Software Product Description

PRODUCT NAME: **DECnet-DOS Version 1.1** **SPD 50.15.01**
DOS Network Software for IBM Personal Computers

DESCRIPTION

DECnet-DOS allows selected IBM® personal computer systems 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.

Note: For purposes of this Software Product Description, IBM's Personal Computer Disk Operating System and MS-DOS are referred to simply as "DOS".

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

DECnet-DOS offers task-to-task communications, remote file access, utilities for network file operations, network command terminal support, and network resource-sharing capabilities using the DIGITAL Network Architecture (DNA) protocols. Access to full DECnet-DOS functions is supported for DOS user programs written in MACRO-86 Assembler (MASM) and the C language.

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-DOS, 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. With DECnet-DOS the user can **either** connect directly to baseband Ethernet, or to an adjacent routing node using an asynchronous serial interface.

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For direct connection of a DECnet-DOS node to a baseband Ethernet Local Area Network, two hardware interfaces are supported. These are described under OPTIONAL HARDWARE. **Operation of these interfaces with broadband modems is not supported.**

Direct connection to an adjacent node is accomplished over a serial line, using IBM's personal computer Asynchronous Communications Adapter as the physical link. The adjacent node must be Phase IV, full-function (routing), supporting asynchronous DDCMP **(DECnet, as opposed to asynchronous terminal)** connections, such as a DECnet-11M-PLUS or DECnet-VAX system, or the DECnet Router Server. 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.

The functions available to the DECnet-DOS 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-DOS 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, and networks that consist solely of DECnet-DOS nodes cannot be built. A File Access Listener server application is provided by DECnet-DOS, and similar applications may be built by the user. However such applications must run to the exclusion of others.

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

Task-to-Task (TTT) Communication

Using DECnet-DOS, a DOS user program written in Microsoft's MACRO-86 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.

Full (non-transparent) user program to user program capabilities are possible in C or MACRO-86 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-DOS C language subroutines to the specific C compiler being used.**

A simpler 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 the supported DOS file OPEN, CLOSE, READ, and WRITE calls. 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.

Network Resource Access

File Transfer

Using the Network File Transfer (NFT) DECnet-DOS utility, the user can transfer (command COPY) 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-DOS system are converted into DOS stream files; such files are converted into the remote system's normal format when transferred from the DECnet-DOS node. On transfer of binary files to a DECnet-DOS 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.

File Access Listener

A DECnet File Access Listener (FAL) server task is provided. When invoked on the personal computer node, FAL enables full access to the personal computer nodes'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 on programs.

Remote File Access

Transparent file access (TFA) is supported to remote DECnet systems by supported DOS function calls in MACRO-86 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

DECnet-DOS supports DIGITAL's Terminal Services Architecture Command Terminal protocol (CTERM), giving the personal computer user the ability to establish a virtual terminal connection to remote multi-user Phase IV DECnet systems which provide similar support. This is particularly useful for doing remote program development, and allows the user of the small, application-oriented personal computer to utilize the resources of larger systems. This protocol implementation makes the personal computer appear as if it were a terminal physically connected to the target system, and the user can take advantage of some of the standard system and network utilities supported by that system.

The virtual terminal utility (SETHOST) allows the IBM PC to emulate features of the VT102 class terminal. Terminal characteristics can be selected and saved by use of the utility's setup feature. The startup of a terminal session can be automated by creating a text file to be read to the remote host during the log-on sequence. Similarly, the entire session may be recorded by directing all

output to a log file on the DOS node. Command line editing can be enabled for terminal sessions to remote systems which provide this capability. Multiple terminal sessions (to the same or different hosts) can be established, suspended, resumed, and aborted, limited by the maximum network links defined during configuration of the DOS node.

Remote Network Devices

DECnet-DOS provides the capability to use disk space on a remote DECnet node as though it were an additional disk local to the DECnet-DOS 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-DOS nodes may access the same network disk simultaneously, subject to restrictions imposed by the remote system. As there are no interlocks with the DOS file system, DECnet-DOS ensures that network disks opened for shared access are used in read-only mode.

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-DOS 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 respondants and for "carbon copies" of all MAIL sent. MAIL cannot be received at the DOS node.

Network Management

The Network Control Program (NCP) performs two primary functions: displaying statistical and error information, and controlling the node's network components. These functions are all performed locally. 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.

The Network Test Utility (NTU) can be used to test local network 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-DOS provides for limited local network event logging. Network management requests from remote command nodes are not responded to by the DECnet-DOS system. However, the

NTU program can act as a loopback mirror to which remote nodes can send test messages for diagnostic purposes.

Communications

The DECnet-DOS product supports 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-DOS system is one (1). The product is designed as and limited to operation as a DNA Phase IV end node.

LAN Communications

DECnet-DOS supports direct connection to baseband Ethernet local area networks via hardware interfaces from third-party vendors (See Optional Hardware). These interfaces, when used in conjunction with DIGITAL's baseband Ethernet components allow DECnet-DOS to utilize Ethernet as its datalink transmission medium. **Proper operation of these interfaces with broadband modems is not possible, and therefore not supported.**

WAN Communications

DECnet-DOS supports the DIGITAL Data Communications Message Protocol, Version 4.1 (DDCMP) for full-duplex transmission in point-to-point operation using the serial asynchronous facility provided by (or available as an option for) one of the supported IBM personal computer systems. DDCMP provides error detection/correction and physical link management facilities. **Neither half-duplex mode nor multipoint tributary operation is supported.**

Maximum line speed is the fastest clock rate at which the serial port can be driven under DECnet-DOS. This means that even though the port may have the ability to operate at a maximum rate, the maximum total number of bits per second which can be handled by the software and CPU will be less. Maximum line speed for full-duplex operation is 9600 baud, although recoverable data errors may occur at this speed.

