

Software Product Description

PRODUCT NAME: PATHWORKS for DOS, Version 4.0
(Formerly DECnet PCSA Client for DOS)

SPD 55.07.10

DESCRIPTION

PATHWORKS for DOS is based on the Personal Computing Systems Architecture (PCSA) which is an extension of Digital Equipment Corporation's systems and networking architecture that merges the VMS, ULTRIX, DOS, OS/2®, and Macintosh® environments. PCSA provides a framework for integrating personal computers into an organization's total information system so different types of users can share information, large system resources, and network services across the entire organization.

PCSA is implemented in the PATHWORKS product set. The PATHWORKS family of software products includes:

- PATHWORKS for DOS (formerly DECnet PCSA Client for DOS) - Required software for the DOS personal computer (described in this document) to use the facilities provided by PATHWORKS for VMS (described in SPD 30.50.xx), PATHWORKS for ULTRIX (described in SPD 32.44.xx), PATHWORKS for OS/2 (formerly PCSA for OS/2) server software (described in SPD 55.24.xx), or VAXmate Services for MS-DOS® (described in SPD 55.09.xx) using DECnet as the network transport.

The PATHWORKS for DOS functions described in this Software Product Description (SPD) are supported with the following Digital servers, unless otherwise noted:

- PATHWORKS for VMS, Version 4.0
- PATHWORKS for ULTRIX, Version 1.0
- PATHWORKS for OS/2 Server, Version 1.1

- PATHWORKS for DOS (TCP/IP) - Required software for the DOS personal computer (described in SPD 33.45.xx) to use the facilities provided by PATHWORKS for VMS (described in SPD 30.50.xx) and PATHWORKS for ULTRIX (described in SPD 32.44.xx) using TCP/IP as the network transport. This product contains the TCP/IP networking software and various TCP/IP network management utilities. The PATHWORKS for DOS product is a prerequisite product.

- PATHWORKS for VMS (formerly VMS Services for PCs) - Software that allows a VAX system, using the VMS Operating System, to act as a file, print, disk, and mail server to DOS- or OS/2-based personal computers (described in SPD 30.50.xx). PATHWORKS for VMS supports DECnet and TCP/IP (through the VMS/ULTRIX Connection software product) as network transports.
- PATHWORKS for ULTRIX - Software that allows a VAX or RISC system, using the ULTRIX Operating System, to act as a file, print, and mail server to DOS- or OS/2-based personal computers (described in SPD 32.44.xx). PATHWORKS for ULTRIX supports DECnet and TCP/IP as network transports.
- PATHWORKS for Macintosh - Software that allows a VAX system, using the VMS Operating System, to act as a file, print, mail, and database server to Macintosh computers (described in SPD 31.53.xx.) using the DECnet transport.
- PATHWORKS for OS/2 (formerly PCSA for OS/2) - Required software for the OS/2 personal computer (described in SPD 55.24.xx) to use the facilities provided by PATHWORKS for VMS (described in SPD 30.50.xx), PATHWORKS for ULTRIX (described in SPD 32.44.xx) and/or make the file and print facilities of an OS/2 system available to other personal computers (described in SPD 55.24.xx) using DECnet as the network transport.
- DECnet/PCSA Client: VAXmate - Required software for VAXmates (described in SPD 55.10.xx) to use the facilities provided by PATHWORKS for VMS (described in SPD 30.50.xx) or VAXmate Services for MS-DOS (described in SPD 55.09.xx) using DECnet as the network transport.
- VAXmate Services for MS-DOS - Software that allows a VAXmate with an expansion box to act as a dedicated server to DOS computers (described in SPD 55.09.xx) using DECnet as the network transport.

The PATHWORKS for DOS software allows Digital, selected IBM®, and selected IBM compatible personal computers to participate in a DECnet Phase IV network

as non-routing (end) nodes. The PCs can utilize selected facilities and services of other Phase IV systems, and access information and services contained on other types of Digital systems in the DECnet network.

Refer to the *Supported Base Systems Chart* in the System Support Addendum (SSA 55.07.10-x) for detailed configuration information.

Communications

PATHWORKS for DOS nodes can be connected to a network via an Ethernet or an asynchronous DECnet connection in a Local Area Network (LAN) or Wide Area Network (WAN). Refer to the *OPTIONAL HARDWARE* section in the System Support Addendum (SSA 55.07.10-x) for details on supported Ethernet configurations.

The PATHWORKS for DOS software can also be installed directly on the PC's local hard disk and used for peer-to-peer DECnet network communications. In this configuration, server software is not required.

The functions available to the PATHWORKS for DOS user depend largely upon the configuration of the rest of the network. Each DECnet product offers users its own level of capability and set of features.

PATHWORKS for DOS software is a DECnet Phase IV network product and is warranted for use only with supported Phase IV products supplied by Digital.

DECnet Phase IV networks can contain a maximum of 1,023 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 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.

