Software Product Description

PRODUCT NAME: X.25 V1.1 for OpenVMS Alpha Systems **SPD 47.37.07**

DESCRIPTION

X.25 for OpenVMS Alpha Systems is a layered product for OpenVMS Alpha systems. It enables appropriately configured systems to connect to an X.25 Packet Switched Data Network (PSDN) via an X.25 Relay node on the same Local Area Network (LAN), via a DNA Phase IV X.25 connector node, or directly using a synchronous communications device.

The product supports communication via PSDNs conforming to ITU/TSS recommendation X.25 1980, 1984, and 1988, or to international standard ISO 8208. Refer to the *SUPPORTED PUBLIC NETWORKS* section for the list of supported PSDNs.

X.25 for OpenVMS Alpha Systems also provides the device drivers and specific data link protocol support for Digital Equipment Corporation's synchronous communications options for OpenVMS Alpha systems.

X.25 for OpenVMS Alpha allows an OpenVMS Alpha system to:

- Act as a packet-mode DTE connected to a supported PSDN.
- Support ISO 8208 DTE to DTE point-to-point operation.
- Act as a packet-mode DTE connected to a LAN.
- Provide an X.25 sub-network for DECnet/OSI CONS and CLNS operation.
- Provide a DEC-HDLC point-to-point data link for DECnet/OSI CLNS operation.
- Act as a combination of the above, chosen on a per-DTE basis.

The following restrictions of X.25 for OpenVMS Alpha should be noted:

- The multi-host mode of operation available in the VAX P.S.I. product is not provided.
- DCE mode is supported for the purposes of point-to-point operation as described in ISO 8208; DCE mode for emulation of a PSDN is not supported.
- Use of the D bit in data packets is not supported.
- Programming interfaces to the data links and device drivers are not supported.

X.25 for OpenVMS Alpha supports the following functions:

- Process-to-process (X.25) communication.
  X.25 for OpenVMS Alpha allows application programs to access X.25 network services via the standard OpenVMS QIO system service.
- Process-to-terminal (X.29) communication.
  Through the X.29 QIO programming interface, users of the OpenVMS Alpha system may make outgoing calls to other Digital or non-Digital systems or suitable network PADs accessible via a PSDN.
- Terminal-to-process (X.29) communication.
  Remote terminals connected to the PSDN may access the OpenVMS Alpha host running X.25 by means of an X.29 Switched Virtual Circuit (SVC) call.
- DECnet/OSI Connectionless Network Service.
  The product supports the use of the DEC-HDLC and X.25 protocols as sub-networks for the OSI Connectionless-mode Network Service (CLNS).
- DECnet/OSI Connection Oriented Network Service.
  The product supports the OSI Connection Oriented Network Service (CONS) for OSI Transport over X.25 sub-networks.
- X.25 Mail.
  The X.25 Mail utility allows communication across a PSDN via electronic mail between two systems running the Mail-11 protocol over X.25. Systems that support Mail-11 over X.25 include WAN Support for Digital UNIX®, X.25 for OpenVMS Alpha, X.25 Client for OpenVMS, and X.25 installations of DECnet/OSI for OpenVMS VAX.

Features

Conformance to Standards

X.25 for OpenVMS Alpha complies with the following standards:

- ITU/TSS recommendations—X.25 (1980, 1984, or 1988), X.3, X28, X.29
- international standards ISO—8208, 7776, 8881, 8802/2, 8878, 8473

Virtual Circuits

X.25 for OpenVMS Alpha offers communication over both Permanent Virtual Circuits (PVCs) and Switched Virtual Circuits (SVCs), and supports up to 4096 virtual circuits in total per system. One virtual circuit is used for each incoming or outgoing X.29 terminal connection, for each X.25 call, and for each DECnet/OSI routing circuit and transport connection. The use of PVCs for X.29 communication is not defined by the 1980 and 1984 ITU/TSS recommendations, and is not available with X.25 for OpenVMS Alpha.

