

Software Product Description

PRODUCT NAME: DECnet-11M, Version 4.3

SPD 10.75.14

DESCRIPTION

DECnet-11M allows a suitably configured RSX-11M system to participate as a routing or nonrouting (end) node in DECnet computer networks. DECnet-11M is a Phase IV network product and is warranted for use only with supported Phase III and Phase IV products supplied by DIGITAL.

DECnet Phase IV networks can contain up to 1023 nodes per network area given proper planning. Phase III nodes participating in Phase III/IV networks are limited to the Phase III routing capability of 255 nodes. Phase II nodes are not supported.

DECnet-11M offers task-to-task communications, utilities for network file operations, homogeneous network command terminal support, and network resource-sharing capabilities using the DIGITAL Network Architecture (DNA) protocols. DECnet-11M communicates with adjacent nodes over synchronous and asynchronous communication lines, Ethernet Local Area Networks (LANs), and parallel interfaces. Communications using X.25 circuits over selected Packet Switched Data Networks (PSDNs) is also possible. This requires DECnet-11M to be configured with the RSX-11 Packetnet System Interface (P.S.I.)/11M product. Refer to the RSX-11 P.S.I./M Software Product Description (SPD 10.42.xx) for further information. Access to DECnet-11M is supported for RSX-11M user programs written in MACRO-11, FORTRAN IV, FORTRAN-77, BASIC-PLUS-2, and COBOL-81.

The functions available to an RSX-11M user depend, in part, on the configuration of the rest of the network. Each DECnet product offers its own level of functionality and its own set of features to the user. Networks consisting entirely of DECnet-11M nodes can have the full functionality described in this SPD. Networks that mix DECnet-11M nodes with other DECnet products can limit the functions available to the DECnet-11M user because some DECnet-11M features are not supported by all DECnet products. Some supplied optional features require hardware configurations larger than the minimum supported systems.

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

Adaptive Routing

Adaptive routing is the mechanism by which one or more nodes in a network can route or forward messages between another pair of nodes in the same network. This routing capability will forward such messages even if no direct physical link exists between the pair of nodes apart from the sequence of physical links that includes the routing node(s).

A DECnet-11M node must function as a routing node whenever multiple lines are used simultaneously by that node. DECnet-11M end nodes provide all the capabilities of DECnet-11M routing nodes except that end nodes cannot route messages on behalf of other nodes in the network. Since end nodes do not route messages, they do not need to store or update routing

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databases. Consequently, end nodes use less system resource and generate less network traffic than routing nodes.

For this same reason, end node operation consumes less processing power than routing node operation. The Full Function DECnet-11M software must be installed on a node in order for that node to operate as a routing node. For a node to operate as an end node either the Full Function or the End Node DECnet-11M software must be installed on that node. Full Function DECnet-11M software allows a node to be set up as either a routing node or as an end node.

Although two adjacent routing nodes can be connected by more than a single physical link, messages will be sent over only one of the links. All other lines will serve as "hot standbys", such that the least cost path available between two nodes is the one that will be used for message traffic. A line cost parameter set by the system manager determines the line over which all messages will be sent from node to adjacent node.

In addition to adaptive routing, which all DECnet Phase IV implementations use, DECnet-11M supports Area Routing. Area Routing is a method by which DECnet can send and route messages between the nodes in the same or different areas of the network. If the network manager chooses to separate the network into areas, up to 63 (Area 1 through Area 63), with up to 1023 nodes per area, may be defined. For single area networks, Area 1 is the default. Area-based DECnet networks are hierarchical networks and some restrictions apply to communications from nodes in one area to nodes in another. For example, Phase III nodes in area-based networks can communicate only with nodes within their own areas. Proper network planning is essential when using Area Routing or configuring large networks.

Task-To-Task Communication

Using DECnet-11M, an RSX-11M user program written in MACRO-11 or one of the supported high level languages can exchange messages with other network user programs. These two user programs can be on the same node, or on any other Phase IV node in the network, or Phase III node in the same area. The messages sent and received by the two user programs can be in any data format.

