Software Product Description

PRODUCT NAME: PATHWORKS for DOS, Version 4.1   **SPD 55.07.11**

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 - Software which allows a personal computer running the DOS Operating System to use the facilities provided by PATHWORKS for VMS, PATHWORKS for ULTRIX, or PATHWORKS for OS/2 server software using DECnet as the network transport.

  The PATHWORKS for DOS features are supported with the following physical media types (Ethernet or Token Ring) and Digital servers, unless otherwise noted:

  — PATHWORKS for VMS, Version 4.1 (Ethernet or Token Ring)

  — PATHWORKS for ULTRIX, Version 1.0, 1.1 (Ethernet only)

  — PATHWORKS for OS/2 Server, Version 1.1 (Ethernet only), Version 2.0 (Ethernet or Token Ring)

- PATHWORKS for DOS (TCP/IP) — Software which allows a personal computer running the DOS Operating System to use the facilities provided by PATHWORKS for VMS and PATHWORKS for ULTRIX using Ethernet as the physical media type, and PATHWORKS for OS/2 server using either Ethernet or Token Ring as the physical media type and TCP/IP as the network transport. This product contains the TCP/IP networking software and various TCP/IP network management utilities. PATHWORKS for DOS is a prerequisite product. (Refer to SPD 33.45.xx.)

- PATHWORKS for DOS (Netware® Coexistence) — Software which allows a personal computer running the DOS Operating System to use the facilities provided by PATHWORKS for DOS, while concurrently using the facilities provided by NetWare client software, when both are utilizing a single Ethernet controller. (Refer to SPD 34.76.xx.)

- PATHWORKS for VMS — Software that allows a VMS-based VAX system to act as a file, print, disk, and mail server to DOS- or OS/2-based personal computers. PATHWORKS for VMS supports Ethernet and Token Ring as physical media types and DECnet and TCP/IP as network transports. (Refer to SPD 30.50.xx.)

- PATHWORKS for ULTRIX — Software that allows an ULTRIX-based VAX or RISC system to act as a file, print, and mail server to DOS- or OS/2-based personal computers. PATHWORKS for ULTRIX supports Ethernet as the physical media type and DECnet and TCP/IP as network transports. (Refer to SPD 32.44.xx.)

- PATHWORKS for Macintosh — Software that allows a VMS-based VAX system to act as a file, print, mail, and database server to Macintosh computers using Ethernet as the physical media type and DECnet as the network transport. (Refer to SPD 31.53.xx.)

- PATHWORKS for OS/2 — Software that allows a personal computer running the OS/2 Operating System to use the facilities provided by PATHWORKS for VMS, PATHWORKS for ULTRIX, and/or make the file and print facilities of an OS/2 system available to other personal computers using Ethernet or Token Ring as physical media types and DECnet or TCP/IP as network transports. (Refer to SPD 55.24.xx)

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 Table* in the System Support Addendum (SSA 55.07.11-x) for detailed configuration information.

Features

The PATHWORKS for DOS software provides:

- Communications
- File Services
- Permit Services
- Disk Services
- Print Services
- Print Screen Support
- Mail Services
- Date and Time Services
- InfoServer 100 (CD-ROM) Services
- Broadcast and Receive
- LAN Manager, Version 2.0 Support
- NETBIOS Interface Support
- Task-to-Task Communications
- Memory Savings Techniques
- DOS Version 5.0 Task Switcher API Support
- Installation and Configuration Utilities
- PC DECwindows Motif™
- Microsoft® Windows™ Version 3.0/3.00A Support
- Terminal Emulators
- 3270 Terminal Emulator Support
- SEDT Screen Editor
- Enhanced DOS Utilities
- Multilinguality
- Digital Network Management
- DECnet Network File Operations
- Maintenance Operations Protocol (MOP) Support for Digital Terminal Servers and Routers
- Remote Boot Capability
- Network Device Interface Specification
- EtherWORKS Support

Communications

PATHWORKS for DOS nodes can be connected to a network via an Ethernet, Token Ring, 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 55.07.11-x) for details on supported Ethernet, Token Ring, or asynchronous DECnet configurations.

The PATHWORKS for DOS software can 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.

If asynchronous DECnet 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.

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 or Token Ring Local Area Network can connect to only one node (for PATHWORKS for 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 ONE of the following connections on any given personal computer:

- Direct connections to baseband or twisted pair (10baseT) Ethernet local area networks via Ethernet controllers. Digital recommends the use of the multi-buffered DEC EtherWORKS controllers in networks which carry heavy traffic.

- Direct connections to shielded or unshielded twisted pair Token Ring local area networks via Token Ring controllers.

