includes task files, symbol tables, and memory maps.

- DN200SYS.CTL: a control file for building a DN200 front end for RJE systems.

  When the commands in this file have been executed, your front-end directory will contain the necessary .STB, .MAP, .TSK, .SYS, and MCBMAP.TXT files for the DN200.

1.4 PREPARING TO CONFIGURE

If you prepare carefully before performing the configuration procedure described in this manual, these procedures will run more smoothly. Observe the guidelines summarized below before you begin to configure your system:

1. Read this entire manual. Configuring the DECnet-20 communications front end requires an understanding of parameters with which you may not be familiar. Terms used in NETGEN and NIPGEN may also have a meaning which is specific to the programs. This manual provides an introduction to both hardware and software terms, a step-by-step summary of the procedures used to generate, verify, and load the system, a flowchart, examples of configuration operations, and a glossary of terms.

2. Ensure that the hardware parameters accepted as defaults or entered by you when running NETGEN reflect the actual hardware installed at your site.

   Also ensure that software parameters are within the ranges described in this manual. You may choose to accept the defaults supplied by NETGEN for software parameters; this is a safe procedure, but one which may not result in optimal performance, particularly if you have high network usage and the maximum number of lines.

   Do not enter a value other than the default without understanding the tradeoffs involved in each specification.

3. Collect the information you will need during your configuration of nodes. Use the Installation Worksheet provided on the next page as a guide to the information you must have before you begin. Some of this information may be available only from field service.

4. Ensure that you are familiar with the OPR-ORION facilities under GALAXY (See TOPS-20 Operator's Command Language Reference Manual). You can successfully complete procedures by following system directions. However, you will be better prepared to handle unexpected situations if you are familiar with the OPR-ORION facilities.

5. Review the capabilities provided by the DUMPER program and the batch system, if you are not familiar with these programs. Both DUMPER and the batch system are used during this installation. Refer to the TOPS-20 Operator's Guide for information on DUMPER and batch processes.

6. Secure a terminal and location where you will not be interrupted during the on-site configuration, and set aside at least two hours for the configuration procedure. Depending upon your own rate of progress, the characteristics of your configuration, and the response time of the timesharing system being used, the actual time may be less or more than this period. Most of the steps in this procedure can be done with a system under normal timesharing. However, to activate any edits to PTYCON.ATO and 5-1-CONFIG.CMD, you must shut the system down temporarily and bring it up again.

1.4.1 DECnet-20 Installation Worksheet

You must know your hardware configuration to perform this installation. The maximum number of each type of supported communications device is shown in Table 1-1. For more information, see the DECnet-20 V3.0 SPD (Software Product Description).

Table 1-1
Supported Devices

Device	Up to
DMC11s	2 at 1000kb 4 up to 56kb
DMR11s	2 above 56kb 4 up to 56kb
KDPs	2
DUP11s for each KDP	4

Hardware:

DN20:

DTE20 number (DTE-0-1, -2, or -3): _____
Cost: _____
Number of DMC11s (0 to 5): _____
DMC-0 Duplex (full,half): ____ Cost: _____
DMC-1 Duplex (full,half): ____ Cost: _____
DMC-2 Duplex (full,half): ____ Cost: _____
DMC-3 Duplex (full,half): ____ Cost: _____
DMC-4 Duplex (full,half): ____ Cost: _____
Number of DMR11s (0 to 5) ____
DMR-0 Duplex (full,half): Cost: _____
DMR-1 Duplex (full,half): ____ Cost: _____
DMR-2 Duplex (full,half): ____ Cost: _____
DMR-3 Duplex (full,half): ____ Cost: _____
DMR-4 Duplex (full,half): ____ Cost: _____
Number of KDPs (0 to 2) _____
KDP-0: Number of DUP11s (0 to 3) _____
KDP-0-0 Maximum Baud Rate: ____ Cost: ____
KDP-0-1 Maximum Baud Rate: ____ Cost: ____
KDP-0-2 Maximum Baud Rate: ____ Cost: ____
KDP-0-3 Maximum Baud Rate: ____ Cost: ____
KDP-1: Number of DUP11s (0 to 3) _____
KDP-1-0 Maximum Baud Rate: ____ Cost: ____
KDP-1-1 Maximum Baud Rate: ____ Cost: ____
KDP-1-2 Maximum Baud Rate: ____ Cost: ____
KDP-1-3 Maximum Baud Rate: ____ Cost: ____

DN200:

Card Reader (yes or no) _____
Line Printer (yes or no) _____
DMC11 or DMR11: _____
Cost: _____

> **NOTE**
>
> In your DN20, hardware addresses for DMC11s must precede hardware addresses for DMR11s to be compatible with DECnet-20 NETGEN. If your DN20 contains both types of devices, and you are not sure if this addressing rule has been followed, consult your Field Service representative.

Software:

Tapes: DECnet-20
RJE-20
TOPS-20 5.1 Monitor

Disk Space Needed:

For DECnet-20 Software: 3750 pages
For RJE-20 Software: 1750 pages
For RJE-20 Dumps: 1000 pages

DN20 Node:

	Initial Settings
Name: _____	None
Address (1 to 255): _____	None
Buffer Size (290 to 576): _____	576
Identification (1 to 32 characters) _____	DECnet-20 V3.0 Release
Inactivity Timer (1 to 65535 seconds) _____	30
Management Account: _____	None
Management Password: _____	None
Management User: _____	None
Maximum Address (2 to 255): _____	255
Maximum Cost (1 to 1022): _____	100
Maximum Hops: (1 to 30) _____	16
Maximum Visits (16 to 255) _____	32
Maximum Links (3 to 16): _____	8
Maximum Phase-II Links (0 to 40): _____	20
Outgoing Timer (1 to 65535 seconds) _____	30
Routing Timer (1 to 65535) _____	60
Phase-II Transmit Password (1 to 8 characters)	DECNET20
Retransmit Factor (1 to 15) _____	5

DN200 Nodes:

Name:	_____	_____	_____	_____
Address (1 to 255):	_____	_____	_____	_____
Host User Name:	_____-DUMPS		_____-DUMPS	
	_____-DUMPS		_____-DUMPS	
Host Account:	_____	_____	_____	_____
DN20 Data Link:	_____	_____	_____	_____

1.4.2 **Network Nodes for NIPGEN**

Host Node Address: __________
Name: __________
User Name: __________
Account: __________
Password: __________
Host Data Link: __________

DN20 Node Address: __________
Name: __________

DN200A Node Address: __________
Name: __________
DN20 Data Link: __________

DN200B Node Address: __________
Name: __________
DN20 Data Link: __________

DN200C Node Address: __________
Name: __________
DN20 Data Link: __________

DN200D Node Address: __________
Name: __________
DN20 Data Link: __________

Remote Node Address: __________
Name: __________
Phase III(y,n): __________
File Xfer(FAL)(y,n): __________
User Name: __________
Account: __________
Password: __________

Remote Node Address: __________
Name: __________
Phase III(y,n): __________
File Xfer(FAL)(y,n): __________
User Name: __________
Account: __________
Password: __________

Remote Node Address: __________
Name: __________
Phase III(y,n): __________
File Xfer(FAL)(y,n): __________
User Name: __________
Account: __________
Password: __________

Remote Node Address: __________
Name: __________
Phase III(y,n): __________
File Xfer(FAL)(y,n): __________
User Name: __________
Account: __________
Password: __________

Remote Node Address: __________
Name: __________
Phase III(y,n): __________
File Xfer(FAL)(y,n): __________
User Name: __________
Account: __________
Password: __________

Remote Node Address: __________
Name: __________
Phase III(y,n): __________
File Xfer(FAL)(y,n): __________
User Name: __________
Account: __________
Password: __________

CHAPTER 2

NETGEN OVERVIEW

This chapter describes the hardware and software terms that are used in performing network configuration procedures. You may not be familiar with some of the terms or with the specific meaning which these terms have for NETGEN or the other DECnet-20 configuration tools.

The NETGEN (NETwork GENeration) program enables you to describe the hardware and software characteristics of your DN20 and DN200 nodes by specifying values for a variety of hardware/software parameters. NETGEN supplies defaults for all of these parameters. You may accept the defaults for many of these parameters or may specify new values that are more appropriate for your own configuration. You may specify a parameter by issuing NETGEN commands and responding to prompts.

The NETGEN LIST command may be issued at any time to display the values currently in effect for all of your configuration's hardware and software parameters.

2.1 PARAMETERS

This section summarizes the parameters you enter when running NETGEN. Parameters are described in their order as seen with the NETGEN LIST EXECUTOR CHARACTERISTICS command. Only parameters you can change with NETGEN are listed. Others are not user settable. Hardware is listed at the end of this section.

Parameter	Meaning
Node type	Type of node being generated: DN20 for a DECnet-20 front end or DN200 for a remote job entry (RJE) station. Using the DN20 node type implies use of the DTE20 device; using the DN200 node type implies use of the DMC or DMR device. Default: DN20
Node name	Name for the node you are generating with NETGEN. The name must include at least one alphabetic character and cannot exceed six characters.

Parameter	Meaning
Node address	Number which identifies the address of node being generated. This address must be unique within the network. Any decimal number in the range 1 through 255 may be specified, provided that it does not duplicate an address assigned to another node in the network. Generally, you should use low numbers for addresses of nodes in a small network. You cannot use a node address larger than the Maximum Address you specify. If you enter an address incompatible with your Maximum Address or Buffer Size, NETGEN warns you.
Identification	A string you can use to identify the software you are generating. The string can be seen with the NCP SHOW EXECUTOR CHARACTERISTICS command. You can specify any text string of 1 to 32 characters. Default: DECnet-20
Outgoing Timer	The number of seconds to wait for acknowledgement, from a remote node, to a connect request issued locally. The range is 1. to 65535. seconds. Default: 30
Maximum Links	The maximum number of logical links supported by DECnet-20. The range is 3 to 16. Default: 8
Inactivity Timer	Number of seconds to wait before exercising a logical link when there is no received traffic on the link. This can happen, for example, because the network is disconnected, or because the physical line went down. When the timer runs out, NSP sends a data request message over the logical link. If, after a certain amount of time (see Retransmit Factor) there has been no acknowledgement of the message, NSP decides that the physical network supporting the logical link has failed. The range for the inactivity timer is 1 to 65535 seconds. Default: 30
Retransmit Factor	The number of times the node software retransmits a message without receiving acknowledgement before the DECnet-20 software running in the node determines that the physical link supporting a logical link has failed. The range is 1 to 15. Default: 5
Routing Timer	Maximum time to elapse before transmitting a routing message. The range is 1 to 65535 seconds. Default: 60

Parameter	Meaning
Maximum Address:	Maximum address for a node in the same network as the node you are configuring. The specified value must be at least equal to the node address of the node you are configuring. This parameter determines the highest node address in the network. The range is 2 to 255. The Maximum Address, node Address, and the Buffer Size you use must be compatible. NETGEN computes buffer size depending on the maximum address you enter, and warns you if they are incompatible. Default: 255
Maximum Cost	Highest allowable "cost" associated with a particular logical path. This parameter is dependent on the individual line costs (the costs of transferring a message over a line) and path costs. The range is 1 to 1022. Default: 100
Maximum Hops	The maximum number of hops allowed between any pair of nodes in the network. The largest value for maximum hops in a network is the network "diameter". You cannot set the value of Maximum Hops lower than the value of Maximum Visits. The range is 1 to 30. Default: 16
Maximum Visits	The maximum number of visits to network nodes that any message can make. A node that receives a message with a visit count greater than the value of Maximum Visits set discards the message. The Maximum Visits value set must be greater than or equal to the Maximum Hops set. The range is 16 to 255. Default: 2 times Maximum Hops: 32
Buffer Size	The size of buffers used to transmit and receive data over any physical link in the network. The size you specify must be the same on every node in the network. A DECnet-20 node cannot communicate with any node whose buffer size differs from its own. The smallest buffer size useable in a given network depends on the number of nodes in the network. The buffer size is (2* Maximum Address) +5, but not less than 290. The range is 290 to 576. NETGEN computes the minimum buffer size depending on the maximum address you enter. If you enter a buffer size that is less than the computed minimum, NETGEN warns you. Default: 576

Parameter	Meaning
Maximum Phase-II Links	Maximum number of logical links to be supported for communication with adjacent Phase II nodes. The number can be 0 to 40. Default: 20
Phase-II Transmit Password	Optional parameter identifying the password sent to a remote node during a Phase II initialization sequence. The password must be a text string consisting of 1 to 8 characters. DECnet-20 does not check passwords on received messages, but other DECnet implementations may. Set the transmit password to match the password expected by other Phase II nodes. Default: DECNET20
Management Parameters:	Three parameters you can set to restrict users at remote terminals from giving NCP commands at your local DN20 node. The parameters are: Account — Up to 16 characters long. User I.D. — Up to 16 characters long. Password — Up to 8 characters long. The default for each is a null string. If you do not enter any of these access control parameters, any user at any remote terminal has unrestricted access to local Network Management commands. Each non-null string must be matched by the remote user before the remote user can execute any NCP command, other than SHOW, on your local node. Character strings can be null, or contain any alphanumeric characters including "." and "-". The account parameter is not checked by DECnet-20. The management parameters are not displayed with LIST EXEC CHAR unless set by the user. You will also use these parameters when you run NIPGEN. Default: null strings
KDPs	Number of KDPs on your DN20 (0 to 2). A KDP is a combination of a KMC11 controller and one to four DUP11's (the default is two DUP11's). With the KMC, the DUP11 functions as a direct memory access device (DMA). The interface is synchronous. Default: 0
DUP11s	Number of DUP11s on your KDP (0 to 4). Default: 2 (0 if no KDP)
DMC11s	Number of DMC11s on your DN20 (0 to 4). The DMC11 is a single-line microprocessor-based interface to the network. The DMC11 is a synchronous DMA device. Default: 0

Parameter	Meaning
DMR11s	Number of DMR11s on your DN20 (0 to 4). The DMR11 is a single-line microprocessor-based interface to the network. The DMR11 is a synchronous DMA device. Default: 0
DTE20 number	Number of the DTE20 with which the DN20 interfaces to the DECSYSTEM-2040S/2060 processor. This is not the number of DTE20s. Normally, the DN20 used for DECnet-20 uses DTE20 number 1, 2, or 3. You cannot use DTE20 number 0 which is always dedicated to the console front end. Default: DTE-0-1
Line printer	Line printer in your configuration. Specify this parameter only for a DN200. Default: 0
Card Reader	Card reader in your configuration. Specify this parameter only for a DN200. Default: 0

2.2 REPRESENTATIVE CONFIGURATIONS

The following diagrams illustrate possible configurations that you can specify with NETGEN.

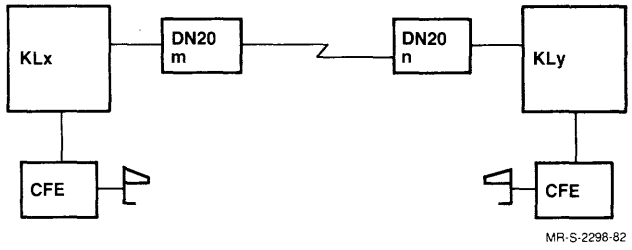


Figure 2-1 Configuration of DN20 Nodes m and n

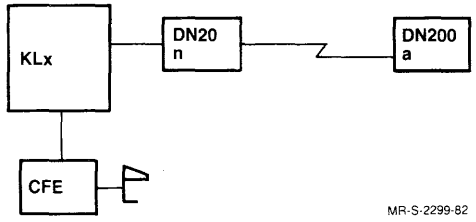


Figure 2-2 Configuration of DN20 Node n and DN200 Node a

2.3 NETGEN COMMANDS

The NETGEN (NETwork GENeration) program is an interactive program which helps you to configure your installation by producing configuration files for a DN20 or DN200 DECnet-20 node. You can use NETGEN commands to display and/or change the network node type, parameters, and communications equipment. The files produced by NETGEN are used in later steps of the network generation procedure.

NETGEN is the core of the configuration procedure described in this manual. Use of this program requires that you be familiar with the hardware and software concepts discussed in Chapter 1, and with the characteristics of your own configuration.

NETGEN must be run once without errors to generate the basic DN20 capability. In addition, if the remote job entry (RJE) (DN200) feature is to be generated at your installation, NETGEN must be run once for each DN200 in your configuration. You must also repeat these configuration procedures whenever you change the local node configuration - for example, when you add a line to the configuration.

NETGEN commands are of two types:

- NETGEN-only commands such as START and INCLUDE
- NCP-type commands such as DEFINE and LIST

NETGEN-only commands apply only to NETGEN and are unique to NETGEN. NCP-type commands are designed to contain the same parameters and syntax as the NCP commands of the same form you can execute through OPR. NCP-type commands do not provide the same guideword facilities as NETGEN-only commands.

2.3.1 NETGEN Help and Recognition Features

NETGEN provides several features that help you to enter necessary commands and arguments:

- You may type a question mark in response to the NETGEN prompt to display a list of NETGEN commands.
- You may follow a command name with a question mark to display a prompt for the valid arguments.
- You may follow a command name with an ESCAPE key to display a guideword for the argument.
- You may take advantage of NETGEN's recognition input feature.

