

Software Product Description

PRODUCT NAME: DECnet VAXmate, Version 2.0

SPD 55.05.02

DESCRIPTION

DECnet-VAXmate allows DIGITAL's personal computer/workstations to participate as non-routing (end) nodes in DECnet computer networks. This software is one of the DECnet-DOS family of products for personal computer systems running Microsoft Corporation's MS-DOS Operating System, and specific variants of that product. Refer to SPD 50.15.xx for information on DECnet-DOS, the member of the DECnet-DOS family for software for IBM personal computers and selected IBM compatible computer systems.

Note: For purposes of this Software Product Description, Microsoft Corporation's MS-DOS Operating System and variants of MS-DOS are referred to simply as "DOS".

DECnet-VAXmate is a DECnet Phase IV network product and is warranted for use only with supported Phase IV products supplied by DIGITAL.

DECnet-VAXmate offers task-to-task communications, remote file access, utilities for network file operations, network virtual terminal support, and network resource-sharing capabilities using the DIGITAL Network Architecture (DNA) protocols. Access to full DECnet-VAXmate functions is supported for DOS user programs written in MACRO Assembler and the C language.

DECnet-VAXmate nodes can be connected to a network via an Ethernet or an asynchronous DECnet connection. Integral Ethernet adapters in the VAXmate provide direct connections to a baseband Ethernet Local Area Network. Operation of DECnet-VAXmate in a broadband configuration is not supported.

Asynchronous connections to the network are accomplished over the VAXmate's integral serial communications port. The adjacent system must be a DECnet Phase IV, full-function (routing) node, supporting asynchronous DDCMP (e.g. DECrouter 200, DECnet-VAX.) The Software Product Description of the DECnet product in question must be consulted to determine if asynchronous operation is supported, and to develop a supportable routing node configuration. Connections over asynchronous terminal lines, such as to a DECserver 200, are not supported.

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In a two node network where a single DECnet connection is needed for both the personal computer and the adjacent node, both nodes may be DECnet end nodes.

Given proper network planning, DECnet Phase IV networks can contain a maximum of 1023 nodes per network area, and up to 63 areas per network. Phase III nodes participating in Phase III/IV networks are limited to the Phase III routing capability of 255 nodes. Phase II nodes are not supported. Phase IV end nodes not directly connected to an Ethernet Local Area Network can connect to only one node (for DECnet-VAXmate, that node must be Phase IV). In order to communicate with other nodes in the network, including Phase III nodes, that node must be a Phase IV full-function (routing) node.

The functions available to the DECnet-VAXmate system user depend largely upon the configuration of the rest of the network. Each DECnet product offers its own level of capability and its own set of features to the user. The DOS operating system is limited to a single user, and access to a DECnet-VAXmate node from a remote network terminal is not possible. Additionally, because DOS is a single-tasking operating system, access and management from remote command nodes is limited. A File Access Listener (FAL) server application is provided by DECnet-VAXmate, and similar applications may be built by the user. However, such applications must run to the exclusion of others, unless they run under MS-Windows, which provides limited multi-tasking on a MS-DOS based personal computer. Refer to SPD 55.10.xx (DECnet/PCSA Client VAXmate), SPD 55.09.xx (VAXmate Services for MS-DOS) and SPD 30.50.xx (VAX/VMS Services for MS-DOS) for information on DECnet-VAXmate based network products with additional functions, such as file services.

The DECnet products and functions available to users on mixed networks can be determined by comparison of the SPDs for the component products.

DECnet-VAXmate User Interfaces

DECnet-VAXmate provides two user interfaces: a command line interface and a menu program. The command line interface is similar to the DOS user interface. The user types commands at the DOS prompt to run DECnet-VAXmate utilities. The menu program allows the user to choose a particular task from a number of DECnet options. The command line is then built and executed to accomplish the task selected.

Versions of NFT and FAL are provided as MS-Windows applications. See application descriptions for more details.

Task-to-Task (TTT) Communication

Using DECnet-VAXmate, a DOS user program written in Microsoft's MACRO Assembler, or the C language, can exchange messages with other network user programs. The remote-end user program can be on a Phase III node in the same area, or on any other Phase IV node in the network. The messages sent and received by the two user programs can be in any data format.

A simple set of functions is provided by the transparent task-to-task interface. With this interface, communication and exchange of data with a remote network program is accomplished using a limited set of DOS calls (e.g. OPEN, CLOSE, READ, and WRITE.) Remote node and program identification is supplied in a string resembling a DOS pathname. Any programming language that supports a standard DOS pathname, and which will accept the network file specification string, and uses the supported DOS function calls, may use this feature.