- Asynchronous connections to the network via serial lines, using the personal computer's asynchronous communications adapter as the physical link.

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.

PATHWORKS for DOS software utilizes Ethernet or Token Ring as its physical media type through the use of an Ethernet or Token Ring controller, in conjunction with Digital's baseband Ethernet components or selected Token Ring components.

PATHWORKS for DOS supports internetworking between local and/or remote Token Ring and/or Ethernet local area networks via a supported internetworking device.

Support is provided for source routing in Token Ring environments. PATHWORKS for DOS, Version 4.1 can gain access to the PATHWORKS for OS/2, Version 2.0 server resources within an extended Token Ring only LAN (that is where the Token Rings are connected via source routing bridges).

Applications which modify the network node address are not supported in a PATHWORKS for DOS Token Ring environment.

File Services

Through the integration of Microsoft's LAN Manager, Version 2.0 with DECnet as well as emulation of IBM's NETBIOS, the DOS 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 LAST transport can be configured through the advanced menu of NETSETUP.

Note: File and print services using the LAST transport are not available in Token Ring configurations or with Ethernet configurations using either the PATHWORKS

for ULTRIX, Version 1.0, Version 1.1 or PATHWORKS for OS/2, Version 1.1, Version 2.0 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. Virtual disks can be useful for remote boot, providing extra storage capacity for the personal computer user or for backing up local files using the DOS COPY utility. Up to eight virtual disks can be opened simultaneously.

Note: Disk services via LAD and LAST are not available in Token Ring configurations or with Ethernet configurations using either the PATHWORKS for ULTRIX, Version 1.0, Version 1.1 or PATHWORKS for OS/2, Version 1.1, Version 2.0 servers.

In a wide area network configuration or in a network without a PATHWORKS server, access to virtual disks through DECnet is provided via the Network Device Utility (NDU) and the NDDRV device driver. 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 for both LAD and NDU disks can be 360KB, 720KB, 1.2M, 1.44M, 10M, 20M, 32M, 64M, 128M, 256M, 512M bytes in any combination.

Print Services

Through the integration of Microsoft's LAN Manager, Version 2.0, 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 PC to be offered to the network as remote printers through the use of the Local Area Terminal (LAT) protocol, Version 5.1. (The PC must be configured within the limitations of the specific version of DOS to utilize this feature.) 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: Using locally attached printers as remote net-worked printers is not available in Token Ring config-urations or with Ethernet configurations using PATH-WORKS for OS/2, Version 1.1, Version 2.0 servers.

The Network Device Utility (NDU) (in conjunction with the NPDRV device driver) 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.

Refer to the System Support Addendum (SSA 55.07.11-x) for a list of supported printers.

Refer to PATHWORKS for VMS (SPD 30.50.xx), PATH-WORKS for ULTRIX (SPD 32.44.xx), or PATHWORKS for OS/2 server software (SPD 55.24.xx) for more infor-mation on remote printer support.

Print Screen Support

Users can print the contents of a screen to a local or remote printer over the network by using Print Screen functionality while using a DOS-based application (in-cluding the SETHOST terminal emulator). To print the contents of a screen while using 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 op-erate within the same DECnet network. (The PATH-WORKS for VMS or ULTRIX mail server must already be installed to utilize MAIL.)

MAIL is a PC-style utility for sending and reading mail. It contains horizontal menu bars, pull-down menus, and Help listed by topics. 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, annotate, 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 se-lected callable editor, such as SEDT) which can out-put 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 and during PATHWORKS sessions.

- Receive notification of incoming messages using the Receive utility. In most cases, notification is achieved via sound while using a graphics application, and via a pop-up window on the user's display while using character cell applications. This feature may be op-tionally 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. This service assures users of consistent timestamps on any given file created, shared or updated by other users.

InfoServer 100 (CD-ROM) Services

Through the integration of Microsoft's CDROM exten-sions to the MS–DOS® Operating System (MSCDEX), DOS clients can access the CD-ROM drives of Digital's InfoServer 100 containing applications written using the PC industry-standard format, ISO 96-60.

The InfoServer 100 is an Ethernet-based, high-performance virtual disk server capable of making CDROMs available to clients on the network. Refer to the InfoServer 100 Software Software Product De-scription (SPD 33.20.xx) for further information on the InfoServer 100.

Access to the InfoServer 100's CD-ROM drives is trans-parent to the DOS clients. Clients see the information they require on fully shareable drives as if they were locally attached devices.

PATHWORKS for DOS clients can access up to eight Local Area Disk (LAD) drives, of which seven can be configured as CDROMs at any one time.