2.3.1.1 **Requesting a List of Commands** - You may ask NETGEN to display a list of valid commands by responding to the NETGEN> prompt with a question mark (?). An example is shown below:

```
NETGEN> ? one of the following:
Define      Exclude     Exit            Finished   Help
Include     Information List            Log        Node
Purge       Push        Restore         Save       Start
Take
```

2.3.1.2 **Requesting a List of Arguments and Values** - When you specify a particular command and are not certain about its valid arguments, you may type the command name, followed by a space, followed by a question mark. NETGEN responds by displaying the valid arguments for the command. For example:

```
                    (ESC)
                      ↓
NETGEN>include (in configuration) ? one of the following:
Card-Reader             DMC11             DMR11     DTE20 KDP
Line-Printer
NETGEN>include (in configuration)
```

You may also use the question mark to request that NETGEN display the values for a particular argument. For example, suppose you wish to specify that the controller in your configuration is a KDP. Type KDP, press the space bar, and type a question mark. NETGEN responds with a prompt for more information about the KDP and the legal range of values for your response. After you enter an appropriate response, NETGEN will continue to prompt for additional information. An example is shown below.

```
                    (ESC)                    (ESC)
                      ↓                        ↓
NETGEN>include (in configuration) kdp (number) ? KDP number, 0 to 2
NETGEN>include (in configuration) kdp (number) 0 ? confirm with carriage return
NETGEN>include (in configuration) kdp (number) 0 (RET)
Number of DUP11 lines on this KDP: 1 (RET)
KDP-0-0 Maximum Baud Rate: ? one of the following:
 1200    1800    19200    2400    3600    4800    7200    9600
KDP-0-0 Maximum Baud Rate: 2400 (RET)
KDP-0-0 Cost: 2 (RET)
NETGEN>
```

If you type ? at the end of a command, when no further response is expected, NETGEN displays the message shown below.

```
NETGEN>include kdp (number) 0 ?  confirm with carriage return
NETGEN>include kdp 0
```

Respond by pressing the RETURN key.

2.3.1.3 **Requesting a Guideword for the Argument** - If you follow KDP by pressing the ESCAPE key ((ESC)) instead of a question mark, NETGEN displays a guideword indicating the type of response (for example, "number") that is required. An example is shown below.

```
                    (ESC)
                      ↓
NETGEN>include kdp (number)
```

If you type (ESC) at the end of a command, that is, when no further response is expected or if no guideword is provided, NETGEN ignores the (ESC) character. However, for the INCLUDE and EXCLUDE commands, NETGEN supplies defaults.

2.3.1.4 **Using Recognition** - The TOPS-20 recognition feature is provided for NETGEN and operates according to standard TOPS-20 conventions. The recognition feature allows you to use the ESCAPE key to complete commands. Because you may not be familiar with the NETGEN commands, recognition is likely to be very helpful when you use NETGEN.

An example of recognition is included below. In this example, the same instructions require more than twice as many key strokes for full input as for recognition input. Notice how the guidewords in this example lead you to enter the correct response.

Full input:

```
NETGEN>save PS:<FORSYTHE>CONFIG.CNF (RET)
```

Using recognition:

```
          (ESC)
            ↓
NETGEN>SAve (configuration on) PS:<FORSYTHE>CONFIG.CNF (RET)
```

2.3.2 NETGEN Error Messages

NETGEN provides error messages both for syntax errors and for assembly errors. NETGEN error messages are described in Appendix A, "Error Messages." If you enter an incorrect command or argument, NETGEN displays an appropriate message. For example, the following shows an invalid command:

```
NETGEN>pop (RET)
? Does not match switch or keyword
NETGEN>
```

The following shows another common error message:

```
NETGEN>node address ABC
? First nonspace character is not a digit
NETGEN>
```

In this example, NETGEN expected but did not receive a numeric value.

2.3.3 NETGEN Reconfiguration Facilities

NETGEN provides a RESTORE facility to simplify reconfiguration of a network node. When you use this facility, you must have a .CNF file containing your front-end configuration created earlier. You then RESTORE the .CNF file, make the changes you need to the configuration with INCLUDE or DEFINE commands, SAVE the edited file and use the FINISH command to generate all the other NETGEN output files. Use INCLUDE to change your hardware configuration, DEFINE to change any software specifications.

You can find an example of using the RESTORE/SAVE/FINISH commands in Chapter 3, "Installation."

2.4 NETGEN COMMAND SYNTAX

The syntax for the individual NETGEN commands is described on the next few pages.

2.4.1 DEFINE EXECUTOR: Defining Executor Characteristics

Description:

Defines the characteristics of your executor node. The management arguments restrict users at remote locations from giving NCP commands at your local node. All numeric values to the arguments are decimal.

Arguments:

Address: numeric value, 1 to 255
Buffer Size: numeric value, 290 to 576
Identification: text, 1 to 32 characters
Inactivity Timer: numeric value, 1 to 65535 seconds
Management Account: string, 0 to 16 characters, "." and "-"
Management Password: string, 0 to 8 characters, "." and "-"
Management User-Id: string, 0 to 16 characters, "." and "-"
Maximum Address: numeric value, 1 to 255
Maximum Cost: numeric value, 1 to 1022
Maximum Hops: numeric value, 1 to 30
Maximum Links: numeric value, 3 to 16
Maximum Phase-II Links: numeric value, 0 to 40
Maximum Visits: numeric value, 1 to 255
Name: node name, 1 to 6 characters
Outgoing timer: numeric value, 1 to 65535 seconds
Phase-II Transmit Password: text, 1 to 8 characters
Retransmit Factor: numeric value, 1 to 15
Routing Timer: numeric value, 1 to 65535 seconds

Example:

```
NETGEN>def exec add 1 (RET)
```

2.4.2 EXCLUDE: Removing a Device

Description:

Removes a device from the configuration.

In certain cases, default is provided for the EXCLUDE command. If you type:


```
exclude dmr11 (number) ESC
```

NETGEN will automatically fill in the most recently included device number. This applies to the following:

```
exclude kdp
exclude dmc11
exclude dmr11
```

Arguments:

```
Card-Reader
DMC11:  number of DMC11, 0 to 5
DMR11:  number of DMR11, 0 to 5
DTE20:  number, 1 to 3
KDP:    number, 0 to 2
Line-Printer
```

Example:


```
NETGEN>exclude (from configuration) ? one of the following:
 Card-Reader  DMC11          DMR11              DTE20     KDP
 Line-printer
```


```
NETGEN>exclude (from configuration) KDP (number) ESC  0 RET
NETGEN>
```

2.4.3 EXIT: Exiting from NETGEN

Description:

Exits from NETGEN procedure. Saves no files. To save your configuration files, use SAVE and FINISH before typing EXIT.

Argument:

None

Example:

```
NETGEN>exit (ESC) (from NETGEN) (RET)
@
```

2.4.4 FINISHED: Finishing the Configuration

Description:

Indicates that you have finished with the configuration. When you give this command, NETGEN writes its output files, NMLACC.MAC, CETAB.MAC and NETPAR.MAC, to your connected directory. If you have generated a system that is not a supported configuration, NETGEN warns you.

Argument:

None

Example:


```
NETGEN>finished (with configuration) RET
[Generating PS:<DxxxxA>NMLACC.MAC.12] [OK]
[Generating PS:<DxxxxA>CETAB.MAC.12] [OK]
[Generating PS:<DxxxxA>NETPAR.MAC.12] [OK]
NETGEN>
```

2.4.5 HELP: Displaying a NETGEN Description

Description:

Displays at the user terminal a short description of the function of NETGEN. The "(with NETGEN)" phrase is displayed if you use the TOPS-20 recognition feature (ESC) .

Argument:

None

Example:

NETGEN>help (with NETGEN) (RET)

NETGEN-20 is the tool that produces configuration files for a DN20 or DN200 DECnet-20 node. Using its commands, you can display and/or change network node type, parameters and communications configuration. NETGEN allows recognition (use of ESC key) and help text (use of ? key) to aid your selection of legal options.

Typically, you will use NETGEN to:

-select node type: DN20 (task-to-task node) - (default)
or DN200 (remote job entry station)

-include synchronous communication line(s)

-optionally, change parameter settings to tailor your configuration to suit local needs

-write the configuration files CETAB.MAC and NETPAR.MAC, which will be used by later steps in the Network Installation Procedure.

NETGEN>

2.4.6 INCLUDE: Adding a Device

Description:

Adds a device to the configuration.

In certain cases, an automatic default is provided for the INCLUDE command. If you type:

include kdp (ESC) (number) (ESC)

NETGEN will provide as a default 0 or the next available number. This applies to the following:

include kdp
include dmc11
include dmr11
include dte20

Note that INCLUDE DTE20 (ESC) always defaults to 1 if the node type is DN20. There is no default DTE number for DN200s.

If you include a KDP, NETGEN prompts you to specify the number of lines on the KDP and the maximum baud rate and cost for each. If you include a DMC11 or DMR11, NETGEN prompts you for transmission mode (full or half duplex) and cost for each.

Arguments:

Card-Reader (1 for a DN200)
DMC11: number of DMC11, 0 to 5; duplex, full or half; cost, 1 to 25
DMR11: number of DMR11, 0 to 5; duplex, full or half; cost, 1 to 25
DTE20: number, 1 to 3; cost, 1 to 25
KDP: number, 0 to 2; maximum baud rate, 1200 to 19200; cost, 1 to 25
Line-Printer (1 for a DN200)

Example:

```
              (ESC)
                ↓
NETGEN>include (in configuration) ? one of the following:
Card-reader   DMC11          DMR11          DTE20      KDP
Line-printer
NETGEN>include (in configuration) kdp (ESC) (number) ? KDP Number, 0 to 2
NETGEN>include (in configuration) kdp (number) 0 ? confirm with carriage return
NETGEN>include (in configuration) kdp (number) 0 (RET)
Number of DUP11 lines on this KDP: 1 (RET)
KDP-0-0 Maximum Baud Rate: ? one of the following:
 1200     1800     19200     2400     3600     4800     7200     9600
KDP-0-0 Maximum Baud Rate: 2400 (RET)
KDP-0-0 Cost: ? Cost of this circuit, 1 to 25
KDP-0-0 Cost: 1 (RET)
NETGEN>include (in configuration) DMC11 (number) 0 (RET)
DMC-0 Duplex: ? one of the following:
 Full   Half
DMC-0 Duplex: full (RET)
DMC-0 Cost: ? Cost of this circuit, 1 to 25
DMC-0 Cost: 2 (RET)
NETGEN>
```

2.4.7 INFORMATION: Displaying Node Information

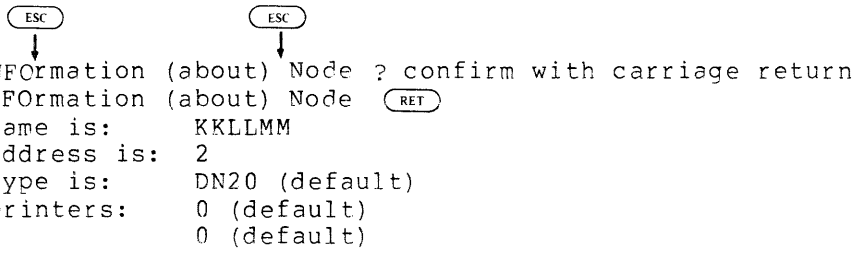
Description:

Displays information on the arguments that have been set.

Arguments:

Card-Reader
Line-Printer
Node
Node-Type

Example:



2.4.8 LIST: Displaying Characteristics

Description:

Displays the characteristics you have set for your executor or your known circuits. The management parameters do not appear if you have not set them.

Arguments:

Executor characteristics
Known Circuits characteristics
Known Lines characteristics

Examples:

```
NETGEN>List executor characteristics (RET)

     Executor Node = 2 (KKKLLL)

          Identification = hhh
          Management Version = 3.0.0
          Loop Count = 1
          Loop Length = 127
          Loop With = Mixed
          Incoming Timer = 10
          Outgoing Timer = 30
          NSP Version = 3.2.0
          Maximum Links = 8
          Delay Factor = 2
          Delay Weight = 3
          Inactivity Timer = 30
          Retransmit Factor = 5
          Routing Version = 1.3.0
          Type = Routing
          Routing Timer = 60
          Maximum Address = 255
          Maximum Circuits = 1
          Maximum Cost = 100
          Maximum Hops = 16
          Maximum Visits = 32
          Buffer Size = 576
          Maximum Phase II Links = 20
          Phase II Transmit Password = DECNET20
          Management User = klh
          Management Account = 341
          Management Password = (password set)

NETGEN>list known circuits characteristics (RET)

     Circuit = DTE-0-1

          Cost = 1
          Hello timer = 10
          Listen timer = 60
          Owner = Node / 2 / KKKLLL
          Line = DTE-0-1
```

```
Circuit = DMR-0

     Cost = 1
     Hello Timer = 10
     Listen timer = 60
     Owner = NODE / 2 / KKKLLL
     Line = DMR-0
     Type = DDCMP-DMC

NETGEN>list Known lines characteristics (RET)

     Line = DTE-0-1

      Device = DTE-0-1
      Controller Register = 174440
      Interrupt Vector = 770
      Interrupt Priority = 7
      Pause Timer = 30

     Line = DMR-0

      Device = DMR-0
      Receive Buffers = 10
      Controller = Normal
      Duplex = Half
      Protocol = DDCMP-DMC
      Clock = External
      Service Timer = 3000
      Retransmit Timer = 3000
      Controller Register = 160740
      Interrupt Vector = 670
      Interrupt Priority = 5

     Line = KDP-0-0

      Device = KDP-0-0
      Controller = Normal
      Duplex = Full
      Protocol = DDCMP-DMC
      Clock = External
      Service Timer = 3000
      Retransmit Timer = 3000
      Controller Register = 160540
      Unit Register = 160300
      Interrupt Vector = 540
      Interrupt Priority = 5
      Baud Rate = 2400
```

2.4.9 LOG: Logging NETGEN Commands

Description:

Logs all of your NETGEN commands in a disk file. If you make a mistake in your NETGEN procedure, you can TAKE this log file instead of reentering all of the commands.

Argument:

output filespec

Example:

```
                ESC
                 ↓
NETGEN> log (TTY input to file)  ? name of output file to record TTY input
NETGEN>log (TTY input to file)  marl.LOG RET

NETGEN>
```

2.4.10 NODE: Specifying the Node Type

Description:

Specifies the node type for the node being configured.

Argument:

Type DN20 or DN200

Example:


```
NETGEN>node type (is) ? one of the following:
 DN20    DN200
NETGEN>node type (is) dn20  RET
NETGEN>
```

2.4.11 PURGE EXECUTOR: Removing a Parameter

Description:

Removes a parameter you have previously set for your executor.

Arguments:

Identification
Management Account
Management Password
Management User
Outgoing Timer
Phase-II Transmit Password

Example:

```
NETGEN>purge executor outgoing timer (RET)
NETGEN>
```

2.4.12 PUSH: Entering the TOPS-20 Executive

Description:

Transfers you from NETGEN command level to the TOPS-20 Command Processor (EXEC). While at this level, you can issue any necessary TOPS-20 commands. The NETGEN commands that you have entered are not lost. You can return to NETGEN by giving the TOPS-20 command, POP.

Argument:

None

Example:

```
NETGEN>push (RET)

 TOPS-20 Command processor 5(711)
@pop (RET)
NETGEN>
```

2.4.13 RESTORE: Restoring a Saved Configuration

Description:

Restores the file saved from a file on disk. You may override the default by specifying a different directory or file name. For example, the command:

RESTORE PS:<SMITH> (ESC)

Restores the configuration from the previous .CNF file you have used. When you use the RESTORE command, cumulative updates are done in order.

Argument:

input filespec

Example:

(ESC)

```
NETGEN>restore (configuration from) ? input filespec
NETGEN>restore (configuration from) marl.cnf (RET)
[Configuration Restored From:  PS:<D2110A>MARL.CNF.1]
NETGEN>
```

2.4.14 SAVE: Saving a Configuration

Description:

Saves the current parameter settings in a file on disk.

Argument:

output filespec

Example:


```
NETGEN>save (configuration on) ? output filespec
NETGEN>save (configuration on) marl.cnf RET
[Configuration Saved On: PS:<D2110A>MARL.CNF.1]
NETGEN>
```

2.4.15 START: Entering NETGEN Dialog

Description:

Engages the user in an interactive dialog with which he/she gives node configuration specifications. NETGEN gives warning and fatal error messages as necessary, and, if there are no fatal error messages, writes output files to the user's connected directory. The user may need to give additional configuration commands and end the task with SAVE and FINISH commands. NETGEN provides defaults for some parameters when you use the START dialog. View the defaults with the (ESC) key.

