Software Product Description

PRODUCT NAME: VAX Packetnet System Interface (P.S.I.), Version 4.3 **SPD 25.40.15**

DESCRIPTION

The VAX Packetnet System Interface (VAX P.S.I.) product allows suitably configured VAX systems to connect to Packet Switching Data Networks (PSDNs) conforming to CCITT recommendation X.25 (1978, 1980 or 1984) and/or to International Standards (ISO) 7776 and 8208. VAX P.S.I. allows a VAX system to function as Data Terminal Equipment (DTE) or Data Circuit Terminating Equipment (DCE) as follows:

- A packet-mode DTE connected to a supported PSDN
- A packet-mode DTE connected to a DCE conforming to ISO 7776 and 8208
- A packet-mode DCE connected to a DTE conforming to ISO 7776 and 8208
- A combination of the above modes chosen on a per-line basis

In this SPD, descriptions referring to PSDNs also apply to supported ISO point-to-point connections unless otherwise stated.

VAX P.S.I. can be configured for either Native or Multi-host mode operation:

- VAX P.S.I. Native mode supports direct connections from a VAX system to one or more PSDNs, each of which may have one or more DTEs.
- VAX P.S.I. Multi-host mode provides the features offered by VAX P.S.I. Native and also allows VAX P.S.I. Access systems to connect to a PSDN as though directly connected.

Features

VAX P.S.I. is a VMS layered product and can be used in the following ways:

- Process-to-process (X.25) communication
- Process-to-terminal (X.29) communication
- Terminal-to-Process (X.29) communication
- DECnet communications
- Open System Interconnection

Process-to-process (X.25) Communication

VAX P.S.I. supports access for VMS user programs written in VAX MACRO and high-level languages such as VAX FORTRAN. Programs executing in PDP-11 compatibility mode cannot use VAX P.S.I.

The VAX P.S.I. programming interface allows application programs to access the service interface to the packet level via the standard VMS QIO interface. Functions include the setting up and breaking of network connections, data transmission and reception, sending and receiving of interrupt messages, and resetting of virtual circuits. The interface also allows splitting and recombining of messages which are longer than the packet size selected for the circuit.

The programming interface enables an application program using VMS System Services to communicate with complementary software on other systems (Digital or non-Digital DTEs) accessible via the X.25 connection.

Process-to-terminal and Terminal-to-process (X.29) Communication

VAX P.S.I. supports terminal communications according to CCITT recommendations X.3, X.28, and X.29 for:

- Outgoing terminal traffic

  VAX P.S.I. host users may make outgoing calls to other Digital or non-Digital CPUs, or suitable network PADs accessible via a PSDN, using the X.29 programming interface or by using the host-based Packet Assembly/Disassembly (PAD) supplied with VAX P.S.I. The PAD facility accepts DCL-style commands or CCITT X.28 commands.

- Incoming terminal traffic

  The X.29 Interactive Terminal Interface allows remote asynchronous terminals (character-mode DTEs) connected to the network to communicate with the VAX P.S.I. host in a manner similar to local terminals. Dissimilarities may appear as a result of delays caused by the PSDN(s) and various PAD parameter settings chosen by the user or peculiar to the PSDN(s). In this case, the remote PAD must perform code conversions between ASCII and the code the terminal uses. Note that there may be some restrictions imposed by the PSDN(s).

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 interface and the host-based PAD user interface. Terminal processes that depend on these extensions may cause problems when used on other PSDNs or when accessing one PSDN via another (for example, international access).

The X.29 terminal interface is compatible with the local terminal interface except for the facilities where the PSDN does not provide adequate support. The X.29 interface includes support for specific X.29 signaling. For example, the break key can be used to disable output and the interrupt message can be mapped directly to the VMS interrupt character.

The host-based PAD employs a DCL-style command syntax offering the ability to reference the CCITT PAD parameters symbolically, as well as an interface that conforms to the standard CCITT command signals. The host-based PAD also offers the capability of running multiple X.29 sessions using the VMS SPAWN and ATTACH commands. The host-based PAD supports reception of reselection messages to allow X.29 calls to be redirected to another DTE.