PATHWORKS for DOS supports direct connections to baseband and twisted pair (10baseT) Ethernet local area networks via Ethernet controllers. Refer to System Support Addendum (SSA 55.07.10-x) for a list of supported Ethernet controllers. These controllers, when used in conjunction with Digital's baseband Ethernet components, allow PATHWORKS for DOS software to utilize Ethernet as its datalink transmission medium.

PATHWORKS for DOS supports the Digital Data Communications Message Protocol, Version 4.1 (DDCMP) for full-duplex transmission in point-to-point operation. An asynchronous connection to the network is accomplished over a serial line, using the personal computer's asynchronous communications adapter as the physical link. The adjacent system must be a DECnet Phase IV, full-function (routing) node, supporting asynchronous

DDCMP (for example, DECrouter 200, DECnet-VAX). DDCMP provides error detection/correction and physical link management facilities. Neither half-duplex mode nor multi-point tributary operation is supported.

Ethernet connections are recommended for their higher speed. Digital recommends the use of the multi-buffered DEC EtherWORKS family of Ethernet controllers in networks which carry heavy traffic.

If communication to another DECnet product is required, the Software Product Description (SPD) for 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.

Features

The PATHWORKS for DOS software provides:

- File Services
- Permit Services
- Disk Services
- Print Services
- Print Screen Support
- Mail Services
- Date and Time Services
- Broadcast and Receive
- Ethernet Controller Support
- Remote Boot Capability
- Task-to-Task Communications
- Memory Savings Techniques
- Installation and Configuration Utilities
- PC DECwindows Motif®
- Microsoft® Windows™ Support
- Terminal Emulators
- DECnet-DOS Facilities
- SEDT Screen Editor
- Enhanced DOS Utilities

File Services

Through the integration of Microsoft's MS-DOS LAN Manager, Version 1.0 basic file and print services with DECnet as well as emulation of IBM's NETBIOS, the client is provided with a remote DOS file system that appears as a transparent extension of the client's local facilities.

Optionally, file and print services can also be configured by combining Digital's Local Area Systems Transport (LAST) protocol with the DECnet protocol. Performance improvements can be realized in some applications that transfer small packets (such as database applications) by using this configuration for file and print services. The user is limited to local area network access while using this combination of transports.

File and print services over the DECnet transport are configured by default. File and print services over the DECnet and LAST transports can be configured through the advanced menu of NETSETUP.

Note: File and print services using the DECnet/LAST combination are not available with PATHWORKS for ULTRIX, Version 1.0 and PATHWORKS for OS/2, Version 1.1 servers.

Permit Services

PATHWORKS for DOS software provides DOS client systems with the ability to offer other users access to local resources via the PERMIT command. A client may offer other client systems access to its local disk; only a single connection is possible at any given time.

Disk Services

Through the use of Digital's Local Area Systems Transport (LAST) protocol and Local Area Disks (LAD), PATHWORKS clients are provided with high performance virtual disks in a local area network. In a wide area network configuration, use the Network Device Utility (NDU) to access virtual disks.

Virtual disk sizes can be 360KB, 720KB, 1.0M, 1.2M, 1.44M, 10M, 20M, 32M, 64M, 128M, 256M, or 512M bytes in any combination.

Note: Disk services are not available with PATHWORKS for ULTRIX, Version 1.0 and PATHWORKS for OS/2, Version 1.1 servers.

Print Services

Through the integration of Microsoft's MS-DOS LAN Manager, Version 1.0 basic file and print services with DECnet as well as emulation of IBM's NETBIOS, remote printers appear as a transparent extension of the client's facilities. This allows the redirection of local printing to a server-based printer.

PATHWORKS for DOS software also allows one or more parallel printers connected to a (within the limitations of the specific version of DOS and hardware configuration utilized) PC to be offered to the network as remote printers through the use of the Local Area Terminal (LAT) protocol, Version 5.1. This feature allows printing to occur in the background and does not prevent the user

from running applications. PostScript® printers configured to use the parallel port are not supported.

Note: Not available with PATHWORKS for ULTRIX, Version 1.0 or PATHWORKS for OS/2, Version 1.1 servers.

Refer to the System Support Addendum (SSA 55.07.10-x) for a list of supported printers.

Refer to the *Microsoft Windows Support* section of this document for a list of supported printers under Microsoft Windows.

Refer to PATHWORKS for VMS (SPD 30.50.xx), PATHWORKS for ULTRIX (SPD 32.44.xx), PATHWORKS for OS/2 server software (SPD 55.24.xx), or VAXmate Services for MS-DOS (SPD 55.09.xx) for more information on remote printer support.

Print Screen Support

Users can use Print Screen functionality while using a DOS-based application, including the SETHOST terminal emulator, to a local or remote printer. However, to print screen from the VT320 terminal emulator under Microsoft Windows, press the F2 key instead. (Print Screen Support is not available while using PC DECwindows Motif.)