Argument:

None

Example:

```
@NETGEN (RET)
TOPS-20 Network Configurator for DN20 or DN200, Version 3(56)

[Type START to begin configuration dialog]

          (ESC)
            ↓
NETGEN>start (dialog for performing configuration) (RET)
Node type: dn200 (RET)
Node name: new2 (RET)
Node address: 20 (RET)

Do you have a card reader on this DN200? n (RET)

Do you have a line printer on this DN200? y (RET)

What is the communications line interface on the DN200?
Specify either DMC11 or DMR11: dmc11 (RET)

[Configuration Saved On: PS:<DN200A>NEW2.CNF.1]
[Generating PS:<DN200A>NMLACC.MAC.1] [OK]
[Generating PS:<DN200A>CETAB.MAC.1] [OK]
[Generating PS:<DN200A>NETPAR.MAC.1] [OK]

[Configuration Complete]
 Type SAVE and FINISH after any additional changes
 Type EXIT to terminate NETGEN

NETGEN>
```

2.4.16 TAKE: Taking a File

Description:

Tells NETGEN to read commands from the specified disk file rather than expecting these commands to be entered from the terminal.

Argument:

input filespec

Example:


```
NETGEN>take (commands from) ? input filespec
NETGEN>take (commands from) mar1.cmd RET

NETGEN>
```

CHAPTER 3

INSTALLATION

This chapter describes how you use NETGEN to prepare configuration software that will run in your communications processor. Each section in this chapter describes the configuration process for a separate product. The products described in this chapter are:

- DECnet-20 for a DN20
- DECnet-20 for a DN200

3.1 DN20 CONFIGURATION

This chapter describes the procedures that you must follow to configure the DN20 capability on any DECSYSTEM-2040S/2060. This is the first step in generating and installing DECnet-20<. Steps in the procedures described in this and subsequent sections are numbered sequentially throughout.

To perform an on-site configuration, you must have available the Version 5.1 monitor of the TOPS-20 operating system. You can either install Version 5.1 first and have it running as you do your on-site configuration, or, if you are upgrading from a previous TOPS-20 or TOPS-20/DECnet-20 release, you can do your configuration with the previous release and bring up Version 5.1 when you reboot the system.

Because command files, control files, and logical definitions may refer to certain files, you should ordinarily name and locate these files as shown in the descriptions and examples shown below. If your installation's conventions allow it, file names and locations may be changed after the configuration and installation procedures have been successfully completed. You should be aware, however, that should you subsequently wish to reconfigure the system or to run validation or certification tests for diagnostic purposes, you will have to resolve references to files and data structures.

The parameters that appear in the commands below have the following characteristics:

- All parameters have been chosen to ensure that the procedure runs efficiently.
- Specified space parameters allow for expansion.
- Specified actual and logical names permit inter-directory referencing.

3.1.1 Initial System Setup

STEP 1: LOGIN and ENABLE WHEEL or OPERATOR PRIVILEGES

If you are a new customer, you must bring up your TOPS-20 Version 5.1 monitor before you can perform this step. Have your system files on PS:<SYSTEM> and PS:<SUBSYS>.

STEP 2: IF UPGRADING, USE <NEW-SYSTEM>, <NEW-SUBSYS>

If you are upgrading from a previous version of DECnet-20, use the <NEW-SYSTEM> directory in place of <SYSTEM>, and the <NEW-SUBSYS> directory in place of <SUBSYS>. You may need to create these directories if they do not exist in your system. If you have previously used these <NEW- directories, copy any files you need to keep from them into some other directories, to empty the <NEW- directories for your use. If you have an earlier version of TOPS-20 running, use it until you bring up the new monitor later in this procedure.

Before you bring up TOPS-20 V5.1, define your system-wide logical names in 5-1-CONFIG.CMD as follows:

```
SYS:  as PS:<NEW-SUBSYS>, PS:<SUBSYS>
SYSTEM:  as PS:<NEW-SYSTEM>, PS:<SYSTEM>
```

Be sure to keep your previous systems (TOPS-20 and DECnet) in the old directories until you are satisfied with **all** of the new release.

STEP 3: TYPE DIR PS:<DECNET> (RET)

Determine if the PS:<DECNET> directory is on your system. If not, you must create it. IF it is on your system because you are upgrading from a previous version of DECnet-20, create the directory PS:<NEW-DECNET> for the new files you will restore from tape.

```
$DIR PS:<DECNET> (RET)
  PS:<DECNET>
NET.MAP.2

Total of 1 file
```

STEP 4: CREATE THE PS:<DECNET> OR PS:<NEW-DECNET> DIRECTORY

If PS:<DECNET> does not exist on your system, create it. If upgrading, create PS:<NEW-DECNET> instead. The example below shows how to create PS:<DECNET>. Later in the generation procedure, you will copy the documentation files from the distribution tape to this directory. This will be your documentation directory.

Type:

```
$^ECREATE PS:<DECNET> (RET)
[New]
$$WORKING 2000 (RET)
$$PERMANENT 2000 (RET)
$$PROTECTION 777740 (RET)
$$FILES-ONLY (RET)
$$ (RET)
$
```

3.1.2 Generating Front-End Software

STEP 5: CREATE THE PS:<DN20> DIRECTORY

The DN20 configuration files are located on the DECnet-20 distribution tape in the directory PS:<DN20>. Create a directory on disk named PS:<DN20>. Later in the generation procedure, you will copy the generation files on the distribution tape to this disk directory. This is your DECnet system directory.

Type:

```
$^ECREATE PS:<DN20> RET
[New]
$$WORKING 1000 RET
$$PERMANENT 1000 RET
$$PROTECTION 777740 RET
$$FILES-ONLY RET
$$MAXIMUM 1 RET
$$ RET
$
```

STEP 6: CREATE THE PS:<DxxxxA> DIRECTORY

Create a separate front-end directory on disk. This directory will contain only those files that are specific to the front-end software you are generating.

You may give this directory any name you wish. For purposes of standard naming conventions, however, it is recommended that you use the format PS:<DxxxxA>, where xxxx in the directory name corresponds to the 4-digit serial number of your TOPS-20 KL system.

Type:

```
$^ECREATE PS:<DxxxxA> RET
[New]
$$WORKING 750 RET
$$PERMANENT 750 RET
$$FILES-ONLY RET
$$ RET
$
```

STEP 7: CREATE THE PS:<DECNET-SOURCES> DIRECTORY

Create a directory for the DECnet sources.

Type:

```
$^ECREATE PS:<DECNET-SOURCES> RET
[New]
$$WORK 750 RET
$$PERM 750 RET
$$FILES-ONLY RET
$$ RET
$
```

STEP 8: CREATE A DECNET-TOOLS DIRECTORY

If you do not already have a DECnet tools directory, create one.

```
$^ECREATE PS:<DECNET-TOOLS>  RET
[New]
$$WORK 200  RET
$$PERM 200  RET
$$FILES-ONLY  RET
$$  RET
$
```

STEP 9: CHECK FOR TAPE ALLOCATION ENABLED

Use I SYS to determine if tape allocation is enabled for your system.

```
$I SYS  RET
 Operator is ...
      .
      .
      .
      .
 Tape-drive allocation is enabled
      .
      .
      .
      .
$
```

STEP 10: SELECT A TAPE DRIVE

If tape-drive allocation is enabled use MOUNT TAPE; the example below uses MTA0:

Type:

```
$MOUNT TAPE MTA0:  RET
[MTA0: assigned to MT0]
```

If tape-drive allocation is not enabled, use ASSIGN MTAx:; this example uses MTA0:.

```
$ASSIGN MTA0:  RET
```

Mount the DECnet-20 Distribution Tape on an available tape drive and put the drive on line.

NOTE

If you are working on a stand-alone system, with the operator not in attendance, go to the operator's console and enter the IDENTIFY command in the form shown below:

OPR>IDENTIFY tape-id REQ request-id

The specified request-id appears on the operator's console. The tape-id is entered in the form MTAn, where n identifies the tape drive from which the files are to be copied. The system associates the physical device MTAn with your logical assignment to MTn. Refer to the TOPS-20 Operator's Command Language Reference Manual for a complete discussion of IDENTIFY and the other OPR commands.

Note that the logical name used below may be your first or last name or any other valid string that you will be able to remember.

➡ STEP 11: RESTORE FILES FROM TAPE

Use DUMPER to restore files from the distribution tape to the directories created on disk.

- Remember to use PS:<NEW-SUBSYS> instead of <SUBSYS> and PS:<NEW-DECNET> instead of <DECNET>, if upgrading.

NOTE

Restoring the save sets not related to configuring the front end is performed at this time to avoid your handling the tape a second time.

```
$DUMPER (RET)
DUMPER>TAPE MTA0: (RET)
DUMPER>REWIND (RET)
DUMPER>ACCOUNT (ESC) (OF RESTORED FILES FROM) SYSTEM-DEFAULT (RET)
DUMPER>RESTORE (ESC) (TAPE FILES) PS:(ESC)<*>*.*.* (TO) <DECNET> (RET)
(or to <NEW-DECNET> if upgrading)
(Restores Documentation files.)
DUMPER>RESTORE (ESC) (TAPE FILES) PS:(ESC)<*>*.*.* (TO) PS:<SUBSYS> (RET)
(or to <NEW-SUBSYS> if upgrading)
(Restores Binary files.)
DUMPER>RESTORE (ESC) (TAPE FILES) PS:<DN20> (ESC) *.*.* (TO) PS:<DN20> (RET)
(Restores DN20 Generation files)
DUMPER>RESTORE (ESC) (TAPE FILES) PS:<DECNET-SOURCES> (ESC) *.*.* (TO) PS:<DECNET-SOURCE> (RET)
(Restores DECnet-20 source files)
DUMPER>RESTORE (ESC) (TAPE FILES) PS:<TOOLS> (ESC) *.*.* (TO) PS:<DECNET-TOOLS> (RET)
(Restores DECnet-20 tools)
DUMPER>REWIND (RET)
DUMPER>EXIT (RET)
$
```

STEP 12: DISMOUNT THE TAPE

If you have tape-drive allocation enabled, type:

```
$DISMOUNT TAPE logical name: (RET)
$
```

If you do not have tape-drive allocation enabled, type:

```
$DEASSIGN MTA0: (RET)
```

STEP 13: READ THE BEWARE FILE

Before proceeding, read the DECnet-20 BEWARE file, DECNET.BWR, you have restored to PS:<DECNET> or PS:<NEW-DECNET>.

STEP 14: CONNECT TO <DxxxxA>

CONNECT to the front-end directory you have created. For example:

```
$CONNECT <D2102A> (RET)
```

STEP 15: CREATE THE FILE DSK.CMD

You must create a file called DSK.CMD to define the DSK: search list for a batch job you will submit later. Create DSK.CMD in the directory where you build the front-end, PS:<DxxxxA>. DSK.CMD must contain the entry:

```
DEFINE DSK:  DSK:, PS:<DN20>
```

PS:<DN20> is the directory where you have restored the DN20 files from your DECnet-20 distribution tape. If you are using another directory for the DN20 files, specify that directory in DSK.CMD instead of PS:<DN20>.

STEP 16: RUN THE NETGEN PROGRAM

Run NETGEN, which is the heart of the system generation procedure. Type:

```
$NETGEN (RET)
```

NETGEN responds with an identifying message:

```
TOPS-20 Network Configurator for DN20 or DN200, Version 3(56)

[Type START to begin configuration dialog]
```

The program prompts for each NETGEN command by displaying:

```
NETGEN>
```

The procedure shown in this section serves only as a model. You must use the NETGEN options that are appropriate to the hardware and software in your configuration. The specifications you enter with NETGEN must reflect the hardware at your site. Do not specify hardware devices not on your system. Use your Installation Worksheet.

STEP 17: DISPLAY NETGEN DEFAULTS

Display the node type default by issuing the INFORMATION command. Use the LIST command to see the initial settings of all parameters.

```
NETGEN> information (about) node (RET)
   Node name is:      (default)
   Node address is:   0 (default)
   Node type is:      DN20 (default)
   Line printers:     0 (default)
   CR11s:             0 (default)
NETGEN>
```

STEP 18: SPECIFY YOUR PARAMETERS

Describe your own configuration by entering your parameters. You can either use the dialog triggered by the START command, enter your own list of commands individually, or both. To use commands other than the START command, see Chapter 2, NETGEN. You will need to enter parameters summarized in the Installation Worksheet. With the START command, some parameters have defaults you can obtain with (ESC) .

Note that if you respond that there are KDPs on your DN20, NETGEN immediately asks for information regarding the lines on the first KDP.

For example, use the START command for the following dialog:

```
NETGEN> START (RET)
Node type: DN20 (RET)
Node name: NEWER (RET)
Node address: 12 (RET)

What DTE port number is used for this DN20:  1 (RET)

The total number of DMC11s and DMR11s must not exceed 6
How many DMC11 lines are on this DN20:  1 (RET)
DMC-0 Duplex: full (RET)
DMC-0 Cost: 2 (RET)

How many DMR11 lines are on this DN20:  0 (RET)

How many KDPs are on this DN20:  1 (RET)
Number of DUP11 lines on this KDP:  2 (RET)
KDP-0-0 Maximum Baud Rate: 19200 (RET)
KDP-0-0 Cost: 3 (RET)
KDP-0-1 Maximum Baud Rate: 2400 (RET)
KDP-0-1 Cost: 6 (RET)

[Configuration Saved On:  PS:<D2102A>NEWER.CNF.1]
[Generating PS:<D2102A>NMLACC.MAC.1] [OK]
[Generating PS:<D2102A>CETAB.MAC.1] [OK]
[Generating PS:<D2102A>NETPAR.MAC.1] [OK]

[Configuration complete]
 Type SAVE and FINISH after any additional changes
 Type EXIT to terminate NETGEN

NETGEN>
```

STEP 19: CHECK THE PARAMETERS

Check the current parameters for the DN20 to be sure that the node information is correct. If you make no changes to the node information, you can EXIT from NETGEN as the output files have already been saved.

```
                ESC
                 ↓
NETGEN>information (about) NODE  RET
   Node name is:      NEWER
   Node address is:   12
   Node type is:      DN20
   Line printers:     0 (default)
   CRlls:             0 (default)
NETGEN>list executor characteristics  RET

          Executor Node = 12 (NEWER)

            Identification = DECnet-20 V3.0 Release
            Management Version = 3.0.0
            Loop Count = 1
            Loop Length = 127
            Loop With = Mixed
            Incoming Timer = 10
            Outgoing Timer = 30
            NSP Version = 3.2.0
            Maximum Links = 8
            Delay Factor = 2
            Delay Weight = 3
            Inactivity Timer = 30
            Retransmit Factor = 5
            Routing Version = 1.3.0
            Type = Routing
            Routing Timer = 60
            Maximum Address = 255
            Maximum Circuits = 4
            Maximum Cost = 100
            Maximum Hops = 16
            Maximum Visits = 32
            Buffer Size = 576
            Maximum Phase II Links = 20
            Phase II Transmit Password = DECNET20

NETGEN>list known circuits characteristics  RET

          Circuit = DTE-0-1

            Cost = 1
            Hello timer = 10
            Listen timer = 60
            Owner = Node / 2 / KKKLLL
            Line = DTE-0-1
```

```
NETGEN> list known lines characteristics (RET)

          Line = DTE-0-1

            Device = DTE-0-1
            Controller Register = 174440
            Interrupt Vector = 770
            Interrupt Priority = 7
            Pause Timer = 30

          Line = DMR-0

            Device = DMR-0
            Receive Buffers = 10
            Controller = Normal
            Duplex = Half
            Protocol = DDCMP-DMC
            Clock = External
            Service Timer = 3000
            Retransmit Timer = 3000
            Controller Register = 160740
            Interrupt Vector = 670
            Interrupt Priority = 5
```

➡ STEP 20: ADJUST THE PARAMETERS

If you find any errors in the configuration described by the LIST or INFORMATION command, you can modify the NETGEN parameters until you are satisfied that your own configuration has been accurately described. Repeat steps 18 and 19 as many times as necessary.

➡ STEP 21: SAVE THE NETGEN RESULTS

If you have used the START command, entered all the correct values, and made no changes to the NETGEN parameters, you can EXIT from NETGEN (use the EXIT command). The .CNF and .MAC files have already been saved. However, if you change any parameters, use the SAVE and FINISH commands before you exit from NETGEN. Otherwise your changes are lost. SAVE keeps the .CNF file, FINISH keeps all the others.

If you do not specify an argument in the command, your results are saved in the file named PS:<DxxxxA>nodename.CNF, where PS:<DxxxxA> is your connected directory, and nodename is the node name (1-6 characters) specified in the NETGEN procedure. Alternatively, you may specify the directory and/or file name.

