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Software Product Description

PRODUCT NAME: DECserver 90TL Software **SPD 38.71.04**

DESCRIPTION

The DECserver 90TL software provides concurrent Local Area Transport (LAT) and Telnet TCP/IP protocol support from a DECserver 90TL communications server to enable connectivity to host systems that utilize LAT or TCP/IP protocols. The TCP/IP protocol suite is used to connect to UNIX® host systems and other host systems that support the TCP/IP protocol suite.

The DECserver 90TL Communications Server is an Ethernet Communications Server for Ethernet Local Area Networks (LANs). The DECserver 90TL 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 can utilize application programs and utilities as though the terminal was directly connected to a host via a DMF32, DHU11, or DHV11/DHQ11 device, with a few exceptions. Thus, it may be possible to utilize the DECserver 90TL to connect all terminals to service nodes in place of traditional interfaces, except for host console terminals.

In addition, the DECserver 90TL provides IP end-node routing via SLIP (Serial Line Internet Protocol). Up to eight TCP/IP systems can be connected to the serial ports of the DECserver 90TL. These systems can run IP applications (such as Telnet, FTP, X-Windows, etc.) on the serial line and communicate with other TCP/IP services on the network.

The DECserver 90TL uses MJ8 (similar to RJ45 jacks used in telephone jacks) for the attachment of asynchronous devices. The DECserver 90TL utilizes the DEC 423-A electrical interface standard for local connections. DEC 423-A is compatible with the DEC 232-D interface and supports DTR/DSR (Data Terminal Ready /Data Set Ready) signals. DEC 423-A supports longer cable runs and higher signaling speeds.

The DECserver 90TL supports reverse LAT and Telnet Listener. These can be used to share the load on asynchronous devices connected to the DECserver 90TL. A group of ports can each be defined as the same service. With reverse LAT, if the node from which the service request is initiated is properly configured, the service request will be sent to the port with the highest capacity rating.

The DECserver 90TL also allows for host-initiated connections to serial printers. A print symbiont on service nodes can initiate connections to serial printers connected to DECserver 90TL ports. This allows the printers to be distributed throughout a facility and accessed transparently by service node users. Incoming host-initiated connect requests can be queued FIFO at the server.

Port-to-port connections on the same server are also supported.

The DECserver 90TL implements the LAT 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 can be realized by using the DECserver 90TL versus direct terminal connections via traditional asynchronous backplane communications interfaces.

The DECserver 90TL also implements the TCP/IP protocol suite for communication with host systems that implement TCP/IP. The TCP/IP implementation is based on the University of California's 4.3 Berkeley Software

Distribution (BSD). The following TCP/IP protocols are supported and adhere to the Defense Data Network (DDN) Request for Comments:

- Transmission Control Protocol (TCP) is the Internet standard transport level protocol that provides the reliable, end-to-end full duplex, stream service that supports many application protocols (RFC793).
- Bootstrap Protocol (BOOTP) is the Internet standard protocol for downloading software that is on the DECserver 90TL (RFC951); also, BOOTP Vendor Information Extensions (RFC1084), the TFTP protocol (RFC783), and Bootstrap Loading using TFTP (RFC906).
- User Datagram Protocol (UDP) is an Internet protocol that provides datagram service to application programs, allowing an application program on one machine to send a datagram to an application program on another machine. UDP is necessary for the Domain Name System and the Simple Network Management Protocol (SNMP) (RFC 768).
- Internet Protocol (IP) is an Internet standard protocol that defines the Internet datagram as the unit of information that gets passed across the Internet, and provides the universal addressing scheme for hosts and gateways for Internet connection-less, best effort packet delivery services. IP includes ICMP as an integral part (RFC 791).
- Internet Control Message Protocol (ICMP) is an Internet network protocol that specifies error and control messages used with the Internet protocols (RFC 792).
- Packet Internet Groper (PING) tests the reachability of nodes on the users' Internet. ICMP echoes requests are sent and replies processed.
- Address Resolution Protocol (ARP) is an Internet protocol used to perform dynamic address resolution to dynamically map or translate an Internet address into the correct physical hardware address (RFC 826).
- Telnet is the standard Internet application level protocol for remote terminal connection service. Telnet is a virtual terminal facility that allows a user at one site to establish a TCP connection to a remote system. Telnet makes the local terminal appear as a direct extension of the remote system, allowing the user to conduct a session and run application programs as if the user's terminal were directly connected to the remote system (RFC 854).