Mail Services

PATHWORKS for DOS MAIL allows DOS clients to send and receive messages and documents to users of MAIL software (for example, MAIL-11) on systems that operate within the same DECnet network.

MAIL is a PC-style utility for sending and reading mail. It contains horizontal menu bars, pull-down menus, and context sensitive help. MAIL allows the user to read mail without having to log into the server.

The PATHWORKS for DOS MAIL utility enables the DOS client to:

- Read, delete, forward, file, print and reply to messages.
- Send messages to a distribution list as well as to a remote nodename::username address. Messages can be sent to primary addressees and to carbon copy addressees.
- Create messages with the built-in editor (or a selected callable editor, such as SEDT) which can output an ASCII file.
- Organize messages into folders which may be stored remotely on a server or locally on the system's hard disk.
- Receive notification of new messages upon login to a PATHWORKS session.

- Receive notification of incoming messages. In most cases, notification is achieved via sound while using a graphics application, and through a pop-up window on the user's display while using character cell applications. This feature may be optionally disabled.
- Send a binary file attachment (one binary file per message).
- Configure the user interface as either command line or menu-driven.

Date and Time Services

Clients can receive the date and time from the server. Users are assured of consistent timestamps on any given file created, shared or updated by other users.

Broadcast and Receive

The Broadcast feature allows users to send (broadcast) messages to DOS and/or OS/2 clients. The Receive feature allows DOS clients to receive the messages. This feature allows DOS clients to notify other DOS clients of various network events, such as system shut-downs for backups.

Broadcast and Receive functionality is only supported between PCs utilizing the same network transport. For example, users can send a message from a PC using DECnet to another PC using DECnet as the network transport; users cannot send a message from a PC using DECnet to a PC using TCP/IP as the network transport.

Ethernet Controller Support

NDIS Support

PATHWORKS for DOS networking software is Network Device Interface Specification (NDIS), Version 1.0 compatible. NDIS is a standard developed by Microsoft Corporation and 3Com® Corporation. PATHWORKS for DOS software adheres to the NDIS standard on two levels:

- The product includes NDIS-compliant device drivers for DEC EtherWORKS LC, DEC EtherWORKS MC, DEC EtherWORKS Turbo, DEC EtherWORKS Turbo /TP, 3Com EtherLink® II, and 3Com EtherLink/MC Ethernet controllers. The NDIS drivers can also be used with previous versions of the Digital Ethernet controller family, DEPCAs.
- The product includes software which allows it to be used with third-party Ethernet controllers that are supplied with NDIS, Version 1.0 compliant device drivers.

PATHWORKS for DOS software supports the use of NDIS, Version 1.0. Every effort has been made to ensure that the software adheres to the NDIS, Version 1.0 specification. However, individual vendors' interpretation of the specification may vary and, therefore, may not function in Digital's PATHWORKS for DOS network environment.

Digital's implementation of the NDIS standard is intended to allow users a greater choice of Ethernet controllers. This implementation is not intended to support the simultaneous operation of the PATHWORKS for DOS product and other vendors' networking products.

Note: The NDIS drivers for the 3Com EtherLink II and 3Com EtherLink/MC Ethernet controllers will not be supplied with the next release of this product. In future releases, users need to contact their vendor directly for these drivers.

Remote boot is not supported with the use of NDIS drivers.

Proprietary Datalink Support

PATHWORKS for DOS software also includes Digital proprietary datalinks (DLLs) for DEC EtherWORKS LC, DEC EtherWORKS MC, DEC EtherWORKS Turbo, and DEC EtherWORKS Turbo/TP Ethernet controllers.

If the personal computer is equipped with a DEC EtherWORKS Ethernet controller, the configuration utility selects the Digital proprietary datalinks by default for memory and performance gains.

Remote Boot Capability

Users can remote boot a personal computer from a network virtual boot disk using the disk services capability of PATHWORKS for VMS software. The personal computer must contain a DEC EtherWORKS Ethernet controller.

Personal computers using DEC EtherWORKS, 3Com Etherlink II, or 3COM Etherlink/MC Ethernet controllers can remote boot by utilizing the floppy remote boot procedure.

Note: Remote boot is not available with PATHWORKS for ULTRIX, Version 1.0 and PATHWORKS for OS/2, Version 1.1 servers. The remote boot capability is also unavailable if the user chooses to use a Network Device Interface Specification (NDIS), Version 1.0 driver with any Ethernet controller.

Task-to-Task Communications

Through DECnet-DOS, user programs written in Microsoft's MACRO Assembler or the C language can exchange messages with other network user programs. A simple set of functions is provided by the transparent task-to-task interface, which allows communication and exchange of data with a remote network program through a limited set of DOS calls (for example, OPEN, CLOSE, READ, and WRITE).