The DECnet-11M software will optionally verify the access control privileges of a task requesting communication with a DECnet-11M task. The RSX-11M System Account File is used to determine access privileges. The results can either be passed on to the receiving task or used to reject the request by the network software.

Network Resource Access

File Transfer Utilities

Using DECnet-11M utilities, a user can transfer sequential ASCII files between DECnet nodes. Files can be transferred in both directions between the locally supported RSX-11M File Control System (FCS) devices and the file system of other DECnet nodes. Wild cards can be used for the user identification code, file name, file type and version number for local to remote file transfers. Transfer of other file types is supported, provided the source and destination DECnet systems support the same file type. Directory listings are also a supported DECnet-11M feature.

The DECnet-11M file transfer utilities support file transfers for both FCS and RMS files, where formats are compatible between the DECnet nodes.

Additional facilities allow system command files to be submitted to a remote node where the list of commands is in a format acceptable to the node responsible for the execution. DECnet-11M also allows RSX-11M command files to be received from other systems and executed.

A utility is also provided with DECnet-11M which allows the user to queue file operation requests for execution at a specified time. The user has the ability to monitor, list, and delete entries from this queue.

Network users must specify the appropriate user identification and password in order to access the files on a DECnet-11M node. Access to local files using the DECnet software can be controlled through the RSX-11M System Account File.

File Access

File access is supported to and from remote DECnet systems by explicit subroutine calls in the supported high level languages. READ, WRITE, OPEN, CLOSE, and DELETE operations can be initiated by local tasks for sequential and random access files residing on the local system or at remote DECnet systems. Other nodes supporting File Access can exercise this capability for files located on the RSX-11M node. Fixed and variable length record formats are supported. Files accessed remotely can contain either ASCII or binary information.

Access to RMS file organizations from other DECnet products is supported by DECnet-11M.

Network Command Terminal

DECnet-11M supports DIGITAL's Terminal Services Architecture Command Terminal protocol (CTERM), giving the terminal user the ability to establish a virtual connection to remote Phase IV DECnet systems which provide similar support. This is particularly useful for doing remote program development, and allows terminal users on small application-oriented systems to utilize the resources of larger development-oriented systems.

Note that some functions using CTERM between VMS and non-VMS systems are not supported. Specifically, VMS-style command line editing, VMS TDMS applications and VMS FMS applications are not supported under DECnet-RSX products.

DECnet-11M also provides an unsupported utility (RMT) that allows a terminal user to establish a virtual connection to other Phase III or Phase IV DECnet-RSX nodes. This utility may not be included in future releases of DECnet-11M.

Down-Line System Loading

Initial memory images for RSX-11S nodes in the network can be stored on RSX-11M file system devices and loaded into nodes across point-to-point, multi-point (DMP/DMV), and Ethernet links. Load requests can come from the local RSX-11M operator or from the remote node. Generation of initial memory images of DECnet-11S systems for down-line loading is supported by RSX-11M.

Up-Line Dumping

Memory images of adjacent RSX-11S nodes connected by DECnet can be written onto a file on a DECnet-11M system. This facility helps a programmer understand what may have caused the RSX-11S system to crash.

Down-Line Task Loading

Programs to be executed on DECnet-11S nodes in the network can be stored on the DECnet-11M system and loaded on request into DECnet-11S nodes. In addition, programs already executing on DECnet-11S nodes can be checkpointed to the host file system and later restored to main memory of the DECnet-11S node. These features simplify the operation of network systems that do not have mass storage devices.

Communications Servers

DIGITAL offers several communications server products for the DECnet Phase IV network environment. These are stand-alone processor and/or software packages based upon the PDP-11/R SX architecture. Such servers include the DECnet Router Server.

Network management, down-line system loading, and up-line dumping of these servers is the same as that described for RSX-11S nodes in the preceding paragraphs. Consult the SPD of the server product in question for details, regarding availability of support on RSX-11M.