Full (non-transparent) user program to user program capabilities are possible in C or MACRO through a library of special network subroutine calls. The C language network interface library is a compatible subset of that provided with the DECnet-ULTRIX product (SPD 26.83.xx). This gives the network programmer access to the complete set of DECnet functions. The user may

need to adapt the DECnet-VAXmate C language subroutines to the specific C compiler being used. Small, medium and large size memory models are supported, where small refers to single data and code segments (under 64K bytes each), medium refers to a single data segment and multiple code segments, and large refers to multiple data segments and multiple code segments.

NETBIOS Interface Support

DECnet-VAXmate supports the session level NETBIOS interface through interrupts 5Ch and 2Ah. Applications written to the NETBIOS interface as documented in the April 1987 edition of "IBM NETBIOS Application Development Guide", order number S68X-2270-00, can be layered on DECnet-VAXmate without modification. This allows computers running DECnet-VAXmate and NETBIOS applications to communicate with other computers running DECnet and NETBIOS applications. This feature preserves customers' investments in industry standard applications. It does not allow personal computers running DECnet to communicate with other personal computers running network protocols other than DECnet. DECnet-VAXmate NETBIOS applications can also communicate with other DECnet applications, such as DECnet-VAX applications.

The NETBIOS naming service and datagram service is only supported in Ethernet LAN Configurations.

Network Resource Access

File Transfer

Using the Network File Transfer (NFT) utility, the user can transfer sequential ASCII and binary files between the personal computer and another DECnet node. Files can be transferred in both directions between the locally supported DOS file system devices and the file systems of other DECnet nodes. Wild cards can be used in source file specifications for both local and remote nodes, subject to support on the remote system.

ASCII text files transferred to the DECnet-VAXmate system are converted into DOS stream files; such files are converted into the remote system's normal format when transferred from the DECnet-VAXmate node. On transfer of binary files to a DECnet-VAXmate system, file data is preserved, but any record attributes will be lost; record attributes can be restored on such transfers from the personal computer to a record file system through use of utility switch settings.

Additional facilities of the utility allow concatenation (APPEND), deletion (DELETE), remote spooling (PRINT), and display (TYPE) of files, as well as submission (SUBMIT) and/or execution of command files, provided the remote node supports these functions. Directory (DIRECTORY) listings are also supported.

Two versions of NFT are provided: one which can be invoked from the DOS command line and one which is an MS-Windows application running under MS-Windows, Version 1.03 or Version 1.04. The MS-Windows version of NFT can operate concurrently with other MS-Windows tasks.

Job Spawner

The job spawner is a utility that allows a personal computer to act as a server for performing multiple service functions. When the job spawner is enabled (it must be the only utility running), it listens for connect requests from other nodes. When the connection arrives, the spawner starts the program which will service the request. When the service is completed, the spawner waits for the next connection. In this way, the personal computer can sequentially process different requests at different times without user intervention. This feature is especially useful

for the remote system user who wants to access files on an idle personal computer. It also allows a user to execute a batch file on a remote PC.

File Access Listener

The File Access Listener (FAL) server task provides full access to the personal computer node's file resources from remote systems. User ID and password protection can be used to control access to local files. FAL receives remote file access requests from the network and translates them into calls to the DOS file system. FAL then sends or receives the resulting file data back to the accessing program. FAL runs to the exclusion of other tasks or programs, except when running under MS-Windows. FAL can, however, be invoked by the job spawner.

Two versions of FAL are provided: one which can be invoked from the DOS command line and one which is an MS-Windows application running under MS-Windows, Version 1.03 or Version 1.04. The MS-Windows version of FAL can operate concurrently with other MS-Windows tasks.

Remote File Access

Transparent file access (TFA) is supported to remote DECnet systems by supported DOS function calls in MACRO Assembler and C. READ, WRITE, OPEN, CLOSE, SUBMIT, DIRECTORY, and DELETE operations can be initiated by a local program for sequential files residing on the personal computer or at such remote DECnet systems. Fixed and variable length record formats are supported. Files accessed remotely can contain either ASCII or binary information.

This file access is available to a user program by adding network location information to a DOS pathname. The supported DOS file I/O operations can then be performed with that file, which will be treated as a simple, sequential DOS file. Access to remote system-specific file characteristics is not provided.