User program-to-user program capabilities (non-transparent) are possible in C or MACRO Assembly through a library of special network subroutine calls. 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. Small, medium and large size memory models are supported.

Memory Savings Techniques

PATHWORKS for DOS software supports several techniques for saving conventional PC memory space. By using these techniques, additional conventional PC memory space becomes available for user applications.

- Several network components can be loaded (optionally) into expanded memory simultaneously. For 80386 and 80486 Intel™ processors, the PC must be configured with a user-supplied Expanded Memory Specification (EMS), Version 4.0 software driver. For 8088, 8086, and 80286 Intel processors, the PC must be configured with both a user-supplied EMS, Version 4.0 software driver and hardware.
- The LAN Manager Basic Redirector can be loaded into the High Memory Area (HMA) portion of extended memory. The configuration must have a minimum of 64KB of extended memory and either the Digital-supplied driver, HIMEM.SYS, or a vendor-supplied high memory manager which supports Extended Memory Specification (XMS), Version 2.06.
- PATHWORKS for DOS software provides the user with the ability to unload several network components from either conventional or EMS memory.

The exact amount of conventional memory remaining for user applications will vary depending on:

- Availability and size of EMS drivers
- Whether the LAN Manager Basic Redirector is loaded into XMS (Extended Memory Specification)
- Ethernet controller type
- NDIS driver size
- DOS version
- Whether the PC is configured to remote boot

- Parameters and drivers specified in CONFIG.SYS and PROTOCOL.INI
- Other Terminate and Stay Residents (TSRs) that may be loaded

The performance of EMS boards will vary depending on the EMS hardware and software selected. PATHWORKS for DOS software includes a utility, EMSSPEED, to measure the performance of EMS boards in a PCSA environment.

PATHWORKS for DOS software supports the use of Expanded Memory Specification (EMS) applications that are Version 4.0 compliant. Every effort has been made to ensure the software adheres to the EMS, Version 4.0 specification. However, individual applications may have interpreted the specification differently and, therefore, may not function in Digital's PATHWORKS for DOS network environment.

Background EMS applications are usually device drivers and terminate and stay resident programs (TSRs). When PATHWORKS for DOS software is loaded into EMS with other background EMS applications, unpredictable results may occur.

Some EMS drivers and disk caching programs provided by PC vendors may conflict with HIMEM.SYS which provides XMS support.

Installation and Configuration Utilities

PATHWORKS for DOS software provides the user with utility programs to assist in the installation and configuration of the product onto a server system or a PC with a local hard disk.

A menued character cell program (NETSETUP) is provided to help users configure client systems. On-line HELP facilities are also provided.

A DOSLOAD utility is provided to simplify system management of various versions of the DOS Operating System to the server system.

PC DECwindows Motif

PC DECwindows Motif is an MS-DOS application. It implements an X server that uses the industry-standard Release 4 of the X Window System, Version 11 (X11), protocol. An X Window System application, such as a DECwindows application, executing on a remote VMS or ULTRIX system with DECnet may be displayed on and receive keyboard and mouse input from the personal computer.

PC DECwindows Motif is only supported on Intel 80286, 80386, and 80486 machines listed in the System Support Addendum (SSA 55.07.10-x). Use:

- DWDOS286.EXE for Intel systems with 80286, 80386, and 80486 processors

- DWDOS386.EXE for Intel systems with 80386 and 80486 processors

(DWDOS286.EXE does not support data allocations greater than 64KB. DWDOS386.EXE does not support XMS.)

PC DECwindows Motif supports the following keyboards with either Digital LK201 or IBM style mappings:

- IBM compatible enhanced keyboard (102-key)

Belgium	Norway
Canada	Portugal
Denmark	Spain
Germany	Sweden
Finland	Switzerland (French)
France	Switzerland (German)
Italy	United Kingdom
Latin America	United States (101-key)
Netherlands	

- IBM compatible 84-key keyboard

Belgium	Norway
Canada	Portugal
Denmark	Spain
Germany	Sweden
Finland	Switzerland (French)
France	Switzerland (German)
Italy	United Kingdom
Latin America	United States

- Digital LK250 keyboard

Canada	Spain
Denmark	Sweden
Finland	Switzerland (French)
France	Switzerland (German)
Germany	United Kingdom
Italy	United States
Norway	

PC DECwindows Motif requires additional extended memory over and above the conventional, EMS, and XMS memory required by other components.

A minimum of 640KB of system memory must be free and accessible to start PC DECwindows Motif after configuring the system with the required PATHWORKS network components. This memory may be made up of free conventional and extended memory.

At least a total of 1 - 4 MB of system memory must be free and accessible to run X Window System applications. The specific amount of X Server memory required will depend on the memory requirements of the application(s) chosen by the user.

Depending on the number of X Window System applications being displayed and the memory requirements of each application, the user should test these types of configurations with PC DECwindows Motif prior to production use.

