Software Product Description

PRODUCT NAME: DECserver 200 for VMS, Version 3.3 **SPD 27.53.07**

DESCRIPTION

The DECserver 200 Terminal Server is a network terminal switch for Ethernet Local Area Networks. The DECserver 200 provides a convenient method to logically connect up to eight Digital asynchronous terminals to one or more service nodes (hosts) on an Ethernet. Once the terminal is connected, a user, with a few exceptions, can utilize application programs and utilities as though the terminal were directly connected to a host via a DZ11, DMF32, or DHU11 device. Thus, it may be possible to utilize the DECserver 200 to connect all terminals, except for host console terminals to service nodes in place of traditional interfaces. Remote connection via dial-in modems is fully supported.

The DECserver 200 also allows for OpenVMS host-initiated connections to serial printers. A special print symbiont on OpenVMS service nodes can initiate connections to serial printers connected to DECserver 200 ports. This allows the printers to be distributed throughout a facility and accessed transparently by service node users. Incoming host-initiated connect requests may be queued first in/first out (FIFO) at the server.

The DECserver 200 also provides the capability to connect host systems that do not support the LAT (Local Area Transport) protocol, Digital personal computers, and dial-out modems directly to ports on the server. Interactive server users can issue commands to connect to services that are offered on such ports. Port-to-port connections on the same server are also supported.

The DECserver 200 implements the Local Area Transport protocol for communication with service nodes that implement this protocol on the same Ethernet. This interface has been optimized for high terminal I/O performance over an Ethernet, while reducing host CPU cycles required to handle interrupts. Hence, under most I/O loading conditions, a significant performance gain may be realized by using the DECserver 200 versus direct terminal connections via DZ11s.

The DECserver 200 also implements and supports the Terminal Device/Session Management Protocol (TD /SMP) to manage multiple sessions at the device level. The DECserver 200 provides the ability to communicate with devices that also implement this protocol, and assists in the management of multiple sessions for these devices. By implementing this protocol, the DECserver 200 can permit attached devices to maintain screen and keyboard context for multiple LAT sessions, as well as allow these devices to run multiple LAT sessions concurrently.

The DECserver 200 implements the ODL (On Demand Loading) font loading protocol which allows Asian terminals that implement the ODL protocol to communicate with an OpenVMS host via a terminal server. The Asian terminals will be able to request font definitions from an OpenVMS host when connected to a DECserver 200.

Software that runs on the DECserver 200 is downline loaded over the network from a Phase IV DECnet load host. Terminal access using the DECserver 200 does not require DECnet running in the same service node; LAT uses the Ethernet addressing mechanism to transport terminal messages. The DECserver 200 server software will operate with all Digital service nodes which support the LAT protocol.

Features such as login load balancing, multiple terminal sessions, automatic failover, and remote printer support can lead to greater user productivity.

For wide area network communications, terminal users can connect to a local service node running DECnet, where they can "SET HOST" to a remote system via the DECnet network terminal protocol. If this system has the requisite X.25 or SNA 3270 access routines, a terminal user could communicate to a remote SNA or X.25 host through the appropriate gateway and this intervening host. A DECserver 200 terminal user cannot communicate directly to remote hosts through DECnet Routers or X.25/SNA Gateways. Wide area network traffic will not provide the same high level of performance as local terminal connections, due to the additional DECnet and Internet protocol overhead.

Features

Terminal Connection Management

Through the use of a simple command, users can establish a logical connection, called a session, to any service node that implements the LAT protocol on the same Ethernet LAN. This connection makes the terminal appear as if it were physically connected to the service node, and the terminal user can use standard system utilities and applications supported by that node. Each terminal connected to the server can connect to the same or a different service node on the Ethernet. Furthermore, several servers can be used to connect many terminals to one or more service nodes.

A service node can have one or more services that are offered to DECserver 200 users. Services and nodes are identified by name. Users always connect to services, not to nodes, although often one of the service names will be the node name.