You may restore the configuration you create with the START command and make changes to it by using the RESTORE command. For example,

```
                    (ESC)
                      ↓
NETGEN> restore (configuration from) ? input filespec
NETGEN>restore (configuration from) PS:<DxxxxA>DxxxxA.CNF.1 (RET)
[Configuration Restored from PS:<DxxxxA>DxxxxA.CNF.1]
```

Use DEFINE or INCLUDE commands, or whatever commands you need, to change devices on your configuration or to change any parameters. For example, the dialog in Step 18 shows a configuration of 2 DUP11s on KDP-0-0. To add a third DUP11, the following sequence would do the job:

```
NETGEN>RESTORE NEWER.CNF (RET)
[Configuration Restored From:  PS:<D2102A>NEWER.CNF.1]
NETGEN>exclude kdp 0 (RET)
NETGEN>include kdp 0 (RET)
Number of DUP11 lines on this KDP: 3 (RET)
KDP-0-0 Maximum Baud Rate:  19200 (RET)
KDP-0-0 Cost: 3 (RET)
KDP-0-1 Maximum Baud Rate:  4800 (RET)
KDP-0-1 Cost: 6 (RET)
KDP-0-2 Maximum Baud Rate:  4800 (RET)
KDP-0-2 Cost: 6 (RET)
NETGEN>Save NEWER.CNF (RET)
[Configuration Saved On:  PS:<D2102A>NEWER.CNF.1]
NETGEN>finished (with configuration) (RET)
[Generating PS:<D2102A>NMLACC.MAC.2] [OK]
[Generating PS:<D2102A>CETAB.MAC.2] [OK]
[Generating PS:<D2102A>NETPAR.MAC.2] [OK]
NETGEN>exit (RET)
```

NOTE

If you set any Management Parameters (User, Account, Password) they are not restored when you use the RESTORE command. To retain them, use the DEFINE command whenever you change your configuration.

If you want to change the configuration, you must repeat the above procedures to restore and change your file.

STEP 22: FINISH THE NETGEN PROCEDURE

To complete the configuration process, use the FINISH command in NETGEN.

After you have saved the NETGEN results, you must finish the NETGEN configuration and exit from the procedure. Type:

```
                ESC
                 ↓
NETGEN>finished (with configuration) (RET)
[Generating PS:<DxxxxA>NMLACC.MAC.2] [OK]
[Generating PS:<DxxxxA>CETAB.MAC.2] [OK]
[Generating PS:<DxxxxA>NETPAR.MAC.2] [OK]
NETGEN>
```

This causes NETGEN to write its output files.

If you have not issued a SAVE command, NETGEN displays:

```
%Have you issued a SAVE command for this configuration?
```

If you did not INCLUDE a synchronous line, NETGEN displays:

```
%You have not configured any communications lines
```

For more information on error messages, see Appendix A.1, NETGEN Error Messages.

STEP 23: EXIT FROM NETGEN

To finish this part of your DN20 configuration, exit from NETGEN.

```
NETGEN> exit (RET)
$
```

After you have concluded the NETGEN procedure, the following files are in your connected directory, PS:<DxxxxA>:

Name	File
CETAB.MAC	Configuration file
NMLACC.MAC	Node-specific access information for control of local NML functions. Remote sites must use this information when connecting to DECnet-20.
nodename.CNF	Saved network configuration file (created if SAVE command was issued)
NETPAR.MAC	System-specific parameters

3.1.3 Creating Front-End Software

STEP 24: SUBMIT THE DN20SYS.CTL FILE

Submit the DN20SYS.CTL file, the control file supplied on your distribution tape, to the batch system. First reset its protection:

```
$ SET FILE PROTECTION PS:<DN20>DN20SYS.CTL 777752 (RET)
```

This changes the protection on the control file so it can be accessed by the batch system.

```
$ SUBMIT PS:<DN20>DN20SYS.CTL/TIME:30/NOTIFY:YES (RET)
```

The system displays a message in the form:

```
[Job DN20SY Queued, Request-ID #60 Limit 00:30:00]
```

When the job has completed, the system displays a message in the form:

```
[From SYSTEM:  Job DN20SY Request-ID #60 Finished Executing at hh:mm:ss]
```

This job does the following:

- lists logical names
- takes a checksummed directory of all required files
- assembles MACRO-11 source modules
- creates TSKs and STBs (tasks and symbol tables)
- builds the DN20 system image, DxxxxA.SYS
- deletes OBJ files
- deletes the file NMLACC.MAC, having used it to create the system image

STEP 25: CHECK THE DN20SYS.LOG FILE FOR ERRORS

Examine the DN20SYS.LOG file produced by the batch job for two things:

- fatal errors
- system image larger than 124K

The batch processor flags errors as follows:

Flag	Meaning
?	Fatal error
%	Warning
]	Comment

For fatal errors:

A successful job produces the DN20 system image; an unsuccessful job creates no system image. If your log file contains error messages, assembly errors, or undefined globals, determine the cause of the error, correct it, and resubmit the DN20SYS.CTL file.

For system-image size:

Your DN20 system image may be too large. In the log file, examine the area under the heading "Build the DN20 system image." Find the words "The conjured system image is xxxK words. Considering buffers, yyyK words of memory will be required during execution." If the value of yyy is greater than 124, your system image is too large. To reduce the value to 124K or less, omit devices from your configuration or make the Buffer Size less than 576. Rerun NETGEN to reduce the complexity of your DN20 configuration, and repeat all subsequent steps in the procedure.

3.1.4 Putting the Files in System Directories

STEP 26: COPY TO PS:<SUBSYS> OR PS:<NEW-SUBSYS>

Put the DxxxxA.SYS file on PS:<SUBSYS> (or, if upgrading, on PS:<NEW-SUBSYS>), with a copy command. For example:

```
$COPY D2102A.SYS   PS:<SUBSYS>D2102A.SYS (RET)
```

3.1.5 Complete and Repeat the Configuration

If you are configuring a system with remote job entry (RJE) facilities, you will have to perform the generation procedure for each remote station. Follow the procedures outlined in Section 3.2. If you are generating a system without the RJE capability, continue your system installation by skipping to Chapter 4.

You must repeat the generation whenever you change the network configuration.

3.2 REMOTE JOB ENTRY CONFIGURATION

This section describes the procedures that you must follow to configure software for any DN200 remote job entry (RJE) stations connected to your DECSYSTEM-2040S/2060. In performing this configuration, you use the RJE distribution tape described in Section 1.3.

This section is only relevant if your installation supports remote job entry. If your installation does not support RJE features, proceed to Chapter 4.

Most of the steps performed for RJE configuration are basically the same as those performed for the DN20 (see Section 3.1). For RJE, however, you build the DN200 directory rather than the DN20 directory, and the <DN200x> directory rather than the DxxxxA directory. You should build a separate <DN200x> directory for each RJE station your system is to support.

3.2.1 Generating RJE Software

The remote configuration files are located on the RJE-20 distribution tape in the directory PS:<DN200>. Create a directory on disk named PS:<DN200> or, if upgrading from a previous version of DECnet-20, as PS:<NEW-DN200>. Later in the generation procedure, you will copy the generation files on the distribution tape to this disk directory. This is your RJE system directory.

STEP 27: CREATE THE PS:<DN200> DIRECTORY or <NEW-DN200>

Type:

```
$^ECREATE PS:<DN200> (RET)
[New]
$$WORKING 1000 (RET)
$$PERMANENT 1000 (RET)
$$PROTECTION 777740 (RET)
$$FILES-ONLY (RET)
$$MAXIMUM 1 (RET)
$$ (RET)
$
```

STEP 28: CREATE THE PS:<DN200x> and PS:<DN200x-DUMPS> DIRECTORIES

Create two directories on disk for each RJE station. Call the primary directory PS:<DN200x>, where x is A for the first RJE station, B for the second, and so on. Each directory will contain only those files for the corresponding RJE node whose software you are building. Call the dump directory <nodename-DUMPS>, where nodename is the name of the DN200 node. This directory must be kept available to receive dumps of DN200 memory. When you create the dump directories, use passwords of your own choice. You must enter these passwords again when you run NIPGEN. Only the DN200 can initiate dumps.

Type:

```
$^ECREATE PS:<DN200x> (RET)
[New]
$$WORKING 750 (RET)
$$PERMANENT 750 (RET)
$$FILES-ONLY (RET)
$$ (RET)
$^ECREATE PS:<nodename-DUMPS> (RET)
[New]
$$ Work 1000 (RET)
$$ Perm 1000 (RET)
$$ Pass [your choice] (RET)
$$ Generations (TO KEEP) 5 (RET)
$$ (RET)
$
```

STEP 29: CREATE THE PS:<DN200-SOURCES> DIRECTORY

Create a directory named <DN200-SOURCES> to contain source code from the last saveset from the RJE-20 tape.

Type:

```
$^ECREATE PS:<DN200-SOURCES> (RET)
[New]
$$WORK 300 (RET)
$$PERM 300 (RET)
$$FILES-ONLY (RET)
$$ (RET)
$
```

STEP 30: RESTORE FILES FROM TAPE

Use the DUMPER utility to restore files from the RJE-20 distribution tape to disk. The RJE-20 distribution tape contains three savesets: documentation, binaries, and sources for generation. Restore documentation to PS:<DECNET> (or PS:<NEW-DECNET>), binaries to PS:<SUBSYS> (or PS:<NEW-SUBSYS> if you are upgrading from DECnet-20 V2.1 to DECnet-20 V3.0), and sources for generation to PS:<DN200>.

- Mount the RJE-20 distribution tape on an available tape drive.
- Use the INFORMATION SYSTEM-STATUS command (see the TOPS-20 Commands Reference Manual) to determine whether tape allocation is enabled for your system.

If tape-drive allocation is enabled, use MOUNT TAPE; the example below uses MTA0:

Type:

```
$MOUNT TAPE MTA0: (RET)
[MTA0: assigned to MT0]
```

If tape-drive allocation is not enabled, use ASSIGN MTAx:; this example uses MTA0:.

```
$ASSIGN MTA0: (RET)
```

Mount the RJE-20 Distribution Tape on an available tape drive and put the drive on line.

```
$DUMPER (RET)
DUMPER>TAPE MTA0: (RET)
DUMPER>REWIND (RET)
            (ESC)
            ↓
DUMPER>ACCOUNT (OF RESTORED FILES FROM) SYSTEM-DEFAULT (RET)
            (ESC)                 (ESC)
            ↓                     ↓
DUMPER>RESTORE (TAPE FILES) PS: <*>*.*.* (TO) <DECNET> (RET)
(or to <NEW-DECNET> if upgrading)
(Restores Documentation files.)
            (ESC)
            ↓
DUMPER>RESTORE (TAPE FILES) PS:<SUBSYS>*.* (TO) PS:<SUBSYS>*.* (RET)
(or to <NEW-SUBSYS> if upgrading)
(Restores binaries)
            (ESC)                       (ESC)
            ↓                           ↓
DUMPER>RESTORE (TAPE FILES) PS:<DN200> *.*.* (TO) PS:<DN200> (RET)
(or to <NEW-DN200> if upgrading)
(Restores DN200 Generation files)
          (ESC)                       (ESC)
          ↓                           ↓
DUMPER>RESTORE (TAPE FILES) PS:<*>*.*.* (TO) PS:<DN200-SOURCES> (RET)
(Restores source files)
DUMPER>REWIND (RET)
DUMPER>EXIT (RET)
$
```

NOTE

If you are working on a stand-alone system with no operator in attendance, go to the operator's console and enter the IDENTIFY command in the form shown below:

OPR IDENTIFY tape-id REQ request-id

The specified request-id appears on the operator's console. The tape-id is entered in the form MTAn, where n identifies the tape drive from which the files are to be copied. The system associates the physical device MTAn with your logical assignment to MTn. Refer to the TOPS-20 Operator's Command Language Reference Manual for a complete discussion of IDENTIFY and the other OPR commands.

Note that the logical name used below may be your first or last name or any other valid string that you will be able to remember.

STEP 31: DISMOUNT THE TAPE

If you have tape-drive allocation enabled, type:

```
$DISMOUNT TAPE logical name: (RET)
$
```

If you do not have tape-drive allocation enabled, type

```
$DEASSIGN MTA0: (RET)
$
```

Once your tape is rewound, remove it from the tape drive.

STEP 32: CONNECT TO <DN200x>

Type:

```
$CONNECT PS:<DN200x> (RET)
```

NOTE

Repeat Steps 32 through 41 for each RJE station. Where the instructions refer to PS:<DN200x>, specify PS:<DN200A> for the first, PS:<DN200B> for the second, and so on. DECnet software can support up to 4 RJE stations.

STEP 33: RUN THE NETGEN PROGRAM

Run NETGEN to define the DN200 configuration. Type:

$NETGEN (RET)

NETGEN responds with an identifying message:

TOPS-20 Network Configurator for DN20 or DN200, Version 3(55)

[Type START to begin configuration dialog]

The program then prompts for each NETGEN command by displaying:

NETGEN>

You may now enter any of the NETGEN commands to configure your DN200 nodes.

NOTE
Ensure that you configure **all** nodes. For example, if you have three DN200's in your configuration, you must run NETGEN once for the DN20 front-end while connected to PS:<DxxxxA>, and once for each of the DN200s while connected to each directory PS:<DN200x>. Each node requires its own communication data base.

STEP 34: SPECIFY DN200 PARAMETERS

Specify NETGEN parameters which identify your DN200. You can use the dialog begun by the START command, or individual commands. You need always to specify:

- The node type (DN200)
- The name of the node
- The address of the node

You might enter the following:

```
NETGEN>start (RET)
Node type:  dn200 (RET)
Node name:  rje1 (RET)
Node address:  68 (RET)

Do you have a card reader on this DN200? no (RET)

Do you have a line printer on this DN200? yes (RET)

What is the communications line interface on the DN200?
Specify either DMC11 or DMR11:  dmc11 (RET)

[Configuration Saved On: RJE1.CNF.1]
[Generating PS:<DN200x>NMLACC.MAC.3] [OK]
[Generating PS:<DN200x>CETAB.MAC.3] [OK]
[Generating PS:<DN200x>NETPAR.MAC.3] [OK]

[Configuration complete]
 Type SAVE and FINISH after any additional changes
 Type EXIT to terminate NETGEN

NETGEN>exit (RET)
$
```

After you have identified the node as a DN200, NETGEN adjusts the default parameters to values appropriate for RJE stations.

STEP 35: CHECK THE PARAMETERS

Check the output from the LIST or INFORMATION command to determine which parameters correctly describe your planned RJE configuration and which parameters must be changed. To change the physical link for a DN200, you may need to use the INCLUDE or EXCLUDE command. For example,

```
EXCLUDE DMC
INCLUDE DMR
```

```
          (ESC)
            ↓
NETGEN>information (about) NODE (RET)
   Node name is:      RJE1
   Node number is:    68
   Node type is:      DN200
   Line printers:     1 (default)
   CR11s:             0 (default)
NETGEN>
```

STEP 36: ADJUST THE PARAMETERS

Adjust the parameters displayed for the DN200 node to reflect any additions or changes to your configuration. For example, to include a card reader in the configuration, enter:

```
NETGEN>include card-reader (RET)
```

Repeat the previous two steps until the configuration parameters are satisfactory.

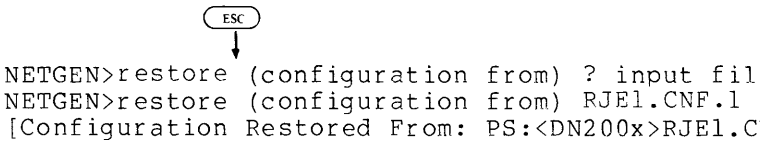
STEP 37: SAVE THE NETGEN RESULTS

When the output from the LIST or INFORMATION command accurately describes your planned configuration, exit from NETGEN. If you have used the START command, entered all the correct values, and made no changes to the NETGEN parameters, you can EXIT from NETGEN (use the EXIT command). The .CNF and .MAC files have already been saved. However, if you change any parameters, use the SAVE and FINISH commands before you exit from NETGEN. Otherwise your changes are lost.

Check your output carefully. If you do not save the results and find that you must make a correction after you issue the FINISHED command, you will have to rerun NETGEN from the beginning.

When you are ready to save the NETGEN results, enter a SAVE command. If you do not enter an argument in the command, your results are saved in the file named PS:<DN200x>nodename.CNF, where nodename is the nodename you gave in the NETGEN procedure. Alternatively, you may specify the directory and/or filename.

You may restore the saved configuration at a later time by using the RESTORE command as follows:

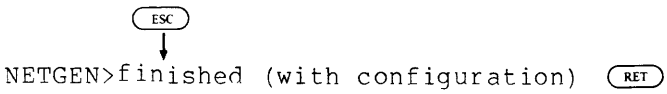


> **NOTE**
>
> If you set any Management Parameters (User, Account, Password), they are not restored when you use the RESTORE command. You must use the DEFINE command to reset them.

If you want to change the configuration, you must restore and change your configuration file.

STEP 38: FINISH THE NETGEN PROCEDURE

After you have saved the NETGEN results you must finish the NETGEN configuration and exit from the procedure. Type:



This causes NETGEN to write its output files.

If you have not previously issued a SAVE command, NETGEN displays the message:

%Have you issued a SAVE command for this configuration?

If you did not include a synchronous line when running NETGEN, NETGEN displays:

%You have not configured any communications lines

For more information on error messages, see Appendix A.

