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Minicomputers

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Supermicrocomputer
Systems

Digital Equipment Corp.
VAX 4000

In this report:

The VAX 4000 line, consisting of the CISC-based, 32-bit Models 200 and 300 running Digital's proprietary VMS operating system, is intended for use as either a server or a timesharing system for distributed transaction processing and is designed for dedicated server applications. The Model 200 operates at six times the speed of the MicroVAX II, while the 300 runs ten times faster.

Strengths

- Dual-hosting capabilities

- Available in realtime configurations

- Servers support a wide range of desktop devices, including Apple's Macintosh, IBM PCs, VAXstations, and UNIX workstations

- Small footprint—size of a two-drawer filing cabinet

- Available in rack-mount configurations

- Upgrades available

- VAX 4000 Model 300 can now be expanded from 128MB to 256MB with the 64-MB, memory-based model

Limitations

- Neither model supports Ultrix

Competition

VAX 4000 Model 200: IBM's AS/400 Model B50, Compaq's Systempro 486, and Sun's SPARCserver.

VAX 4000 Model 300: The HP 3000 Model 932, IBM's 9370, and IBM's AS/400 Models B45, B50, and B70.

Vendor

Digital Equipment Corp.
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Fax: (508) 493-5020
In Canada:
Digital Equipment of Canada, Ltd.
P.O. Box 13,000,100
Herzberg Road, Kanata, ON K2K 2A6
(613) 592-5111

Price

Thirteen, base-system configurations are available ranging in price from $16,420 to $233,000. **GSA Schedule:** Yes.

—*By Gregg Wendorf*

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Product Analysis

Digital's CISC (Complex Instruction Set Computing) based VAX 4000 midrange line of computers consists of the entry-level Model 200 and the 8-MIPS Model 300.

Both are 32-bit pedestal and rack-mount systems available in multiuser, dedicated application, file, compute, print server, and realtime configurations. Both systems use RISC chips to off-load the CPU for communications and disk functions.

The Model 300 represents the future platform of the VAX 4000 series, while the Model 200 protects the Q-bus memory and peripherals' investment of MicroVAX 3000 users. The MicroVAX 3000 machines are upgradable to the VAX 4000 Model 200 via a CPU swap.

Users in search of a compute and file server, a mail server, or a database server with excellent I/O throughput, storage, and processing power should be interested in what Digital's VAX 4000 Models 200 and 300 have to offer—especially those users who have already invested in VMS.

Target Applications

Model 200	Finance, manufacturing, insurance, engineering, office automation, distribution, government, education, medical, and departments and small work groups that need a system that will complement higher-level VAX models.
Model 300	All applications targeted by the 200 and other distributed production applications running in branch offices, departments, factories, and research and development laboratories.

Strengths

Dual-hosting capabilities provide a high level of data availability and two independently functioning CPUs. Should one CPU in a dual-host system fail, data is still available through a second path, and all applications can resume immediately.

Available in realtime configurations, the product is ideal for data acquisition and control applications where users demand predictable performance and fast response time.

Servers support a wide range of desktop devices, including Apple's Macintosh, IBM PCs, VAXstations, and UNIX workstations. This strength is almost required in most of today's client-server configured sites. This approach allows users to get the maximum use out of their existing computing resources transparently through the VAX 4000 server.

The small footprint of the VAX 4000 line—the size of a two-drawer filing cabinet—and the fact that it does not require special air-conditioning or a separate computer room is significant in terms of cost when comparing it, for example, with IBM's AS/400 Model B70.

The VAX 4000 Model 300 can now be expanded from 128MB to 256MB with the 64MB, memory-based model.

Limitations

The Model 200 cannot be upgraded to a Model 300 without using a dual-host DSSI configuration to link the Model 200 to the 300. This limitation might be offset to some degree by the fact that the 200 protects the Qbus memory and peripherals investment of the MicroVAX 3000 users and by the flexibility of today's client-server environment.

Neither model supports Ultrix, which might not prove to be a hindrance because of Digital's announced support of X/OPEN branding and POSIX compliance. Digital takes the position that the key to providing open systems is to provide standard programming interfaces, not standard operating systems, and many other vendors would tend to agree. The fact that the VAX 4000 series doesn't run Ultrix may prove not to be a limitation of any significance. For those users who wish to run UNIX products, Digital offers, among others, the DECstation 5000 line.

User Ratings

Site One
Steven Arnold, of Joiner Software Inc., told Datapro that his 25-employee, software development company uses a VAX 4000/300 and 7 other MicroVAX and VAXstation machines for commercial and general business software support. Mr. Arnold rated the capabilities of VMS and VAXeln as "very good," and the reliability of the VAX 4000 line as "perfect." Arnold said he had compared the

Overview

Model	Model 200	Model 300
Product Type & Design	RISC/Midrange server	RISC/Midrange server
Base Price	$20,000	$56,970
Design	SPARC/RISC	SPARC/RISC
Date Announced	Jan. 1991	Jul. 1990
Date Installed	Jan. 1991	Jul. 1990
Number Installed to Date	Digital representatives decline to provide any numbers in terms of how many units have been sold or shipped.	
Number of Users	80-160	124-248

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Decision Points

Model	Requirements	Comments
VAX 4000	Cost of Ownership	When compared to IBM's AS/400, Digital's VAX 4000 offers 15 times the growth and networking capabilities with a common software environment, better price/performance, superior data integrity, and multiple high-availability options. In addition, the VAX 4000 has a higher capacity for maximum memory, disk space, and number of subscribers—with a lower cost of ownership.
	Data Integrity	The data integrity protection on an AS/400 system is probably its weakest attribute. The database objects (programs, files, libraries) are stored across multiple disks for system I/O performance. This improves performance at the risk of data reliability and recovery time. The recovery issue is so serious and time consuming that mission-critical information should not be stored on the machine. The VAX 4000, combined with volume shadowing software, offers much greater data protection. Dual-host configurations provide even higher levels of data reliability while boosting performance and adding a high level of system availability.
	Growth and Migration	The VAX 4000 is a better choice for customers considering HP systems, because it offers better price/performance, higher system capacity, easy growth and migration paths, advantageous networking and compatibility, multiple high-availability options, and superior system security. The VAX 4000 provides a superior solution to these competitors and offers customers virtually unlimited growth without changing operating systems, dynamic networking and routing through DECnet, an extensive library of applications, easy integration into multivendor and distributed environments, lower cost of ownership, and compatibility with a family of systems that fall into a wide range of prices.