  Both Telnet client and server capabilities are provided:

  — Telnet client provides the ability to connect to any remote TCP port at an Internet address on a Local Area Network (LAN) or a Wide Area Network (WAN). Telnet client allows the user to specify a remote computer by Internet address as well as by domain name.

  — Telnet server provides the ability to accept connection requests from Internet hosts on a LAN or WAN to DECserver 90TL ports, such as printers, host systems, or other serial devices.

  — Telnet character and binary profiles are supported for Internet sessions. Telnet options supported include: status (RFC 859), end of record (RFC 885), remote flow control (RFC 1080), echo (RFC 857), timing mark (RFC 860), binary (RFC 856), and suppress go ahead (RFC 858).

  — Telnet Remote Console allows a user to establish a remote Telnet connection to the management port on the terminal server and manage the server as if locally attached. The Telnet listener 23 can now be assigned to any server port as well as the remote console. Any Telnet listener (23, 2001-20016) can be assigned to be the remote console.

- Internet Domain Name System (DNS) Support. The Domain Name System provides the translation from system name to Internet address. The DECserver 90TL will interface to user programs and send queries to domain name servers for translating domain names to Internet addresses, and Internet addresses to domain names (RFCs 1034, 1035).
- Subnet Addressing (RFC 950).
- Simple Network Management Protocol (SNMP). The SNMP agent allows the DECserver 90TL to be managed by an SNMP network management system. Retrieving information from the terminal server is possible using the SNMP GET and GET-NEXT requests. The SNMP SET operation is fully supported providing the ability to modify DECserver parameters as well as create and delete applicable table entries. The server can send unsolicited event alarms to specified SNMP management stations via the SNMP TRAP message. Server variables accessible via SNMP (RFC 1157) are defined by the Internet documents: MIB II (RFC 1213), RS232-like MIB (RFD 1317), the Character MIB (RFC 1316).
- Serial Line Internet Protocol (SLIP). A host computer that supports SLIP can use the DECserver 90TL serial port as it's network connection. This gives IP end nodes, which have no Ethernet controller, access to the network and to other serial-line attached TCP/IP end nodes. Any IP application (such as MAIL, X-Windows, NFS®, Rlogin, FTP, etc.) can then be run over the SLIP link (RFC 1055).

The DECserver 90TL also implements and supports the Terminal Device /Session Management Protocol (TD /SMP) to manage multiple sessions at the device level. The DECserver 90TL provides the ability to communicate with terminals that also implement this protocol (such as VT420, VT330+, or VT340+), and to assist in the management of multiple sessions for these devices. By implementing this protocol, the DECserver 90TL can permit attached devices to maintain screen and keyboard context for multiple LAT and/or Telnet sessions, as well as allow these devices to run multiple LAT and /or Telnet sessions concurrently.

The DECserver 90TL implements the ODL (On Demand Loading) font loading protocol that allows Asian terminals that implement the ODL protocol (such as VT382 or VT282) 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 90TL. This feature is supported only for LAT connections.

Software that runs on the DECserver 90TL is downline loaded over the network from a load host using MOP or BOOTP/TFTP. Terminal access using the DECserver 90TL does not require DECnet running in the same service node; LAT uses the Ethernet addressing mechanism to transport terminal messages.

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

For wide area network communications, terminal users can connect to remote hosts via Telnet through a TCP /IP router or gateway.

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 or Telnet protocol on the same Ethernet LAN, or to a remote host that implements the TCP/IP protocol suite. 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 90TL 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 90TL 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.

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.

This feature is supported only for LAT connections.

Multiple Sessions

The DECserver 90TL allows each user to establish and maintain up to eight sessions to one or more service nodes, up to a maximum of 64 per DECserver 90TL. 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 dialogue each time. Some operating systems may impose limits on the number of LAT or Telnet sessions that a host will support.