Network Command Terminal

The SETHOST utility provides the user with VT240 terminal emulation via LAT, CTERM or the asynchronous serial communications port. SETHOST allows the personal computer to appear as if it were a terminal physically connected to the target system. This is particularly useful for remote program development because it allows the user of the small, application-oriented personal computer to utilize the resources of larger systems.

A maximum of 4 SETHOST sessions, can be enabled simultaneously, via LAT or CTERM. With a single keystroke, the user can switch among active SETHOST sessions. Only one session can be enabled when SETHOST uses the asynchronous communication port for an asynchronous terminal connection. With a single keystroke, the user can leave an active SETHOST session and return to the DOS environment. To return to the SETHOST session, the user simply types exit. Multiple CTERM and LAT terminal sessions (to the same or different hosts) can be established, suspended and resumed.

Terminal characteristics can be selected and saved by use of the utility's setup feature. The following list of character sets are supported with SETHOST: ISO Latin-1 (ISO), DEC Multi-national (MCS) and National Replacement (NRCS).

Full local printer support is provided under SETHOST (i.e. printing within ALL-IN-1) with DIGITAL printers. SETHOST sessions can also be logged to a file for future examination. SETHOST supports control of an asynchronous modem.

SETHOST provides a script processing language, which allows the automation of frequently executed functions. For example, a script can be written to automatically log a user in to a computer or to dial in to a computer and establish a DDCMP connection. Scripts can be written which perform a task and then exit SETHOST, without user intervention.

CTERM, DIGITAL's Terminal Services Architecture Command protocol, is used by SETHOST to give the personal computer the ability to establish a virtual connection to remote multi-user Phase IV DECnet systems which provide this support. The maximum number of CTERM sessions is limited by the maximum number of network links defined during the configuration of the DECnet-VAXmate node.

In local area Ethernet network configurations, DIGITAL's Local Area Transport protocol (LAT) is used for virtual terminal connections to DIGITAL systems which offer this support. This is the same protocol used between DIGITAL terminal servers and LAT hosts.

The interface to the CTERM and LAT interfaces are documented in order to allow users to write their own applications which take advantage of these protocols.

Remote Network Devices

DECnet-VAXmate provides the capability to use disk space on a remote DECnet node as though it were an additional disk local to the DECnet-VAXmate system. This can be useful for providing extra storage capacity to the personal computer user, or for backing up local files using the DOS COPY utility.

The Network Device Utility (NDU) creates a file on the remote system (using the standard DECnet file access interface) representing a local device. This file is then opened and assigned a local DOS device name (such as G:). User programs or DOS utilities which then perform I/O to this pseudo-device will actually be affecting the remote file. Up to four network disks can be opened simultaneously. Sizes can be 1.2M, 10M, 20M, or 32M bytes in any combination.

Multiple DECnet-VAXmate nodes may access the same network disk simultaneously, for read only operations.

The Network Device Utility also permits assignment of a local printer device identifier to the default system printer of a remote DECnet system. The user can direct output to the network printer device identifier, NPRN:, causing the data to be sent to a file located at the remote node. That file will be queued to the remote system's printer when the connection is closed by NDU. This is a limited facility, and does not allow the use of print job switches or the setting of printer characteristics.

DOS MAIL Utility

DECnet-VAXmate MAIL allows transmission of text messages and documents to users of MAIL software (e.g., VAX/VMS MAIL, MAIL-11) on systems that operate within the same DECnet network. The user can specify a text editor such as EDLIN to be invoked when creating a message, as well as a remote nodename::username to be used by respondents and for "carbon copies" of all MAIL sent. A MAIL receiver task is not supported.

Network Management

The Network Control Program (NCP) performs three primary functions: displaying statistical and error information, controlling the node's network components and testing local network components. The output resulting from a command can be directed to a local file or to the personal computer console.

The user can display the status of the local node's DECnet activity. Statistics related to both the node and the communication line can be displayed, including data on traffic and errors. Network parameters such as line speed, timer values, and buffer sizes can be modified. Control functions are limited to starting and stopping the line, and activating the local node. In order to test hardware components, test messages can be sent and received over the line either between the personal computer and adjacent node, or through controller or modem loopback arrangements.

DECnet-VAXmate provides for limited local network event logging. Network management requests from remote command nodes are not responded to by the DECnet-VAXmate system, unless NML, the Network Management Listener task, is running in the DECnet-VAXmate System. However, the NCP program can act as a loopback mirror to which remote nodes can send test messages for diagnostic purposes.