VAX 4000 line to IBM's AS/400 and found that it ran "a lot faster." Regarding the original equipment selection, he said the decision was based on Digital's "large, stable market out there for software development and general business purposes, and we're happy with it." He praised Digital's "longer, deeper, wider line of software applications" and rated the vendor's technical support and maintenance "excellent."

Site Two
Datapro interviewed Hazel Morell of K & M Associates, a 175-employee, costume jewelry distributor that uses VAX 4000/300 and some VAX 3100 machines for general business applications. Ms. Morell called VMS and VAXeln "the best choice there is," and said she was "very happy" with the VAX 4000 line, assessing it as "a very flexible, friendly system" and very reliable. She rated the vendor's application software excellent, and called the vendor's technical support "very responsive, very capable, and very good." She praised Digital's maintenance as prompt and "very responsive."

Vendor Analysis

Product Strategy

Digital, ranked as the second largest U.S. computer company as measured by total revenues, likes to characterize itself as the world's leading supplier of networked computer systems and a leader in systems integration. To remain a leader in these specific arenas, Digital is taking action to support openness and industry standards.

The company has taken steps to change its image from being a vendor of proprietary systems to being a leading proponent of open systems computing, offering users enterprise-wide networks, system integration, and a client-server computing model that is one of the cornerstones of the open systems concept. This strategy, which Digital

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calls Open Advantage, includes sharing its technology with other vendors, supporting multiple industry standard protocols in new products, and forming development and marketing alliances with other vendors.

With the VAX 4000 models, Digital has plunged head first into the client-server market, which the company estimates will be a $100 billion market in 5 years. Digital's President Kenneth Olsen has said his company realizes that in many companies vendor client-server computing is going to replace the proprietary minicomputer with intelligent terminals. Therefore, Digital appears to have decided to be one of the companies that benefits from the decline of the computer platform that has served it so well in the past.

A year after the release of the 300 and 6 months following the unveiling of the 200, Digital representatives stated that the demand for both models has exceeded their initial expectations, proving to the industry in general that part of Digital's estimated $1.5 billion investment toward new product development has already paid off. The company is expected to continue investing heavily in VAX and RISC-based systems and VMS and UNIX software.

Looking at the VAX family from the low to high end, the 4000 line fits above the MicroVAX 3000 line and just below the VAX 6000 series. With the introduction of the 200 model, the VAX series seems more robust, providing users with what was missing before it began shipping—an entry point into the VAX 4000 line that protects the Qbus memory and the peripherals investment of MicroVAX 3000 users.

Because the 4000 series is a VAX, it offers full compatibility with the rest of the VAX system family and its extensive library of applications software—its easy integration into the multivendor and distributed environments is another plus.

Target Markets

The VAX 4000 series is being aimed at several markets, of which Digital seeks a bigger market share. Those markets include:

- Banking
- Online transaction processing
- CAD/CAM
- Agriculture
- Small retailers
- Restaurants
- Legal services
- Construction

Also, the 4000's target customer base includes departments and small work groups that need a system that will complement higher-level VAX models.

Market Position

Digital ranks second in the market behind IBM, although the VAX 4000 series beats the IBM competition on several fronts.

The model 200 has proved a boon to the 4000 series because it has solved the low-end competitiveness issue Digital has had to face for the past several years with the Intel 386- and 486-based products. At a base price of

$20,000, the 200 is competitive with the SPARCserver from Sun and the System Pro 486 from Compaq.

Major Competitors

Features	Model 300	HP 3000/932	
Maximum memory:	128MB	64MB	
Transactions per second (TPS)	21.6	13.6	
Price	$95,000	$130,000	

Features	Model 200	Sun SPARC system 2	IBM AS/400-B45
Storage:	21.0GB	20.8GB	13.7GB
Transactions per second (TPS)	13.1	51.9	8.3
Price	$73,000	$52,000	$163,000

Sales and Distribution Strategy

With more than 500 sales offices worldwide, Digital has organized its direct sales force into three major geographical areas: U.S., Europe, and the General International Area, which serves all countries not covered by the first two areas. Successful in its marketing strategy up until the recent downturn in computer sales, Digital has now turned its marketing strategy toward other sales channels, which includes encouraging resellers to provide integration in markets where Digital is not strong, such as small businesses, health care, and state and local governments.

Sales

Digital's direct sales force focuses on specific large corporations and select industries. The three major segments recognized by Digital's direct sales force are *Fortune* 1000 customers; small establishments and institutions that are termed casual users, to whom Digital is one of many vendors; and independent intermediary channels represented by business centers, dealers, distributors, systems houses, and retailers who then sell to end users.

Companies not named as accounts by the direct sales force may be targeted by resellers.

Distribution

A wide variety of distribution channels support Digital's marketing efforts. Among the most significant are:

- The Digital Electronic Store, a computer-based sales service that enables customers to select electronically, review, and purchase products 7 days a week, 24 hours a day.
- Individual franchises, signed and used with vertical-marketing expertise.
- Those businesses needing temporary timesharing services or peripheral rentals, including entire in-house systems that may be leased.
- The Components Business Group, formed to focus on the OEM market and gain a larger share of the market for peripherals, networks, software, and component products.