Multiple Session Management

The DECserver 90TL 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 or Telnet sessions that the DECserver 90TL provides. By implementing the ability to directly communicate with this protocol to the attached device, the DECserver 90TL can now assist in the management of context of these multiple sessions, as well as allow for simultaneous output to multiple LAT or Telnet 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 server user may opt to have the requested connection queued

* The terms OpenVMS and VMS refer to the OpenVMS Operating System.

to the remote service. If the user's port has been appropriately configured, this feature happens automatically whenever a connection fails for this reason. 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. This feature is supported only for LAT connections. Similar functionality may be available via a print filter program on a Telnet host.

Command Line Recall and Editing

The DECserver 90TL server supports multiple command line entry recall and editing.

Welcome Identification

The DECserver 90TL server standard welcome banner, which includes communications server type, version number, internal base level, 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 server users.

Local Mode and Service Mode

For the most part, the environment provided by the DECserver 90TL is identical to the environment 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 90TL. When operating in this mode, the user is in Local Mode.

In Local Mode, the terminal input is interpreted directly by DECserver 90TL as commands to be performed by the server.

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

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.

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 that 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 can 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 can 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 90TL 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 logged out of the server automatically when the user logs out of the service node.

If a preferred service is specified, the DECserver 90TL 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 Protocol Selection

It is possible to connect to an Internet host or LAT service automatically without explicitly identifying the connection as LAT or Telnet. If the port is configured with a value for the default protocol as "ANY," the server will attempt a LAT connection first to the name specified in the LAT service field. If the service is not available or unknown, the server will then automatically attempt a Telnet connection to the Internet host specified in the command.

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 connected already 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. This feature is supported only for LAT connections.

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, for those nodes that implement group codes, a user can further limit 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. Groups apply only to LAT connections.

Security

The DECserver 90TL provides functions that enhance security features already available in the service nodes. DECserver 90TL 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 can 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 re-entered. The lock feature can 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-port basis by the Server Manager. If enabled, the terminal user must enter a login password to access server functions.

DECserver 90TL 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 the 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 learn the basics of DECserver 90TL operation quickly. Tutorial HELP can be entered upon logging into the server.

Directory Service

Any DECserver 90TL 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. Services apply only to LAT connections.

Permanent Characteristics

The DECserver 90TL 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 Factory Reset button on the hardware unit while the unit is in power up self test.

Port Characteristics Configuration

Characteristics governing the operation of an individual port can be displayed by a nonprivileged terminal user interactively from the user's terminal. Many of the characteristics may be set by the user, but certain characteristics are privileged and can 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, default protocol, and password protection.

Port Access

A port on a DECserver 90TL can be configured in different ways depending on the device attached to the port and its intended use. DECserver 90TL uses MJ8 connectors as the physical interface. The DECserver 90TL utilizes DEC 423-A electrical interface standard for local connections, which is compatible with the DEC 232-D interface and supports eight asynchronous devices operating at speeds up to 57.6 Kbps with DTR/DSR (Data Terminal Ready/Data Terminal Set Ready) signaling.

Port access is the characteristic that determines how a port can 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 or Telnet.
- Access Remote—Designed for application-driven devices such as asynchronous printers that are allocated by a service node process. This allows the implementation of certain shared printers by multiple service nodes.
- Access Dynamic—Designed for devices (such as personal computers or printers with keyboards) that 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 configuration procedure of remote printers needs to be done once and will be 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.

Improved printer sharing allows a printer port on the server to be shared among hosts using LAT and hosts using Telnet.

Terminal Operation

The DECserver 90TL software supports the simultaneous operation of up to eight asynchronous devices at speeds from 75 bps to 57.6 Kbps. The software also supports:

- Data leads only support
- DSR logout
- Signal check
- Signal control
- DSR/DTR flow control
- XON/XOFF flow control
- Split speed (transmit and receive) terminal operation
- Block Mode transfers up to 2,048 bytes
- 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. 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 90TL service nodes; VAX/VMS service nodes do not support this service loopback capability.

The server maintains a variety of statistics and counters. These include the following: Ethernet data link statistics, LAT protocol statistics, and port error statistics. This 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.

Internet statistics are also maintained by the server. Internet characteristics such as Internet address and subnet mask can be modified and displayed. IP, ICMP, TCP, IP, UDP, DNS, and SNMP protocol statistics can be displayed.

Remote Server Management

The DECserver 90TL implements the console carrier feature that enables access to the DECserver 90TL local mode from either a Telnet host or a Phase IV or V 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 90TL software is designed to run on DECserver 90TL hardware exclusively, which includes an Ethernet interface for connection to an Ethernet transceiver cable.