Note: DOS clients cannot access the InfoServer 100s in a Token Ring configuration as the InfoServer 100 is an Ethernet-only device.

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.

LAN Manager, Version 2.0 Support

PATHWORKS for DOS includes Microsoft's LAN Manager, Version 2.0 which provides the following capabilities:

- Full set of LAN Manager Application Programming Interface (API) functions (such as named pipes) which allow for the development and support of distributed applications.

  Note: Support of distributed applications requires full API support on both the client and server system. Therefore, a LAN Manager server-client application is currently only supported between a PATHWORKS for DOS or PATHWORKS for OS/2 client and a PATHWORKS for OS/2 server.

- Net commands.

- Basic Redirector — Use the Basic Redirector to access the file and print services of a PATHWORKS for VMS, ULTRIX, and/or OS/2 server(s). The Basic Redirector supports user names (share names) up to 32 characters.

- Enhanced Redirector — Use the Enhanced Redirector to access the full LAN Manager, Version 2.0 capabilities with a PATHWORKS for OS/2 server.

Note: The Enhanced Redirector supports user names (share names) up to 8 characters.

NETBIOS Interface Support

PATHWORKS for 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 PATHWORKS for DOS.

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

The NETBIOS naming service and datagram service is supported in both Ethernet and Token Ring Local Area Network configurations.

Note: Datagram services cannot be forwarded through routers.

Task-to-Task Communications

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 (TTT), 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).

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.

Note: The Task-to-Task interface (TTT) and the Transparent File Access (TFA) utility are currently not supported under Microsoft Windows, Version 3.0.

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 PATHWORKS for DOS C language subroutines to the specific C compiler being used. Small, medium and large size memory models are supported.

The PATHWORKS for DOS license grants a royalty-free, non-exclusive license to use Digital's source code located only in the subdirectory \PCSAV41\DECNET\-SOURCE to create binaries which a user may then copy and merge with user's software for distribution to its customers.

A program written for the DOS client using the programming libraries can be identified as a network object and invoked through the Job Spawner utility.

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.

Memory Savings Techniques

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

- Several network components can be optionally loaded 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 Enhanced Redirector can be loaded into HMA or into Expanded Memory (EMS). The configuration must have a minimum of 64KB of extended memory (if either redirector is loaded in 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.

  Users should use the Enhanced Redirector to take advantage of the full LAN Manager capabilities in conjunction with a PATHWORKS for OS/2 server.

  Note: DOS Version 5.0 cannot be loaded in the High Memory Area (HMA) if either the Basic or Enhanced Redirector is already loaded into the HMA.

- Provides the ability to unload several network components from either conventional or EMS memory.

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

- Availability and size of EMS drivers

- Whether the LAN Manager Basic or Enhanced Redirector is used and what portion of memory they are loaded into

- Whether an Ethernet or Token Ring controller is used

- 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 PATHWORKS 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.

DOS Version 5.0 Task Switcher API Support

PATHWORKS for DOS supports only those applications that support the DOS Version 5.0 Task Switcher Application Programming Interface (API). Every effort has been made to ensure that the PATHWORKS for DOS software adheres to the DOS Version 5.0 Task Switcher API. However, individual vendors' interpretation of the specification may vary and, therefore, some applications may not function in Digital's PATHWORKS for DOS network environment with the Task Switcher enabled.

Installation and Configuration Utilities

PATHWORKS for DOS includes an automated installation procedure to install the client software to the PATHWORKS for VMS or ULTRIX server system or to the client's hard disk.

A DOSLOAD utility is provided to simplify management of various versions of the DOS Operating System to the PATHWORKS for VMS or ULTRIX server system.

PATHWORKS for DOS includes a configuration utility, NETSETUP, which guides the user through the configuration process using a series of screen selections and online Help. The user's input to the procedure establishes the PATHWORKS for DOS node's network configuration and copies the startup software to the key disk. NETSETUP has three operational modes depending upon the configuration choices desired. In many cases, defaults can be selected for fast and easy configuration.

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, ULTRIX system with DECnet may be displayed on and

receive keyboard and mouse input from the personal computer.

Only one transport, either DECnet or TCP/IP, is supported at any one time regardless of the number of applications running in various windows.

PC DECwindows Motif is only supported on Intel 80286, 80386, and 80486 machines listed in the System Support Addendum (SSA 55.07.11-x).

Use:

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

- DWDOS386 for Intel systems with 80386 and 80486 processors

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

A minimum of 1 MB 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.

Between 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) or the DOS Protected Mode Interface (DPMI) specification. 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.

DWDOS386 does not support DPMI.

DECwindows and X Window System applications that do not take into account the PC's 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.