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Company Activity

6/91	Formed Components Business Group; DECWindows for Sun SPARCstations.
5/91	Ported Lotus to DECsystems and DECstations. Also, signed agreement with 21 companies to form the Advanced Computing Environment (ACE) Initiative. Its goal is to develop the Advanced RISC Computing (ARC) specification, based on extensions to MIPS RISC computer architecture for the purpose of creating an environment in which software written for ARC will run on any ARC-compliant platform.
4/91	Signed an agreement with Sony under which Digital will buy Sony's optical drives and develop its own subsystems.
1/91	Laid off 3,500 employees. Introduced the VAX 4000 Model 200.
11/90	Announced intended support of X/OPEN branding and POSIX compliance.

Support

Digital offers its customers complete support, including more than 25 training centers worldwide; a 1-year warranty on hardware and software; and an extensive 7-day-a-week, 24-hour-a-day network of 40,000 maintenance providers in 450 locations worldwide.

Policies and Programs

Warranty
The 200 and 300 models are covered by a 1-year warranty, with optional warranty coverage available 7 days a week, 24 hours a day.

List price warranty features one year of "return to Digital" support for parts and one year of conformance warranty for software.

System Warranty Support offers 3 service levels: Basic, Standard, and Optimum. Standard Warranty Support prices are generally 10% to 20% higher than List Price Warranties. All warranty coverage may be extended for up to 36 months.

List price warranty for the Models 200 and 300 includes:

- Field-replaceable unit return to Digital for hardware.

- Conformance to Software Product Description for software.

Standard warranty includes:

- Hardware installation.

- One-year hardware basic service, 8 a.m. to 5 p.m., Monday through Friday, except local holidays that Digital observes, holidays, and priority response time.

- Telephone assistance for hardware and operating system.

- Telephone assistance for Digital layered products purchased with Standard Warranty and running on systems receiving telephone assistance from Digital for the operating system.

- Critical on-site software support.

- Advanced Electronic Support.

- Right-to-use new versions of operating system and kernel software.

- Product Foundation Warranty for kernel software.

Support Services
Digital Services, formed in mid-1991, has merged all the resources, capabilities, and personnel of what was formerly called Enterprise Integration Services (EIS) and Customer Services (CS). Out of the reorganization, three major business clusters have emerged to provide support service to the customer.

Digital Product Services provides customer support services for all Digital and non-Digital hardware, software, and applications.

Digital Systems Integration and Support Services provides complex systems integration solutions from 12 Digital Customer Centers (DCCs) and 42 Application Centers for Technology (ACTs). This unit also provides services that include integration and management of local and global networks, operations management services, and recovery services.

Digital Education and Consulting Services provides self-paced or customized training in more than 16 languages, either at the customer site or at 145 training centers worldwide, as well as the services of more than 2,000 consultants.

Service Provider, Locations, and Hours
For information regarding either hardware or software support or names of third-party maintenance providers nearest the user's site, the following numbers are available seven days a week, 24 hours a day:

- Colorado Customer Support Center for hardware support 1-800-525-6570.

- Atlanta Customer Support Center for hardware/software support 1-800-332-8000.

Training/Education
Digital provides self-paced and on-site customer training in more than 16 languages, either at the customer's site or at 145 training centers throughout the world. Courses covering both Digital-related and nonproduct-related topics are offered.

Digital's Educational Services division publishes a quarterly digest listing available courses. For more information, call 1-800-332-5656. Office hours are 8:15 a.m. to 6 p.m., ET, Monday through Friday.

Documentation
Hardware documentation is included with each VAX 4000 system. Digital's documentation consists of owner and

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technical manuals. Optional documentation kits are available for selected software packages; the kits include reference manuals, user's guides, and other instructional material.

User Groups

DECUS is the name/acronym of the user group focused on Digital's products. The contact names and phone numbers for three of the local users groups are listed below. Any of them can provide the names and numbers of otherDECUS locations across the U.S. and in other countries.

- Gary Griswold, Endwell, NY 607-774-3057
- Dave MacPherson, Glendale, CA 213-616-2519
- Laurie Maytrott, Cape Canaveral, FL 407-783-0300, ext. 160

Specifications

Enhancements

Date	Event
July 1990	Introduced the VAX 4000 Model 300 network server.
January 1991	Added the VAX 4000 Model 200 to its VAX 4000 line of server, replacing the MicroVAX 3400 and MicroVAX 3800 systems.
April 1991	Enhanced the VAX 4000 Model 300 by offering a 64MB memory board.
April 1991	Announced plans to add voice applications support to its MicroVAX 3000 and VAX 4000 computers, introducing the Multiline DECvoice voice-synthesis and recognition module.
July 1991	Introduced the TRNcontroller 100, a Token-ring adapter card that enables VAX 4000 and MicroVAX 3000 series minicomputers to attach to Token-ring LANs.

Features/Functions

Model	VAX/4000/200 small pedestal	VAX/4000/200 large pedestal	VAX/4000/300
Model Characteristics			
Number of Processors	1	1	1
Min/Max Memory (bytes)	8 - 64	8 - 64	32 - 256
Memory Type	ECC CMOS	ECC CMOS	ECC CMOS
Expansion Increments (MB)	8 and 16	8 and 16	32
Min/Max Cache per Processor (KB)	6 on chip	6 on chip	2 on chip; 128 on board
Word Size	32-bit	32-bit	32-bit
Battery Backup	Yes	Yes	Yes
Comments	Based on Digital's proprietary RISC, I/O technology, and CMOS CPU, upgrades to the 300 are impossible because of a different CMOS processor, memory, and CPU interconnect architecture. Users who wish to expand beyond the 200 must use a dual-host DSSI configuration to link the Model 200 to the 300.		
General Performance			
Relative Performance	5	5	10
MIPS	5	5	8
Transactions per Second	13.1	13.1	21.6
Processor Cycle Time (ns)	35	35	28
Memory Cycle Time (ns)	35 on chip	35 on chip	28 on chip; 56 on board
Max I/O Data Rate (MB per sec)	4 (1 DSSI) 3.3 (Q -bus)	4 (1 DSSI) 3.3 (Q-bus)	8 (2 DSSI) 3.3 (Q-bus)
Comments	Relative performance rated at MicroVAX II equal to one.		