The DECserver 90TL hardware has eight MJ8 connectors integral to the box. Each port can be individually configured in various modes:

- Data leads only
- Signal Control
- Data leads with DSR logout (if a terminal is powered down the session is automatically disconnected)
- Data leads with signal check (checks signal status before and during a session)
- DSR/DTR flow control
- Long Break logout

DECserver 90TL Operation

The DECserver 90TL ROM-based firmware provides the necessary maintenance operation protocols for downline loading DECserver 90TL soft ware from a TCP/IP host via BOOTP/TFTP or from a Phase IV or V DECnet load host over the Ethernet into server memory. All self-test diagnostics are in DECserver 90TL ROM and are executed on power-up prior to downline loading the server. In the event of a bugcheck caused by a fatal error, the unit will normally attempt to upline dump server memory to the load host. The upline dump is via either BOOTP/TFTP or via MOP. Following this, the unit will automatically initialize itself and invoke a downline load.

DECserver 90TL Configuration and Performance

The process of configuring the DECserver 90TL 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 to those of relatively high performance (e.g., connecting high-speed local terminals to local hosts within a local area network). 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
- Terminal speeds
- Terminal user applications
- Number and size of host buffers
- Terminal workload

The DECserver 90TL can sustain an aggregate character throughput of 30K characters per second.

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 through-put 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 90TL Usage

While terminal connections using the DECserver 90TL 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 that are directly dependent on the following functions may not operate as with a direct connection:

- 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

Use of the DECserver 90TL with Modems

The DECserver 90TL provides DSR and DTR signals that can be used to control some modems. The control signals required between a communications server and a modem are determined by the modem and, in some cases, Telecommunication Utility regulations. To provide satisfactory operation, the modem must be configured as follows:

- DSR—The modem must assert DSR when it has connected to an open telephone line and the modem is ready to establish an outgoing call. The modem must de-assert DSR when it is not connected to an open telephone line.
- DTR—When DTR is asserted by the server, the modem must be put into a state of readiness for receiving an incoming call or the modem must be made ready to initiate an outgoing call. When DTR is deasserted, the modem must disconnect from the telephone line and prevent subsequent connections to the telephone line.

Modems that cannot be configured in this way are not compatible with the DECserver 90TL.

The DECserver 90TL can operate with a modem that is speed buffering only if the modem and server are configured for XON/XOFF flow control and the data is non-binary. For binary data communication with a modem that is speed buffering and is not configured for XON/XOFF flow control, a communications server with CTS/RTS flow control is needed (such as the DECserver 700).

The modems that have been tested with the DECserver 90TL are specified in the System Support Addendum of this SPD.

HARDWARE REQUIREMENTS

Processor and/or hardware configurations as specified in the System Support Addendum of this SPD.

SOFTWARE REQUIREMENTS

For VMS-Based Systems:

- OpenVMS Operating System
- DECnet–VAX

For ULTRIX-Based Systems:

- ULTRIX Operating System
- MOP (included with ULTRIX operating system)
- DECnet–ULTRIX

For Non-DIGITAL UNIX Systems:

The following generic operating systems are supported. Note that complete support can not be granted on systems where customization has taken place. Also note that some UNIX implementations not listed below may operate successfully, but no support is implied.

- SunOS™
- OSF/1®
- IBM® AIX®
- SCO™ UNIX System V/386
- HP-UX®

Some System V systems, such as HP-UX and SCO, may not support an upline dump of the server memory.

For MS–DOS®-Based Systems:

- MS–DOS Operating System
- PATHWORKS for DOS

Refer to the System Support Addendum of this SPD for availability and required versions of prerequisite/optional software.

ORDERING INFORMATION

- Software License: QL-MJPA9-AA (DECserver 90TL TRAD License is included with hardware, not available separately)
- Software Kit: QA-MJPA*-H* (DECserver 90TL software and software documentation)

* 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 90TL software license applies to the DECserver 90TL 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.

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System Support Addendum

PRODUCT NAME: DECserver 90TL Software

HARDWARE REQUIREMENTS

The following tables list processors known to be capable of supporting the DECserver Software kit. Other models not listed may also be capable of supporting the kit, provided they can accept one of the distribution media types listed in this document.

