Software Product Description

PRODUCT NAME: **DECrouter 2000, Version 1.2** **SPD 28.85.03**

DESCRIPTION

The DECrouter 2000 is a communications product that provides a routing service for the Local Area Network (LAN). This allows communication with nodes outside the LAN within a Wide Area Network (WAN). By using a DECrouter 2000, the routing load on the other Ethernet nodes can be reduced, releasing these resources for other applications.

Overview

The DECrouter 2000 provides access to and from Phase IV DECnet nodes on a Local Area Network (LAN) to Phase III or Phase IV DECnet nodes over synchronous lines. These nodes may be located either locally, via dedicated wiring, or remotely via modem connections. Note that LAN refers to any Local Area Network that conforms with the Ethernet, IEEE 802.3, or ISO 8802/3 standards.

The DECrouter 2000 software product runs on the DEC MicroServer (DEMSA) and DEC MicroServer-SP (DEMSB) hardware units. These units contain an Ethernet interface port (IEEE 802.3 compatible); the DEC MicroServer has four synchronous communications ports, and the DEC MicroServer-SP has a single synchronous port.

Note: The DECrouter 2000 software license is available as part of two packages - the DECrouter 2000 package includes the DEC MicroServer hardware and the DECrouter 2000 software license; the DECrouter 100 package includes the DEC MicroServer-SP hardware and DECrouter 2000 software license

The DECrouter 2000, on the DEC MicroServer, supports the four synchronous lines at speeds up to 64K bits per second, two synchronous lines at speeds up to 384K bits per second, or one synchronous line at speeds up to 2.048M bits per second. The DECrouter 2000, on the DEC MicroServer-SP, supports the single synchronous line at speeds up to 64K bits per second. Communication over the synchronous lines is full- or half-duplex, and full modem control is supplied on all synchronous line(s). The synchronous port(s) can operate as DDCMP point-to-point or multipoint links, and can communicate with all supported synchronous Digital DDCMP products, excluding the DMC11. On DDCMP multipoint links, the DECrouter 2000 can act only as a tributary.

The DECrouter 2000 software image is installed and configured on a VMS, MicroVMS, ULTRIX (VAX or RISC) or MS-DOS ® system (termed a load host) on the same LAN as the DEC MicroServer or DEC MicroServer-SP; this software image is then down-line loaded to the unit from this load host. The installation process enables the manager of the load host to define the Ethernet address, routing characteristics, and DDCMP circuits to be used by the DECrouter 2000. The configuration databases can be created and modified by using utilities that are on the load host.

The DECrouter 2000 is fully integrated into Digital's Network Management strategy. Management is through the DECnet Network Control Program (NCP) from any DECnet Phase IV node, allowing the system manager to control the DECrouter 2000, display statistics and error information, and test the components of the network. A separate TRACE utility (available on VMS or MicroVMS load hosts) assists problem-solving by tracing information within the DECrouter 2000.

Path splitting, where there are two or more equal-cost paths between the DECrouter 2000 and the destination DECnet node, is supported. For this feature, all the destination nodes on the network must support out-of-order packet caching.

Routing and DECnet Phase IV Areas

The DECrouter 2000 implements Phase IV (with extended functionality) DECnet DDCMP routing and network management. Phase IV DECnet networks are hierarchical networks that can be segmented into up to 63 areas, each containing up to 1023 nodes. Note that these are maximum values permitted by the Digital Network Architecture, and that satisfactory operation in large networks requires proper network planning.

Level 1 Routers route directly towards nodes within their own area, and route towards a Level 2 Router when the destination node is in a different area. Level 2 Routers act as Level 1 Routers within their own area, but in addition route to other areas.

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The DECrouter 2000, on the DEC MicroServer, is a dedicated routing system that supports both the intra-area routing (Level 1) and inter-area routing (Level 2) for Phase IV nodes on a Local Area Network, or Phase III or Phase IV remote nodes connected to one of the four synchronous lines.