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Features/Functions (Continued)

Input/Output Control

Model	VAX/4000/200 small pedestal	VAX/4000/200 large pedestal	VAX/4000/300
Number of IOPs	2	2	3
Number of Channels/Transfer Rate	800 I/Os/sec	800 I/Os/sec	1600 I/Os/sec

Peripherals

Hard Disk Storage Devices

Model	RF 31	RF 31F	RF 72
Type	Winchester (ISE)	Winchester (ISE)	Winchester (ISE)
Diameter (in.)	5.25	5.25	5.25
Formatted Capacity	381MB	200MB	1GB
Controller Model	Internal	Internal	Internal
Data Transfer Rate (MB/sec)	4	4	4
Average Seek Time (ms)	15.3	12.2	13.4/10.7 Hi Speed Mode
Average Access Time (ms)	23.6	20.5	21.7
Supported by System Models	200 and 300	200 and 300	200 and 300

Disk Controllers

Model	Description
KDA50-SE	SDI disk controller. Connects up to 4 external RA drives. Uses 3 Q-bus slots. Up to 2 controllers supported.

Tape Devices

Model	TK70	TLZ04	TU81
Type	cartridge	cartridge	reel-to-reel
Size	4 mm.	4 mm.	0.50 in.
Format			
Recording Density	10000	Not specified	1600/6250
Recording Mode	Serial, serpentine pattern	Digital data storage/DAT	GCR/PE
Characteristics			
Controller Model	Q-bus adapter	SCSI, Q-bus	Q-bus adapter
Unformatted Storage Capacity	296MB	1.2GB	145MB (GCR); 40MB (PE)
Tape Speed (ips)	100 streaming	Not specified	75/25
Data Transfer Rate (B/sec.)	125 K	180 K	468 K
Supported on Workstation Models	200 and 300	200 and 300	200 and 300
Comments	Entry-level, backup drive	Helical-scan rotating head designed for applications requiring sustained input/output.	

Tape Controllers

Model	Description
TK50, TK70	Controllers for TK50 and TK70 tape units.

Printers

Model	LPS40 Plus	LP29/LG01/LG02	LPS20
Type	Laser	Band/Line dot-matrix	Laser
Speed	40 ppm	2000 lpm/600 lpm	20 ppm

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Printers (Continued)

Model	LPS40 Plus	LP29/LGO1/LGO2	LPS20
Graphics Resolution	300 x 300	No graphics capability on LP29 LGO2 only: Pixel	300 x 300
Interface/Controller	Ethernet	Parallel/EIA-232/Parallel	Ethernet

Workstations/Terminals

Model	VT 330	VT 340	VT 420
Screen Size (in.)	14	13	14
Screen Size (lines)	800 pixels x 500 lines	800 pixels x 500 lines	800 x 414 resolution
Symbol Formation	80-col 10x20	132-col 6x20	80 or 132 columns
Character Phosphor	White, green, or amber	4096 colors	White, green, or amber
Max. No. Simultaneous Colors/Grays	4 shades	16 shades	Does not apply
Interface	DEC-423, RS-232-C	DEC-423, RS-232-C	DEC-423, RS-232-C

Other Peripherals

Model	Type	Description
RRD 40	CD-ROM	600MB

Networking Features

Network Protocols Supported	OSF, X.400, ODA/ODIF, SGML, PostScript, SQL, TCP/IP, X.400, ODA/ODIF, SGML, SQL
Network Applications	Local Area VAX Cluster Ph. II, Remote System Manager (RSM), DECnet/SNA Gateway Channel Transport
Comments	Allows LAVCs to be connected over Ethernet to VAXclusters of VAX superminis and Hierarchical Storage Controllers.
	Layered on top of Digital's DECnet software, is a central management facility for distributed systems.
	Along with Gateway-Synchronous Transport, provides users of IBM's SNA with a network to net interface to Digital applications.

Communication Processor

Model	Description
DESQA 802.3	Ethernet controller: thin wire/thick wire
DESQA-SA	Maximum three per system (one included with base system)
DESQA-SF	Field installed

Software

Operating System	VMS, VAXeln
Compilers	Digital writes a full range of compilers, including Cobol, Fortran, RPG, C, Basic, Ada, Bliss, and others.
Application Development Tools	Digital has a full suite of software development tools that are part of its Cohesion Environment.
Communications Software	
Model	Description
QL-453A9-JB:	DECnet/SNA VMS Remote Job Entry
QL-454A9-JB:	DECnet/SNA VMS 3270 Terminal Emulator
QL-VEBA9-JB:	DECnet/SNA VMS Data Transfer Facility Server
QL-112A9-JB:	VAX 2780/3780 Protocol Emulator

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Software (Continued)

Comments
The operating systems for the VAX 4000 system are the general-purpose VMS and VAXeln. VMS provides the environment for the concurrent execution of multiuser timesharing, batch, and time-critical applications, while VAXeln serves not so much as an operating system but instead as a development tool and specialized run time environment. With more than 13 years of online service, VMS has more than 10,000 applications written to it. Digital is in the process of moving to make VMS fully compliant with X/OPEN branding and POSIX, making VMS applications fully portable to UNIX and X/OPEN systems. This will be the next phase in Digital's Network Application Support (NAS) program for VM. The VAX 4000 Model 200 is supported by VMS Version 5.4-1 and VAXeln Version 4.2. The Model 300 system is supported by VMS Version 5.3-2 and the same version VAXeln. The VAX 4000 models support the Digital Network Architecture (DNA), a set of protocols governing the format, control, and sequencing of message exchange for all DECnet implementations. Communications software include the DECnet/SNA VMS Remote Job Entry, the DECnet/SNA VMS 3270 Terminal Emulator, the DECnet/SNA VMS Data Transfer Facility Server, and the VAX 2780/3780 Protocol Emulator.