Virtual circuits may use X.25 protocol over a LAN connection, over a WAN synchronous communications connection or may use Digital X.25 Client for OpenVMS Alpha Systems over a DECnet circuit to a DECnet Gateway Access Protocol (GAP connector node. **NOTE** that there is no support for use of more than 512 of the available virtual circuits by Digital X.25 Client for OpenVMS Alpha Systems with DECnet Gateway Access protocol connector nodes. See HARDWARE REQUIREMENTS for details of GAP connector nodes and ISO relay nodes supported.

Process-to-Process Communication

The X.25 for OpenVMS Alpha programming interface allows application programs to access X.25 packet level services via the standard OpenVMS QIO interface.

Functions include the establishment and clearing of network connections, data transmission and reception, sending and receiving of interrupt messages, and resetting of virtual circuits. The interface also provides for the segmentation and recombination of messages that are longer than the packet size selected for the circuit.

This interface enables an application program using OpenVMS System Services to communicate with complementary X.25 software on other systems, whether Digital or non-Digital..

Terminal Communications

X.25 for OpenVMS Alpha supports terminal communications according to ITU/TSS recommendations X.3, X.28, and X.29. Only those terminal parameters defined in the X.3 recommendation are explicitly supported. Network-specific enhancements or extensions to the X.3 parameters are available at both the X.29 programming and the host-based PAD user interface. Terminal processes that depend on these extensions may not function correctly when used on other PSDNs or when accessing one PSDN via another (for example, international access).

The X.29 interactive terminal interface allows remote asynchronous terminals (character-mode DTEs) connected to the network to communicate with the OpenVMS Alpha system in a manner similar to local terminals. The maximum number of terminals supported on a OpenVMS Alpha system (both local and X.29 remote) cannot exceed the number for which the system has been configured.

When using applications designed for interactive, local terminal operations, transmission delays or PAD parameter settings can cause inconsistencies between incoming X.29 traffic and the application's operation. It may be necessary to make modifications to the application user interface or alter PAD parameter settings.

The X.29 interface includes a programming capability for the support of specific X.29 signaling requirements, including modification of PAD parameters.

Accounting

Accounting information is collected and is made available to the user via a report writing utility.

For incoming X.29 calls, no information can be retrieved relating to the process or account onto which a user is logged.

Security

An extensive security facility is provided. Control of remote access to the system (incoming security) and local access to the network (outgoing security) are supported. Incoming and outgoing security can be based on any combination of:

- Normal or reverse charging
- DTE number
- Network (PSDN)
- Process (or user) making the outgoing call
- Application handling the incoming call

Network Management

The Network Control Language (NCL) is provided for the management of X.25 for OpenVMS Alpha and DECnet/OSI. NCL provides network management facilities to:

- Define outgoing call destinations
- Define incoming call handling
- Modify X.25 frame and packet levels parameters
- Define security parameters
- Modify network configuration
- Monitor connection statistics
- Perform network maintenance functions

The network manager can be notified of significant network events such as security violations or network failures through the event logging facility.

Problem solving is facilitated by the Common Trace Facility (CTF) provided with the OpenVMS operating system. CTF enables the user to trace and analyze frames passing between the PSDN and the X.25 for OpenVMS Alpha system.

Communications Interfaces

Refer to the tables in this Software Product Description and consult your local hardware service provider for complete information on the synchronous communication devices supported by X.25 for OpenVMS Alpha, as well as a list of the relay/connector nodes that may be used as X.25 gateways to the LAN.

In addition to the devices listed in this Software Product Description, operation over CSMA/CD (ISO 8802 /3) and FDDI (ISO 9314) networks is supported via the LLC2 protocol.

Optional Facility Support

Table 1 describes the Optional User Facilities of the 1988 ITU/TSS X.25 recommendations that X.25 for OpenVMS Alpha supports.

Support for any facility is dependent on the PSDN used. The product documentation describes specific facility availability for supported PSDNs.