The Network Management Listener task is an optional background task which allows DECnet nodes to monitor NCP parameters on DECnet-VAXmate nodes. This allows network managers to know whether or not remote DECnet-VAXmate nodes are functioning correctly on the network. Remote alteration of any network parameters is not supported.

Communications

The DECnet-VAXmate products support both wide area network (WAN) and local area network (LAN) connections. However, the maximum number of physical communication lines that can be attached and driven by the DECnet-VAXmate system is one. The product is designed as, and its operation is limited to, a DNA Phase IV end node.

LAN Communications

DECnet-VAXmate supports direct connection to baseband Ethernet local area networks via its integral Ethernet adapter. This interface, when used in conjunction with DIGITAL's baseband Ethernet components, allows DECnet-VAXmate to utilize Ethernet as its datalink transmission medium.

DECnet-VAXmate does not support connection to broadband Ethernet networks.

WAN Communications

DECnet-VAXmate supports the DIGITAL Data Communications Message Protocol, Version 4.1 (DDCMP) for full-duplex transmission in point-to-point operation using the VAXmate's integral serial communications port. DDCMP provides error detection/correction and physical link management facilities. Neither half-duplex mode nor multi-point tributary operation is supported. Maximum line speed for full-duplex operation is 9600 baud.

DECnet-VAXmate Configuration and Performance

The process of configuring a DECnet-VAXmate node is based primarily on trade-off of cost, performance, and capability, within the realm of satisfying the user's application requirements. The performance of any given DECnet node is a function of not only the expected network traffic and resultant processing ("global" conditions), but also of the amount of processing specific to the IBM personal computer node ("local" conditions).

Thus, node performance depends on many factors, including:

- Memory size
- Number of device interrupts per unit time
- Communication line characteristics
- Number and size of buffers
- Message size and frequency of transmission
- Local application

Note that the rate at which user data can be transmitted (throughput) over a communications line may sometimes approach, but will never equal or exceed, the actual line speed. The reason is that the actual throughput is a function of many factors, including the network application(s), topology, protocol overhead, and line quality, as well as the factors cited at the beginning of this section.

DECnet-VAXmate Installation and Operation

DECnet-VAXmate is provided as a set of device drivers, resident tasks, and utilities. Not all components provided on the DECnet-VAXmate media kits are necessary for a viable DECnet node. Users can customize DECnet-VAXmate configurations to best suit their needs. The network database files must be accessible by the DECnet utility programs at run time. Note that there are DOS layered software applications which are not compatible with DECnet operation.

The software installation procedure, included with the product, guides the user through installation with a series of questions. The answers will establish the DECnet-VAXmate node's network parameters. The installer will be prompted for network node name, address, and type of network connection (line speed when using asynchronous connection); default values for all other options, such as buffer size, are supplied.

The procedure will insure that the system configuration files, CONFIG.SYS and AUTOEXEC.BAT cause the network processes (and optional network device drivers) to be loaded at system startup (boot) time.

An interactive procedure is also provided to help the installer verify successful software installation and demonstrate connectivity to the adjacent network node.

Note: The DECnet installation procedure is only supported on systems with fixed disks.

HARDWARE REQUIRED

Any valid VAXmate configuration, as defined in the VAXmate Software for Stand-alone use SPD (SPD 55.06.xx), with at least 512 KB system memory.

See Memory Requirements Chart for detailed memory requirements.

A configuration which includes the RCD31 VAXmate Expansion unit is strongly recommended for most efficient software operation. While DECnet-VAXmate can be used on the base (floppy-only) system, disk space limitations will require that the user hand-tailor the configuration to the specific application environment. Future releases of DECnet-VAXmate may only support VAXmates with a fixed disk.

Operation of the Ethernet interface with broadband modems is not supported.

OPTIONAL HARDWARE

Any hardware support in the VAXmate Software for Stand-alone use SPD (55.06.xx)

PREREQUISITE SOFTWARE

VAXmate Software for Stand-alone use Version 1.1 or Version 2.0.

OPTIONAL SOFTWARE

None

Memory Requirements Table

The following components are required for minimal communications. They can be loaded after system boot, but remain resident.

Component	System Memory	Disk Space
Asynch DDCMP connection:	3KB resident	6KB
— SCH, Interrupt Scheduler	67KB resident	46KB
— DNP, DECnet Process		
Ethernet connection:	3KB resident	6KB
— SCH Interrupt Scheduler	3KB resident	7KB
— DLL, Ethernet Datalink	52KB resident	46KB
— DNP, DECnet Process		

The following components are user applications which are not memory resident. They are listed here to help the user estimate system memory and disk requirements.