Other Software

Package	Source	Description
QL-020A9-JB	VAX APL	SEE COMMENTS
QL-056A9-JB	VAX Ada	
QL-095A9-JB	VAX Basic	
QL-106A9-JB	VAX Bliss-32	
QL-015A9-JB	VAX C	
QL-099A9-JB	VAX Cobol	
QL-100A9-JB	VAX Fortran	
QL-114A9-JB	VAX PL/1	
QL-126A9-JB	VAX Pascal	
QL-A97A9-JB	VAXeln Ada	

Comments
Programming languages available for the VAX 4000 Models 200 & 300 include Ada, APL, Basic, Bliss-32, C, Cobol, Fortran, OPS5 (for artificial intelligence), PL/1, Pascal, RPG II, Lisp, and VAXeln Ada. As another part of its strategy for multivendor networking, Digital provides Network Applications Support (NAS) products that allow common access to services on DECnet/OSI networks. These products provide application access, business communications, and information/resource sharing services for Digital's VT Series terminals, based on VAX Systems running either VMS or UNIX, Apple Macintosh microcomputers, and MS-DOS- and OS/2-based. The DECnet/SNA Gateway-Channel Transport (CT) and Gateway-Synchronous Transport (ST) provide users of IBM's SNA with a network-to-network interface to Digital applications. Using either gateway, users can simultaneously perform large quantity processes.

Security Features

Operating System/Physical Security
Digital offers users more than 100 separate security features built into the kernel of VMS; they can be operator set. Digital's Security System Architecture is not built into the VAX 4000's system but is available upon request.

Operating Requirements

Model	VAX/VAXserver 4000, Model 200 Small and Large Pedestal (BA215 & BA430):	VAX 4000, Model 300:
Hardware	Base systems, see inclusions in Table 15 (Multiuser systems and Server systems are also available).	Base systems, see inclusions in Table 15 (Multiuser, Multiuser Dual-Host, Server Dual-Host, and Server systems are also available).
	Mass Storage/Mass storage and Q-bus expansion (See Table 16).	Mass Storage/Mass storage and Q-bus expansion (See Table 16).
	Memory	Memory
	Networks and Communications (LAN Communications Controller, Local and Wide Area Communications Servers)	Networks and Communications (LAN Communications Controller, Local and Wide Area Communications Servers)
	Console Terminal	Console Terminal
	Terminals and Printers	Terminals and Printers
	Power Cords	Power Cords

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Operating Requirements (Continued)

Model (Continued)	VAX/VAXserver 4000, Model 200 Small and Large Pedestal (BA215 & BA430):	VAX 4000, Model 300:
Software	VMS Multiuser License Upgrade	VMS Multiuser License Upgrade
	VMS Media and Documentation	VMS Media and Documentation
	VMS Consolidated Software Media and Documentation	VMS Consolidated Software CD-ROM Media and Documentation
	VMS/Ultrix Connection	VMS/Ultrix Connection
	VAXcluster Software License	VAXcluster Software License
	VMS Volume Shadowing License	
	Software Processor Code	Software Processor Code
Clusterwide License Rating	Clusterwide License Rating	
Diagnostics	Diagnostics	

Configuration

Components

VAX/VAXserver 4000, Model 200 Small Pedestal
KA660 CPU with embedded DSSI adapter and 802.3.
Ethernet (thin wire/thick wire) controller.
BA215 pedestal enclosure includes two dedicated slots for the CPU and memory modules and four Q-bus slots that support the same Q-bus type options as VAX 4000 Model 300 systems.
BC16E 25-foot console terminal cable.
8MB ECC memory module.
Factory-installed software.
English-language hardware documentation kit.

VAXserver 4000, Model 200 Large Pedestal
KA660 CPU with embedded DSSI adapter and 802.3.
Ethernet (thin wire/thick wire) controller.
BA430 pedestal enclosure includes two dedicated slots for the CPU and memory modules and ten Q-bus slots that support the same Q-bus type options as VAX 4000 Model 300 systems. Also included is a Universal power supply that automatically adjusts to 90-128 Vac or 190-256 Vac.
BC16E 25-foot console terminal cable.
16MB ECC memory module.
Factory-installed software.
English-language hardware documentation kit.
BC06P-2F KZQSA adapter cable.
120-V power cord.

VAX/VAXserver 4000, Model 300
KA670 system module with CPU, two embedded DSSI adapters, and 802.3 Ethernet (thin wire/thick wire) controller.
BA440 system pedestal enclosure includes five dedicated slots for the system and memory modules and seven Q-bus slots that support the same Q-bus type options as Micro VAX 3xxx systems. Also included is a Universal power supply that automatically adjusts to 90-128 Vac or 190-256 Vac.
BC16E 25-foot console terminal cable.
32-MB ECC memory module.
Factory-installed software.
English-language hardware documentation kit.
BC06P-2F KZQSA adapter cable.
120-V power cord.