Table 1
Optional User Facilities Support

ITU /TSS X.25 (1988) reference	Optional User Facility	Support[1]
6.1	On-line facility registration	no
6.2	Extended packet sequence numbering	yes
6.3	D bit modification	n/a
6.4	Packet retransmission	no
6.5	Incoming calls barred	n/a
6.6	Outgoing calls barred	n/a
6.7	One-way logical channel outgoing	yes
6.8	One-way logical channel incoming	yes
6.9	Non-standard default packet sizes	yes
6.10	Non-standard default window sizes	yes
6.11	Default throughput class assignment	yes
6.12	Flow control parameter negotiation	yes
6.13	Throughput class negotiation	yes
6.14.1	Closed User Group (CUG)	yes
6.14.2	CUG with outgoing access	yes
6.14.3	CUG with incoming access	yes
6.14.4	Incoming calls barred within a CUG	n/a
6.14.5	Outgoing calls barred within a CUG	n/a
6.14.6	CUG selection	yes
6.14.7	CUG with outgoing access selection	yes
6.15.1	Bilateral Closed User Group (BCUG)	yes
6.15.2	BCUG with outgoing access	n/a
6.15.3	BCUG selection	yes
6.16	Fast select	yes
6.17	Fast select acceptance	n/a
6.18	Reverse charging	yes
6.19	Reverse charging acceptance	n/a
6.20	Local charging prevention	n/a
6.21.3	NUI selection	yes
6.22	Charging information	yes
6.23.2	RPOA selection	yes
6.24	Hunt group	no[2]
6.25.1	Call redirection	n/a

[1] Refers to those features of a facility that are relevant to the operation of a DTE. "n/a" refers to DCE facilities requiring no action from the DTE.

[2] The individual DTEs must be assigned addresses independent of the hunt group address.

Table 1 (Cont.)
Optional User Facilities Support

ITU /TSS X.25 (1988) reference	Optional User Facility	Support[1]
6.25.2.2	Call deflection selection	no
6.25.3	Call redirection or call deflection notification	yes
6.26	Called line address modified notification	no
6.27	Transit delay selection and indication	yes
6.28	TOA/NPi address selection and indication	no
7.1	Non-X.25 facilities	yes
G.3.1	Calling Address Extension	yes
G.3.2	Called Address Extension	yes
G.3.3.1	Minimum throughput class	yes
G.3.3.2	End-to-end transit delay	yes
G.3.3.3	Priority	yes
G.3.3.4	Protection	yes
G.3.4	Expedited data negotiation	yes

[1] Refers to those features of a facility that are relevant to the operation of a DTE. "n/a" refers to DCE facilities requiring no action from the DTE.

INSTALLATION

Digital recommends that a customer's first purchase of this software product include Digital Installation Services. These services provide for installation of the software product by an experienced Digital Software Specialist. Only customers experienced with Digital's X.25 products should attempt installation.

Customer Responsibilities

In some cases, the X.25 network supplier may impose restrictions, limitations, or requirements on the proposed Digital network configuration. The customer must ensure these are understood and adhered to for each network.

Before installation of the software, the customer should:

- Previously have installed all requisite software and hardware, including terminals.
- Obtain, install, and demonstrate as operational any modems and other equipment and facilities necessary to interface to Digital's communication equipment.
- Demonstrate equivalence of operation for modems other than Bell 208A, 208B, 209, 212A synchronous modems, or, in Europe, employ only PTT approved modems.
- Subscribe to the Open User Group and to at least two SVCs to complete the product's installation checkout (this test loops information from the X.25 for OpenVMS Alpha system to the PSDN and back to the X.25 for OpenVMS Alpha system). Systems in Closed User Groups only, or where the PSDN does not support calls to the originating DTE address, require specially negotiated arrangements for Digital installation of the product.
- Make available for a reasonable period of time, as mutually agreed by Digital and the customer, all hardware, communication facilities and terminals that are to be used during a Digital supervised installation.