Network Management

The Network Control Program (NCP) performs three primary functions: displaying statistical and error information, controlling network components, and testing network operation. These functions can be performed locally or executed at remote Phase III and Phase IV nodes that support this feature. In either case, the output resulting from a command can be directed to a local file or to the user's terminal.

An operator can display the status of DECnet activity at the local node and other Phase III or Phase IV nodes. The user can choose to display statistics related to both node and communication lines, including data on traffic and errors. The local console operator can also perform many network control functions such as loading and unloading DECnet components, starting and stopping lines, activating the local node, and down-line loading RSX-11S systems.

DECnet-11M also provides local network event logging to the console device, a file, or a user written program. Logging of events to a remote node is also supported. The NCP utility can be used to enable and disable the logging of specific events as well as to enable and disable the event logging facility.

Communications

DECnet-11M, supports the DIGITAL Data Communications Message Protocol (DDCMP) for full- or half-duplex transmission in point-to-point and multi-point operation using serial synchronous or asynchronous facilities. DDCMP provides error detection/correction and physical link management facilities. In addition, an auto-answer capability is provided if supported by the modem in use.

Multi-point and auto-answer function with EIA-type devices only. Parallel communication devices use special link protocols (not DDCMP) optimized for their characteristics.

The Ethernet bus interfaces, when used in conjunction with DIGITAL's Ethernet transceivers, or DELNI, allows DECnet-11M to utilize Ethernet as a data link transmission medium.

RSX-11 P.S.I./M is the software product that provides an interface to X.25 Packet Switched Data Networks. When DECnet-11M is used in conjunction with RSX-11 P.S.I./M, DECnet-11M can utilize the PSDN as though it was a standard datalink to transmit messages between DECnet nodes.

The maximum number of physical links that can be supported by a DECnet-11M node is sixteen, depending on CPU, type of communications interface, and speed of interfaces.

A maximum of 32 X.25 virtual circuits is supported when DECnet-11M is used in conjunction with RSX-11 P.S.I./M for DECnet communication through an X.25 PSDN. However, when the total number of DECnet circuits (Data Link Mapping and other) is greater than 24, the maximum node address supported is less than 1023 (#circuits * maximum address <25,000).

DECnet-11M multi-point will support up to a maximum of twelve tributaries on a single multi-point line. Aggregate bandwidth of tributaries is limited to that of the control station device. The communication path to each tributary counts as a link with respect to the limits on number of links specified above. Multi-point line configurations will be supported for the following devices:

Multi-point Devices

Devices	Multi-point Control Station (Master)	Multi-point Tributary (Slave)
DL11/DLVE1	YES	YES
DUP11	YES	YES
DUV11	YES	YES
DPV11	YES	YES
DZ11/DZV11/DZQ11	YES	NO
DHU11/DHV11/DHQ11	YES	NO
KMC11 (DZ11)	YES	NO
KMC11 (DUP11)	YES	YES
DV11	YES	YES
DMP11*	YES	YES
DMV11*	YES	YES

* Multi-point communication hardware device

Direct Line Access

User written MACRO-11 tasks will be provided with Direct Line Access (DLX) support to all supported devices (including Ethernet Controller). DLX will allow direct control of the communications lines, bypassing the logical link control and transport mechanism provided by the DECnet software. User programs are required on both ends of the link in order to use this interface. Direct Line Access supports both Ethernet and IEEE 802.3 frame formats in a LAN environment.