Rack-mountable VAX 4000, Models 200 & 300
The rack-mountable versions of the 200 model and 300 model are identical to the pedestal-mounted systems functionality and configuration requirements. The following are key features of the rack-mountable chassis (BA431 & BA441):
No computer room, air-conditioning, or special power required.
Requires only 14 in. of vertical rack, cabinet, or enclosure space.
Conforms to standard 19-in., rack-mounting specifications.
Multiuser VAX, VAXserver, and rtVAX (real-time) rack-mountable system versions are available.
Front-to-back cooling allows space-efficient, vertical, system stacking.
Slide-equipped for easy servicing and configuring.
Can be installed in environmental cabinets for use in harsh environments.
Factory-installed operating system software for quick and easy startup.

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Configuration (Continued)

Configuration Rules

VAX 4000, Model 200 Small Pedestal (BA215)	Mass Storage—Systems Enclosure (Internal) Selection of one DSSI disk (ISE) is required for factory-installed software. Two half-height ISEs or one full-height ISE and one TKxx tape drive can be housed in the BA215 system enclosure. Additional ISEs may be housed in expansion pedestals. Three disk adapters/controllers are supported—one embedded DSSI adapter and two additional (two KDA50s, two KFQSAs, or one of each). Single-host systems support seven ISEs per DSSI adapter; dual-host systems support six ISEs and can be connected between any pair of DSSI adapters (one adapter in each system). A second KFQSA for dual-DSSI dual host is supported. Maximum of two KZQSA storage adapters. Maximum of two TU81E storage controllers. Mass Storage—Q-bus Expansion (External). Maximum of three RF-series storage expansion pedestals or two RF-series storage expansion pedestals and one R400X, B400X, or BF213 expansion pedestal may be configured on a single-host system—the system enclosure and three expansion pedestals. R400X expansion pedestals can be configured with two separate DSSI buses (requires additional cable). 21 ISEs are supported with expansion pedestals.
VAX 4000, Model 200 Large Pedestal (BA430)	Mass Storage—Systems Enclosure (Internal) Selection of one DSSI disk (ISE) is required for factory-installed software. Four ISEs, three ISEs, and one TKxx tape drive or one TLZO4 DAT drive can be housed in the system enclosure. Additional ISEs are housed in expansion pedestals. Two TKxx tape drives are supported: one in the system enclosure and one in an expansion pedestal. Three disk adapters/controllers are supported: the embedded DSSI adapter and two additional (two KDA50s, two KFQSAs, or one of each). Single-host systems support seven ISEs per DSSI adapter; dual-host systems support six ISEs and can be connected between any pair of DSSI adapters (one adapter in each system). A second KFQSA for dual-DSSI dual host is supported. Maximum of two KZQSA storage adapters. Maximum of two TU81E storage controllers. Mass Storage—Q-bus Expansion (External). Maximum of three storage expansion pedestals (R400X) or two R400X storage expansion pedestals and one Q-bus/mass storage expansion pedestal (B400X) can be configured on a single-host system—the system enclosure and three expansion pedestals. 21 ISEs are supported with R400X expansion pedestal. R400X expansion pedestals can be configured with two separate DSSI buses (requires additional cable).
VAX 4000, Model 300 (BA440)	Mass Storage—Systems Enclosure (Internal) Selection of one DSSI disk (ISE) is required for factory-installed software. Four ISEs, three ISEs and one TKxx tape drive, or one TLZO4 DAT drive can be housed in the system enclosure. Additional ISEs are housed in expansion pedestals. Four disk adapters/controllers are supported: the two embedded DSSI adapters and two additional (KDA50s and KFQSAs in any combination). Single-host systems support seven ISEs per DSSI adapter; dual-host systems support six ISEs and can be connected between any pair of DSSI adapters (one adapter in each system). A second KFQSA for dual-DSSI dual host is supported. Maximum of two KZQSA storage adapters. Maximum of two TU81E storage controllers. Maximum of two KDA50 controllers. Mass Storage—Q-bus Expansion (External) Maximum of four storage expansion pedestals (R400X) or three R400X storage expansion pedestals and one Q-bus/mass storage expansion pedestal (B400X) can be configured on a single-host system. R400X expansion pedestals can be configured with two separate DSSI buses (requires additional cable). 21 ISEs are supported with R400X expansion pedestal. Mass Storage Expansion Pedestals: R400X-B9 accomodates up to seven, 5.25-in. devices in several combinations. The R400X supports split-bus capability, allowing one R400X to be used with two hosts. The top tier of four devices is dedicated to one system, and the lower tier of three devices is dedicated to another system.
Q-bus and Mass Storage Expansion Pedestal	B400X-B9 adds 10 Q-bus slots (B400X has 12 slots, 1 slot each from the system enclosure and the expansion enclosure are used in creating the connection between the 2 enclosures) and can accommodate either four 5.25-in. devices or three 5.25-in. devices.
Q-bus and DSSI Mass Storage Expansion Pedestal	BF213-P2/P3 expansion enclosure for the DSSI-based VAX/VAXserver 4000 offers both Q-bus option and DSSI mass storage expansion capability. The enclosure includes a 12-slot Q-bus backplane and space for 3 RF-series ISEs. The number of additional Q-bus slots for the system is increased by 10.

Sample Configuration

VAX 4000, Model 300	32MB of memory, 4 storage bays for 5.25-in. storage devices, one 381MB disk drive, TK70 tape drive, 7 Q-bus backplanes, 3 memory slots, DECnet-VAX license, VMS or VAXeln license. $75,410

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Compatibility

Standards Supported

Digital supports the following industry/de facto standards: ISO/OS, IEEE 802.3 Ethernet, LU6.2, X.400, X.25, TCP/IP.