Two utilities are provided which report the amount of memory available to the X Server:

- DWINFO2 is for Intel systems with 80286, 80386, and 80486 processors and reports the amount of memory available to DWDOS286.
- DWINFO3 is for Intel systems with 80386 and 80486 processors and reports the amount of memory available to DWDOS386.

Because PC DECwindows Motif includes its own extended memory manager, it will conflict with expanded memory managers that do not support the Virtual Control Program Interface (VCPI). PC DECwindows Motif may also conflict with other drivers using extended memory, such as disk caching programs and RAM drives, if their presence cannot be detected by the PC DECwindows Motif extended memory manager.

DECwindows and X Window System applications that do not take into account the PC hardware characteristics (such as screen resolution, screen aspect ratios, keyboard layouts, and number of mouse buttons) may not function optimally with a PC as a display server.

In addition to the supported VMS and ULTRIX DECwindows window managers, Digital provides a VMS window manager designed specifically for PC screens that allows users to move windows off the screen.

A configuration utility is provided so users may configure the X Server for their hardware and configure the user preferences parameters.

A KEYSYM compiler is provided so users may build custom keyboard layouts to support applications.

A Font compiler is provided which compiles fonts in the Adobe Bitmap Distribution Format, Version 2.1 into a format for the X Server.

A DECnet Remote Application Startup Program is provided for VMS systems (as a DCL command procedural file) and for ULTRIX VAX and RISC systems (as an executable program). These programs start X Window System applications on the host system on behalf of the X Server.

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Print Screen Support is not available while using PC DECwindows Motif.

Microsoft Windows Support

PATHWORKS for DOS software supports two versions of Microsoft Windows - Microsoft Windows, Version 3.0 and Microsoft Windows/286, Version 2.1.

Microsoft Windows, Version 3.0 support includes:

- Access to file and disk services provided through the Microsoft Windows, Version 3.0 File Manager.
- Access to print services provided through the Microsoft Windows, Version 3.0 Control Panel.
- The PATHWORKS for DOS software provides users with the ability to run the networking software in expanded memory (EMS) with Windows, Version 3.0 in Real, Standard, and 386 Enhanced modes in most cases.

If using the remote boot feature in conjunction with Microsoft Windows, Version 3.0 in 386 Enhanced Mode, the PATHWORKS for DOS networking components must be loaded into conventional memory.

If using Microsoft Windows, Version 3.0 in 386 Enhanced Mode, the Redirector must be loaded into conventional memory.

EMM386.SYS is a memory manager shipped with Microsoft Windows, Version 3.0. PATHWORKS for DOS does not support the use of other third-party memory managers while using Microsoft Windows, Version 3.0.

- A windowed VT320-like terminal emulator is provided. (See *Terminal Emulator* section for more detail.)
- Windowed versions of the Network File Transfer (NFT) and File Access Listener (FAL) network utilities are provided.
- A DOS-based menu-driven utility is provided to simplify the installation of PATHWORKS for DOS Microsoft Windows, Version 3.0 support software.
- A Digital VSXXX-AA Mouse driver is provided (for use with a DEC EtherWORKS Ethernet controller that is equipped with a mouse port).
- A Digital LK250 keyboard driver is provided with Dynamic Link Libraries for the following languages:

English (US)	German
English (UK)	Italian
Canadian-English	Norwegian

Canadian-French	Spanish
Finnish	Swedish
French	Swiss-French
Danish	Swiss-German

- Digital printer support, as defined below, is provided:

Digital printer drivers are supplied in the PATHWORKS for DOS product to support the following Digital printers in both Digital and industry-standard mode. These used with Microsoft Windows Real Mode only.

- LA50 Printer
- LA75 Companion Printer
- LA210 Letterprinter
- LJ250, LJ252 Companion Color Printer
- LN03 Printer
- LN03 PLUS Printer
- Generic text-only printer

In Microsoft Windows Standard and 386 Enhanced Modes, use the appropriate industry-standard printer driver from the Microsoft Windows, Version 3.0 retail kit for Digital printers (in industry-standard mode).

- A DECnet Socket Library for Microsoft Windows, Version 3.0 and DOS-based applications is included. The library is provided for programmers who wish to write networked applications that execute under Microsoft Windows, Version 3.0.
- Programming access for Microsoft Windows, Version 3.0 and DOS-based applications is provided to Digital's enhanced NETBIOS functions.
- A Terminal Access Library that provides LAT and CTERM access to Microsoft Windows, Version 3.0 applications is included. The library is provided for programmers who wish to write terminal emulators that execute under Microsoft Windows, Version 3.0.
- PIFs (Program Information Files) for most DOS-based PATHWORKS for DOS applications/utilities are provided. (These PIFs are provided as examples and should work with most configurations. The user may need to tailor them given the application mix and specific personal computer configuration.)