OpenVMS* Processors

Processors Supported:

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

* The terms OpenVMS and VMS refer to the OpenVMS Operating System.

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

ULTRIX Processors

VAX-Based Processors Supported:

VAX: VAX 6000 Model 200 Series,
VAX 6000 Model 300 Series,
VAX 6000 Model 400 Series,
VAX 6000 Model 500 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, VAX 9000 Model 410 Series, VAX 9000 Model 420

VAX–11/750, VAX–11/780, VAX–11/785

MicroVAX: MicroVAX II, MicroVAX 2000, MicroVAX 3100, MicroVAX 3300, MicroVAX 3400, MicroVAX 3500, MicroVAX 3600, MicroVAX 3800, MicroVAX 3900

VAXstation: VAXstation II, VAXstation II/GPX, VAXstation 2000, VAXstation 3100, VAXstation 3200, VAXstation 3500, VAXstation 3520, VAXstation 3540

VAXserver: VAXserver 100, VAXserver 2000, VAXserver 3100, VAXserver 3300, VAXserver 3400, VAXserver 3500, VAXserver 3600, VAXserver 3602, VAXserver 3800, VAXserver 3900

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

RISC-Based Processors Supported:

DECstation: DECstation 2100, DECstation 3100, DECstation 3100s

Personal DECstation 5000 Model 20/25 HX,
Personal DECstation 5000 Model 20/25 MX,
Personal DECstation 5000 Model 20/25 TX,
Personal DECstation 5000 Model 20/25 PXG+,
Personal DECstation 5000 Model 20/25 PXG Turbo+

DECstation 5000 Model 120/125/133 CX,
DECstation 5000 Model 120/125/133 HX,
DECstation 5000 Model 120/125/133 MX,
DECstation 5000 Model 120/125/133 PX,
DECstation 5000 Model 120/125/133 TX,
DECstation 5000 Model 120/125/133 PXG,
DECstation 5000 Model 120/125/133 PXG+,
DECstation 5000 Model 120/125/133 PXG Turbo,
DECstation 5000 Model 120/125/133 PXG Turbo+

DECstation 5000 Model 200 CX,
DECstation 5000 Model 200 HX,
DECstation 5000 Model 200 MX,
DECstation 5000 Model 200 PX,
DECstation 5000 Model 200 TX,
DECstation 5000 Model 200 PXG,
DECstation 5000 Model 200 PXG+,
DECstation 5000 Model 200 PXG Turbo,
DECstation 5000 Model 200 PXG Turbo+,

DECsystem 5000 Model 240 HX,
DECsystem 5000 Model 240 MX,
DECsystem 5000 Model 240 TX,
DECsystem 5000 Model 240 PXG+,
DECsystem 5000 Model 240 PXG Turbo,

DECsystem 3100,
DECsystem 5000 Model 25,
DECsystem 5000 Model 200,
DECsystem 5000 Model 240,
DECsystem 5100, DECsystem 5400,
DECsystem 5500, DECsystem 5810,
DECsystem 5820, DECsystem 5830,
DECsystem 5840, DECsystem 5900

MS–DOS® Processors Supported:

Personal DECstation 316, 325 with DEC EtherWORKS Turbo or LC Computer Ethernet adapter

Other Hardware Required

The DECserver 90TL software runs on any of the following packaged hardware options:

- DSRVE-**

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

The DECserver 90TL supports ThinWire connections integral to the box. The DECserver 90TL can be connected to a ThickWire Ethernet using an Ethernet transceiver connection, transceiver drop cable, and a repeater (such as a DECMR, DEMPR, or DESPR). In a DEChub90, a DECbridge 90 can be used in place of the repeater.

Optional Hardware

Terminals Supported

The DECserver 90TL 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 seven-bit characters with even parity or eight-bit characters with no parity.

The DECserver 90TL software also supports DIGITAL Asian terminal device variants, including VT282 and VT382, when accessed from OpenVMS /Hanzi systems. Please refer to the OpenVMS Operating System SPD for a complete listing of supported devices.

The DECserver 90TL software also supports DIGITAL Asian terminal device variants when accessed from OpenVMS/Japanese systems. Please refer to the OpenVMS Operating System SPD for a complete listing of supported devices.