Physical Environment

Model	VAX 4000/200 small pedestal	VAX 4000/200 large pedestal	VAX 4000/300	Rack-Mount
Physical Specifications				
Height x Width x Depth (in.)	27 x 13.6 x 17.8	27 x 21 x 17.8	27 x 21 x 17.8	14 x 19 x 29.4
Weight (lbs.)	85	140	150	119
Electrical Specifications				
Max Power Consumption (amps)	340 W	670 W	860 W	860 W
Operating Environment				
Temperature Range (F°)	59 - 90	59 - 90	50 - 104	50 - 104
Humidity (%)	20 - 80	20 - 80	20 - 80	20
Heat Output (BTU/hr.)	1178	2933	2933	2978

Pricing

	Purchase Price ($)
VAX 4000 Model 200 Systems	
DV- 42HT1 -A9 VAX4000-200 VMS BA430 T/S SYSTEM, timesharing system, BA430 pedestal enclosure, universal power supply, 16MB memory, one Ethernet adapter on CPU, VMS license 1-20 users, DECnet end-node license, hardware documentation	50,591
DV- 42HT2 -A9 VAX4000-200 VMS DUAL-HOST SYSTEM, dual-host timesharing system, 2 BA430 pedestal enclosures, universal power supply, 16MB memory (each), one DSSI and Ethernet adapter on each CPU module, 2 VMS licenses unlimited users, DECnet licenses, 1 end-node, 1 full-function, 2 VAXcluster licenses	145,846
DV- 42KT1 -A9 RACKMOUNT VAX4000-200 TIMESHARE SYSTEM, BA431 rackmountable enclosure with slides and mounting brackets, universal power supply, 16MB memory, one DSSI adapter on CPU, one Ethernet adapter on CPU, VMS license 1-20 users, DECnet end-node license, hardware documentation	51,991
DV- 42RT1 -A9 VAX4000-200 BA215 120V TIMESHARE SYSTEM, BA215 pedestal enclosure, 120VAC, 60 Hz, 8MB memory, one DSSI adapter on CPU, VMS license 1-10 users, DECnet end-node license, hardware documentation	29,531
DW- 42HR1 -A9 VAX4000-200 VAXeln SYSTEM, real-time system, VAX4000 Model 200 Base System, BA431 rackmountable enclosure with slides and mounting brackets, universal power supply, 16MB memory, one DSSI adapter on CPU, one Ethernet adapter on CPU, VAXeln license, VAX4000-200 hardware information kit	31,907
DW- 42KR1 -A9 RACKMOUNT VAX4000-200 VAXeln, real-time system, VAX4000 Model 200 Base System, BA431 rackmountable enclosure with slides and mounting brackets, universal power supply, 16MB memory, one DSSI adapter on CPU, one Ethernet adapter on CPU, VAXeln license, VAX4000-200 hardware information kit	33,517
DW- 42RR1 -A2 VAX4000-200 BA215 VAXeln SYSTEM, real-time system, VAX4000 Model 200 Base System, BA215 pedestal enclosure, 120VAC, 60 Hz, 8MB memory, one DSSI adapter on CPU, one Ethernet adapter on CPU, VAXeln license, VAX4000-200 hardware information kit	20,087
DW- 42RR1 -A3 VAX4000-200 BA215 VAXeln SYSTEM, real-time system, VAX4000 Model 200 Base System, BA215 pedestal enclosure, 240VAC, 50 Hz, 8MB memory, 1 DSSI adapter on CPU, 1 Ethernet adapter on CPU, VAXeln license	20,087