DECnet-11M Configuration

The process of configuring a DECnet-11M node is based primarily on trade-offs of cost, performance, and functionality, within the realm of satisfying the user's application requirements. It can be readily expected that network applications will run the full gamut from low-speed, low-cost situations to those of relatively high performance and functionality. The performance of a given DECnet node is a function not only of the expected network traffic and resultant processing ("global" conditions), but also of the amount of concurrent processing specific to that node (local conditions). Thus, node performance depends on many factors, including:

- CPU type and Memory Size
- Number of device interrupts per unit time
- Communication line characteristics
- Number and size of buffers
- Message size and frequency of transmission
- Local applications
- Size and frequency of route-through traffic

Note that the rate at which user data can be transmitted (throughput) over a communications line may sometimes approach, but will never equal or exceed, the actual line speed. The reason is that the actual throughput is a function of many factors, such as the network application(s), topology, protocol overhead and line quality, as well as the factors cited above.

Note: Careful analysis is required when configuring routing nodes with 124K words or less.

Six basic groups of communications interfaces are presented in the tables below. They differ in many respects, particularly in their effect upon CPU utilization.

- With character interrupt devices such as the DUP11, CPU cycles are required for not only the line protocol processing such as DDCMP or the optional X.25 protocol, but also for each character sent and received.
- Devices such as the DV11 are direct memory access (DMA) for both transmission and reception. Since the line protocol (DDCMP) is in the PDP-11 software, CPU cycles are required for its processing.
- Devices such as the DHQ11 are direct memory access (DMA) on transmit, and character interrupt on receive. While CPU cycles are consumed for line protocol processing, and for each character received, the load is reduced for messages transmitted.
- The DMR11, DMV11, and KMS11 are DMA devices with the line protocol (DDCMP or X.25) executed in microcode, thus off-loading the PDP-11 CPU. The only DECnet load the processor sees is completed incoming and outgoing messages.
- The PCL11-B is a high speed DMA device which uses local parallel communications lines. It has its own line protocol and does not use DDCMP. CPU cycles are only required for processing of incoming and outgoing data messages and to perform control functions.
- The DEUNA and DELUA, UNIBUS-to-Ethernet, and the DELQA and DEQNA Q-BUS-to-Ethernet controllers are high speed DMA controllers supporting CSMA/CD protocol. CPU cycles are only required for processing of incoming and outgoing messages.

The following tables describe the physical hardware configurations supported by DECnet-11M in terms of CPU type and communication interface. The numbers given in the tables are "load costs". Maximum line speeds (the fastest clock rate at which the device can be driven under DECnet-11M relative to the load cost), expressed in kilobits per second, are shown in parentheses.

Device loading provides a method by which one can compute a maximum system configuration for a variety of communications devices. The load cost indicates the maximum load that a device can put on a particular type of CPU. The load cost limit for each CPU type is 16.

For communications devices which support half/full duplex, the load costs in the tables are for full duplex configurations. The load cost for a half duplex configuration can be calculated as one half of the load cost in the table except at very low speeds, in which case the load cost is the same as in the full duplex case.

DECnet-11M UNIBUS Device Load Table

Device Type	Processor Type			
	11/24	11/44	11/70	11/84
DEUNA (10meg)	16	16	16	16
DELUA (10meg)	16	16	16	16
PCL (4meg)	16	16	16	16
DMP (to 19.2K)	2	1	1	1
DMP (56K)	3	3	3	3
DMP (1meg)	16	16	16	16
DMR (to 19.2K)	2	1	1	1
DMR (56K)	3	3	3	3
DMR (1meg)	16	16	16	16
DV (to 9.6K)	4	3	3	3
DHU (to 9.6K)	2	2	2	2
DL (to 9.6K)	2	2	2	2
DU (to 9.6K)	2	2	2	2
DUP (to 9.6K)*	2	2	2	2
DZ (to 9.6K)	2	2	2	2

* Maximum 4.8Kbps for 11/24 processor

Note: For processor types not shown, use the load costs associated with the PDP-11/24 to compute device loading