DECnet-DOS Configuration and Performance

The process of configuring a DECnet-DOS node is based primarily on trade-offs 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-DOS Installation and Operation

DECnet-DOS is provided as a set of device drivers, resident tasks, and utilities. Only the basic DECnet drivers and tasks are required for all DECnet functions. The network database files must be accessible by the DECnet utility programs at run time. **Note that there may exist 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 to which will establish the DECnet-DOS 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.

MINIMUM HARDWARE REQUIRED

The following IBM PC Disk Operating System (DOS), Version 3.1 minimum configurations are valid:

IBM PC Model 5150 System Unit with 256Kb memory, 2 dual-sided diskette drives, monochrome display, monochrome display/printer adapter, asynchronous communications adapter Model 2074.

IBM PC/XT™ Model 5160 System Unit with 256Kb memory, fixed disk, dual-sided diskette drive, monochrome display, monochrome display/printer adapter.

Note: The Model 2074 comm adapter is standard equipment in IBM PC/XT System Units.

IBM Personal Computer AT ™ Model 5170 System Unit with 256Kb memory, fixed disk, dual-sided diskette drive, monochrome display, monochrome display/printer adapter, serial/parallel adapter Model 0215.

- Memory allocated to the network driver and buffers
  - — 105K bytes for Ethernet connection
  - — 75K bytes for serial line connection
- 800K bytes available disk for DECnet-DOS drivers and all utilities
- IBM Communications Adapter cable (or equivalent) corresponding to the comm option model.

Note: A configuration which includes an IBM Fixed Disk is strongly recommended for most efficient software operation. While DECnet-DOS can be used on diskette-based systems, disk space limitations will require that the user hand-tailor the configuration to the specific application environment.

OPTIONAL HARDWARE

Additional disk space of:

- 230K bytes for C language programming interface files

Additional memory allocation of:

- 22K bytes for TTT task-to-task resident task
- 47K bytes for TFA transparent file access resident task
- 8K bytes for network disk driver
- 7K bytes for network printer driver
- 13K bytes for Local Area Transport driver (Ethernet configurations only)

One of the following interfaces is required for direct connection to an Ethernet network:

- MICOM™-Interlan NI5010-1 Ethernet Data Link Controller (rev. XD). External transceiver required for connection to standard Ethernet cabling.
- MICOM-Interlan NI5010-2 Ethernet Data Link Controller for use with standard Ethernet. External transreceiver required for connection to standard Ethernet cabling.

Choosing the MICOM-Interlan products requires that the user purchase and have onsite at least one copy of the Distribution Kit for NI5010 Device Driver and Diagnostic Program (MICOM-Interlan option SDK-NS2090-DI5Q).

- 3Com™ IE4 EtherLink™/IBM PC Ethernet Network Interface. External transceiver required for connection to standard Ethernet cabling. Normally includes documentation and diagnostic software. (On the face of the card is printed "Assembly #1221-00".)
- 3Com IE2 EtherLink/IBM PC Ethernet Network Interface. External transceiver required for connection to standard Ethernet cabling. Normally includes documentation and diagnostic software. (On the face of the card is printed "Assembly #34-0780-00".)

Note: Proper operation of the Ethernet interfaces with broadband modems is not possible, and therefore not supported.

The following hardware options from IBM may be added to the configurations (subject to the limitations of the system chosen) described under MINIMUM HARDWARE:

Diskette Drives and Adapters, Fixed Disks and Adapters, Memory Expansion Options, Memory Module Kits, Color Display, Color/Graphics Monitor Adapter, and Printer Adapter.

PREREQUISITE SOFTWARE

IBM PC Disk Operating System, Version 3.1.

Note that this release is also supported when used with Version 2.10 of IBM PC DOS. This support may be dropped in any future version of DECnet-DOS.

OPTIONAL SOFTWARE

None

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.

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 as 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.

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.

ORDERING INFORMATION

Single-Use licensed software is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, 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.

Self Maintenance Service

This service delivers to you, all software product and documentation updates for this specific software product, as defined and released by DIGITAL during the term of this service contract. In order to receive updates through this service, you must return to DIGITAL the "Service Initiation Card," enclosed in this software kit. As a prerequisite to the purchase of this service, you must be at the most current version of this software product.

Basic Service

Basic Service is ideal for customers who have a staff whose experience and expertise enables them to analyze and communicate a software problem to DIGITAL remote support centers. You receive telephone support that gives you timely answers and solves most software problems. In addition, you get revised versions of the software and documentation.

SOFTWARE OPTIONS CHART

DECnet-DOS is available only on RX31 Floppy Diskette.

OPTIONS	ORDER NUMBER
LICENSE OPTION: A LICENSE IS REQUIRED FOR EACH CPU.	
Single-use license, binaries, documentation, warranty	QVA05-AI
MATERIALS AND SERVICE OPTIONS:	
Distribution and Documentation Revision Option	QVA05-HI
Software Revision Right-to-Copy Option	QVA05-HZ
Installation Service	QVA05-II
Basic Service	QVA05-8I
Self-Maintenance Service	QVA05-3I