The DECserver 90TL 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 90TL 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 90TL software also supports DIGITAL Asian printer device variants when accessed from OpenVMS/Hanzi systems. Please refer to the OpenVMS Operating System SPD for a complete listing of supported devices.

The DECserver 90TL software also supports DIGITAL Asian printer device variants when accessed from OpenVMS/Japanese systems. Please refer to the OpenVMS Operating System SPD for a complete listing of supported devices.

Modems Supported

The DECserver 90TL provides DSR and DTR signals that can be used to control some modems. The control signals required between a communications server and a modem are determined by the modem and, in some cases, Telecommunication Utility regulations. To provide satisfactory operation, the modem must be configured as follows:

- DSR—The modem must assert DSR when it has connected to an open telephone line and the modem is ready to establish an outgoing call. The modem must de-assert DSR when it is not connected to an open telephone line.
- DTR—When DTR is asserted by the server, the modem must be put into a state of readiness for receiving an incoming call or the modem must be made ready to initiate an outgoing call. When DTR is de-asserted, the modem must disconnect from the telephone line and prevent subsequent connections to the telephone line.

Modems that cannot be configured in this way are not compatible with the DECserver 90TL.

The DECserver 90TL can operate with a modem that is speed buffering only if the modem and server are configured for XON/XOFF flow control and the data is non-binary. For binary data communication with a modem that is speed buffering and is not configured for

XON/XOFF flow control, a communications server with CTS/RTS flow control is needed (such as the DECserver 700).

The following modems have been tested and, when properly configured, are compatible with the DECserver 90TL:

- DECmodem V32
- DF242
- DF224
- DF212

Note: This server is not warranted to support modems other than those listed. However, modems that support control signaling only with in-band signals and/or DSR/DTR can operate with this server for certain data communications.

Disk Space Requirements

Disk Space Requirements for OpenVMS (Block Cluster Size=1):

Disk space required for installation:	3,550 blocks
Disk space required for use (permanent):	3,150 blocks

Disk Space Requirements for ULTRIX:

Disk space required for installation and permanent:	1,331 Kbytes

Disk Space Requirements for DOS:

Disk space required for installation:	625 Kbytes
Disk space required for use (permanent):	610 Kbytes

Disk Space Requirements for UNIX®:

Disk space required for installation and permanent:	1,731 Kbytes

These counts refer to the disk space required on the 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 sections of this product's Software Product Description and System Support Addendum detail any special hardware required by this product.

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

MINIMUM SOFTWARE REQUIREMENTS

This section lists the minimum versions of operating systems capable of supporting the DECserver Software kit.

For VAX-Based Systems:

- OpenVMS Operating System V5.0
- DECnet–VAX V5.0

OpenVMS Tailoring:

For OpenVMS 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 Operating System Software Product Description (SPD 25.01.xx)

For ULTRIX-Based Systems:

- ULTRIX Operating System V4.0
- MOP V4.0 (included with ULTRIX operating system)
- DECnet–VAX V5.0

For Non-DIGITAL UNIX Systems:

The following generic operating systems are supported. Note that complete support can not be granted on systems where customization has taken place. Also note that some UNIX implementations not listed below may operate successfully, but no support is implied.

- SunOS™ Release 4.0
- OSF/1® V1.0
- IBM AIX® Version 3.1.1
- SCO™ UNIX System V/386 Release 3.2, V2.0
- HP-UX® 8.0

Some System V systems, such as HP-UX and SCO, may not support an upline dump of the server memory.

For MS–DOS-Based Systems:

For each MS–DOS System acting as a load host or dump receiver:

- MS–DOS Operating System V3.1
- PATHWORKS for DOS V4.1

OPTIONAL SOFTWARE

- Terminal Server Manager V1.5 - 1.6

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

For VAX-Based Systems:

TK50 9-track 1600 BPI Magtape

For ULTRIX-Based Systems:

TK50 9-track 1600 BPI Magtape

For MS–DOS-Based Systems:

RX24 and RX33

For UNIX-Based Systems:

RX23, Tape Cartridge: QIC-150

ORDERING INFORMATION

- Software License: QL-MJPA9-AA (DECserver 90TL Traditional License is included with hardware, not available separately)
- Software Kit: QA-MJPA*-H* (DECserver 90TL software and software documentation)

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

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