Component	System Memory	Disk Space
— NDDRV, Virtual Disk driver	8KB resident	3KB
— NPDRV, Virtual Printer driver	7KB resident	3KB
— TTT, Transparent Task-to-Task	23KB unloadable	20KB
— TFA, Transparent File Access	47KB unloadable	30KB
— LAT, Local Area Terminal driver	12KB resident	14KB
— CTERM, Command Terminal driver	38KB unloadable	34KB
— NETBIOS, NETBIOS session	29KB resident	35KB
— NML, Network Management Listener	19KB resident	18KB

Note: It is possible to run the LAT driver without DNP loaded.

The following components are disk resident and are loaded upon request. They are listed here to help the user estimate system memory and disk requirements.

Component	System Memory	Disk Space
NCP, Network Control Program (This utility has several overlays. Not all are required.)	102KB	339KB
NFT, Network File Transfer	110KB	89KB
windows version	110KB	167KB
FAL, File Access Listener	60KB	54KB
windows version	72KB	117KB
SETHOST, Terminal Emulation	288KB	125KB
DECNET Menu Utility	150KB	140KB
NDU, Network Disk Utility		57KB
TNT, Transparent Interface Control	17KB	14KB
MAIL	86KB	70KB
SPAWNER	24KB	21KB
C language Programming sources on distribution media		191K
Unpacked		300K

Total distribution kit size is approximately 2,531K bytes.

SOFTWARE WARRANTY

Warranty for this software product is provided by DIGITAL with the purchase of a license for the product as defined in the Software Warranty Addendum of this SPD.

INSTALLATION

This software product can be installed by the customer using the step-by-step documentation available for this product. Optionally, you can purchase DIGITAL Installation Services which provide for the installation of the software product by an experienced DIGITAL Software Specialist.

CUSTOMER RESPONSIBILITIES

Before installation of the software, the customer must:

- Previously have installed all requisite software and hardware including terminals
- Obtain, install and demonstrate as operational any modems and other equipment and facilities necessary to interface to DIGITAL's communication equipment.
- Make available for a reasonable period of time, as mutually agreed by DIGITAL and the customer, all hardware, communication facilities and terminals that are to be used during installation.

Delays caused by any failure to meet the responsibilities will be charged at the then prevailing rate for time and materials.

ORDERING INFORMATION

Single-Use licensed software is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions, which provide in part that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of DIGITAL's copyright notice and any proprietary notices on the software) for use on that same CPU.

You will need a separate license for each CPU on which you will be using the software product (except as otherwise specified by DIGITAL). Then, Materials and Service Options are selected to utilize the product effectively. **THE LICENSE OPTIONS ARE DESCRIBED BELOW. IF YOU ARE NOT FAMILIAR WITH THE SERVICE OPTIONS, YOU MAY OBTAIN THE APPROPRIATE SOFTWARE PRODUCT SERVICE DESCRIPTION(S) FROM YOUR LOCAL DIGITAL OFFICE.** If you are already familiar with these options, you may obtain the ordering information directly from the Software Options Chart.

Software Revision Right-to-Copy Option

The Right-to-Copy Option allows a customer with multiple CPUs to copy a revised version of a software product from one CPU to another. Each CPU must be licensed for that product. You first install the revised software on one CPU; then you can make copies for additional CPUs by purchasing the Right-to-Copy Option for each additional CPU.

Software Product Services

A variety of service options are available. For more information on these or other services, please contact your local DIGITAL office.

SOFTWARE OPTIONS CHART

DECnet-VAXmate is available only on RX33 Floppy Diskette Media.

OPTIONS	ORDER NUMBER
LICENSE OPTION: A LICENSE IS REQUIRED FOR EACH CPU.	
Single-Use License, warranty	Q6000-UZ
Single-Use License, binaries, documentation, warranty	Q6000-A7
Single-Use Upgrade License from DECnet-VAXmate to DECnet/PCSA Client: VAXmate	Q6ZP5-UZ
MATERIALS AND SERVICE OPTIONS:	
Documentation Option	Q6000-GZ
Distribution and Documentation Revision Option	Q6000-H7
Software Revision Right-to-Copy Option	Q6000-HZ
Installation Service	Q6000-I7
Basic Service	Q6000-87
Self-Maintenance Service	Q6000-37