HARDWARE REQUIREMENTS

Processors Supported

Alpha:
DEC 2000 Model 300/500
DEC 3000 Model 300/300L/300X/300LX,
DEC 3000 Model 400/400S,
DEC 3000 Model 500/500S/500X,
DEC 3000 Model 600/600S,
DEC 3000 Model 700,
DEC 3000 Model 800/800S,
DEC 3000 Model 900
DEC 4000 Model 600/700 series [1]
DEC 7000 Model 600/700 series [1]
DEC 10000 Model 600/700 series [1]
AlphaServer 8200 5/300
AlphaServer 8400 5/300 [1]
Digital 2100 Server Model A500MP
Digital 2100 Server Model A600MP
AlphaServer 2100 4/{200/233/275}, 5/250
AlphaServer 2000 4/{200/233}
AlphaServer 1000 4/{200/233}
AlphaServer 400 4/166
AlphaStation 600 5/300
AlphaStation 400 4/233
AlphaStation 250 4/266
AlphaStation 200 4/{100/166/233}

[1] No synchronous communication option available. Connection only available via LLC2.

System Memory Required

In addition to the memory requirements of OpenVMS Alpha and user applications, the minimum memory requirements of X.25 for OpenVMS Alpha are:

- 2.5 Mbytes for software and data structures
- 40Kbytes for each active virtual circuit in a Client configuration
- 10Kbytes for each active virtual circuit in a directly connected configuration

These figures represent an upper bound only and should be used as a guide to sizing a system to provide adequate X.25 performance. The product will require less memory than quoted. However, an underconfigured system will display reduced performance, not only for X.25 communications but also for other processes.

Communication Devices Required

X.25 for OpenVMS Alpha requires one or more synchronous communication devices when directly connected to one of the following.

- A PSDN via the X.25 protocol
- Another system using DECnet/OSI over X.25
- Another Digital system using DECnet/OSI over DEC-HDLC

The devices available on the supported processors are listed in Table 3. For additional information on the configuration and performance of these devices see the *CONFIGURATION GUIDELINES* section.

For operation using the ISO 8802-2 protocol (LLC2) the product requires a Local Area Network (LAN) device. The product supports Digital's ISO 8802-3 (CSMA/CD) and ISO 9341 (FDDI) devices for use with the LLC2 protocol.

For operation over LLC2 to an X.25 relay node, the supported relay nodes are

- DEC X.25gateway 100/500 (SPD 32.97.xx)
- DEC Network Integration Server (DECNIS) 500/600 (SPD 36.05.xx)
- Alpha system running WAN Support for Digital UNIX (SPD 42.47.xx) configured for X.25 relay

For operation over DECnet (using the Gateway Access Protocol, GAP), the supported connector nodes are

- DEC X.25gateway 100/500 (SPD 32.97.xx)
- DEC Network Integration Server (DECNIS) 500/600 (SPD 36.05.xx)
- X25router 2000 or X25router 100 (SPD 28.86.xx)
- DECnet/OSI V6.2 (or later) for OpenVMS VAX configured for X.25 multi-host operation (SPD 25.03.xx)

For additional information on the configuration and performance of these relay nodes, consult your local hardware service provider and relevant Software Product Descriptions.

Disk Space Required

The disk space required for installation and use of the product is 15,000 Blocks (7.5 Mbytes).

This size is approximate. The actual size will vary depending on the user's system environment, configuration, and software options.

OPTIONAL HARDWARE

Additional communications devices, subject to limitations described in the *CONFIGURATION GUIDELINES* section of this SPD.

SOFTWARE REQUIREMENTS

OpenVMS Alpha Operating System V7.0 (SPD 41.87.xx)
DECnet/OSI V7.0 for OpenVMS Alpha (SPD 50.45.xx)

GROWTH CONSIDERATIONS

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

SUPPORTED PUBLIC NETWORKS

Table 2 shows the public PSDNs supported by the product in the countries shown. In addition, certain private PSDNs have been tested by Digital and appropriate profiles have been included with the product. For more detail, consult your local Digital office.