In a VAXcluster environment, the DECserver 200 sees each VAXcluster on the Ethernet as a collection of service nodes offering a common service. Each cluster node may also offer a service whose name is equivalent to its node name. In this case, a terminal user can connect either to the cluster service or a service associated with a particular cluster node.

Non-LAT Host Support

The DECserver 200 can be used to provide logical terminal connections to hosts that do not implement the LAT protocol. In this type of configuration, the server becomes the Ethernet connection and protocol support for these hosts. This expands the LAT network accessibility to the terminal user to include LAT hosts directly connected to the same Ethernet and hosts connected to the LAT network via the DECserver 200.

A host that supports XON/XOFF, ASCII standards and EIA RS-232-C/CCITT V.24/V.28 interfaces can be connected to the DECserver 200. This provides the terminal user with a transparent connection to the non-LAT host. It is strongly recommended that server port and the host side port utilize modem control signals to automatically signal the host upon session disconnection.

In this configuration, there is a one-to-one correspondence between the port on a DECserver 200 and the connection on the host. The server manager assigns service names to individual ports or groups of ports that connect the host interface to the server.

Load Balancing

When a connection is made to a service, the actual node for the connection is determined by load balancing. Load balancing is a process the server uses when more than one node offers the same service. Service nodes do not have to be configured in a cluster in order for load balancing to be used. Service nodes with the same names may be running different operating systems. Using the load balancing process, the server connects to the node with the highest rating for the service desired. This rating is based on the current loading on the nodes that offer the service.

Multiple Sessions

The DECserver 200 allows each user to establish and maintain up to 8 sessions to one or more service nodes, up to a maximum of 64 per DECserver 200. Only one session per user can be active at a time. Through simple switching commands, the user can access the different sessions without repeating a login dialog each time. Some operating systems may impose limits on the number of LAT sessions such a host will support.

Multiple Session Management

The DECserver 200 server allows direct communication with devices that support the TD/SMP protocol. This protocol provides the ability for the attached device to maintain screen and keyboard context for the multiple LAT sessions which the DECserver 200 provides. By implementing the ability to directly communicate with this protocol to the attached device, the DECserver 200 can now assist in the management of context of these multiple sessions, as well as allow for simultaneous output to multiple LAT sessions being maintained by the device.

Outbound Connection Queues

If a terminal user requests a connection to a server, and the requested service is currently in use, the terminal server users may opt to have the connection requested queued to the remote service. This feature will happen automatically whenever a connection fails for this reason, if the user's port has been appropriately configured. The connection request is queued at the service node end and is processed first in/first out until such time as the user's connection request can be completed. This feature assists in the fair management of limited network resources. Once queued for connection, the user also has the option to cancel the queue entry and proceed with other sessions.

Welcome Identification

The DECserver 200 server standard welcome banner, which includes terminal server type, version number, internal baselevel, and protocol version number, is issued whenever a user successfully logs in to the server. The server will also print a server manager settable identification string. This can be useful for automatic server identification, or for small daily messages used for communication with the terminal server users.

Local Mode and Service Mode

For the most part, the environment provided by the DECserver 200 is identical to that the user would experience if attached directly to the service node. When operating in this mode, the user is said to be in Service Mode. Occasionally, such as during connection establishment, the user interacts directly with the DECserver 200. When operating in this mode, the user is in Local Mode.

In Local Mode, the terminal input is interpreted directly by the DECserver 200 as commands to be performed by the server. The local mode prompt can be modified by a privileged command and can be changed from LOCAL> to any printable characters (up to 16 characters).

Additional commands and displays to support the features available with the TD/SMP protocol are usable in Local Mode. These commands will be used to enable or disable server recognition of the TD/SMP commands.

Local Mode has three different levels of privilege: privileged, nonprivileged, and secure. Privileged mode is provided for the Server Manager to control the environment of the server and the terminal users. Access to this mode is password protected. Nonprivileged commands allow terminal users to control their service sessions, set their terminal characteristics, and show server information. The Server Manager can set the server to secure mode on a per-terminal basis, which further limits the commands and displays of services and nodes that users can enter to only those which directly relate to the user's own terminal.