Microsoft Windows/286, Version 2.1 support includes:

- Access to file, print, and disk services provided through the DCONTROL network utility.
- A windowed VT320-like terminal emulator is provided. (Refer to the *Terminal Emulator* section for more detail.)

- Windowed versions of the Network File Transfer (NFT) and File Access Listener (FAL) network utilities are provided.
- A Digital VSXXX-AA Mouse driver is provided (for use with a DEC EtherWORKS Ethernet controller that is equipped with a mouse port).
- The following Digital LK250 keyboard drivers are provided:

Canadian	Italian
Danish	Norwegian
English (UK)	Spanish
English (US)	Swedish
Finnish	Swiss-French
French	Swiss-German
German	

- Support for the following Digital printers in both Digital and industry-standard mode is provided:
 - LA50 Printer
 - LA75 Companion Printer
 - LA210 Letterprinter
 - LJ250, LJ252 Companion Color Printer
 - LN03 Printer
 - LN03 PLUS Printer
 - Generic text-only printer
- A Terminal Access Library that provides LAT access to all Microsoft Windows/286, Version 2.1 applications is included. The library is provided for programmers who wish to write terminal emulators that execute under Microsoft Windows/286, Version 2.1.
- PIFs (Program Information Files) for most DOS-based PATHWORKS for DOS applications/utilities are provided. (These PIFs are provided as examples and should work with most configurations. The user may need to tailor them given the application mix and specific personal computer configuration.)

Note: Support for Microsoft Windows/286, Version 2.1 will be discontinued with the next release of this product.

Terminal Emulators

The PATHWORKS for DOS software includes three terminal emulators that allow users to establish terminal sessions with a host computer such as VMS or ULTRIX:

- VT320 for Microsoft Windows, Version 3.0 (A VT320-like Microsoft Windows terminal emulator) - The VT320 does not support full modem control or replaceable character sets (DRCS).

- VT320 for Microsoft Windows/286, Version 2.1 (A VT320-like Microsoft Windows terminal emulator) - The VT320 does not support full modem control or replaceable character sets (DRCS).
- SETHOST (A VT320-like character-cell terminal emulator) - SETHOST supports control of asynchronous modems but does not support replaceable character sets (DRCS).

Terminal sessions can be established using either a serial communications port, or via an Ethernet port on a supported Ethernet controller on the client.

VT320 Features for Microsoft Windows, Version 3.0 and Microsoft Windows/286, Version 2.1

The following features of the VT320 terminal emulators are available while using either Microsoft Windows (Version 3.0 and Version 2.1) VT320 applications except where otherwise noted:

- User-definable color attributes, background/foreground, reverse, bold, underline.
- While using Microsoft Windows, Version 3.0, support for Digital's Local Area Terminal (LAT) and CTERM protocols, and serial terminal communication. The user can load LAT into EMS, thereby gaining more memory for other applications.
- While using Microsoft Windows/286, Version 2.1, support for Digital's Local Area Terminal (LAT) and serial terminal communication only.
- Support for the Microsoft Windows Clipboard to cut and paste information.
- Ability to log characters received from the host into a file.
- Ability to send characters to the host from a file instead of from the keyboard.
- Setup feature allows selection and saving of terminal characteristics.
- Printing to a Digital remote or local printer; printing may be a screen at a time or a toggle-like function may be used to print everything from the screen until the toggle is switched off.
- Digital multi-national and ISO multi-lingual character sets and compose sequences as defined below:
 - ISO (default) - International Standards Organization character set
 - IBM extended and IBM Norway/Denmark extended character sets
 - MCS - DEC Multinational Character set

— NRC - Supports a 7-bit National Character Replacement set of countries:

United States	German
Swiss/French	Denmark
Sweden	United Kingdom
Italy	Swiss/German
Norway	Spain
France	Finland
Canada	

- Support for scripting facilities. The script processing language enables the automation of frequently executed functions.

SETHOST Features

- Support for Digital's Local Area Terminal (LAT) and CTERM protocols.
- Support for serial terminal communication.
- Support for a maximum of four simultaneous SETHOST sessions via LAT or CTERM. Only one session can be enabled when SETHOST uses the asynchronous communication port for an asynchronous terminal connection.
- Setup feature allows selection and saving of terminal characteristics.
- Ability to log characters received from the host into a file.
- Ability to send characters to the host from a file instead of from the keyboard.
- Support for the following list of character sets: ISO Latin-1 (ISO), DEC Multinational (MCS), DEC Technical (TCS), and the following 7-bit National Character Replacement Sets (NRCS):

ASCII	British
French	German
Italian	Spanish
Finnish	Swedish
Norwegian/Danish	Swiss
Canadian	Dutch
Portuguese	

- Support for PC code page character sets. Translation table files between the Digital character sets and the PC code page character sets (437, 865, 850, 860, 863) are used by SETHOST, NFT, and MAIL to provide code page support.
- Support for scripting facilities. The script processing language enables the automation of frequently executed functions.