Now type:

ESC
↓
NETGEN>exit (from NETGEN) RET

After you have concluded the NETGEN procedure, the following files are in your connected directory, PS:<DN200x>:

Name	File
CETAB.MAC	Configuration file
nodename.CNF	Saved network configuration file (created if SAVE command was issued)
NMLACC.MAC	Node-specific access information for control of local NML functions.
NETPAR.MAC	System-specific parameters

3.2.2 Creating RJE Software

STEP 39: SUBMIT THE DN200SYS.CTL FILE

NOTE

The control file DN200SYS.CTL used to build the DN200 image TAKEs a file named DSK.CMD. DSK.CMD defines the DSK: search list for the batch job. Before you SUBMIT DN200SYS.CTL, create DSK.CMD in the <DN200x>directory. The DSK.CMD file should contain the entry:

```
DEFINE DSK: DSK:,
PS:<DN200>,PS:<DN20>
```

PS:<DN200> is the directory to which you restored the DN200 files from the RJE tape, and PS:<DN20> is the directory to which you restored the DECnet-20 files from the DECnet-20 tape. If you are using directories other than PS:<DN200> and PS:<DN20> for the distribution directories, your DSK.CMD file must specify your directories instead.

Submit the DN200SYS.CTL file, the control file from the RJE-20 distribution tape, to the batch system.

Enter the following:

```
$ SET FILE PROTECTION PS:<DN200>DN200SYS.CTL  777752 (RET)
```

This changes the protection on the control file so the batch system can access it.

```
$ SUBMIT PS:<DN200>DN200SYS.CTL/TIME:30/OUTPUT:NOLOG/NOTIFY:YES (RET)
```

The system displays a message in the form:

```
[Job DN200S Queued, Request-ID #61 Limit 00:30:00]
```

This job does the following:

- lists logical names
- takes a checksummed directory of all required files
- assembles MACRO source modules
- creates TSKs and STBs (tasks and symbol tables)
- builds the DN20 system image, DN200x.SYS
- deletes OBJ files
- deletes the file NMLACC.MAC, having used it to create the system image

You must submit this control file for each RJE station in your network.

STEP 40: CHECK THE DN200SYS.LOG FILE

Examine the DN200SYS.LOG file produced by the batch job for two things:

- fatal errors
- system image larger than 124K

For fatal errors:

A successful job produces the DN200 system image. An unsuccessful job creates no system image. If your log file contains error messages, assembly errors, or undefined globals, determine the cause of the error, correct it, and resubmit the DN200SYS.CTL file.

For system-image size:

Your DN200 system image may be too large. In the log file, examine the area under the heading "Build the DN200 system image." Find the words "The conjured system image is xxxK words. Considering buffers, yyyK words of memory will be required during execution." If the value of yyy is greater than 124, your system image is too large. To reduce the value to 124K or less, omit devices from your configuration or make the Buffer Size less than 576. Rerun NETGEN to reduce the complexity of your DN200 configuration, and repeat all subsequent steps in the procedure.

3.2.3 Putting Files in System Directories

STEP 41: COPY TO PS:<SUBSYS> OR PS:<NEW-SUBSYS>

For each RJE station, prepare a file in PS:<DN200x> that is free of errors. When done, copy all the individual DN200x.SYS files to PS:<SUBSYS> with copy commands, or, if upgrading, copy to PS:<NEW-SUBSYS>. Remember that the input file name and the directory name of each RJE system image is the same. Remember to copy to PS:<NEW-SUBSYS> if upgrading. For example:

```
$COPY DN200A.SYS PS:<SUBSYS> (RET)
```

CHAPTER 4

NETWORK CHECKOUT

This chapter describes how to setup the control and system files needed to check out DECnet capabilities between certain nodes in your network.

Before you can load the nodes and test their connectivity, you must run the NIPGEN program described in this chapter. NIPGEN creates the command and control files utilized by the procedures discussed below.

To perform verification and installation procedures, you must have a fully installed TOPS-20 operating system, Version 5.1 or later. This must be the system you will bring up at the beginning of Chapter 5. Before beginning the procedures described below, you must be logged in as a user with OPERATOR or WHEEL privileges, and have your privileges enabled.

Because command files and control files and logical definitions may refer to certain files, you should ordinarily name and locate these files as shown in the descriptions and examples shown below. If your installation's conventions allow it, file names and locations may be changed after the configuration and installation procedures have been successfully completed. You should be aware, however, that should you subsequently wish to reconfigure the system or to run validation or certification tests for diagnostic purposes, you will have to resolve references to files and data structures.

4.1 NIPGEN OVERVIEW

After you have created your front end and optionally your remote job entry (DN200) software, you are ready to describe the host and remote nodes and to verify and install the system. This chapter describes the interactive NIPGEN (Network Installation Procedure GENerator) program, which creates the command and control files used to verify your generated DECnet-20 node. The next chapter describes the detailed steps which you must follow to install the system.

Before you invoke the NIPGEN program, you must ensure that you have configured your front end and RJE software and that the appropriate configuration files have been produced. You should have the following files on PS:<SUBSYS>, or, if upgrading, on PS:<NEW-SUBSYS>.

- For the DN20: DxxxxA.SYS
- For each RJE station: DN200x.SYS

You must have a fully installed TOPS-20 operating system, Version 5.1 or later. If you are upgrading, Version 5.1 need not be running until you reboot the system.

STEP 42: BE SURE YOU ARE CONNECTED TO <DxxxxA>

To proceed with the next steps, be connected to <DxxxxA>.

STEP 43: RUN NIPGEN

Invoke the NIPGEN program typing:

```
$NIPGEN (RET)
```

in response to the TOPS-20 enabled prompt ($).

NIPGEN responds by displaying the following message:

```
NIPGEN (V2.6) for DECnet-20 V3.0
```

The program now prompts you to enter the name, address, and related information about the following nodes:

- Host node
- DN20 node
- DN200 nodes
- All remote nodes with which you plan to communicate

The prompts and responses are described in the subsections that follow.

STEP 44: SPECIFY YOUR HOST NODE

> **NOTE**
>
> You cannot use (ESC) or (CTRL/U) with NIPGEN. If you make an error when entering a value, use the DELETE key to back up. If you have already pressed (RET) and a new prompt is displayed, you cannot return to a previous line. You must rerun NIPGEN, unless you are entering values for a DN200.

NIPGEN first prompts you to enter information about your host node. For example:

```
Host Node Address:  120 (RET)
             Name:  KL2102 (RET)
        User Name:  THE-USER (RET)
          Account:  341 (RET)
         Password:  GUEST (RET)
  Host Data Link:   DTE-0-1 (RET)
```

These entries must be specified as follows:

- The host node address must correspond to the node address of the host TOPS-20 computer at your installation.
- The host node name must correspond to the node name of your TOPS-20 KL system.
- The user name, account, and password are your own, or a temporary set of, TOPS-20 name, account number, and password.
- The host data link is the DTE20 device specification representing the interface between the DECSYSTEM 2040S/2060 and the DN20 front end.
- You should have collected the information needed for NIPGEN in your Installation Worksheet.

Note that in this chapter, node name examples follow the naming conventions for the front-end node described earlier.

STEP 45: SPECIFY THE DN20 NODE

Next, NIPGEN prompts you to enter the node address and name of the front end (DN20) node, as shown below.

```
DN20 Node Address: 67 (RET)
             Name: D2102A (RET)
        User Name: jake (RET)
          Account: 3 (RET)
         Password: jill (RET)
```

The address and name must correspond to the specifications entered for the front end during the NETGEN procedure. The user name, account, and password must correspond to the values entered for the Management Parameters when running NETGEN.

STEP 46: SPECIFY YOUR DN200 NODES

Next, NIPGEN displays an informational message and prompts you to enter the node address, name, and data link of the DN200 nodes. If remote job entry is not supported for your configuration, simply respond to the prompt below by pressing (RET) :

```
Terminate DN200 node address/name input
questioning with a null node address.

     DN200 Node Address: (RET)
```

If you have generated one or more DN200s, enter node information in the following form:

```
DN200 Node Address: 68 (RET)
             Name: RJE1 (RET)
    Host User Name: RJE1-DUMPS (RET)
      Host Account: (RET)
     Host Password: rick (RET)
    DN20 Data Link: DMC-0 (RET)
```

The node address, name, and DN20 data link must correspond to the address, name, and link specified for this node with NETGEN. NIPGEN creates the host user name as nodename-DUMPS; you must enter the host password you used when creating the <nodename-DUMPS> directory in an earlier step.

- The DN20 data link must correspond to the name and number of the synchronous line which serves as an interface between the DN200 and the front end.

You must specify entries for all DN200's in your configuration.

NIPGEN prompts for DN200 node information until you press RETURN in response to the prompt:

```
DN200 Node Address:
```

Note that you can correct a mistake in a DN200 node specification by reentering a previously specified node address in response to the "DN200 Node Address:" prompt. NIPGEN will replace the previously entered name and data link with the newly entered information.

STEP 47: SPECIFY ADJACENT NODES IN YOUR NETWORK

Next, NIPGEN displays an informational message and prompts you to enter information for the remote nodes in the network with which you want to communicate. Specify adjacent nodes you wish to test against.

```
Terminate remote node address/name input
questioning with a null node address.  A
file of pre-prepared inputs may be read
via an indirect file, i.e.,
     @FILENAME.EXT

      Remote Node Address:  103 (RET)
                    Name:  MILL20 (RET)
           Phase III ?     NO (RET)
     File Xfer (FAL) ?     YES (RET)
               User Name:  SOME-USER (RET)
                 Account:  MONITOR (RET)
                Password:  SECRET (RET)
```

These entries describe the remote node as follows:

- For remote node address, enter the DECnet address of the remote node.
- For name, enter the name of the remote node.
- Enter YES for the Phase III entry if the current Phase III software is installed at this remote node; enter NO if Phase II software is installed.
- Enter YES for the file Xfer (FAL) entry if the FAL (File Access Listener) program resides at the remote node and is used to process transfer requests initiated by the NFT (Network File Transfer) program; enter NO if FAL is not used. Consider DECnet-20 hosts as Phase III nodes in answer to this question.

NOTE
For each remote Phase III DECnet-20 node pair, you must make an entry for both the host KL and its DN20 front end. For the Phase III remote host KL, answer YES to the FAL question; for the remote DN20, always answer 'NO' to the FAL question. A Phase II KL node requires only one entry; a Phase III DECnet-20 node requires two NIPGEN specifications. (See the examples below for KL2116 and KL2137.)

- Enter the user name, account, and password for any node using FAL. This information is not requested for nodes without FAL.

You should have collected this information as part of your Installation Worksheet.

NIPGEN continues to prompt you for remote node entries until you indicate that you are done by typing <RET> in response to the prompt:

```
Remote Node Address:
```

NIPGEN then creates the files described in Section 4.2 and responds by displaying the following:

```
Writing CMD and CTL files---

NIPGEN Completed.
$
```

An example of entering remote node specifications is shown below.

```
Remote Node Address: 103 RET
               Name: MILL20 RET
          Phase III ? NO RET
   File Xfer (FAL) ? YES RET
          User Name: SOME-USER RET
            Account: MONITOR RET
           Password: SECRET RET

Remote Node Address: 113 RET
               Name: KL2137 RET
          Phase III ? YES RET
   File Xfer (FAL) ? YES RET
          User Name: ANOTHER-USER RET
            Account: 341 RET
           Password: SHHH RET

Remote Node Address: 116 RET
               Name: KL2116 RET
          Phase III ? NO RET
   File Xfer (FAL) ? YES RET
          User Name: A-USER RET
            Account: 341 RET
           Password: QUIET RET

Remote Node Address: 118 RET
               Name: SYS880 RET
          Phase III ? YES RET
   File Xfer (FAL) ? YES RET
          User Name: [200,200] RET
            Account: RET
           Password: PRIVY RET

Remote Node Address: 123 RET
               Name: D2137A RET
          Phase III ? YES RET
   File Xfer (FAL) ? NO RET

Remote Node Address: 33 RET
               Name: VX1522 RET
          Phase III ? NO RET
   File Xfer (FAL) ? YES RET
          User Name: SOME-USER RET
            Account: RET
           Password: SECRET RET

Remote Node Address: RET

Writing CMD and CTL files---

NIPGEN completed
$
```

You can set up a command file to supply responses to the NIPGEN prompts for remote node specifications. If you use such a file, you will not have to enter specifications from the terminal, as shown in the example above. Simply respond to the last remote node prompt with an @ and the filename and extension. An example is included below.

```
Remote Node Address: @NIPGEN.CMD (RET)

Writing CMD and CTL files --

NIPGEN completed
$
```

The contents of NIPGEN.CMD are shown below.

```
103
MILL20
NO
YES
SOME-USER
MONITOR
SECRET
113
KL2137
YES
YES
ANOTHER-USER
341
SHHH
116
KL2116
NO
YES
A-USER
341
QUIET
118
SYS880
YES
YES
[200,200]

PRIVY
123
D2137A
YES
NO
33
VX1522
NO
YES
SOME-USER

SECRET
```

The final (RET) ends the list. If the command file contains specifications for a remote node that has already been defined, the information in the file will supersede the previously entered information. If the command file contains a remote node specification for a node previously defined as the host, DN20, or DN200 node, the duplicate specification will be ignored. For convenience, you might wish to set up a file which describes all of the nodes in the network, including your DN20 node. This file can then be invoked from any TOPS-20 node.

4.2 NIPGEN COMMAND AND CONTROL FILES

NIPGEN creates five command and control files which are used to verify and load the configured nodes and to test connectivity to the specified remote nodes. These files are listed below and are discussed in greater detail in the subsections that follow. It is good practice to look at these files, to be sure they contain no errors, before using them.

Name	File
NCP.CMD	Command file defining the front end (DN20) data base for input to OPR.
NCPRJE.CMD	Command file defining the remote job entry (DN200) data base(s) for input to OPR.
NIPLCL.CTL	Control file which will be used to verify host, front end, and DN200 nodes.
NIPNM.CTL	Control file which will use the Phase III loopback facility for verification.
NIPNFT.CTL	Control file which will use NFT for Phase II and Phase III verification.

4.2.1 NCP.CMD: DN20 Command File

NCP.CMD is a command file which is input to the OPR program. It contains a series of commands which:

- Define the node names and addresses of all of the nodes in the configured network in a format readable by the host system.
- Define the data base for the network front end (DN20).

These definitions are made in the volatile data base.

A sample NCP.CMD file, based on the preceding input, is included below.

```
!
!NCP.CMD
!
ENTER NCP
SET NODE 67 NAME D2102A
SET NODE 68 NAME RJE1
SET NODE 103 NAME MILL20
SET NODE 113 NAME KL2137
SET NODE 116 NAME KL2116
SET NODE 118 NAME SYS880
SET NODE 120 NAME KL2102
SET NODE 123 NAME D2137A
SET NODE 33 NAME VX1522
SET NODE D2102A CPU PDP-11
SET NODE D2102A SERVICE CIRCUIT DTE-0-1
SET NODE D2102A SECONDARY LOADER SYS:DTEMPS.SYS
SET NODE D2102A TERTIARY LOADER SYS:DTEMPT.SYS
SET NODE D2102A LOAD FILE SYS:D2102A.SYS
SET NODE D2102A HOST KL2102
SET NODE D2102A SECONDARY DUMPER SYS:DTEDMP.SYS
SET NODE D2102A DUMP FILE SYS:D2102A.DMP
RETURN
```

4.2.2 NCPRJE.CMD: DN200 Command File

NCPRJE.CMD is a command file which is input to the OPR program. It contains a series of commands which define the remote job entry data bases for all DN200's configured in the network. These definitions are made in the volatile data base; no permanent data base processing is performed for the DN200.

NCPRJE.CMD will be created only if one or more DN200 nodes were generated by NETGEN. A sample NCPRJE.CMD file is included below.

```
!
!NCPRJE.CMD
!

ENTER NCP
SET EXECUTOR NODE D2102A USER JAKE PASSWORD JILL
SET NODE 68 NAME RJE1
WAIT 2
SET NODE RJE1 CPU PDP-11
WAIT 2
SET NODE RJE1 SERVICE CIRCUIT DMC-0
WAIT 2
SET NODE RJE1 HOST KL2102
WAIT 2
SET NODE RJE1 SECONDARY LOADER -
    KL2102"THE-USER GUEST 341"::SYS:DMCMPS.SYS
WAIT 2
SET NODE RJE1 TERTIARY LOADER -
    KL2102"THE-USER GUEST 341"::SYS:DMCMPT.SYS
WAIT 2
SET NODE RJE1 LOAD FILE -
    KL2102"THE-USER GUEST 341"::SYS:RJE1.SYS
WAIT 2
SET NODE RJE1 DUMP FILE -
    KL2102"RJE1-DUMPS RICK ":: PS:<RJE1-DUMPS>RJE1.DMP
WAIT 2
SET CIR KDP-0-2 SERVICE ENABLED
WAIT 2
CLEAR EXECUTOR NODE
RETURN
```

4.2.3 **NIPLCL.CTL: Node Verification File**

NIPLCL.CTL is a control file which contains statements that perform the following operations:

- Examines the host node
- Examines the DN20 front end node.
- Sets up the DN200 data base (if any DN200s were configured).

These statements are executed when you give the SUBMIT NIPLCL.CTL command.

Check the batch log file, NIPLCL.LOG, for errors. The WAIT commands shown below are included to ensure that responses are entered in the log file. The WAIT interval may be tuned to shorten installation testing.