The Server Manager environment is a logical extension of the user environment. The Server Manager is treated as a server user with a privileged status. The Server Manager sets a terminal to this status using a command which requires a password. This privileged status allows the Server Manager to enter commands not normally available to server users. These commands set server characteristics, provide control over server port usage, and provide the ability to control the user's access to the server and network services.

In Service Mode, the terminal input is passed directly to the connected service node with several exceptions. One exception, called the local switch character, allows the user to enter Local Mode from Service Mode. The BREAK key may also be used for this function. Other exceptions, called the forward and backward switch characters, allow the user to switch between sessions without the need to enter local mode. The switch characters are disabled by default but may be enabled by command. Both CTRL/S and CTRL/Q are normally interpreted locally but flow control using these characters can be disabled.

Autoconnection

Autoconnection is a function that automatically connects a user terminal to a service node when connection failures occur or upon user login to the server. In conjunction with this function, a dedicated or preferred service can be specified for each terminal user.

If a dedicated service is specified, the DECserver 200 will attempt to connect to that service when a character is typed on the terminal keyboard or when an existing connection fails. In dedicated service mode, only one session is available. As this mode is designed to simulate a direct terminal connection, no local mode commands or messages are available to the terminal user. Ports with dedicated service can be automatically logged out of the server when the user logs out of the service node.

If a preferred service is specified, the DECserver 200 will attempt to connect to that service as with the dedicated service mode of operation. However, the terminal user can enter local mode and establish other sessions.

Automatic Session Failover

If a service is available on two or more service nodes and a connection to a service fails, the server will attempt to connect the user to another service node offering the same service. The user does not have to be already connected to that service node. Furthermore, the user's context at the time of failure is not automatically restored and login to the new service is required.

Groups

Every terminal and service node in a LAT network is a member of one or more groups, which are specified by a list of numbers from 0 to 255. Groups allow an easy means of subdividing the network into what appears to be many smaller networks. A terminal user is only aware of the services that are offered by nodes in the same group(s).

The Server Manager can specify the authorized group(s) in which a terminal is a member. The authorized groups define the set of services that the user is allowed to access. In addition, a user can further restrict access to services by disabling some of the authorized groups using a nonprivileged group command. The user-settable group codes are a subset of the authorized groups.

Groups provide a restrictive view of the network. This restricted view is mainly for user convenience and, although it also provides a form of security, it is not intended to be the primary form of access authorization or system security for a node.

Security

The DECserver 200 provides functions that enhance security features already available in the service nodes. DECserver 200 security includes the ability to lock a terminal's keyboard from other users, optional login protection, and nonprivileged local mode of operation as a default.

A user may lock the terminal using a lock password. This allows the user to leave sessions running at the terminal without fear of security violations. When a terminal is locked, all input from the terminal is ignored until the lock password is reentered. The lock feature may be disabled by the Server Manager.

Each terminal port can be set to operate in a secure mode, which causes all commands that relate to other users to be disabled for that port.

Login passwords can be enabled on a per-line basis by the Server Manager. If enabled, the terminal user must enter a login password to access server functions.

DECserver 200 users normally have access to the nonprivileged local mode. In this mode, users may only issue commands that affect their own terminal environment. The server has a privileged mode for server manager's use. The mode is password protected.

Online HELP Facility

A full online reference HELP facility is available. The server's HELP command provides information on the correct syntax and details about each command. In addition, a tutorial HELP feature allows new users to quickly learn the basics of DECserver 200 operation. Tutorial HELP may be entered upon logging into the server.

Directory Service

Any DECserver 200 user can obtain a directory of services available to that user with a SHOW SERVICES command. Services for which the user is not authorized will not be displayed.

Permanent Characteristics

The DECserver 200 maintains permanent characteristics in nonvolatile memory which is retained even when the power is disconnected. Permanent characteristics are maintained for service and server parameters as well as per-port parameters. Permanent characteristics can be reset to factory defaults by pressing the software reset button on the hardware unit while plugging in the power cord.