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		Purchase Price ($)
VAX 4000 Model 300 Systems		
DV- 43JS1 -B9	VAXSERVER 4000-300 VMS, base system, BA440 pedestal enclosure, universal power supply, 64MB memory, 2 DSSI adapters and 1 Ethernet adapter on CPU module, VMS file & application server license, DECnet full-function license, VAXcluster license, VMS/Ultrix connection license	87,669
DV- 43JS2 -B9	VAXSERVER 4000-300 DUAL HOST, server base system, BA440 pedestal enclosure, universal power supply, 64MB memory each, 2 DSSI adapters and 1 Ethernet adapter on each CPU module, 2 VMS file and application server license, 2 VAXcluster licenses, 2 VMS/Ultrix connection licenses, DECnet end-node license, DECnet full-function license	174,638
DV- 43JSA -B9	VAXSERVER 4000-300 DHPKG SYSTEM, dual-host server base system, BA440 pedestal enclosure, universal power supply, 64MB memory each, 2 DSSI adapters and 1 Ethernet adapter on each CPU module, 2 VMS file & application server license, 2 VAXcluster licenses, 2 VMS/Ultrix connection licenses, DECnet end-node license, DECnet full-function license, 5 RF72E-AA disks (1GB each), R400X-B9 expander box, TLZ04-JA DAT tape, KZQSA-SA controller, RRD42-FB CD-ROM	240,566
DV- 43JT1 -A9	VAX 4000-300 VMS TIMESHARING SYSTEM, BA440 pedestal enclosure, universal power supply, 32MB memory, 2 DSSI adapters and 1 Ethernet adapter on CPU module, VMS license 1-40 users, DECnet end-node license, VMS services for MS-DOS	99,021
DV- 43JT1 -B9	VAX 4000-300 VMS TIMESHARING SYSTEM, BA440 pedestal enclosure, universal power supply, 64MB memory, 2 DSSI adapters and 1 Ethernet adapter on CPU module, VMS license 1-40 users, DECnet end-node license, VMS services for MS-DOS	121,821
DV- 43JT2 -A9	VAX 4000-300 VMS DUAL-HOST TIMESHARING SYSTEM, 2 BA440 pedestal enclosures, universal power supply, 32MB memory (each), 2 DSSI adapters and 1 Ethernet adapter on each CPU module, 2 VMS licenses unlimited users, DECnet licenses, 1 end-node, 1 full-function, VMS services for MS-DOS, 2 VAXcluster licenses	231,962
DV- 43JT2 -B9	VAX 4000-300 VMS DUAL-HOST TIMESHARING SYSTEM, 2 BA440 pedestal enclosures, universal power supply, 64MB memory (each), 2 DSSI adapters and 1 Ethernet adapter on each CPU module, 2 VMS licenses unlimited users, DECnet licenses, 1 end-node, 1 full-function, VMS services for MS-DOS, 2 VAXcluster licenses	277,562
DV- 43JTA -B9	VAX 4000-300 DH PKG SYSTEM, dual-host timesharing system, 2 BA440 pedestal enclosures, universal power supply, 64MB memory (each), 2 DSSI adapters and 1 Ethernet adapter on CPU module, 2 VMS licenses unlimited users, DECnet licenses, 1 end-node and 1 full-function, VMS services for MS-DOS, 2 VAXcluster licenses, 5 RF72E-AA disks (1GB each), R400X-B9 expander box, TLZ04-JA DAT tape drive, KZQSA-SA controller, RRD42-FB CD-ROM	344,340
DV- 43LT1 -A9	RACKMOUNT VAX4000-300 TIMESHARING SYSTEM	100,821
DV- 43JR1 -B9	VAX 4000-300 VAXeln SYSTEM, real-time system, base system, BA440 pedestal enclosure, universal power supply, 64MB memory, 2 DSSI adapters and 1 Ethernet adapter on CPU module, VAXeln license	83,069
Memory		
300	32MB ECC CMOS memory increment for VAX Model 300	25,000
Mass Storage		
RF31B-DA	381MB disk drive	7,400
RF71B-DA	400MB disk drive	10,340
RF72	1-GB disk drive	56,800
Optical Disk		
RRD40-SA	600MB Compact Disk Read-Only Memory (CD-ROM) disk drive with cables, includes KRQ50 controller; uses 1 Q-bus slot.	2,500
Magnetic Tape		
TQK50-BA	TK50 controller with cables for BA123 enclosure.	1,333
TBZ04-JA	1.2-GB digital audio tape (DAT) drive.	4,900
TK70E-AA	296MB TK70 tape drive.	1,995
TU81E-SA	TU81-Plus 1600/6250 bpi PE/GCR tape drive	34,755
TK70-AA	296MB cartridge drive	4,600
TSVO5-SE	Data interchange device	9,995
TA90E-AA/BA	3480-compatible tape subsystem with improved data recording capability	137,100/ 146,400
Printers		
LNO3	8 ppm laser printer	3,040
LA75-CA	34/42/125/250 cps dot matrix printer	835
LA324-CA	100/300 cps dot matrix printer	1,995

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Printers (Continued)		
LJ252-CA	160 cps color dot matrix tabletop printer	1,549
LG02-DA	600 lpm text and graphics printer	13,639
LA210	40/80 240 cps dot matrix printer	1,675
Workstations/Terminals		
VT320-AA	White text terminal with standard keyboard	599
VT330-AA	White graphics terminal with standard keyboard	1,795
VT340-AA	Color graphics terminal with standard keyboard	2,595
VT1000	X-Windows terminal with standard keyboard	13,995
Software		
Operating Systems		
QL-001A2-BK	VMS (1-40 users) for VAX 4000	33,750
QL-001A2-BZ	VMS unlimited license	45,000
QL-001A2-B4	VMS (41-unlimited user) upgrade license	11,250
QL-001AC-BA	VMS file and application server license-bundled	N/C
Database Management		
QL-453A9-JB	VAX Datatrieve	1,850
QL-899A9-JB	VAX DBMS	5,720
QL-DO7A9-JB	VAX Rdb/ELN	1,540
QL-VCLA9-JB	VAX Rdb/VMS interactive	2,080
Communications		
QL-453A9-JB	DECnet/SNA VMS Remote Job Entry	340
QL-454A9-JB	DECnet/SNA VMS 3270 Terminal Emulation	325
QL-VEBA9-JB	DECnet/SNA VMS Data Transfer Facility Server	1,510
QL-112A9-JB	VAX 2780/3780 Protocol Emulator	2,530
Languages		
QL-100A9-JB	VAX Fortran	1,050
QL-126A9-JB	VAX Pascal	970
QL-114A9-JB	VAX PL/1	1,640
QL-015A9-JB	VAX C	980
QL-099A9-JB	VAX Cobol	1,640
QL-056A9-JB	VAX Ada	5,160
QL-020A9-JB	VAX APL	1,620
QL-095A9-JB	VAX Basic	1,080
QL-106A9-JB	VAX BLISS-32 Implementation Language	1,180
QL-A97A9-JB	VAXELN Ada	1,540
Utilities and Tools		
QL-YELA9-JB	VAX Disk stripping	410
QL-081A9-JB	VAX Encryption	410
QL-A86A9-JB	VAX Rally	5,730

N/C—No charge.
Digital provides the VAX 4000 Models 200 and 300 systems on a purchase basis with separately priced maintenance agreements. Leasing arrangements are available through Digital's U.S. Customer Finance Group. Digital software is licensed rather than sold. Users purchase licenses and distribution rights separately. The company provides a number of licensing options for VMS software, including Clusterwide licensing. The price of a VAX system includes operating system and DECnet licenses. The PPL option for those products includes the initial license charge and 12 months of PPI fees for both products. Digital offers a Volume Software Pricing program that allows users to acquire large numbers of licenses for a single product at a discount; options for a single software product run from 8-license to 160-license bundles.
Note: The prices listed are for Standard Warranty Support. List warranty prices, which do not include Basic Service Support, are generally 10 to 20% less. Contact the manufacturer for more information on pricing and support. Digital offers a 5-year leasing program, but because leasing prices change so often, according to the vendor, the company representative in charge of the leasing program asks that interested parties contact the corporate office when information is desired. ∎