DECnet-11M Q-BUS Device Load Table

Device Type	Processor Type				
	11/23	11/23-PLUS	11/53	11/73	11/83
DEQNA (10meg)	16	16	16	16	16
DELQA (10meg)	16	16	16	16	16
DMV (to 19.2K)	2	2	1	1	1
DMV (56K)	3	3	3	3	3
DHQ (to 9.6K)	2	2	2	2	2
DHV (to 9.6K)	2	2	2	2	2
DLV (to 4.8K)	2	2	2	2	2
DPV (to 4.8K)	2	2	2	2	2
DUV (to 4.8K)	2	2	2	2	2
DZV (to 9.6K)	2	2	2	2	2

**Maximum Line Configurations Guidelines
(Multi-point)**

**Maximum Line Speed
(Kilobits per Second, half- or full-duplex)**

Device Group	19.2	56	250	500	1000
DMV11 (All Options)	2/8	2/8			
DMP11 (RS232C, V.35)	+4/8	2/8			
(Local)		2/8	1/12	1/12	1/12*
(RS422/449)	+4/8	2/8	1/12	1/12	1/12*

* half-duplex

+ 11/24 is limited to 2 controllers

Note: Left side of slash (/) indicates number of controllers per node and right side indicates total number of tributaries per control node.

Total number of circuits no to exceed 16 per node.

Number of tributaries on lines should be carefully configured for performance considerations.

In order to achieve a viable configuration, the user and/or a DIGITAL software specialist must perform a level of application analysis which addresses the factors above.

MINIMUM HARDWARE REQUIRED

Any valid RSX-11M system configuration with:

- The following additional memory available.

DECnet-11M end node - 20KW

DECnet-11M routing node - 22KW

DECnet-11M end node with RSX-11 P.S.I./M - 26KW

DECnet-11M routing node with RSX-11 P.S.I./M - 34KW

Ethernet support will add 6 KW to the above memory requirements.

- The following additional disk space must be available for DECnet-11M network software.

DECnet-11M end node - 4200 blocks
(2,150,400 bytes)

DECnet-11M routing node - 4700 blocks
(2,406,400 bytes)

DECnet-11M end node with RSX-11 P.S.I./M - 4700 blocks
(2,406,400 bytes)

DECnet-11M routing node with RSX-11 P.S.I./M - 5200 blocks
(2,662,400 bytes)

- PDP-11/24, PDP-11/34, PDP-11/40, PDP-11/44, PDP-11/45, PDP-11/55, PDP-11/60, PDP-11/70, or PDP-11/84, central processor with one of the following communications devices:

DUP11 low-speed synchronous interface⁴

DMP11 synchronous UNIBUS interface (RS232-C/RS423A, CCITT V.35/DDS, or RS449/RS422)^{4,5}

DMP11	local synchronous UNIBUS interface ^{4,5}
DMR11	synchronous UNIBUS interface (RS232-C/RS423A, CCITT V.35/DDS, or RS449/RS422) ⁴
DMR11	local synchronous UNIBUS interface ⁴
DL11	asynchronous EIA interface with modem control ⁴
DL11	asynchronous 20mA current loop interface ^{1,4}
DZ11	multi-line asynchronous EIA interface ^{2,4}
DZ11	multi-line asynchronous 20mA current loop interface. ^{1,2,4}
DHU11	multi-line asynchronous interface ^{2,4}
DV11	multi-line NPR synchronous interface ^{2,4}
PCL11-B	multiple CPU link
DELUA	UNIBUS-to-Ethernet controller
DEUNA	UNIBUS-to-Ethernet controller
KMS11	8-line synchronous UNIBUS multiplexer ^{3,4}
●	PDP-11/23, 11/23-Plus or Micro/PDP-11 (11/23, 11/53, 11/73 and 11/83) central processors with one of the following communications devices. Note that the KDJ11-A 11/73 option is only supported per RSX-11M (SPD 14.35.xx).
DMV11	synchronous Q-BUS interface (RS232-C/RS423A or CCITT V.35/DDS) ⁴
DMV11	local synchronous Q-BUS interface ⁴
DUV11	low-speed EIA synchronous interface ⁴
DLVE1	asynchronous EIA interface with full modem control for a single line ⁴
DZV11	multi-line asynchronous Q-BUS EIA interface ^{2,4}
DZQ11	multi-line asynchronous Q-BUS EIA interface ^{2,4}
DHQ11	multi-line asynchronous Q-BUS interface
DHV11	multi-line asynchronous Q-BUS interface ^{2,4}
DPV11	synchronous Q-BUS interface ⁴
DELQA	UNIBUS-to-Ethernet controller
DEQNA	Q-BUS-to-Ethernet controller