Port Characteristics Configuration

Characteristics governing the operation of an individual port can be displayed by nonprivileged terminal users interactively from their terminal. Many of the characteristics may be set up by the user, but certain characteristics are privileged and may only be changed by the Server Manager.

Port parameters that can be set and displayed include speed, character size, group codes, parity, terminal type, access, autobaud, modem, and password protection.

Port Access

A port on a DECserver 200 may be set up in different ways depending on the device attached to the port and its intended use. DECserver 200 supports EIA-RS-232-C and DECconnect asynchronous devices operating at speeds up to 19.2K bps.

Port access is the characteristic that determines how a port may access or be accessed by interactive users and service nodes.

- Access Local—Designed for interactive terminals. This allows the device (typically an interactive terminal) attached to the port to CONNECT to LAT services. This type of access is also used for dial-in modems.
- Access Remote—Designed for applications-driven devices such as asynchronous printers which are allocated by a service node process. This allows the implementation of certain shared printers by multiple service nodes. This type of access is also used for connections to dial-out modems, and non-LAT host systems.
- Access Dynamic—Designed for devices such as personal computers or printers with keyboards which require both Local and Remote access.
- Access None—Designed to allow the Server Manager to disable the use of a port.

With printer support capabilities, the setup procedure of remote printers needs to be done once and is automatically reconfigured on system startup. The particular server port must be configured for remote access and set up to match the characteristics of the printer. The system startup command file must be modified to call the two command files provided with the service node software. Finally, the command files themselves must be customized to reflect the environment of their node. The server can optionally queue remote connects if these connects cannot be satisfied immediately. This queue management can be enabled for the server by the Server Manager. Note that this is a connection queue only.

Terminal Operation

The DECserver 200 software supports the simultaneous operation of up to eight asynchronous devices at speeds from 75 bps to 19.2K bps. The software also supports:

- Full modem control support (DECserver 200/MC only)
- Data leads only support
- XON/XOFF flow control
- CTS/RTS and DSR/DTR flow control (DECserver 200/MC only)
- Split speed (transmit and receive) terminal operation
- Modem fallback features (DECserver 200/MC only)
- Block Mode transfers
- Automatic line speed detection
- Digital personal computer file transfer
- Data transparency mode
- Ability to pass break character and error notification
- Ability to assist in multiple session management via TD/SMP

Server Management

Several facilities exist for managing and troubleshooting server operation. The Server Manager in privileged mode can set up server identification information, change port characteristics, or fine tune the operating characteristics of the server. The Server Manager can also assign service names to groups of one or more ports that are connected to non-LAT hosts or modems. Troubleshooting facilities include diagnostic tests, a remote console feature, and online statistics.

A privileged user can diagnose Ethernet communications problems by looping messages to an Ethernet host and through the Ethernet hardware interface at the server. To diagnose terminal problems, users can execute a command to transmit test data to their terminal, or the server manager can send test data to any terminal.

The capability also exists for the Server Manager to test a service connection by sending data from the initiating port to the service node and back again. The data is then compared and any discrepancies reported. At the service node, the data can be looped back by the LAT protocol, or internally or externally at the service port. This feature is supported only by DECserver 200 service nodes; OpenVMS service nodes do not support this service loopback capability.

The server maintains a variety of statistics and counters including Ethernet data link statistics, LAT protocol statistics, and port error statistics. These data can be displayed and zeroed by the Server Manager. Server parameters that can be modified and displayed include the server identification, circuit timer, session limits, and login limits.

Remote Server Management

The DECserver 200 implements the console carrier feature, which enables access to the DECserver 200 local mode from a Phase IV DECnet host on the same LAN. With the exception of remote console port configuration, the entire local mode user interface is accessible to the remote console carrier user. This includes the privileged commands, if the user knows the server's privileged password. This capability allows centralized server management and remote server diagnosis.

Communications

DECserver 200 software is designed to run exclusively on DECserver 200 hardware that includes an Ethernet interface for connection to an Ethernet transceiver cable.

The DECserver 200/MC has eight EIA RS-232-C/CCITT V.24 asynchronous line interfaces for connecting terminals to the unit.