Table 2
Supported Public Networks

Argentina	Arpac
Australia	Austpac
Austria	Datex-P
Belgium	DCS
Brazil	Renpac
Canada	Datapac
	Infoswitch
Chile	VTRnet
Denmark	Datapak
Eire	Eirpac
Finland	Datapak

Table 2 (Cont.)
Supported Public Networks

France	Transpac
Germany	Datex-P
Hong Kong	Datapak
	Inet
	Intelpak
Indonesia	SKDP
Ireland	Ciepac
Italy	Itapac
Japan	CC-VAN
	DDX-P 80/84
	Jaisnet
	Tymnet®
	Venus LP
Luxembourg	Luxpac
Malaysia	Maypac
Mexico	Telepac
Netherlands	Datanet 1
New Zealand	Pacnet
Norway	Datapak
Pakistan	Paknet
Philippines	Datanet
Portugal	Telepac
Singapore	Telepac
South Korea	Dacomnet
Spain	Iberpac
Sweden	Datapak
	Datapak II
Switzerland	Telepac
Taiwan	Pacnet
Thailand	Thaipak
Turkey	Turpak
United Kingdom	PSS [2]
	Postgem
	Mercury
United States	Accunet
	Autonet®
	Bell Atlantic
	CompuServe®
	ConnNet
	FedexITC
	FreedomNet II
	Impacs
	Infonet
	Mark*Net Extended Service
	Pacific Bell PPSnet
	Pulselink
	Sprintnet
	Telenet®
	Tymnet
	US West Digipac
	Western Union PTN-1
	Worldnet

[2]PSS is only supported when the Extended Facilities option has been subscribed.

CONFIGURATION GUIDELINES

For direct connection of the Alpha system to the PSDN, operation of the product requires the use of one or more synchronous communication devices. The following devices are supported by X.25 for OpenVMS Alpha Systems:

- *integral SCC device*
  - A single port multi-function device on the system motherboard. Only the synchronous communications function is supported.
  - Limited modem signaling capabilities. Local and remote loopback signals and DTE-sourced clock are not provided.
- *WANcontroller 720 (DSYT1)*
  - single slot dual port TURBOchannel serial synchronous communications adapter
  - for systems with no available TURBOchannel slots, an extender box may be required
- *DNSES*
  - single slot dual port serial synchronous communications EISA adapter
- *PBXDI-Ax*
  - a range of single slot dual port serial synchronous communications ISA adapter

Additional factors to consider when configuring hardware devices for use with the product are

- Hardware configuration limits, such as power supply, backplane space, bus throughput, mapping registers, and any other restrictions on the number of devices per CPU or per bus must be observed. Consult your local hardware service provider for further information.
- CPU utilization. Ensure sufficient CPU power will be available to drive the required number of lines at the desired speeds and leave sufficient margin for application processing.

The supported devices available on each system are given in Table 3. The operational characteristics of each device are given in Table 4.

Table 3
Synchronous Communication Devices

System	Devices supported
DEC 10000 Model 6*0/7*0	–
DEC 7000 Model 6*0/7*0	–
DEC 4000 Model 6*0/7*0	–
AlphaServer 8400	–
DEC 3000 Model 900	SCC, DSYT1
DEC 3000 Model 800/800S	SCC, DSYT1
DEC 3000 Model 700	SCC, DSYT1
DEC 3000 Model 600/600S	SCC, DSYT1
DEC 3000 Model 500/500S/500X	SCC, DSYT1
DEC 3000 Model 400/400S	SCC, DSYT1
DEC 3000 Model 300/300X	SCC [1], DSYT1
DEC 3000 Model 300LX	SCC [1], DSYT1
DEC 3000 Model 300L	SCC [1]
DEC 2000 Model 300	DNSES
DEC 2000 Model 500	DNSES
Digital 2100 Server A500MP	DNSES
Digital 2100 Server A600MP	DNSES
AlphaServer 1000	DNSES
AlphaServer 2000	DNSES
AlphaServer 2100	DNSES
AlphaServer 8200	DNSES
AlphaServer 400	PBXDI–Ax
AlphaStation 200	PBXDI–Ax
AlphaStation 250	PBXDI–Ax
AlphaStation 400	PBXDI-Ax
AlphaStation 600	DNSES