- Printing to a Digital remote or local printer; printing may be a screen at a time or a toggle-like function may be used to print everything from the screen until the toggle is switched off. SETHOST sessions can also be logged to a file for future examination.

DECnet-DOS Facilities

The DECnet-DOS component of PATHWORKS for DOS includes the following facilities:

- Network Management
- NETBIOS Interface Support
- File Transfer
- Job Spawner
- File Access Listener
- Transparent File Access
- Network Device Utility

Network Management

The Network Control Program (NCP) performs three primary functions:

- Displaying statistical and error information
- Controlling the node's network components
- Testing local network components

The user can display the status of the local node's DECnet activity and statistics related to both the node and the communication line. Control functions are limited to starting and stopping the line, and activating the local node. 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. The Network Control Program (NCP) can act as a loopback mirror to which remote nodes can send test messages for diagnostic purposes.

DECnet-DOS provides for limited local network event logging.

The Network Management Listener (NML) task is an optional background task which allows remote DECnet nodes to monitor network activity and parameters on DECnet-DOS nodes. Remote alteration of network parameters is not supported.

NETBIOS Interface Support

DECnet-DOS supports the session level NETBIOS interface through interrupts 5C HEX and 2A HEX. 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-DOS.

This allows computers running DECnet-DOS and NETBIOS applications to communicate with other computers running DECnet-DOS and NETBIOS applications. This feature preserves users' investment in industry standard applications. DECnet-DOS NETBIOS applications can also communicate with other DECnet applications such as DECnet-VAX applications.

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

File Transfer

Using the Network File Transfer (NFT) utility, users 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. NFT runs to the exclusion of other tasks or programs, except when running under Microsoft Windows/286, Version 2.1 and Microsoft Windows, Version 3.0.

On transfer of binary files to a DECnet-DOS system, file data can be restored on such transfers from the personal computer to a record file system through use of utility switch settings.

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 and initiates the program which will service the request. The JOB Spawner can initiate the File Access Listener (FAL), Data Test Receiver (DTR), and other user written programs or batch files.

File Access Listener

The File Access Listener (FAL) server task provides access to the personal computer's file resources from remote systems. FAL provides user ID and password protection. FAL runs to the exclusion of other tasks or programs, except when running under Microsoft Windows /286, Version 2.1 and Microsoft Windows, Version 3.0.

Transparent File Access

Transparent File Access (TFA) is a utility that allows access to remote DECnet systems through supported DOS function calls, such as READ, WRITE, OPEN, CLOSE, SUBMIT, DIRECTORY, and DELETE.

Network Device Utility

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. Up to four network disks can be opened simultaneously. Sizes can be 360KB, 720KB, 1.0M, 1.2M, 1.44M, 10M, 20M, 32M, 64M, 128M, 256M, 512M bytes in any combination.

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. This is a limited facility and does not allow the use of print job switches or the setting of printer characteristics.

SEDt Screen Editor

SEDt is a text editor which allows the display and editing of a full screen of text. It may be used as the callable editor for creation of text messages within the PATHWORKS for DOS MAIL utility. The features and capabilities of SEDt include:

- Simultaneous editing of up to four files in separate buffers
- Text selection, insertion, deletion, and search
- Cut and paste capability
- Use and definition of multiple rulers, with tab, margin and justification settings
- An information line which displays the current editing modes, such as forward versus reverse search, insert versus replace, and cut and paste modes
- A file information line which displays the name of the file being edited, the current line and column position in the file, and the file buffer in use
- Customization of commands and configuration
- Definable keyboard maps

Enhanced DOS Utilities

These utilities support Digital's LK250 keyboard (including international versions) and Microsoft Mouse emulation, Version 7.0 of the Digital VSXXX-AA mouse (for use with a DEC EtherWORKS Ethernet controller that is equipped with a mouse port).

Unsupported Utilities

Included in the PATHWORKS for DOS, Version 4.0 release are several disks labeled UNSUPPORTED. They contain several utilities/programs that may be useful for the user. They can be found on separate diskettes and are not part of the installation procedure.

Note: These utilities are provided on an unsupported basis; that is, they are provided without phone support from the Customer Services Centers. A reader's reply card is included in the software kit for the user to report any comments to the engineering group. Inclusion of these utilities does not constitute a commitment from Digital Equipment Corporation that these utilities will continue to be provided in this product.

Restrictions and Limitations

To create a floppy key disk, a disk greater than or equal to 720KB is required for booting purposes.

The DOS Operating System is limited to a single user, and access to a PATHWORKS for 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.

Any application which does not properly mask and unmask interrupts is incompatible with this product. For example, applications which use IBM BASICA, Version 1.0 interpreter or compiler, or GW-BASIC,® Version 1.0 do not unmask the interrupts when they exit. In these cases, a BASIC program must be interpreted or recompiled using a version of BASIC that would unmask the interrupts.