The DECserver 200/DL has a single 36-pin DECconnect connector for eight ports.

On the DECserver 200/MC, each port on the server can be set up by the Server Manager to operate using full-duplex modem control. The DECserver 200/MC is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents. A BREAK feature is available and can be set on a per-port basis. This allows the DECserver 200/MC to force a break condition on connections to host interfaces. BREAK can also be passed through from a terminal connected on the server to the non-LAT host connected on the server.

DECserver 200 Operation

The DECserver 200 ROM-based firmware provides the necessary maintenance operation protocols for downline loading DECserver 200 software from a Phase IV DECnet load host over the Ethernet into server memory. All self-test diagnostics are in DECserver ROM, so downline loading is not a precondition for DECserver self-test. In the event of a bugcheck caused by a fatal error, the unit will normally attempt to upline dump server memory to a DECnet Phase IV host. Following this, the unit will automatically initialize itself and invoke a downline load.

DECserver 200 Configuration and Performance

The process of configuring the DECserver 200 is based primarily on tradeoffs of cost and performance within the realm of satisfying user application requirements. Network applications will range from low-speed, low-cost situations (e.g., connecting remote terminals through low-speed modems) to those of relatively high performance (e.g., connecting high-speed local terminals to local hosts within a local area network or connecting to non-LAT systems). The performance of a given server is a function of the expected network traffic, the load on hosts to which terminals are connected, and resultant processing pursuant to the dedicated function of the unit. Thus, performance depends on several factors:

- Number of terminals
- Number of host systems with active connections to the server
- Number of active connections to non-LAT hosts
- Terminal speeds
- Terminal user applications
- Number and size of host buffers
- Terminal workload

The DECserver can sustain an aggregate character throughput of over 11520 characters per second. This is equivalent to running four ports at 19200 bps, and four at 9600 bps.

In order to achieve a viable configuration, the user and /or a Digital software specialist should perform a level of application analysis that addresses the factors above. The actual maximum data throughput cannot be calculated by multiplying the number of lines by the line speed, since many factors already discussed in this section may reduce the actual throughput.

Restrictions on DECserver 200 Usage

While terminal connections using the DECserver 200 have been designed to simulate direct terminal connections as much as possible, a few differences necessarily exist because of the nature of the product. Under most circumstances, these differences are not noticed by terminal users or service node application programs. However, applications which are directly dependent on the following functions may not operate as with a direct connection:

- Applications that depend on reading or setting the terminal speed, character size, and parity by manipulating system data structures
- Applications that depend on an extremely fast response time (typically less than 200 ms) to operate
- Applications that utilize an alternate terminal driver in the service node
- Applications that expect incoming connections to have fixed device names

Other DECserver 200 Systems

Refer to the following Software Product Descriptions for information on other supported DECserver 200 systems:

- DECserver 200 for RSX–11M–PLUS and Micro/RSX (SPD 15.72.xx)
- DECserver 200 for ULTRIX (SPD 27.54.xx)

HARDWARE REQUIREMENTS

Processors Supported

Alpha AXP:
DEC 2000 Model 300 AXP Workstation
DEC 2000 Model 300 AXP Server
DEC 3000 Model 300 AXP Workstation
DEC 3000 Model 300 AXP Server
DEC 3000 Model 400 AXP Workstation
DEC 3000 Model 400 AXP Server
DEC 3000 Model 500 AXP Workstation
DEC 3000 Model 500 AXP Server
DEC 3000 Model 600 AXP Workstation
DEC 3000 Model 600 AXP Server
DEC 3000 Model 800 AXP Workstation

DEC 4000 Model 610 AXP System

DEC 7000 Model 610 AXP System

DEC 10000 Model 610 AXP System

VAX:
VAXft Model 110,
VAXft Model 310,
VAXft Model 410,
VAXft Model 610,
VAXft Model 612

VAX 4000 Model 100,
VAX 4000 Model 200,
VAX 4000 Model 300,
VAX 4000 Model 400,
VAX 4000 Model 500,
VAX 4000 Model 600