OPTIONAL HARDWARE

- Additional lines and/or communication interfaces (from above) up to maximum as defined in Device Load tables for mapped systems.
- KG11-A Communications Arithmetic Element 5 (may be used in conjunction with DV11, DZ11, and DL11)
- KMC11-A (without the RSX-11 P.S.I./M product, can be used in conjunction with up to eight DUP11s or one sixteen-line DZ11)

Notes:

¹Requires either the H319 option for optical isolation or one side of the 20mA line to be in passive mode.

²All lines on this interface must be dedicated as DECnet links.

³Requires RSX-11 P.S.I./M product.

⁴With appropriate FCC-compliant cabinet option.

⁵These products are no longer marketed by DIGITAL and may not be supported in future releases of DECnet-11M.

PREREQUISITE SOFTWARE**RSX-11M**

Refer to the RSX-11M Optional Software Cross Reference Table (SPD 20.98.xx) for the required version.

OPTIONAL SOFTWARE

COBOL-81/RSX

FORTRAN-77/RSX

BASIC-PLUS-2 for RSX-11M

RSX-11 P.S.I./M

FORTRAN IV/RSX

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.

INSTALLATION

This software product can be installed by the customer using the step-by-step documentation available for this product. Optionally, you can purchase DIGITAL Installation Services which provide for the installation of the software product by an experienced DIGITAL Software Specialist.

Courtesy Installation Service

This software product will be installed by DIGITAL at no additional charge if you purchase it concurrent with a Startup Service Package that includes installation service. Both the host operating system and this product must be installed concurrently.

Installation Service Option

DIGITAL's Installation Service is provided by a DIGITAL Software Specialist and accelerates your productive use of this product. For more information on what is included in this service, please obtain the appropriate Service Description from your local DIGITAL office.

Installation Service will be provided at no additional charge (Courtesy Installation) under the conditions described in the Installation section above.

Installation Services

For a fixed price, a DIGITAL Software Specialist will assure that the customer's system is ready for installation, install the software, and familiarize the customer with its operation.

Installation for DECnet-11M will consist of the following:

- Verification that all components of DECnet-11M have been received.
- Verification that the necessary versions of the RSX-11M software and documentation are available.
- Verification of the appropriate sysgen parameters.

Note: Should a software specialist be required to modify the previously installed operation system parameters, a time and materials charge will apply.

- Install DECnet-11M software
- Define and create a local node DECnet database.
- Modify the system's start-up command procedure including starting up the DECnet-11M network node.
- Verify the proper installation of DECnet-11M by running a series of tests to show connectivity (demonstrated by the use of the post installation checkout procedure) to a designated node.

Connectivity to all other nodes within the network is the responsibility of the customer.

Pre-Installation Procedures Required

Before DIGITAL can install the software, the customer must:

- Ensure that system meets the minimum hardware and software requirements (as specified in the SPD).
- Obtain, install and demonstrate as operational any modems and other equipment and facilities necessary to interface DIGITAL's communication equipment.
- For multi-node networks, designate one adjacent node to verify installation/connectivity.
- Make available for a reasonable period of time, as mutually agreed upon by DIGITAL and the customer, all hardware communication facilities and terminals that are to be used during installation.

Delays caused by any failure to meet these responsibilities will be charged at the prevailing rate for time and materials.

ORDERING INFORMATION

Single-Use licensed software is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, which provide, in part, that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of DIGITAL's copyright notice and any proprietary notices on the software) for use on that same CPU.