The X.29 programming interface is similar to the X.25 programming interface and allows a VMS process to control the virtual circuit (for example, to modify PAD parameters or clear a call). The X.29 programming interface can also be used to make an outgoing call to a remote PAD. The programming interface allows generation of PAD reselection messages.

The maximum number of terminals supported (both local and remote X.29) must not exceed the number supported by VMS. The use of PVCs for X.29 connections is not defined by the 1980 and 1984 CCITT recommendations, and is not available with VAX P.S.I.

DECnet Communication

VAX P.S.I. allows the use of DECnet-VAX facilities over X.25 circuits. This technique is known as Data Link Mapping (DLM). A DECnet-VAX license is required to communicate with other DECnet nodes via a PSDN(s). For details, refer to DECnet-VAX Software Product Description (SPD 25.03.xx).

Open System Interconnection

VAX P.S.I. may be used for Open System Interconnection (OSI) communication using the OSI Applications Kernel product (OSAK). Refer to the VAX OSI Applications Kernel Software Product Description (SPD 27.47.xx).

VAX P.S.I may be used with VAX FTAM for managing files on open systems (refer to VAX FTAM Software Product Description SPD 29.86.xx), and with VAX Message Router X.400 Gateway to enable message exchange with other X.400 systems in X.400 public or private networks (refer to the VAX Message Router X.400 Software Product Description SPD 27.50.xx).

VAX P.S.I. also provides features of X.25 which permit a Connection Oriented Network Service (CONS) over X.25 according to ISO 8348.

Virtual Circuits

VAX P.S.I. (in Native or Multi-host mode) supports both Permanent Virtual Circuits (PVCs) and Switched Virtual Circuits (SVCs), and supports up to 512 virtual circuits in total per host machine. One virtual circuit is used for each:

- Incoming or outgoing X.29 terminal connection
- X.25 call using either a SVC or PVC
- Active Data Link Mapping (DLM) circuit

Configuration

VAX P.S.I. provides a configuration procedure to configure a VAX P.S.I. system locally. This allows network managers to create a configuration after initial installation or subsequently when reconfiguration is necessary.

Network Management

VMS provides a Network Control Program (NCP) for management of both DECnet-VAX and VAX P.S.I. This program allows network managers to define the line(s) and PSDN(s) to which the system is connected, select the mode (DTE or DCE) of each, specify destinations for incoming calls, access counters, and perform other maintenance functions.

Problem Solving

The TRACE utility assists problem solving by tracing and analyzing information at various stages as it passes between the PSDN and the VAX P.S.I. node. Event logging is available by means of normal VMS mechanisms.

P.S.I. Accounting

The P.S.I. Accounting utility enables the system manager to obtain information on VAX P.S.I. and network usage. The P.S.I. Accounting utility can extract the information collected and display the information directly on a terminal, or write the information to a file. Information can be extracted for selected records or a summary produced. The P.S.I. Accounting utility product is compatible with the VMS Accounting utility.

In the case of incoming X.29 calls, no information can be stored relating to the process/account on which a user is logged; this may be obtained through correlation with VMS accounting records.

P.S.I. Security

The P.S.I. Security utility allows control of both remote DTE access to VAX P.S.I. and access to the PSDN(s) by VMS processes. The Security utility allows for access control on the basis of:

- The remote DTE numbers involved either on the basis of individual DTE numbers or groups of DTE numbers with common leading digits.
- The process making the outgoing call or the application handling the incoming call.
- Whether or not the call is normally or reverse charged.

In addition, when configured in Multi-host mode, VAX P.S.I. can apply security checks to both incoming calls to and outgoing calls from any suitably configured VAX P.S.I. Access node. Security on both the VAX P.S.I. and the VAX P.S.I. Access node is required for comprehensive protection.

P.S.I. Mail

The P.S.I. Mail utility allows communication across a PSDN via electronic mail between two VMS systems running VAX P.S.I. or VAX P.S.I. Access, using the VMS Mail facility even in the absence of any DECnet communications between the two DTEs. Refer to the VMS Operating System Software Product Description (SPD 25.01.xx) for more information about VMS Mail.