[1] Only standard Workstation configurations support use of the SCC

Table 4
Synchronous Communication Device Characteristics

Device	Max. line speed (Kbps)	Max. HDLC data size (bytes)	Max.X.25 data size (bytes)[1]	Supported interface standards
SCC	19.2	1018	512	EIA–232 V.24
DSYT1	2x64 or 1x2000	4080	2048	EIA–232/–422/–423 V.10 /V.11/ V.24 /V.35
DNSES	2x64 or 1x2000	4080	2048	EIA–232/–422/–423 V.10 /V.11/ V.24 /V.35
PBXDI-Ax	2x2400, 4x2400	8300	4096	EIA–232/ EIA–530/ V.24 /V.28/ V.35 /X.21 [2]

[1] Fragmentation of larger data sizes is supported

[2] X.21 electrical levels and connector in data-leads only communication. X.21 call control is **not** supported.

DISTRIBUTION MEDIA

This software and documentation are available on the Digital CD-ROM Software Library for OpenVMS Alpha. The software documentation is also available in hard-copy format.

ORDERING INFORMATION

Software Licenses: QL–0THA9–**
Software Media/Documentation: QA–03XAA–H8
Software Documentation (hardcopy): QA–0THAA–GZ
Software Product Services: QT–0THA*–**

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

SOFTWARE LICENSING

Customers who purchased the Digital X.25 Client product (see SPD 46.37.xx) for an OpenVMS Alpha system may upgrade that processor to X.25 for OpenVMS Alpha *at no additional cost*. X.25 for OpenVMS Alpha Systems can be installed and enabled using the same license management key (PAK) received for Digital X.25 Client for OpenVMS Alpha. Thus the software upgrade of an OpenVMS Alpha system from DECnet and Digital X.25 Client to DECnet/OSI and X.25 requires no new license purchases, presuming the original licenses are within warranty or covered by Digital service contract. This condition in no way supercedes or invalidates Digital's licensing terms and policies.

Specific functions of the X.25 for OpenVMS Alpha product are enabled by the licenses described in Table 5.

Table 5
Software Licenses

License	Function Enabled
DECnet/OSI	CONS over LLC2. CLNS over DEC-HDLC.
X.25 for OpenVMS Alpha	All functions over LAPB and LLC2.
Digital X.25 Client for OpenVMS Alpha	All functions over LAPB and LLC2.

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

License Management Facility Support:

This layered product supports the OpenVMS Alpha License Management Facility.

License units for this product are allocated on an Unlimited System Use basis.

For more information on the License Management Facility, refer to the OpenVMS Alpha Operating System Software Product Description (SPD 41.87.xx) or documentation.

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.
Digital has designed or adapted this software product to operate with equipment conforming to the ISO standards 7776/8208 and with the public networks in the associated countries and with certain private PSDNs that have been tested and approved by Digital.

Digital cannot offer its standard warranty for this software unless it has been tested with such networks and the software configured appropriately. Such a testing service is available from Digital on request, and will permit both full Digital support of the X.25 for OpenVMS Alpha product and also ensure that X.25 for OpenVMS Alpha is optimally configured against the PSDN concerned.

The presence of a network/country combination in the list of supported public PSDNs indicates Digital's commitment to support X.25 for OpenVMS Alpha when using that public X.25 service. It does not necessarily imply that network certification by the particular networking authority has been granted for all or any hardware devices supported by the X.25 for OpenVMS Alpha software product. Please contact your local Digital office for up-to-date information regarding supported configurations and certification status.

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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