The DECrouter 2000, on the DEC MicroServer-SP, is a dedicated routing system that supports only intra-area routing (Level 1) routing for Phase IV nodes on a Local Area Network, or Phase III or Phase IV remote nodes connected to the single synchronous line.

Line Support

The DECrouter 2000 software product runs on the DEC MicroServer (DEMSA) and DEC MicroServer-SP (DEMSB) hardware units. These are LANbridge 100-type enclosures that contain an Ethernet interface port (IEEE 802.3 compatible); the DEC MicroServer has four synchronous communications ports, and the DEC MicroServer-SP has a single synchronous port. Both hardware units are supplied as table-top units, but also can be wall or rack mounted in a standard 19 inch rack.

The DECrouter 2000 supports V.24 interchange circuits, the following electrical interfaces: V.28 (RS232-D), RS232-C, V.36/V.11 (RS449/RS422), V.10 (RS449/RS423), and V.35, and CCITT (1980) X.21 for leased line services only. The number of lines supported depends on the hardware unit, the electrical interface type, and the maximum line speed in use, as follows:

DEC MicroServer	**Maximum Line Speed (Kbps)**					
Interface Type	19.2	64	256	384	1544	2048
V.28/V.24 (RS232-C/D	4	-	-	-	-	-
V.36/V.11 (RS422/RS449)	4	4	3	2	1	1
V.10 (RS423)	4	4	-	-	-	-
V.35	4	4	3	2	1	1
X.21 leased line	4	4	3	2	1	1

DEC MicroServer-SP	**Maximum Line Speed (Kbps)**	
Interface Type	19.2	64
V.28/V.24 (RS232-C/D)	1	-
V.36/V.11 (RS422/RS449)	1	1
V.10 (RS423)	1	1
V.35	1	1
X.21 leased line	1	1

Adapter cables provide the necessary interchange circuits for each synchronous line. Refer to the System Support Addendum (SSA 28.85.03-x) for further information on the required adapter cables.

The DECrouter 2000 always requires an external clock source (such as a modem). The additional requirements for operation of the DEC MicroServer with T1 and G.703 lines are as follows:

- The DEC MicroServer only supports clear channel interfaces. Connection to a T1 or G.703 line requires a V.35/RS422 to T1/G.703 DSU/CSU converter to provide framing to meet CCITT G.704. The DEC MicroServer does not provide either T1 framing pulses or separate channels for 64K bits per second control data for G.703.

  Note also that the DEC MicroServer does not guarantee line density. T1 links can offer only 1.536M bits per second or 1.344M bits per second data rates. 1.536M bits per second rates require the DSU/CSU converter to offer B8ZS and the line to accept bipolar violations. 1.334M bits per second rates require the DSU/CSU converter to offer B7.

- Transmit clocking should be provided by the DCE, CCITT 114. The DEC MicroServer uses CCITT 114 to clock data out of the DTE, and will source a CCITT 113 transmit clock. CCITT 113 should be used by the DCE to receive the transmit data. The DEC MicroServer implements CCITT 113 as a buffered version of CCITT 114. This clocking scheme ensures both network synchronization and minimized skew between the clock and data for a range of cable lengths and parameters.

  If the above transmit clocking mechanism is not provided by the DCE, this DCE must provide a method of adjusting the phase of the clock used to sample the data with respect to that supplied to the DTE. This requires that the DCE provide test points to allow analysis of the clock and data waveforms and that this adjustment is performed on installation, and after any subsequent alteration of the connection cable. This alternative method is required also for DCEs utilizing the X.21 interface.

Installation and Configuration

The DECrouter 2000 has no file storage of its own, and so relies on host systems to load the software.

The minimum requirement is for one host to load the DEC MicroServer or DEC MicroServer-SP. The DECrouter 2000 software can be installed on a number of load hosts. This helps to protect against loss of service if a single load host is unavailable, or unable to load the system for any other reason. Each load host must be on the same LAN and preferably in the same DECnet area as the DECrouter 2000.

The network manager can create and modify the configuration databases by using utilities on the load host. The configuration database is loaded into the DECrouter 2000 during system initialization.