A sample NIPLCL.CTL file is included below.

```
!
!NIPLCL.CTL
!
@ENABLE
@NOERROR
@OPR
*ENTER NCP
*SHOW EXECUTOR CHARACTERISTICS
*WAIT 35
*LOOP EXECUTOR COUNT 25 LENGTH 100
*WAIT 35
*LOOP NODE D2102A COUNT 25 LENGTH 100
*WAIT 35
*SET EXECUTOR NODE D2102A
*WAIT 35
*SHOW EXECUTOR CHARACTERISTICS
*WAIT 35
*LOOP EXECUTOR COUNT 25 LENGTH 100
*WAIT 35
*LOOP NODE KL2102 COUNT 25 LENGTH 100
*WAIT 35
*TAKE SYSTEM:NCPRJE
*WAIT 35
*EXIT
```

Note that the last TAKE and WAIT lines above are not included if you did not specify a DN200 node. The first command to SHOW EXECUTOR CHARACTERISTICS gives information on the KL because whenever you enter NCP, the executor is set to the KL.

4.2.4 NIPNM.CTL: Loopback Verification File

NIPNM.CTL is a control file which contains statements that use the Phase III Network Management node loopback facility to verify connections to other Phase III nodes in the network. These statements are executed when you give a SUBMIT NIPNM.CTL command.

Check the batch log file, NIPNM.LOG, for errors. The WAIT commands shown below are included to ensure that responses are entered in the log file. The WAIT interval may be tuned to shorten installation testing.

A sample NIPNM.CTL file is included below.

```
!
!NIPNM.CTL
!
@ENABLE
@NOERROR
@OPR
*ENTER NCP
*SHOW EXECUTOR CHARACTERISTICS
*WAIT 35
*LOOP NODE RJE1 COUNT 25 LENGTH 100
*WAIT 35
*LOOP NODE KL2137 COUNT 25 LENGTH 100
*WAIT 35
*LOOP NODE SYS880 COUNT 25 LENGTH 100
*WAIT 35
*LOOP NODE D2137A COUNT 25 LENGTH 100
*WAIT 35
*SET EXECUTOR NODE D2102A
*WAIT 35
*SHOW EXECUTOR CHARACTERISTICS
*WAIT 35
*LOOP NODE 68 COUNT 25 LENGTH 100  !68 = RJE1
*WAIT 35
*LOOP NODE 113 COUNT 25 LENGTH 100  !113 = KL2137
*WAIT 35
*LOOP NODE 118 COUNT 25 LENGTH 100  !118 = SYS880
*WAIT 35
*LOOP NODE 123 COUNT 25 LENGTH 100  !123 = D2137A
*WAIT 35
*EXIT
```

4.2.5 NIPNFT.CTL: NFT Verification File

NIPNFT.CTL is a control file which contains statements that perform the following operations:

- Use the Network File Transfer (NFT) facility to verify connections to Phase II nodes.
- Provide an additional test for Phase III node connections.

These statements are executed when you give the SUBMIT NIPNFT.CTL command.

Check the batch log file, NIPNFT.LOG, for errors.

A sample NIPNFT.CTL file is included below.

```
!
!NIPNFT.CTL
!
@ENABLE
@NOERROR
@DELETE NFTNIP.CTL
@NFT
*SET DEFAULTS MILL20:: -
      /ACCOUNT:MONITOR /USER:SOME-USER /PASSWORD:SECRET
*COPY NIPNFT.CTL   MILL20::
*COPY MILL20::NIPNFT.CTL   NFTNIP.CTL
*DELETE MILL20::NIPNFT.CTL
*EXIT
@FILCOM
*TTY:=NIPNFT.CTL, NFTNIP.CTL
@DELETE NFTNIP.CTL
@NFT
*SET DEFAULTS KL2137:: -
      /ACCOUNT:341 /USER:ANOTHER-USER /PASSWORD:SHHH
*COPY NIPNFT.CTL    KL2137::
*COPY KL2137::NIPNFT.CTL    NFTNIP.CTL
*DELETE KL2137::NIPNFT.CTL
*EXIT
@FILCOM
*TTY:=NIPNFT.CTL, NFTNIP.CTL
@DELETE NFTNIP.CTL
@NFT
*SET DEFAULTS KL2116:: -
      /ACCOUNT:341 /USER:A-USER /PASSWORD:QUIET
*COPY NIPNFT.CTL   KL2116::
*COPY KL2116::NIPNFT.CTL   NFTNIP.CTL
*DELETE KL2116::NIPNFT.CTL
*EXIT
@FILCOM
*TTY:=NIPNFT.CTL, NFTNIP.CTL
@DELETE NFTNIP.CTL
@NFT
*SET DEFAULTS SYS880:: -
      /ACCOUNT: /USER:[200,200], /PASSWORD:PRIVY
*COPY NIPNFT.CTL    SYS880::
*COPY SYS880::NIPNFT.CTL    NFTNIP.CTL
*DELETE SYS880::NIPNFT.CTL
*EXIT
@FILCOM
*TTY:=NIPNFT.CTL, NFTNIP.CTL
@DELETE NFTNIP.CTL
@NFT
*SET DEFAULTS VX1522:: -
      /ACCOUNT: /USER:SOME-USER /PASSWORD:SECRET
*COPY NIPNFT.CTL   VX1522::
*COPY VX1522::NIPNFT.CTL   NFTNIP.CTL
*DELETE VX1522::NIPNFT.CTL
*EXIT
@FILCOM
*TTY:=NIPNFT.CTL, NFTNIP.CTL
@DELETE NFTNIP.CTL
```

➡ STEP 48: COPY COMMAND FILES

Copy the command files created by NIPGEN from your connected directory to PS:<SYSTEM>, or, if upgrading, to PS:<NEW-SYSTEM>. These files are:

NCP.CMD: definitions for DN20 node
NCPRJE.CMD: definitions for DN200 nodes

Note that if your installation does not support remote job entry, there will be no NCPRJE.CMD file.

To copy to PS:<SYSTEM>, enter the following from the EXEC:

For the DN20:
$COPY (FROM) NCP.CMD (TO) PS:<SYSTEM>NCP.CMD (RET) (or to PS:<NEW-SYSTEM>)

For the DN200:
$COPY (FROM) NCPRJE.CMD (TO) PS:<SYSTEM>NCPRJE.CMD (RET) (or to PS:<NEW-SYSTEM>)

4.3 SYSTEM FILE EDITS

To set up your system to bring the network up automatically, you must edit certain system files. The files you must edit or create are:

PTYCON.ATO (NETWRK.ATO)
5-1-CONFIG.CMD
SYSJOB.RUN
SYSTEM.CMD

When the system comes up, the monitor invokes CONFIG.CMD and runs SYSJOB. SYSJOB starts PTYCON, executes commands in the PTYCON.ATO file and starts copies of LPTSPL and CDRIVE. PTYCON starts OPR and executes commands in SYSTEM.CMD and NCP.CMD (see Figure 4-1).

If you are upgrading from a previous version of DECnet-20, use the <NEW-SYSTEM> directory in place of <SYSTEM>, and the <NEW-SUBSYS> directory in place of <SUBSYS>. Save the previous version on tape or disk until the current version runs successfully in a normal working environment.

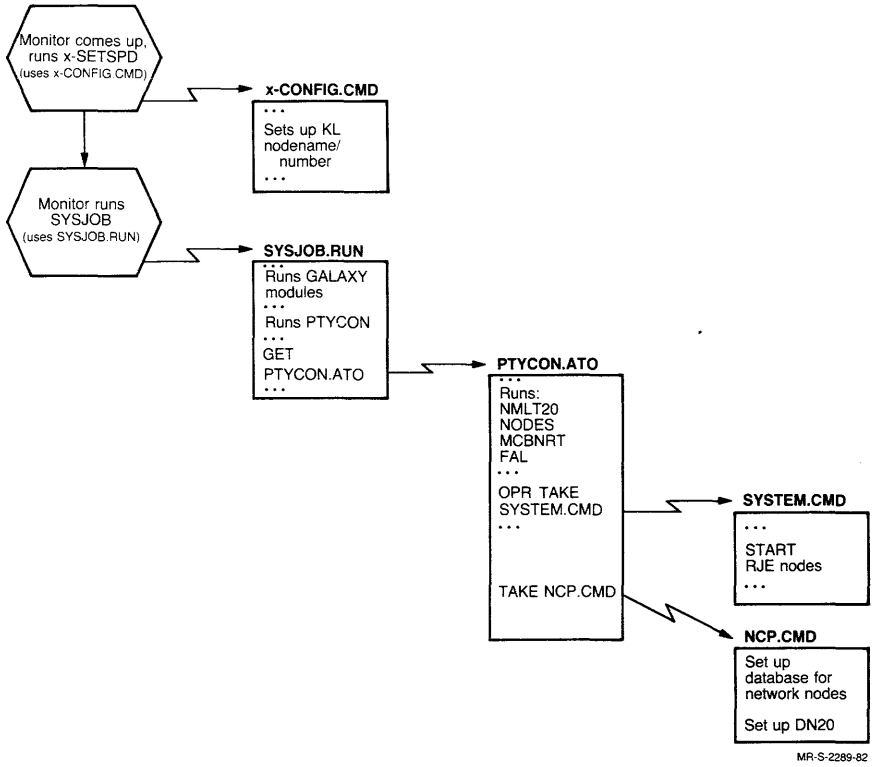


Figure 4-1 System Startup

STEP 49: EDIT AND RENAME NETWRK.ATO

You must now set up PTYCON.ATO to start network programs on TOPS-20 automatically when the system is restarted. You have received a NETWRK.ATO file on your DECnet-20 tape. It will be in PS:<SUBSYS> (or <NEW-SUBSYS>, if you are upgrading) if you have followed these procedures. NETWRK.ATO contains the commands to start the network support programs NMLT20, NODES, MCBNRT, and FAL. It also contains an OPR command to take the file SYSTEM.CMD, and the NCP command to SET SERVICE ENABLED on the DTE connected to your DN20. NETWRK.ATO contains:

```
^X
DEFINE ^$NML
CONN NML
LOGIN OPERATOR FOO OPERATOR
ENABLE
SYS:NMLT20.EXE
^X
DEFINE ^$NODES
CONN NODES
LOGIN OPERATOR FOO OPERATOR
ENABLE
SYS:NODES.EXE
^X
DEFINE ^$MCBNRT
CONN MCBNRT
LOGIN OPERATOR FOO OPERATOR
ENABLE
SYS:MCBNRT.EXE
^X
DEFINE ^$FAL
CONN FAL
LOGIN OPERATOR FOO OPERATOR
ENABLE
SYS:FAL.EXE
^X
CONN OPR
LOGIN OPERATOR FOO OPERATOR
ENABLE
TAKE SYSTEM:SYSTEM.CMD
NCP SET CIRCUIT DTE-0-1 SERVICE ENABLED
^X
```

If your DN20 is not on DTE number 1, you must edit NETWRK.ATO. Change the command

```
NCP SET CIRCUIT DTE-0-1 SERVICE ENABLED
```

to reference DTE-0-2 or DTE-0-3 as appropriate.

If you have previously made changes to your PTYCON.ATO file, incorporate those changes into NETWRK.ATO.

If you want to collect CHK11 output automatically, and have it logged, add the following lines to NETWRK.ATO after the SET SERVICE ENABLED command. This will place CHK11 output in the PTYCON log file.

```
^X
DEFINE ^$CHK
CONN CHK
LOGIN OPERATOR FOO OPERATOR
TYPE DL1:
^X
```

Once you have all necessary commands in your NETWRK.ATO file, rename it as PTYCON.ATO and put it on PS:<SYSTEM>, or <NEW-SYSTEM> if you are upgrading.

Type:

```
$RENAME PS:<SUBSYS>NETWRK.ATO PS:<SYSTEM>PTYCON.ATO (RET)
```

(For information on PTYCON, see the TOPS-20 Operator's Command Language Reference Manual.)

NOTE
The SET CIRCUIT command value (DTE-0-1, DTE-0-2, or DTE-0-3) must be the same as the DTE port number specified in Step 18. This is also the value you can see with the NETGEN LIST KNOWN CIRCUITS CHARACTERISTICS command.

STEP 50: EDIT CONFIG.CMD

Your current CONFIG.CMD file must define the host node name and address for your KL. Insert the following line in 5-1-CONFIG.CMD:

```
NODE hostnodename  hostnodeaddress
```

For example:

```
NODE KL2102 120
```

STEP 51: FOR RJE STATIONS, EDIT SYSJOB.RUN

If your system has no RJE stations, skip this step.

For each RJE station your system supports, you must have a copy of LPTSPL running. If any RJE station has a card reader, you must also have a copy of CDRIVE running.

For each RJE station, add to SYSJOB.RUN:

```
RUN SYS:LPTSPL
```

To support any card readers, you must have one copy of CDRIVE. Examine SYSJOB.RUN to see if it contains:

```
RUN SYS:CDRIVE
```

If not, add it. Also resolve any conflicts between entries in SYSJOB.RUN and PTYCON.ATO. For example, remove any reference to NETCON.EXE, that you may have used with an earlier version of DECnet-20.

STEP 52: FOR RJE STATIONS, EDIT SYSTEM.CMD

If your system has no RJE stations, skip this step.

For each RJE station your system supports, you must place a START NODE command in SYSTEM.CMD. The format of the OPR START NODE command is:

```
START NODE nodename::
```

You must append the double colon. For example if the node name of your RJE station is RJE, enter:

```
START NODE RJE::
```

These START NODE commands can be anywhere in SYSTEM.CMD.

STEP 53: USE THE LATEST OPR

DECnet-20 software interfaces with GALAXY software that runs with TOPS-20. Your new version of DECnet-20 software uses an OPR.EXE that has been built with the NCPTAB.REL for DECnet Phase III. The TOPS-20 V5.1 Installation Tape includes an OPR.EXE built with GALAXY V4.2 and the DECnet Phase III NCP commands. By using this new OPR.EXE, you will have the correct NCP commands for DECnet Phase III.

If you have applied patches to the field-image sources for OPR, you may not want to use the OPR.EXE supplied on the tape. If this is the case, you should relink your OPR files with the NCPTAB.REL supplied in PS:<SUBSYS> on the DECnet-20 Distribution Tape. Use the same procedures you used before when you rebuilt OPR.EXE, but use the new NCPTAB.REL. Be sure to save a backup copy of your old NCPTAB.REL in case you need to rebuild an OPR compatible with DECnet-20 Phase II.

To rebuild NCPTAB.REL from the NCPTAB.MAC sources from the <DECNET-SOURCES> saveset on the DECnet-20 Distribution Tape, use the file NCPTAB.CTL. Then rebuild OPR using OPERAT.CTL and your new NCPTAB.REL. You can use OPERATOR.CTL only if all the correct universal files are on your system. If this is not the case, use the GALAXY.CTL file to rebuild all your GALAXY components.

The standard procedure for shutting down and restarting the GALAXY system is described in the TOPS-20 Software Installation Guide. Check the GALAXY Beware file, if any, for additional pointers on this procedure.

STEP 54: USE THE LATEST NFT and FAL

The versions of NFT and FAL on the DECnet-20 V3.0 tape have been built with GALAXY 4.2. To rebuild these programs with a different version of GALAXY, examine NFTFAL.CTL, resolve any logical name definitions, and submit it as follows:

```
SUBMIT NFTFAL/TIME:0:30:00
```

When the batch job completes successfully, move the new NFT.EXE and FAL.EXE to SYS:.

STEP 55: FOR RJE STATIONS, USE THE LATEST NURD.REL

NURD.REL is required to build both LPTSPL.EXE and CDRIVE.EXE. Before you can use any DN200, you must rebuild both LPTSPL and CDRIVE using the NURD.REL or NURD.MAC file supplied on the RJE-20 tape. The LPTSPL.EXE and CDRIVE.EXE shipped on the TOPS-20 V5.1 tape were NOT built with the latest version of NURD.REL. If you have followed these procedures, you have restored the source and control files needed to build NURD.REL from the fourth saveset of the RJE-20 to PS:<DN200-SOURCES>.

Included with the GALAXY software on the TOPS-20 Monitor tape are the control files LPTSPL.CTL and CDRIVE.CTL. Use them to rebuild LPTSPL and CDRIVE. Read the instructions at the beginning of each control file to be sure you have all the required universal and source files in the correct directories. Then use a SUBMIT command with a reasonable time limit to submit the control files to the batch system.

If you wish, you can use the GALAXY.CTL file to rebuild all GALAXY components instead of rebuilding only LPTSPL and CDRIVE. You should note, however, that rebuilding all GALAXY components takes about two hours and requires considerable disk storage. For more information on rebuilding GALAXY, see the TOPS-20 Software Installation Guide.

CHAPTER 5
NETWORK NODE STARTUP

STEP 56: SHUTDOWN AND REBOOT

You now reboot the TOPS-20 system by performing a shutdown and bringing the system back up again. This will also bring up the network.

To reboot the system in an orderly fashion, do the following:

- Inform system users that timesharing will end in a specified time.
- Shutdown the KL10.
- Reboot from disk.
- Log in as usual to a directory with WHEEL or OPERATOR privileges.
- ENABLE capabilities.
- CONNECT to <DxxxxA> directory.