VAX 6000 Model 200 Series,
VAX 6000 Model 300 Series,
VAX 6000 Model 400 Series,
VAX 6000 Model 500 Series,
VAX 6000 Model 600 Series

VAX 7000 Model 600 Series

VAX 8200, VAX 8250, VAX 8300,
VAX 8350, VAX 8500, VAX 8530,
VAX 8550, VAX 8600, VAX 8650,
VAX 8700, VAX 8800, VAX 8810,
VAX 8820, VAX 8830, VAX 8840

VAX 9000 Model 110,
VAX 9000 Model 210,
VAX 9000 Model 300 Series,
VAX 9000 Model 400 Series

VAX 10000 Model 600 Series

VAX–11/730, VAX–11/750,
VAX–11/780, VAX–11/785

MicroVAX: MicroVAX II, MicroVAX 2000,
MicroVAX 3100 Model 10/10E,
MicroVAX 3100 Model 20/20E,
MicroVAX 3100 Model 30,
MicroVAX 3100 Model 40,
MicroVAX 3100 Model 80,
MicroVAX 3100 Model 90,
MicroVAX 3300, MicroVAX 3400,
MicroVAX 3500, MicroVAX 3600,
MicroVAX 3800, MicroVAX 3900

VAXstation: VAXstation II, VAXstation 2000,
VAXstation 3100 Model 30,
VAXstation 3100 Model 38,
VAXstation 3100 Model 40,
VAXstation 3100 Model 48,
VAXstation 3100 Model 76,
VAXstation 3200, VAXstation 3500,
VAXstation 3520, VAXstation 3540

VAXstation 4000 Model 60,
VAXstation 4000 Model 90,
VAXstation 4000 VLC

VAXserver: VAXserver 3100 Model 10/10E,
VAXserver 3100 Model 20/20E,
VAXserver 3300, VAXserver 3400,
VAXserver 3500, VAXserver 3600,
VAXserver 3602, VAXserver 3800,
VAXserver 3900

VAXserver 4000 Model 200,
VAXserver 4000 Model 300,
VAXserver 4000 Model 500

VAXserver 6000 Model 210,
VAXserver 6000 Model 220,
VAXserver 6000 Model 310,
VAXserver 6000 Model 320,
VAXserver 6000 Model 410,
VAXserver 6000 Model 420,
VAXserver 6000 Model 510,
VAXserver 6000 Model 520,
VAXserver 6000 Model 610,
VAXserver 6000 Model 620,
VAXserver 6000 Model 630

Processors Not Supported

MicroVAX I, VAXstation I, VAX–11/725, VAX–11/782, VAXstation 8000

Processor Restrictions

A TK50 Tape Drive is required for standalone MicroVAX 2000 and VAXstation 2000 systems.

The DECserver 200 software runs on any of the following packaged hardware options:

- DSRVB-**

** Denotes product variant models. For additional information, refer to the appropriate price book.

Use the following SHIELDED cables with each of the physical lines depending on the connection required beyond the cable concentrator:

BC22D	Null modem cable for local terminal or printer connections.
BC22E	Full modem straight through cable for modem connections.
BC22F	Full modem straight through cable for modem connections.
BC22R	Recommended null modem cable for host systems and other devices, including those that use CTS/RTS flow control.
BC17D	Null modem cable for host systems and other devices that do not use CTS/RTS flow control.

OPTIONAL HARDWARE

Terminals Supported

The DECserver 200 software supports the following Digital terminal devices that have keyboards:

- LA12, LA34, LA35, LA36, LA38
- All VTxxx terminals

Supported terminal parameters are:

- Character size: 7 or 8 bits per character
- Parity: Even, Odd, or None

The automatic line speed detection (Autobaud) feature is supported for either 7-bit characters with even parity or 8-bit characters with no parity.

The DECserver 200 software also supports Digital Asian terminal device variants when accessed from OpenVMS/Hanzi systems. Please refer to the appropriate OpenVMS/Hanzi Software Product Description for a complete listing of supported devices.