For IBM PC/AT compatible configurations with EGA or VGA graphics adapter, the DEPCA Revision E or later is required to utilize EMS.

For asynchronous network connections, all client functionality and network services are supported, except:

- NETBIOS naming service and datagrams.
- Remote boot.
- Local area disk services provided through the Local Area Systems Transport protocol. (The user can access virtual disks via NDU in an asynchronous DECnet environment.)
- LAT.
- PC DECwindows Motif.

Simultaneous Ethernet network activity and non-DECnet asynchronous communication via the asynchronous port will experience character loss under some conditions.

The "Autosense Mode" of the Zenith Enhanced EGA card (Z-449) is incompatible with PATHWORKS for DOS and must be disabled. Refer to the *Zenith Owner's Manual* for more information.

HARDWARE REQUIREMENTS

Only systems, components, and peripherals, as specified in the System Support Addendum (SSA 55.07.10-x) are supported.

PATHWORKS for DOS, Version 4.0 has been tested on several supported configurations (refer to SSA 55.07.10-x). If a customer problem with PATHWORKS for DOS software can be reproduced by the customer on one of these supported configurations, Digital will work the problem to resolution on these supported configurations. If the customer problem cannot be reproduced by the customer on one of these supported configurations, it will be the responsibility of the customer to resolve the issue.

SOFTWARE REQUIREMENTS *

If the PATHWORKS for DOS software is used in a server/client environment, at least one of the following server products are required:

- PATHWORKS for VMS (SPD 30.50.xx)
- PATHWORKS for ULTRIX (SPD 32.44.xx)
- PATHWORKS for OS/2 server software (SPD 55.24.xx)
- VAXmate Services for MS-DOS (SPD 55.09.xx)

Support for the VMS Operating System is provided by PATHWORKS for VMS (SPD 30.50.xx). Support for the ULTRIX Operating System is provided by PATHWORKS for ULTRIX (SPD 32.44.xx). Support for the OS/2 Operating System is provided by PATHWORKS for OS/2 (SPD 55.24.xx).

Support for PC DECwindows Motif requires VMS DECwindows Software or ULTRIX Worksystem Software.

* Refer to the System Support Addendum for availability and required versions of prerequisite/optional software (SSA 55.07.10-x).

ORDERING INFORMATION

Software Licenses: QL-0TL**-**

Software Media and Documentation: QA-0TL**-**
TK50 or Magtape kits are required for most customers.

- For use with a VAX/VMS server: QA-0TL**-H5 or -HM
- For use with a VAX/RISC ULTRIX server: QA-0TL*E-H5 or -HM
- Kits: QA-0TL*-HI, -H7, or -HB :
 - To use with a PATHWORKS for OS/2 server
 - To use with VAXmate Services for MS-DOS
 - To use PATHWORKS for DOS locally (installed to a hard disk)
 - Recommended use of DECnet-DOS only
 - Recommended use PATHWORKS for DOS or DECnet-DOS for asynchronous network connections
 - To use any component of the PATHWORKS for DOS product which does not require a file server, such as PC DECwindows Motif.

Documentation

System Administration Documentation (for VMS Servers):
QA-0TL*B-GZ

System Administration Documentation (for ULTRIX Servers):
QA-0TL*E-GZ

System Administration Documentation (for floppy-only use):
QA-0TL*C-GZ

User Documentation: QA-0TL*A-GZ

DECnet-DOS Documentation: QA-0TL*D-GZ

PATHWORKS for DOS User Handbook: AA-PAF7B-TK

DECnet-DOS Programmer's Documentation:
AA-PAFJA-TK

Software Product Services:

PATHWORKS Layered Product Support:
QT-GZPA9**-**

Media and Documentation Update Service:
QT-0TL**-E*

- * Denotes variant fields. For additional information on available licenses, services, and media, refer to the appropriate price book.

SOFTWARE LICENSING

The PATHWORKS for DOS license gives the user the right to use the client software on a single DOS personal computer and/or to access the services of one or more VAX systems running PATHWORKS for VMS server software, VAX or RISC systems running PATHWORKS for ULTRIX server software.

To access the services of the PATHWORKS for OS/2 server, a server license is required. (Refer to SPD 55.24.xx.)

A license must be obtained in advance for each system on which the client software is installed.

The PATHWORKS for DOS license also grants users the right to run ALL-IN-1 MAIL for DOS (SPD 31.51.xx) on the client system. ALL-IN-1 MAIL is an electronic mail product which adheres to CCITT X.400 international standards for electronic messaging. The client media and documentation for the ALL-IN-1 MAIL for DOS are available separately. The ALL-IN-1 MAIL server for VMS license and software must be also purchased separately.

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SOFTWARE PRODUCT SERVICES

A variety of service options are available. For more information, please contact your local Digital office.

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.

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