Conformance to Standards

VAX P.S.I. conforms to the following standards:

- CCITT Recommendation X.25 (1978, 1980, or 1984) and ISO 8208 and 7776 using the LAPB or LAPBE variants of the data link level and X.25 packet level protocols.
- ISO 3309 - Frame generation and recognition (not protocol) using High-Level Data Link Control (HDLC). Bisynchronous (BSC) framing is not supported.

Table 1 (Optional Facility Support) describes the particular aspects of the CCITT X.25 recommendation supported by VAX P.S.I. Note that actual support for any given feature depends on the PSDN used.

Line Interface

The electrical line interface used for PSDN communications depends on the hardware device used. VAX P.S.I. provides only the electrical interface of a DTE rather than a DCE and does not provide clock signals. Therefore, an external clock source (e.g., a modem) is required.

The range of supported devices cover V.24, V.35, V.10, RS232, RS422 and RS423 over point-to-point, 4-wire, synchronous, full-duplex lines at transmission rates up to 256K bits per second, as well as ISDN Basic Rate Access at transmission rates up to 64K bits per second.

Synchronous Communications Devices

The communications devices supported by VAX P.S.I. are different, particularly in the amount of CPUs used. For optimum performance, customers are recommended to use a DMA device. Refer to the VAX P.S.I. System Support Addendum (25.40.15-x) for details of the hardware configurations supported by VAX P.S.I., supported line-speeds, and information about the supported synchronous driver products.

Prerequisite Support

For new PSDNs, the customer and Digital must jointly prepare a Network Profile and Customer Support Plan covering all the intended network nodes, their usage of SVCs, PVCs, and other network facilities, and their support. Without this Network Profile and Customer Support Plan, Digital cannot support the network connections.

INSTALLATION

Digital requires 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 second or subsequent installations. Digital recommends that all other customers purchase Digital's Installation Services.

Customer Responsibilities

In some cases, the PSDN supplier (or PTT) may impose restrictions, limitations, or requirements on the proposed Digital network configuration. The customer must ensure that they understand and adhere to these controls for each and every network.

Before installation of the software, the customer must:

- Previously have installed all required software and hardware including terminals.
- Obtain, install and demonstrate that any modems and other equipment and facilities necessary to interface to Digital's communication equipment are operational.
- Demonstrate equivalence of operation for modems other than Bell™ 208A, 208B, 209, 212A synchronous modems, or in Europe, PTT approved modems.
- Demonstrate that, where necessary, modems used meet the appropriate interface standards.
- Subscribe to the Open User Group and to at least two SVCs to complete the product's installation checkout (this tests loops information from the VAX P.S.I. system to the PSDN and back to VAX P.S.I. system). Systems that use PVCs or Closed User Groups only, or where the PSDN does not support calls to the same 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 installation.

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

Courtesy Installation Service

This software product will be installed by Digital at no additional charge if purchased concurrently with a Startup Service Package that includes installation service. This service may not be available in all countries. This service is available for those configurations which comply with the restrictions described under the *SOFTWARE WARRANTY* section. Consult the System Support Addendum (SSA 25.40.15-x) for a list of countries and networks where this service is available.

HARDWARE REQUIREMENTS

VAX, MicroVAX, VAXstation or VAXserver configuration as specified in the System Support Addendum (SSA 25.40.15-x).

SOFTWARE REQUIREMENTS *

VMS Operating System

For use with the synchronous communications interfaces, the appropriate device driver in the VAX Wide Area Network Device Drivers software is required. Refer to the VAX Wide Area Network Device Drivers Software Product Description SPD 29.64.xx.

For use with the ISDN Basic Rate Access communications device, VAX ISDN software and hardware is required. Refer to the VAX ISDN Software Product Description SPD 31.23.xx.

ORDERING INFORMATION

Software Licenses: QL-071A*-**
Software Media: QA-071A*-**
Software Documentation: QA-071AA-GZ
Software Product Services: QT-071A*-**

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

SOFTWARE LICENSING

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, please contact your local Digital office.

LICENSE MANAGEMENT FACILITY

This layered product supports the VMS License Management Facility.