NOTE
If, in your edit to CONFIG.CMD, you have changed the nodename/nodenumber of the KL to be something other than TOPS-20 and 64 (defaults for earlier versions of DECnet-20), you may have batch and output queues with entries to be processed on the old "node". To get these processed with your new node, you must modify jobs, as appropriate, with PROCESSING-NODE or DESTINATION-NODE switches using the new node name.

5.1 NODE CHECKOUT

Once the TOPS-20 5.1 monitor is up and running, and you have been able to LOGIN as usual, verify that the network has been started by using the I DEC command. If your new monitor does not come up, you can try to reboot a second time. If it still fails to come up, revert back to the previous monitor (use the procedures described in the TOPS-20 Software Installation Guide). Then check your TOPS-20 Installation Procedure to be sure your new monitor has been installed correctly.

STEP 57: GIVE THE I DEC COMMAND

```
$I DEC (RET)
Local DECnet node: KL2102
Accessible DECNET nodes are: ABACUS ADAM CROW D2102A D2137A
KL2137
```

5.2 NODE TROUBLESHOOTING

If the TOPS-20 5.1 monitor is up and running, but your network has failed to come up, you can try to start the network manually. To do this, use OPR to DEFINE your network nodes and load the DN20.

STEP 58: DEFINE THE NODES

Run the OPR program and then issue the TAKE NCP command. This causes the commands in the NCP.CMD command file to be executed. These commands define the network topology (the logically adjacent nodes in the network).

```
$OPR (RET)
```

Use the TAKE command to execute the commands in the NCP.CMD file.

```
OPR>TAKE PS:<SYSTEM>:NCP (RET)
OPR>
```

NCP.CMD will be on PS:<NEW-SYSTEM> if you are upgrading from a previous release. The first command in NCP.CMD is to enter NCP.

STEP 59: LOAD THE DN20

Load the DN20 front-end node using the Network Control Program (NCP) from OPR. Type:

```
NCP LOAD NODE DxxxxA (RET)
```

where DxxxxA is the name of your DN20 front end. This must be the name of your DN20 node. For example:

```
OPR>NCP LOAD NODE D2102A (RET)
```

Alternatively, instead of using NCP.CMD, you can transfer control from OPR to NCP by typing:

```
OPR>ENTER NCP (RET)
NCP>LOAD NODE DxxxxA (RET)
NCP>
```

After you issue this command, be sure that the load is successful before proceeding to the next step. If the load is successful, the following message is displayed on the system console:

```
time stamp  -- Network Node xxx is Online --
```

If the load is not successful, determine the cause of the failure and correct it. CHK11 is a module that resides in the DN20. It starts when the DN20 is loaded and outputs messages concerning available memory, the number and status of devices, and any detected errors. If you have difficulty bringing up the front end, use the following commands to observe CHK11 output:

After the command:

```
NCP>LOAD NODE DxxxxA (RET)
```

Enter:

```
NCP>PUSH (RET)

 TOPS-20 command processor (6)735
@ENA(RET)
$TYPE DL1:(RET)
```

NOTE
Use DL2: if your DN20 is on DTE no. 2; use DL3: if your DN20 is on DTE no. 3. Using DL1, 2, or 3 requires that a DL11 line connect the appropriate DN20 to the console front end. To see if DL1, 2, or 3 has been assigned in your system, use I L DL1: (RET) System-wide: dl1: => TTY202:

At this point, CHK11 output is displayed on your terminal.

For example:

```
CHK11 Hardware Test
Version 3 (5) of 5-Jun-82 by rjp
Testing begins...

THE PROCESSOR SEEMS TO BE A KD11-E (11/34)
  CHK11 EXPECTED an 11/34

KT11 memory management test

PHYSICAL MEMORY HAS ABSOLUTE LIMITS OF
  0 - 757777
  FOR A TOTAL OF 124KW (DECIMAL)

MAPPED PHYSICAL MEMORY TEST...
     ... COMPLETE

KW11-L checked

device scan report assumes
     DN20
     DN21
     DN25 fixed assignments (no floating)
2 Fixed DMC11s from 160740, vector at 670

  CHK11 complete
DECnet-20  V3.0
```

NOTE
CHK11 reports DMRs as DMCs.

DLn: is a logical name defined by the TOPS-20 monitor; the value of n represents the DTE20 to which your DN20 is connected. Each DN20 has a DL11-W that connects to a DL11-E on the console front end. This link is used for terminal input and output from the program executing in the DN20.

For example, as you can see if you execute the TOPS-20 monitor command I L A (information about Logical-names of All), DL1: is defined as TTYxx:. The value of xx depends on the size of the monitor.

When CHK11 executes, it receives input from and sends output to its controlling terminal; it also creates an inferior process that receives input from and sends output to TTYxx:. Therefore, when the program running in the DN20 outputs characters to be seen at the terminal, they cross the DL11-E link (known to the monitor as TTYxx:) to the inferior process, which then sends the characters to the job's controlling terminal. Analogous traffic occurs in the reverse direction when characters entered from the job's controlling terminal are sent to the program running in the DN20. Figure 5-1 illustrates the path of data from the controlling terminal to the DN20.

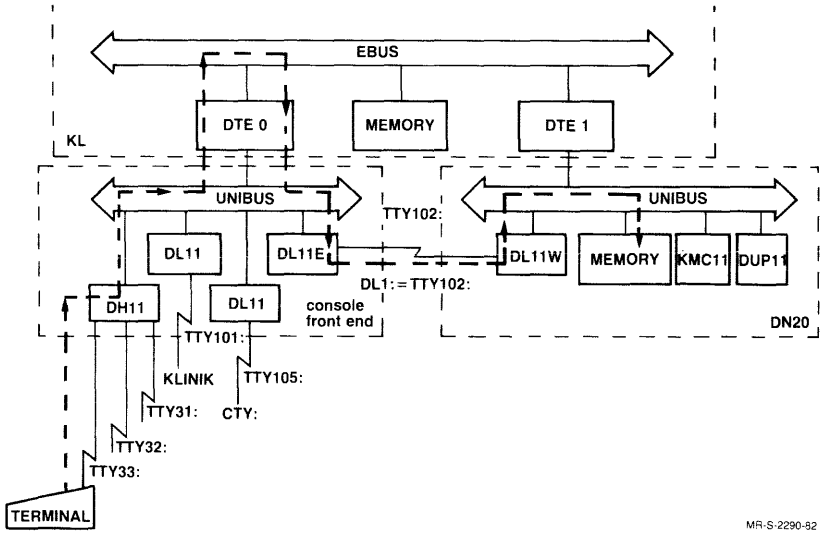


Figure 5-1 Path from Terminal to DN20

Once CHK11 completes successfully, and the DN20 load is complete, you can exit from OPR and proceed to test your network setup.

```
NCP>EXIT (RET)
$
```

If the DN20 node still fails to come up, you must revert back to the previous release. After doing so, examine the installation procedure to try to determine the cause of the failure. DECnet-20 Version 2.1 can run only with TOPS-20 Version 5.0; DECnet-20 Version 3.0 can run only with TOPS-20 Version 5.1. Be sure the system image for your DN20 is not too large to load (check the DN20SYS.LOG file for this value - it must be less than 124K).

STEP 60: TEST THE HOST AND THE DN20

Use the NIPLCL.CTL batch control file created by NIPGEN to perform the following operations:

- SHOW EXECUTOR NODE CHARACTERISTICS of your KL10 host.
- SHOW EXECUTOR NODE CHARACTERISTICS of your DN20.
- Execute LOOP EXECUTOR COUNT and LOOP NODE COUNT commands.

Submit the NIPLCL.CTL file to the batch system. Type:

```
$SUBMIT NIPLCL.CTL (RET)
$
```

If you submit this file from the system console you receive notification when the job is done. The normal time limit for this job is 05:00 minutes. Once the job is complete, the log file prints automatically.

If you have built software for RJE-20 stations, you must wait for this batch job to complete successfully before proceeding to Section 5.3, RJE STARTUP.

STEP 61: CHECK THE LOG FILE

Check the batch job log file to be sure no errors occurred. If all is well, proceed; otherwise, find the cause of the errors, correct them, and resubmit the batch job.

```
$TYPE NIPLCL.LOG (RET)
```

5.3 RJE STARTUP

To start up any remote stations in your network, you must communicate with the operators at the stations.

STEP 62: LOAD THE DN200

Do the following:

1. At the host, run OPR and give the command: TAKE NCPRJE
2. Ask the remote station operators to power down the appropriate RJE stations, if the stations are on.
3. Ask them to power the stations up again. This initiates a station load. Any printer at the station should also be on and ONLINE.
4. Wait until loading completes. Loading is done when you see the following message on your terminal. The same message also appears on the operator's console of each RJE station being loaded. Such a message appears for each station being loaded.

   timestamp -- Network Node xxx is Online --

NOTE
While loading of RJE stations is in progress, the DN20 itself will not respond to commands as it is busy.

The remote station operator can also press <CNTRL> <BOOT> on the DN200 instead of performing steps 2 and 3, above. The power must be on for pressing <CNTRL><BOOT> to work. The operator at the remote station can also use the SHOW STATUS command to check status of the printer and card reader, if any. Printer and card reader should be "Idle" when not actively processing. Remember that you must have edited SYSJOB.RUN and SYSTEM.CMD to support your remote stations.

Completing the above load procedure gets the DN200s loaded but does not ensure that they are all operating properly. You should check out typical RJE functions at this time.

For example, you can use a TOPS-20 PRINT command to print a file at the RJE station.

STEP 63: PRINT A FILE AT THE DN200

For example, if the nodename of your RJE station is DN200, use the following command. Have a text file called text.txt ready to print.

```
$PRINT text.txt/DESTINATION-NODE:DN200:: (RET)
[Printer job NCP queued, request #94, limit 3]
$
```

See the TOPS-20 DN200 Remote Station Guide for more information on facilities at the RJE station. If the file prints correctly at the DN200, create a batch job on cards to read in at the DN200. Use the batch job and check that its log file returns correctly to the DN200.

STEP 64: TEST PHASE III NODES

Use the NIPNM.CTL batch control file created by NIPGEN to:

- SHOW EXECUTOR NODE CHARACTERISTICS of your KL10 host and your DN20 front end.
- Execute LOOP NODE commands between the KL host processor and adjacent Phase III nodes in the network.
- Execute LOOP NODE commands between the DN20 front end and adjacent Phase III nodes in the network.

Submit the NIPNM.CTL file to the batch system. Note that the time limit you use for this batch job depends on how many nodes you are testing. Allow about 1 minute per node.

```
$SUBMIT NIPNM.CTL (RET)
[Batch job NIPNM queued, request #97, limit 0:05:00]
$
```

➡ STEP 65: CHECK THE LOG FILE

If the batch job completes successfully, check the log file to be sure no errors occurred. If all is well, proceed; otherwise, find the cause of the errors, correct them, and resubmit the batch job.

```
$TYPE NIPNM.LOG (RET)
```

5.4 FILE TRANSFER CHECKOUT

➡ STEP 66: TEST NFT/FAL NODES

Use the NIPNFT.CTL batch control file created by NIPGEN to test file transfer between the KL host processor and adjacent nodes in the network that support NFT/FAL (Network File Transfer/File Access Listener). NIPNFT.CTL copies an ASCII file from one node to another and compares the output file with the input file. It does this task between the two adjacent TOPS-20 hosts.

Submit the NIPNFT.CTL file to the batch system by typing the following from the EXEC:

```
$SUBMIT NIPNFT.CTL (RET)
[Batch job NIPNFT queued, request #98, limit 0:05:00]
$
```

➡ STEP 67: CHECK THE LOG FILES

Type or print the log file generated by the batch job, examine the file for errors, and verify that file transfers have completed successfully. The output of file transfer checkout will be in:

```
NIPNFT.LOG
```

➡ STEP 68: EDIT NCP.CMD TO DEFINE THE NODE DATABASE

You must include in NCP.CMD, SET NODE commands that give the nodenumber-node name correspondence for all nodes in your network. Up to this point, you have provided this information for only the nodes against which you have tested. To build a complete NCP.CMD containing nodename-number correspondence for all nodes, you can either

- edit the existing NCP.CMD or
- rerun NIPGEN

To edit NCP.CMD, add a line of the following form for each node not already in NCP.CMD:

```
SET NODE nodenumber NAME nodename
```

For example:

```
SET NODE 25 NAME JAKE
```

If you prefer, run NIPGEN, enter the values for the DN20, do not enter values for any DN200s, and enter only the following for each remote node in your network:

```
Remote Node Address:
Name:
Phase III ?:  n
File xfer (FAL) ?:  n
```

Respond to the Phase III and File xfer prompts with n (NO). When you have entered the data for all the nodes in your network, exit normally from NIPGEN. NIPGEN will then create an NCP.CMD file containing entries for all nodes in your network. Discard the .CTL files, which contain no entries needed for the node data base.

STEP 69: ACTIVATE THE NODE DATABASE

To activate the node database while your system is running under normal timesharing, run OPR and take NCP.CMD.

```
$OPR (RET)
OPR>TAKE NCP (RET)
```

This activates the node database normally. When the system is restarted, so long as your new NCP.CMD is in PS:<SYSTEM> (or PS:<NEW-SYSTEM), it will be invoked.

STEP 70: PAUSE

When you are satisfied with TOPS-20 Version 5.1 and DECnet-20 Version 3.0, use the standard TOPS-20 method of making the new release the primary software. (See the TOPS-20 Software Installation Guide.)

This completes the DECnet-20 installation and verification procedures.

If your network is running successfully, your system startup files all worked correctly, and your log files contain no errors, you are done. If some parts of your network are still not operational, you must resolve the errors and repeat the appropriate installation procedures to correct the software.

APPENDIX A

ERROR MESSAGES

A.1 NETGEN MESSAGES

This appendix contains error messages that NETGEN displays. These messages can occur when you enter information to NETGEN, or when you try to SAVE the NETGEN files and EXIT from NETGEN.

Address Must Be In Range 1 to 255

The specified node address must be in the range 1 to 255.

%BUFFER SIZE is being left as 290 (default is now 576)

Warning message. You have used an old .CNF file created with the default of 290 for buffer size. Because the current default for buffer size is 576, NETGEN warns you about the difference but does not change the value.

Cannot open log file

?Cannot read file after open ok

?Card Reader Not In Use

You did not include a card reader for this configuration, and one is required.

[Configuration Restored From: filename]

[Configuration Saved On: filename]

?DMC11 is already included, exclude it first

You cannot include a DMC11 more than once.

?DMC11 not in configuration

You have not included a DMC11 in your configuration, so you cannot exclude it.

?DMR11 is already included, exclude it first

You cannot include a DMR11 more than once.

?DMR11 not in configuration

You have not included a DMR11 in your configuration, so you cannot exclude it

?error opening restore file

?Error opening save file

?Error Reading Restore File - Data Area Corrupted

?Error writing save file

Have you issued a SAVE command for this configuration?

This is a Warning Message. The SAVE command saves all your configuration parameters. If you exit from NETGEN without saving the configuration, and discover errors that require you to rerun NETGEN, you will have to configure the node from the initial settings again.

INFORMATION COMMAND - should never have gotten here.

?Illegal to Exclude DMC11 Other Than The Last One Included

To determine the correct number, use the INFORMATION or LIST command.

?Illegal to Exclude DMR11 Other Than The Last One Included

To determine the correct number, use the INFORMATION or LIST command.

?Illegal to Include DMC11s except in Numeric Order

Use the INFORMATION or LIST command to find the last number you included.

?Illegal to Include DMR11s except in Numeric Order

Use the INFORMATION or LIST command to find the last number you included.

?Illegal character in name

A node name can contain alphabetic characters and numeric characters only. Special characters are not allowed.

?Illegal to Exclude KDP Controller other than last one Included

Use the INFORMATION or LIST command to find the number of the last KDP included.

?Illegal to Include KDP Controllers except in numeric order

Use the INFORMATION or LIST command to find the number of the last KDP included.

?Incorrect DTE20 number

The number you specified is outside the valid range (1 to 3).

?Invalid KDP Controller Number

The number you gave for the KDP Controller is outside the valid range (0 to 2).

?Invalid KDP number

The number you gave for the KDP Controller is outside the valid range (0 to 2).

?Invalid line printer number

A DN200 can support one printer only.

?Invalid number of DUP11 lines, must be in range 1-4

The number you gave for the number of DUP11 lines is outside the valid range. Use a value from 1 to 4.

?Invalid size of POOL

?KDP Controller is already included, exclude it first

You cannot include a KDP controller more than twice.

?KDP not in configuration

You have not included a KDP in your configuration, so you cannot exclude it.

?KDP11 Number Must Be In Range 0 To 2

?Length Of Save File Differs From Expected Length - Cannot Restore This File

The file specified in a RESTORE command is the wrong length. Check your file specification.

?Line printer not in use

You have not included a Printer in your configuration, so you cannot exclude it.

?Logging error

%MAXIMUM ADDRESS is being left as 142 (default is now 255)

Warning message. You have used an old .CNF file created with the default of 142 for maximum address. Because the current default for maximum address is 255, NETGEN warns you about the difference but does not change the value.