Note: The VMS window manager will be discontinued with the next release of this product.

A configuration utility, DWCONFIG, is provided for users to configure the X Server for their hardware and configure the user preferences parameters.

A KEYSYM compiler, DWKEYSYM, is provided for users to build custom keyboard layouts to support applications.

A font compiler, DWFONT, 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.

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

Use of PC DECwindows Motif exclusively does not require that a PATHWORKS server reside in the network.

Microsoft Windows Version 3.0/3.00A Windows Support

PATHWORKS for DOS software supports Microsoft Windows, Version 3.0, including:

- 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 ability to run the networking software in expanded memory (EMS) with Windows, Version 3.0 in Real, Standard, or 386 Enhanced modes.

If using the remote boot feature in conjunction with Microsoft Windows, Version 3.0 in 386 Enhanced Mode, the Microsoft-supplied TSR named RPLMEM must be loaded.

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

EMM386.SYS is the 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. (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 DOS-based menu-driven utility (WIN3SETU) is provided to simplify the installation of PATHWORKS for DOS Microsoft Windows, Version 3.0 support software.

- 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 (TRMNLAXS) that provides LAT, CTERM, and TELNET 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 the PIFs, given the application mix and specific personal computer configuration.)

    Note: The Task-to-Task interface (TTT) and the Transparent File Access (TFA) utility are currently not supported under Microsoft Windows.

    Only one transport, either DECnet or TCP/IP, is supported at any one time regardless of the number of windows running.

Terminal Emulators

The PATHWORKS for DOS software includes two 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).

- 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 through a Ethernet or Token Ring controller on the client.

Note: Both terminal emulators are NOT fully VT320 compatible; for example, SETHOST does not support double-height, double-wide characters.

VT320 Features for Microsoft Windows, Version 3.0

- 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.

    Note: If using Token Ring, only the CTERM protocol and serial terminal communications are supported.

- 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, and serial terminal communication.

   Note: If using Token Ring, only the CTERM protocol is supported.

- 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.

3270 Terminal Emulation Support

PATHWORKS for DOS includes a component called Systems Network Architecture Gateway NETBIOS Interface (SNAGNI). SNAGNI is an enabling technology that allows 3270 terminal emulators to communicate with an IBM mainframe via a Digital DECnet/SNA Gateway while operating in a PATHWORKS for DOS environment. Refer to the vendor's 3270 documentation to determine if the terminal emulator in question can interoperate with SNAGNI.

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 with 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 include support for 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).

Multilinguality

Some PATHWORKS for DOS components are available in languages other than English. More than one language variant can be run from the PC without rebooting. For more information, refer to the following SPDs:

   Swedish (SPD 55.17.xx)
   Spanish (SPD 55.18.xx)
   Dutch (SPD 55.19.xx)
   French (SPD 55.20.xx)
   German (SPD 55.21.xx)
   Italian (SPD 55.22.xx)

Digital Network Management

The Network Control Program, Network Management Listener, and Local Area Terminal Control Program are provided for network management purposes.

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

- Displaying statistical and error information. The user can display the status of the local node's DECnet activity and statistics related to both the node and the communication line.

- Controlling the node's network components. Control functions are limited to starting and stopping the line, and activating the local node.

- Testing local network 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. The Network Control Program (NCP) can act as a loopback mirror to which remote nodes can send test messages for diagnostic purposes.

PATHWORKS for 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 DOS nodes. Remote alteration of network parameters is not supported.

LATCP (Local Area Terminal Control Program) allows the user to:

- Display statistical and error information for LAT

- Manipulate preferred services (add, delete)

- Set LAT parameters

DECnet Network File Operations

The Network File Transfer and File Access Listener utilities are provided for network file operations.

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, Version 3.0.

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

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, Version 3.0.

Maintenance Operations Protocol (MOP) Support for Digital Terminal Servers and Routers

Maintenance Operations Protocol (MOP) down-line load and up-line dump support for Digital terminal servers and routers is included in PATHWORKS for DOS. This allows users to utilize Digital communications servers in environments which would not justify the presence of VMS or ULTRIX load host systems. This capability is not supported if using Token Ring as Digital terminal servers and routers are Ethernet-only devices.

Remote Boot Capability

Users can remote boot a personal computer from an Ethernet network virtual boot disk using the disk services capability of the 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 unavailable in Token Ring network configurations. Remote boot is unavailable in Ethernet network configurations with PATHWORKS for ULTRIX, Version 1.0, 1.1 or PATHWORKS for OS/2, Version 1.1, Version 2.0 servers. The remote boot capability is also unavailable if the user chooses to use a Network Device Interface Specification (NDIS), Version 2.0.1 driver with any Ethernet controller.