System Management

The manager controls the running system by using the DECnet Network Control Program from any DECnet Phase IV node. For example, the manager can use the utility from one of the systems on the LAN.

The utility provides three basic functions:

- Display statistics and error information for the DECrouter 2000 (for example, statistics on line usage or errors)
- Control the DECrouter 2000 (for example, starting and stopping lines, setting parameters, and loading the software)
- Test the components of the network (for example, loop messages through all or part of a communications path to isolate a defective component)

In addition, a separate utility available on VMS or MicroVMS load hosts, assists problem-solving by tracing information at various stages in its path through the DECrouter 2000.

Event-logging and dump reception facilities can be used at the discretion of the customer. The product will attempt to dump to a Phase IV node on the same LAN and reload automatically following a system failure.

Path Splitting

If the costs are set appropriately, the DECrouter 2000, on the DEC MicroServer, performs path splitting. Note that routing cost is an arbitrary network management parameter set by the network manager to control network traffic flow. If the cost between the DECrouter 2000 and the destination node is the same on multiple synchronous ports, then the DECrouter 2000 splits the traffic across the ports. As a result, higher data transfer rates and higher reliability due to redundant paths are provided with the DECrouter 2000.

Performance

The actual packet rate will be less than that indicated by the aggregate synchronous line speed, and is determined by such factors as:

- Type of traffic (routing updates or data packets) and data rates
- The path of messages through the DECrouter 2000 system (LAN-to-LAN, synchronous-to-LAN, or synchronous-to-synchronous)
- Communications line characteristics
- Frequency and type of errors on the synchronous links
- Network topology
- Protocol overhead

PREREQUISITE SUPPORT

A Network Profile and DECnet Customer Support Plan covering all intended network nodes and their support may be required by your Digital office.

HARDWARE REQUIREMENTS

VAX, MicroVAX, VAXstation, VAXserver, DECstation, DECsystem or IBM® PC-compatible configuration as specified in the System Support Addendum (SSA 28.85.03-x)

DEC MicroServer or DEC MicroServer-SP as specified in the System Support Addendum.

SOFTWARE REQUIREMENTS

For each VAX system acting as a load host or dump receiver:

VMS Operating System or
MicroVMS Operating System or
ULTRIX-32 Operating System

DECnet-VAX or
DECnet-ULTRIX

For each DECstation or DECsystem acting as a load host or dump receiver:

ULTRIX-32 Operating System

DECnet-ULTRIX

For each IBM PC-compatible system acting as a load host or dump receiver:

MS-DOS Operating System or
PC-DOS Operating System

DECnet-DOS

Refer to the System Support Addendum for availability and required versions of prerequisite/optional software (SSA 28.85.03-x).

ORDERING INFORMATION

Software Licenses: QL-VI8A*-**

Software Media for VMS and MicroVMS Operating Systems: QA-VI8AA-**

Software Media for ULTRIX-32 Operating Systems: QA-VI8AB-**

Software Media for MS-DOS Operating Systems: QA-VI8AC-**

Software Documentation: QA-VI8AA-GZ

Software Product Services: QT-VI8A*-**

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

SOFTWARE LICENSING

You will need a separate license for each DEC MicroServer or DEC MicroServer-SP unit on which you will be using the software product (except as otherwise specified by Digital).

The licensing provisions of Digital's Standard Terms and Conditions provide in part that the software and any part thereof (but excluding those parts specific to the load hosts) may be used only on the single DEC MicroServer hardware unit on which the software is operated, but may be copied, in whole or in part (with the proper inclusion of Digital's copyright notice and any proprietary notices on the software) between multiple load hosts on the same LAN.

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

SOFTWARE PRODUCT SERVICES

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

SOFTWARE WARRANTY

The DECrouter 2000 is warranted for use only with supported Phase III and Phase IV DECnet products supplied by Digital. Any system connected to one of the DECrouter 2000's synchronous link(s) must run a current version of a DECnet Phase III/IV product using any supported synchronous interface, but excluding a DMC11 device.

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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