%More than 8 communications lines on a DN20 is unsupported.

You have included too many synchronous lines on your DN20.

Name Must Contain At Least One Alphabetic Character

A node name must contain at least one alphabetic character.

Name too long:

Node names must be six characters or less.

?No such DUP11 in this KDP11

?Number of DMxll (DMC/DMR) Devices Exceeded - Cannot Add this DMCll

The maximum number of combined DMCll and DMRll devices you can include is 6.

?Number of DMxll (DMC/DMR) Devices Exceeded - Cannot Add this DMRll

The maximum number of combined DMCll and DMRll devices you can include is 6.

The maximum number of combined DMCll, DMRll, and DMP devices you can include is 6.

%Physical address already in use

?Physical Address Must Be In Range 1 To 255

Specify either DN20 or DN200 -- not xxxx

Only DN20 and DN200 are valid node types.

%The MAXIMUM ADDRESS and BUFFER SIZE parameters are inconsistent
% BUFFER SIZE is being increased to xxx

Warning message. The buffer size is (2* maximum address) +5, but not less than 290. You have used an old .CNF file created with old defaults; NETGEN warns you that it is changing the parameter according to the new rules.

%The MAXIMUM VISITS and MAXIMUM HOPS parameters are inconsistent
% MAXIMUM VISITS is being set from xxx to yyy

Warning message. The maximum visits must be greater than or equal to the maximum hops. You have used an old .CNF file created with old defaults; NETGEN warns you that it is changing the parameter according to the new rules.

?The Node Address has not been set

Warning Message. Runnable software is created if you see this message, but you should set this parameter for each node.

?The node address must be less than or equal to the number of nodes in the net.

Fatal Error Message. The output files are not written. Check your node address. If the address is larger than the number of nodes in the network, your node will be unable to talk to its host, and all loads will fail.

The node address requires a MAXIMUM ADDRESS of at least xxxx

The node address you use and the maximum address you give must be compatible. Either correct one or the other.

?The Node Name has not been set

Warning Message. Runnable software is created if you see this message, but you should set this parameter for each node.

%The Node Number and MAXIMUM ADDRESS parameters are inconsistent
% MAXIMUM ADDRESS is being increased to yyy

Warning message. The node number cannot be greater than the MAXIMUM ADDRESS you have set. You have used an old .CNF file created with an old default; NETGEN warns you that it is changing this parameter according to the new rules.

The number of nodes in the net requires a BUFFER SIZE of at least xxxx

The number of nodes in the network and the BUFFER SIZE you use must be compatible. Change either one or the other.

This system is not supported by DEC

You have created software with parameters outside the allowed ranges. See the documentation describing configuration for the valid ranges.

?Too many card readers

You can have only one card reader on a DN200.

?Too Many DMx11 Devices - Can't Add The DN200's Default DMC

A DN200 can have only one DMC/DMR.

?Too many line printers

You can have only one printer on a DN200.

?Value is out of range:

The value you have entered is too large. See the descriptions of individual NETGEN commands to review the allowed ranges.

%Version Mis-Match - File Might Not Be Compatible

Warning Message. You have specified a file in a RESTORE command that may be the correct length, but the data in the file may not be compatible with the current software. Check your file specification, or rerun NETGEN.

?You cannot include LP11 or CR11 devices on DN20s.

A DN20 cannot be used to support unit record equipment.

?You have not configured any communications lines.

This is a Fatal Error Message. If you receive this message, the output files are not written. You have not included any synchronous lines (DMC,DMR,KDP) for your DN20 node. The DN20 configuration must include at least one synchronous line for communication with the network.

%You have not included an I/O device for your DN200.

Warning Message. Your DN200 will be loadable and will run without an I/O device (a printer or card reader), but it cannot fulfill its purpose without one.

?You have not specified any communications lines.

Fatal Error Message. You must include at least one communications line for any node you are configuring.

?You have not configured a communications line (DMC/DMR) for your DN200.

Fatal Error Message. The output files are not written. A DN200 must have either a DMC or a DMR to communicate with the DN20. You must include one or the other when creating your configuration with NETGEN.

?You must have only one communications line on the DN200, and that a DMC or DMR.

Fatal Error Message. The output files are not written. A DN200 can have only one line, included as a DMC or a DMR. If you have included more than one, exclude all but one.

?Your DN20 has no DTE.

Fatal Error Message. The output files are not written. A DTE link between your KL10 host and your DN20 is required.

A.2 NIPGEN MESSAGES

This appendix contains error messages from NIPGEN.

% Address already in use for node

The address you have specified is already in use. Choose another. Node addresses must be unique in the network.

% Can't open file

The filename you have specified is incorrect. Either you have given the wrong filename, or the file you need is not where you expect it to be.

% Node address out of range

Node addresses must be within the allowed range, 1 to 255. Node addresses greater than 142 are not supported by DECnet-20.

% Node names must contain from one to six characters

A node name cannot be all numeric characters, and it cannot be more than six characters long.

% Node names must contain at least one alpha character

A node name cannot be all numeric characters.

% Node names may contain only alphanumeric characters

A node name cannot contain special characters.

% Node name already assigned to node

The node name you have specified is already in use. Node names must be unique in the network, so choose another name.

% Please answer YES or NO

You must answer YES ot NO to the prompt.

Superseding with this new specification

The last node specification you entered is superseding the previous one.

A.3 TKB36 AND VNP36 MESSAGES

This appendix contains a list of messages that may be produced by TKB36 and/or VNP36. A warning message starts with %, a fatal error message starts with ?. The messages are listed in alphabetical order.

When a warning message appears, processing continues; however, subsequent processing may or may not be successful. If processing terminates some time after a warning message is issued, you should examine earlier warning messages.

When a fatal error message appears, processing is always terminated.

Replaceable arguments in both warning and fatal error messages are shown as abbreviations, shown below.

Abbreviation	Meaning
addr	octal address
cmdline	command line
cntname	controller name
ddmname	device driver module name
dlcname	data link controller name
filename	file name
ft	file type
llcname	logical link controller name
modname	module name
objfile	object file name
psect	p-section name
rtnname	routine name (usually follows the message text and two dashes)
symname	symbol name

ADDRESS OUT OF RANGE - STO11

Attempting to OPEN an already OPEN channel - OPEN

% Badly formatted OBJ file filename A -- routine-name A

CALL TO GETSTG BEFORE INISTG

? Cannot find nnn D bytes in system pool in filename A -- routine-name A

nnn is the number of decimal bytes requested.

Channel is not OPEN - CLOSE

Channel not OPEN - INPUT

Channel not OPEN - OUTPUT

Channel number out of range - INPUT

Channel number out of range - OUTPUT

% Checksum error in OBJ file filename A; should be nnn O, was mmm O -- routine-name A

nnn is the octal value of the computed checksum.
mmm is the octal value of the checksum that was read.

CLOSE

? Complex relocation exceeded stack limit of nnn D, file filename A -- routine-name A

nnn is the stack limit in decimal.

? Database Verification Error, Value l=

? DCP filename A is unknown -- routine-name A

? DDM filename A is unknown -- routine-name A

% Divide by zero when resolving relocation in P-section filename A -- routine-name A

EOF IGNORED IN SCAN

? Error in text file filename A -- routine-name A

Eval Called with Operand type

? Failure freeing nnn bytes at addr in system pool in filename, code errcode -- routine-name

nnn is the number of octal bytes in the block in question.
errcode the decimal error code.

Fatal Database Format Error -- BLOCKLOAD

? File filename A size of nnn D bytes is larger than max of mmm D - routine-name A

nnn is the file's size in decimal.
mmm is the maximum permissible file size in decimal.

% Global symbol routine-name A is undefined

% Global symbol filename A is not defined in nnn A -- routine-name A

? Illegal error

This message indicates that the error number is out of the range of the defined error numbers. The "Terminating....." message does not follow this message, as it does for all other error messages preceded by a question mark.

? Indirect files nested too deep: "filename A" -- routine-name A

? Input error or unexpected EOF -- routine-name A

INPUT

? Invalid address filename O in file nnn A -- routine-name A

Invalid Channel Number - OPEN

Invalid Channel Number - CLOSE

? Invalid contype - xxx found -- routine-name

contype	the type of construct that was found to be invalid.
xxx	is the decimal value of the invalid construct.

? Invalid error

ERROR MSG HAS NO TEXT

? Invalid file name: "filename A" -- routine-name A

? Invalid filename A nnn A mmm A mmm O -- routine-name A

? I/O DATA ERROR on filename A, status = nnn O -- routine-name A

nnn	is the octal status of the I/O data error.

? LLC filename A is unknown -- routine-name A

? Loading library file filename A overflowed network pool by nnn D bytes -- $lA.b ? LOOKUP/ENTER UUO failed for filename A, code = nnn O -- routine-name A

May not OPEN channel 0 - OPEN

% Module filename A multiply defines P-section nnn A; flags = mmm O, were nnn O -- routine-name A

mmm	is the octal value of the new flags.
nnn	is the octal value of the old flags.

NOT ENOUGH STORAGE FOR INITIALIZATION - INISTG

? No input files -- routine-name A

% Object file feature is unsupported -- routine-name A

% Only one module allowed in symbol table file filename A -- routine-name A

? OPEN UUO failed for filename A -- routine-name A

% Partition length of mmm less than task length of nnn -- rtnname

mmm	is the partition length in octal.
nnn	is the task length in octal.

? Program logical address space (PLAS) is not supported - routine-name A

% Relocation value xxx truncated to 8 bits in P-section psect -- rtnname

xxx	is the octal value that was truncated.

? Second nnn A file in command string: "filename A" -- routine-name A

? Storage exhausted -- routine-name A

? Switches must be associated with a file -- routine-name A

? Symbol symname has conflicting values in symtabl and symtab2 -- rtnname

symtabl	the first symbol table file.
symtab2	the second symbol table file.

? Syntax error in command line: "filename A" -- routine-name A

?Terminating - No Recovery Available for Previous Error

? The Communications Executive has already been loaded into kernfile -- routine-name

kernfile	the name of the kernel file

? The top of the COMM EXEC is too high: ceaddr .GT. maxaddr in fn -- routine-name

ceaddr	is the address of the top of the communications executive.
maxaddr	is the maximum permitted address of the RSX11S executive.

% Unspecified output file: "filename A", ignored - routine-name A

You May Not Close Channel 0 - CLOSE

? 22-bit memory management not supported in filename A -- routine-name A

APPENDIX B

GLOSSARY

computer network	An interconnection of computer systems, I/O devices, and communications facilities.
configuration	The process of customizing the DECnet software to use with the DECSYSTEM-2040S/2060. Using the configuration tools, the DECnet user establishes the network parameters specific to the DECnet communications front end (and any RJE station) being configured.
configuration tools	The programs NETGEN, NIPGEN, TKB36, VNP36, and DNMAC. These programs are needed for on-site configuration of DECnet-20 on a DECSYSTEM-2040S/2060.
data link	A physical connection between two nodes.
data link cost	An arbitrary positive integer assigned to a physical path. Because the routing algorithm selects the least-cost path to a destination, an operator can dynamically affect the path to be taken by changing line costs.
DMC11	Single-line microprocessor-based interface to the network. The DMC11 is a synchronous direct-memory-access device.
DMR11	Single-line multiprocessor-based interface to the network. The DMR11 is a synchronous direct-memory-access device.
DN20	A DECnet-20 communications front-end based on a PDP-11/34A. As used in this manual, DN20 is a generic term.
DN200	A remote station based on a PDP-11/34A connected by a synchronous line to the DN20. The DN200 provides an operator's console, printer, and card reader. The software that runs on the DN200 is called RJE-20.
DNMAC	The cross-assembler for PDP-11 macro source files.

DTE20	The hardware interface between the KL10-E main processor in a DECSYSTEM-2040S/2060 and the PDP-11 processor in the DN20 communications front end.
DUMPER	A TOPS-20 utility program which is used to copy files from tape to disk.
DUP11	Single-line microprocessor-based interface to the network. The DUP11 is a synchronous device.
FAL	The File Access Listener, a program which resides on a local DECnet host and acts as the target for requests made by the NFT program residing on remote DECnet hosts.
hop	The logical distance between two adjacent nodes in a network.
host node	The network node at which a host computer provides services such as computation, data base access, special programs, or programming languages.
inactivity timer	The length of time, in seconds, that DECnet waits before exercising a logical link when there is no received traffic on the link. When the timer runs out, DECnet software sends a data request message over the logical link. If the message has not been acknowledged after a certain amount of time (see Retransmission Threshold), the software decides that the physical network supporting the logical link has failed.
installation	DECnet installation is the process of setting up the DECnet software, specifying the node data base, and modifying several system files to include DECnet-related jobs.
KDP	The combination of a KMC11 controller (a microprocessor-based system) and from one to four DUP11s. With a KMC, a DUP11 functions as a direct-memory-access device.
local node	A relative term indicating the node to which your terminal is attached. Your task usually executes at your local node.
logical link	A virtual data path between two tasks in a network that permits them to communicate.

logical node	The node to which the system sends a user's output. At login time, the logical node is the same as the physical node. The user may specify a logical node away from the local node by using the SET LOCATION command at TOPS-20 command level.
loopback	A mode of operation in which data transmitted by some task is reflected at some point along the communication path and returned to the originating task.
maximum cost	The greatest total cost that the path to a node may have if the node is to be reachable. When the cost associated with transmitting a message from one node to another exceeds the maximum cost, the transmission is not completed.
MCBNRT	Server for the SETHOST program.
NCP	The Network Control Program that processes DECnet-20 network control commands. NCP is the OPR command set for network control.
NETGEN	The interactive Network Generation Program used to describe the hardware and software during the installation of a DECnet-20 node.
network	An interconnected or interrelated group of nodes. In this manual, network is synonymous with computer network.
network diameter	The reachability distance between the two nodes of the network having the greatest reachability distance; reachability distance is the length of the shortest path between a given pair of nodes.
NFT	The Network File Transfer Program which allows you to access or delete files residing on DECnet hosts that provide network file access capabilities. NFT initiates the service requests that will be carried out by the FAL program.
NIPGEN	The interactive Network Installation Procedure Generator Program used to create the command and control files used to verify and load configured nodes.
NMLT20	A specialized Network Management Task that accepts requests from operator commands and command files. NMLT20 processes network control requests such as loading or dumping the communications front end, loading or dumping synchronous line controllers, and displaying line statistics for any line.

node	A processor in the network. Every processor in the DECnet network is a node, whether it is a remote station, a communications front end, or a host itself. For DECnet-20 Version 3, a node is an implementation of a computer system that supports transport, network services, and session control. Each node has a unique node address.
node address	A number uniquely identifying a node within a DECnet network.
node name	A 1- to 6-character name identifying a node within a network. Node names can be any combination of the characters A through Z and 0 through 9 and must contain at least one alphabetic character.
NODES	The program that maintains information about on- and off-line status of DECnet nodes. This information is seen when the user gives an INFORMATION (About) DECNET command at TOPS-20 command level. NODES interrogates the process in the DN20 that contains on- and off-line status of every DECnet node, and communicates the status of all nodes to the KL10.
node type	The type of node. When creating software for a DECnet-20 node using NETGEN, you specify the node type as either DN20 or DN200.
OPR	The Operator Command Language program that provides the operator with one command language to communicate with several TOPS-20 components. OPR processes commands for syntax and passes syntactically correct commands to the appropriate GALAXY component (QUASAR, ORION, or others).
packet	A group of bits, comprising data and control information, which is transmitted as a composite whole over a physical link. The data, control information, and possibly error control information, are arranged in a specified format.
path	The route that a packet takes from the source node to the destination node.
path cost	The sum of the line costs along a path between two nodes.
physical link	A communications path between two adjacent nodes. This can be a dial-up line, leased line, radio link, satellite link, or a channel-to-channel connector such as a DTE20.

point-to-point link	A type of network link in which two nodes are connected with a communications line and are the only nodes connected by that line.
remote node	A node in a network that is not your local node.
retransmission threshold	The number of times NSP retransmits a message with no intervening received acknowledgement before deciding that the physical network supporting a logical link has failed.
SETHOST	A user program that lets the user access a remote TOPS-20 host across a DECnet.
software ID	The name of the DECnet software; the installer can supply this identification when running NETGEN.
TKB36	TKB36 is the task builder that constructs PDP-11 formatted task images from object files. TKB36 is used when generating the software for a DECnet-20 or RJE-20 node.
transmit password	A 0-8 character password received by the remote node during an NSP initialization sequence.
verification	DECnet verification is the process of ensuring that the appropriate DECnet-20 software modules have been installed. The verification process checks for the existence of each required module and for the correct version of each required module.
VNP36	VNP36 is the Virtual Network Program that creates the communication front end system image. VNP36 is used when generating software for a DECnet-20 or RJE-20 node.
Volatile data base	Dynamic values in memory. When the system is first started, data and control information are read into the volatile data base. You may change many of these values using the NCP command, SET. Volatile data base values are lost when the system shuts down. They may also be cleared or reset. The volatile data base is called the running data base in some implementations.

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