Network Device Interface Specification

PATHWORKS for DOS networking software is Network Device Interface Specification (NDIS), Version 2.0.1 compatible. NDIS is a standard developed by Microsoft Corporation and 3Com® Corporation.

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

Because the PATHWORKS for DOS software is written to the NDIS interface, users can use third-party Ethernet or Token Ring controllers if accompanied by an NDIS, Version 2.0.1 driver. Every effort has been made to ensure the software adheres to the NDIS, Version 2.0.1

specification. However, individual vendor's interpretation of the specification may vary and therefore may not function in Digital's PATHWORKS for DOS network environment.

The PATHWORKS for DOS product contains several NDIS drivers for the convenience of our users. The NDIS drivers are furnished "AS IS", and Digital cannot be held liable for any special, indirect, incidental, or consequential damages.

Remote boot is not supported using NDIS drivers in either Ethernet or Token Ring configurations.

EtherWORKS Support

PATHWORKS for DOS supports Digital's family of EtherWORKS controllers via Digital's propriety datalinks (DLLs) or NDIS drivers. (These drivers are included in this software package.) The family of Ether-WORKS controllers include: EtherWORKS LC, Ether-WORKS LC/TP, EtherWORKS MC, EtherWORKS MC TP/BNC, EtherWORKS Turbo, EtherWORKS Turbo/TP, and EtherWORKS Turbo TP/BNC.

Notes:

Digital Ethernet NDIS drivers can also be used with previous versions of the Digital Ethernet controller family, DEPCAs.

Digital recommends the use of the Digital multi-buffered EtherWORKS controllers in networks which carry heavy traffic.

Restrictions and Limitations

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

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 DECnet 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 (LAST) protocol. (The user can access virtual disks via NDU in an asynchronous DECnet environment.)

- LAT.

- PC DECwindows Motif.

- Microsoft Windows, Version 3.0 running in Standard or Enhanced Mode.

Simultaneous Ethernet network activity and non-DECnet asynchronous communication via the asynchronous port results in character loss on the asynchronous port.

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

Systems, components, and peripherals, as specified in the System Support Addendum (SSA 55.07.11-x) are supported.

PATHWORKS for DOS, Version 4.1 has been tested on several supported configurations (refer to SSA 55.07.11-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)

Refer to the System Support Addendum (SSA 55.07.11-x) for availability and required versions of prerequisite /optional software.

ORDERING INFORMATION

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

Software Media and Documentation: QA-0TL**-**

- QA-0TL**-H5 (TK50 cartridge) or -HM (magtape) for use with a VAX/VMS server.

- QA-0TL*E-H5 (TK50 cartridge) or -HM (magtape) for use with a VAX/RISC ULTRIX server.

- QA-0TL*A-H7 (high-density 5 1/4 inch floppies) or -HB (low-density 3 1/2 inch floppies):

  — To use with a PATHWORKS for OS/2 server

  — 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

  — QA-0TL*B-H7 (high-density 5 1/4 inch floppies) or -HB (low-density 3 1/2 inch floppies) to install additional languages

Documentation

Complete Documentation (for VMS Servers):

  QA-0TL*B-GZ

Complete Documentation (for ULTRIX Servers):

  QA-0TL*E-GZ

Complete Documentation Set (for floppy-only systems):

  QA-0TL*C-GZ

User Documentation: QA-0TL*A-GZ

DECnet–DOS Documentation: QA-0TL*D-GZ

PATHWORKS for DOS User Handbook: AA-PAF7C-TK

DECnet Programmer's Documentation: AA-PAFJC-TK

* 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 to use the PATHWORKS for VMS server software on one or more VAX systems, and the PATHWORKS for ULTRIX server software on one or more VAX or RISC systems.

To use the PATHWORKS for OS/2 server software, 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 the right to use:

- ALL–IN–1 MAIL for DOS software (SPD 31.51.xx) on the client system. The client media and documentation for ALL–IN–1 MAIL for DOS are available separately. The ALL–IN–1 MAIL server for VMS license and software must also be purchased separately.

- PATHWORKS for DOS (Netware® Coexistence) software (SPD 34.76.xx) on the client system. The media and documentation for PATHWORKS for DOS (Netware Coexistence) are available separately.

The CD-ROM sharing capability of the PATHWORKS for DOS product is restricted for use with the Digital InfoServer 100 product only.

This software is furnished under the licensing provisions of Digital Equipment Corporation's Standard Terms and Conditions. For more information about Digital's licensing terms and policies, contact your local Digital office.

SOFTWARE PRODUCT SERVICES

A variety of service options are available. For more information, 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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