The DECserver 200 software also supports Digital Asian terminal device variants when accessed from OpenVMS /Japanese systems. Please refer to the appropriate OpenVMS/Japanese Software Product Description for a complete listing of supported devices.

The DECserver 200 software also supports the following Digital Personal Computers (PCs) in both terminal emulation mode and file transfer mode:

- Professional 325, 350, 380
- Rainbow 100A, 100B, 100+, 190
- DECmate II
- DECmate III
- VAXmate
- DECstation

Note: This product is NOT WARRANTED to support non-Digital terminal devices or personal computers. However, terminals supporting VT100- or VT200-like characteristics and personal computers supporting IBM® PC, IBM PC/XT and IBM PC/AT® characteristics may operate with this product.

Printers Supported

The DECserver 200 software supports the following Digital asynchronous printers when accessed from OpenVMS systems:

- All LJ, LA, LQP, LXY, LN0, LG, and DTC printing devices

The DECserver 200 software also supports Digital Asian printer device variants when accessed from OpenVMS /Hanzi systems. Please refer to the appropriate OpenVMS/Hanzi Software Product Description for a complete listing of supported devices.

The DECserver 200 software also supports Digital Asian printer device variants when accessed from OpenVMS /Japanese systems. Please refer to the appropriate OpenVMS/Japanese Software Product Description for a complete listing of supported devices.

Modems Supported

For DECserver 200/MC:

- DF03, DF112, DF124, DF224, DF242, DFM X.29 pad, and DECmodem V32 full-duplex asynchronous modems for either dial-in or dial-out use. Also supported are private or leased line modem applications, however, connections to data switches are NOT WARRANTED but may operate with this product.

Disk Space Requirements (Block Cluster Size= 1):

Disk space required for installation:	900 blocks
	(435.2K bytes)
Disk space required for use (permanent):	764 blocks
	(391.7K bytes)

These counts refer to the disk space required on the downline load host system disk. The sizes are approximate; actual sizes may vary depending on the user's system environment, configuration, and software options.

CLUSTER ENVIRONMENT

This layered product is fully supported when installed on any valid and licensed VAXcluster* configuration without restrictions. The *HARDWARE REQUIREMENTS* section of this Software Product Description detail any special hardware required by this product.

* V5.x - V6.x VAXcluster configurations are fully described in the VAXcluster Software Product Description (29.78.xx) and include CI, Ethernet, and Mixed Interconnect configurations.

SOFTWARE REQUIREMENTS

- OpenVMS AXP Operating System V1.5
- DECnet for OpenVMS AXP V1.5
  or
- OpenVMS VAX Operating System V4.7 - V6.0
- DECnet–VAX V4.7 - V6.0

OpenVMS Tailoring

For OpenVMS V5.x -V6.x systems, the following OpenVMS classes are required for full functionality of this layered product:

- OpenVMS Required Saveset
- Network Support
- Utilities

For more information on OpenVMS classes and tailoring, refer to the OpenVMS VAX Operating System Software Product Description (SPD 25.01.xx).

OPTIONAL SOFTWARE

- Terminal Server Manager V2.0

GROWTH CONSIDERATIONS

The minimum hardware/software requirements for any future version of this product may be different from the requirements for the current version.

DISTRIBUTION MEDIA

TK50 Streaming Tape, 9-track 1600 BPI Magtape

ORDERING INFORMATION

Software Licenses: QL-VCBA*-**

Software Media: QA-VCBA*-H*

Software Documentation: QA-VCBAA-GZ

Software Product Services: QT-VCBA*-**

LAT Networks Concept Guide: AA-LD84B-TK

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

SOFTWARE LICENSING

This software is furnished only under a license. For more information about Digital's licensing terms and policies, contact your local Digital office.

The DECserver 200 software license applies to the DECserver 200 on which the server software runs, not to service host node CPUs in the network.

This product does not provide support for the OpenVMS License Management Facility. A Product Authorization Key (PAK) is not required for installation or use of this version of the product.

SOFTWARE PRODUCT SERVICES

A variety of service options are available from Digital. 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.

The above information is valid at time of release. Please contact your local Digital office for the most up-to-date information.

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