License units for this product are allocated on a CPU-capacity basis.

For more information on the License Management Facility, refer to the VMS Operating System Software Product Description (SPD 25.01.xx) or the VMS Operating System documentation set.

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

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 ISO 7776/8208 with the public networks in the countries listed in the System Support Addendum (SSA 25.40.15-x), and with certain private PSDNs that have been approved by Digital.

Optional Facility Support

VAX P.S.I. support for any given CCITT X.25 facility depends on support for it in the appropriate supported PSDN. Generally, VAX P.S.I. is designed to disallow use of facilities that the PSDN will not support. Table 1 shows what VAX P.S.I. is capable of doing, rather than what it will do when used on any particular PSDN. The product documentation describes specific facility availability for the supported public PSDNs.

Note: Not all optional facilities are supported for use with VAX P.S.I. Mail, DECnet Data Link Mapping (DLM) and VAX OSI Transport (VOTS).

Table 1
Optional Facility Support

Number	Description of the Option	Paragraph Number in CCITT X.25 (1984)	VAX P.S.I. Support
1.	Extended packet sequence numbering	6.2	Yes
2.	Non-standard default window size	6.10	Yes
3.	Default throughput classes assignment	6.11	N/A
4.	Packet re-transmission	6.4	See Note 1
5.	Incoming calls barred	6.5	N/A
6.	Outgoing calls barred	6.6	N/A
7.	One-way logical channel outgoing	6.7	N/A
8.	One-way logical channel incoming	6.8	Yes
9.	Closed User Group	6.14.1	Yes
10.	CUG with outgoing access	6.14.2	Yes
11.	CUG with incoming access	6.14.3	Yes
12.	Incoming Calls barred within CUG	6.14.4	Yes
13.	Outgoing Calls barred within CUG	6.14.5	Yes
14.	CUG selection	6.14.6	Yes
15.	CUG with outgoing access selection	6.14.7	No
16.	Absence of both CUG selection facilities	6.14.8	Yes
17.	Bilateral CUG	6.15.1	Yes
18.	Bilateral CUG with outgoing access	6.15.2	Yes
19.	Bilateral CUG selection	6.15.3	Yes
20.	Reverse charging	6.18	Yes
21.	Reverse charging acceptance	6.19	Yes
22.	Local charge prevention	6.20	N/A
23.	Network User identification	6.21	Yes
24.	Charging information	6.22	Yes
25.	RPOA selection	6.23	Yes
26.	Hunt group	6.24	See Note 2
27.	Call redirection	6.25	N/A
28.	Called line address modified notification	6.26	Yes
29.	Call redirection notification	6.27	Yes
30.	Transit delay selection and indication	6.28	Yes
31.	On-line facility registration	6.1	No
32.	Non-standard packet size	6.9	Yes
33.	Flow control parameter negotiation	6.12	Yes
34.	Throughput class negotiation	6.13	Yes
35.	Fast select	6.16	Yes
36.	Fast select acceptance	6.17	Yes
37.	D-bit modification	6.3	No
38.	Abbreviated address	-	N/A

Table 1 (Cont.)
Optional Facility Support

Number	Description of the Option	Paragraph Number in CCITT X.25 (1984)	VAX P.S.I. Support
39.	Datagram queue length selection ex	-	No
40.	Datagram service signal logical channel	-	No
41.	Datagram non-delivery indication	-	No
42.	Datagram delivery confirmation	-	No
43.	Call statistics (non-X.25)	-	See Note 3

Notes:

1. This is not applicable to a DTE. VAX P.S.I. does not support receiving a level 3 Reject packet and will not generate one.
2. The individual DTEs must be assigned their own addresses independent of the hunt group address. VAX P.S.I. can then ignore the hunt group. Alternatively, each line on the same CPU can be configured as if connected to a separate PSDN; each with the same DTE address.
3. VAX P.S.I. does not generate these statistics, however, incoming statistics supplied by the PSDN are available in the accounting records and at the programming interface.
4. VAX P.S.I. does not support the following items of the CCITT X.25 recommendation:
   - Multi-link protocol
   - Use of the D-bit in outgoing packets

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