You will need a separate license for each CPU on which you will be using the software product (except as otherwise specified by DIGITAL). Then, Materials and Service Options are selected to utilize the product effectively. **THE LICENSE OPTIONS ARE DESCRIBED BELOW. IF YOU ARE NOT FAMILIAR WITH THE SERVICE OPTIONS, YOU MAY OBTAIN THE APPROPRIATE SOFTWARE PRODUCT SERVICE DESCRIPTION(S) FROM YOUR LOCAL DIGITAL OFFICE.** If you are already familiar with these options, you may obtain the ordering information directly from the Software Options Chart.

LICENSE OPTIONS

Single-Use License Option

The Single-Use License is your right to use the software product on a single CPU.

For your first installation of this software product you must purchase as a minimum:

- Single-Use License Option, and
- Distribution and Documentation Option

The license gives you the right to use the software on a single CPU and the Distribution and Documentation Option provides the machine-readable software and related documentation.

To use this software product on additional CPUs, you must purchase for each CPU as a minimum:

- Single-Use License Option

In addition to the right to use, the license gives you the one-time right to copy the software from your original CPU installation to the additional CPU. Therefore, the Distribution and Documentation Option is not required, but optional.

Distribution and Documentation Option

The Distribution and Documentation Option provides the machine-readable software and the basic documentation. You must have, or order, a Single-Use License to obtain this option. You will need this option to install the software for the first time. When revised versions of this software product become available, they may also be obtained by purchasing this option again.

Software Revision Right-To-Copy Option

The Right-To-Copy Option allows a customer with multiple CPUs to copy a revised version of a software product from one CPU to another. Each CPU must be licensed for that product. You first install the revised software on one CPU; then you can make copies for additional CPUs by purchasing the Right-To-Copy Option for each additional CPU.

Documentation-Only Option

The Documentation-Only Option provides one copy of the basic documentation.

Software Product Services

A variety of service options are available. For more information on these or other services, please contact your local DIGITAL office.

SOFTWARE OPTIONS CHART

The distribution Media Codes used in the Software Options Chart are described below. You specify the desired Media Code at the end of the Order Number, e.g., QJ764-HD = binaries on 9-track 800 BPI Magtape (NRZI).

- 5 = TK50 Tape Cartridge
- D = 9-Track 800 BPI Magtape (NRZI)
- H = RL02 Disk Cartridge
- M = 9-track 1600 BPI Magtape (PE)
- Z = No hardware dependency

Note: The availability of these software product options and services may vary by country. Customers should contact their local DIGITAL office for information on availability.

	ORDER NUMBER FULL FUNCTION	ORDER NUMBER END NODE
LICENSE OPTION: A LICENSE IS REQUIRED FOR EACH CPU.		
Single-Use License	QJ764-UZ	QJ765-UZ
MATERIALS AND SERVICE OPTIONS:		
Distribution and Documentation Option	QJ764-H5 QJ764-HD QJ764-HH QJ764-HM	QJ765-H5 QJ765-HD QJ765-HH QJ765-HM
Software Revision Right-To-Copy Option	QJ764-HZ	QJ765-HZ
Documentation-Only Option	QJ764-GZ	QJ763-GZ
Installation Service Option	QJ764-I5 QJ764-ID QJ764-IH QJ764-IM	QJ765-I5 QJ765-ID QJ765-IH QJ765-IM
DECsupport Service	QJ764-95 QJ764-9D QJ764-9H QJ764-9M	QJ765-95 QJ765-9D QJ765-9H QJ765-9M
Basic Service	QJ764-85 QJ764-8D QJ764-8H QJ764-8M	QJ765-85 QJ765-8D QJ765-8H QJ765-8M

	ORDER NUMBER FULL FUNCTION	ORDER NUMBER END NODE
Self-Maintenance Service	QJ764-35 QJ764-3D QJ764-3H QJ764-3M	QJ765-35 QJ765-3D QJ765-3H QJ765-3M