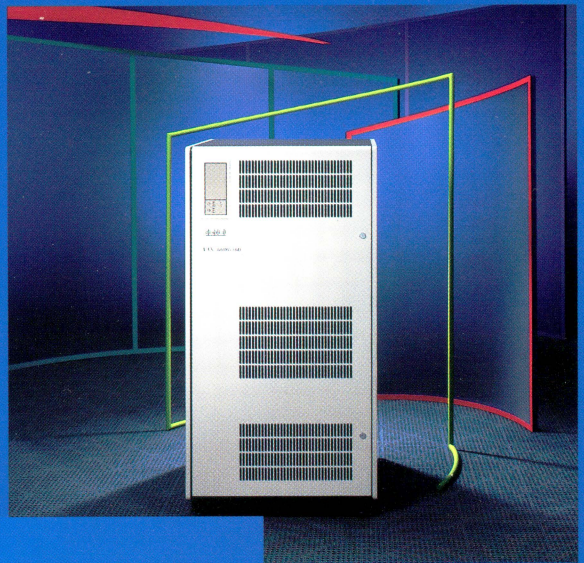
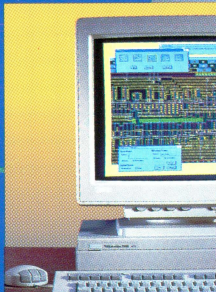


# VAX

digital



VAXstations

MicroVAX 3000 and  
VAX 4000 Systems

VAX 6000 Systems

VAX 9000 Systems

VAXcluster Systems

VAXft Systems

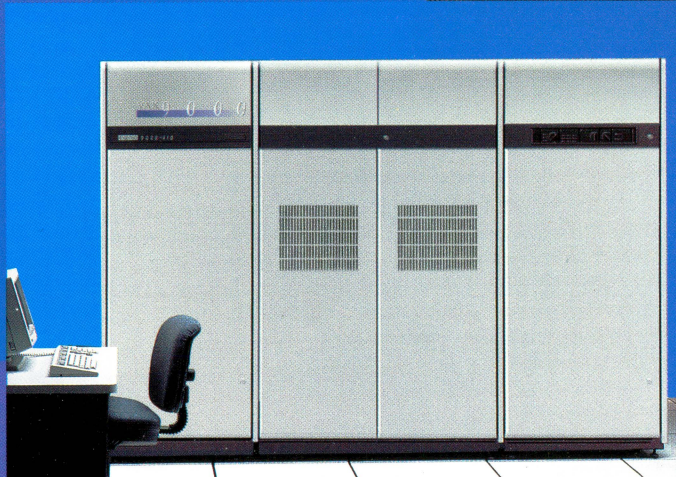
DECstation Workstations

DECstation PCs

Terminals and Printers

Storage

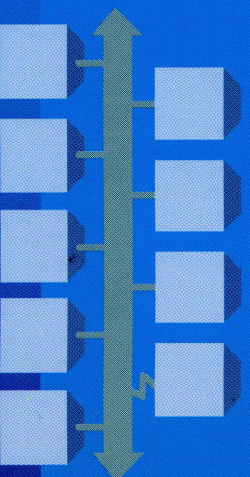
Software



#### CORPORATE PROFILE

Digital Equipment Corporation is the world's leading supplier of networked computer systems and services. Rated number 27 on the FORTUNE 500, Digital offers a full range of computing solutions and systems integration for the entire enterprise - from the desktop to the data center.

Digital's business runs on the world's largest private data network, connecting over 46,000 systems, workstations, and PCs. Digital's network provides voice and data services to over 100,000 users in 498 worldwide locations. This network integrates all levels of Digital employees in all departments, allowing them to exchange information instantaneously across the entire enterprise.



Providing Large  
System Resources  
to the World's  
Desktops

# VAX VMS Executive Summary

## COMMERCIAL STRENGTH

### **Dependable Systems for Total Data Protection**

VAX VMS systems and servers offer the dependability, reliability, and peace-of-mind you need in a system that supports your enterprise. You can count on a VAX system to protect your data anywhere—on the desktop, in the department, or in the data center. And Digital's service and support offerings keep your system running smoothly (see page 2).

### **Exceptional Flexibility and Growth**

Being able to change and grow in response to fluctuations in the marketplace keeps you competitive. VAX VMS systems give you this flexibility while protecting your investments. With a VAX VMS system you can choose the best system for your organization today with the knowledge that it will still be the best system for your organization tomorrow (see page 4).

### **Performance Leadership in Open Networks**

VAX VMS systems are capable of exceptional networking and multivendor interoperability using the latest technologies in local and wide area networks. Our network management products ensure that your networks operate at peak performance, distributing business-critical data throughout your enterprise (see page 6).

### **Over 10,000 Applications and the Best Tools to Write Your Own**

VAX VMS systems today run well over 10,000 applications. These applications offer solutions for offices, data centers, factories, laboratories, and engineering departments. With POSIX, thousands of UNIX<sup>®</sup> applications can run on VAX VMS systems. For writing your own applications, Digital provides COHESION, a CASE environment so rich in development tools that programming time is often cut in half. Software development is only one of the many uses for VAX VMS systems—they excel in whatever type of client/server and production environments you need for your enterprise (see page 8).

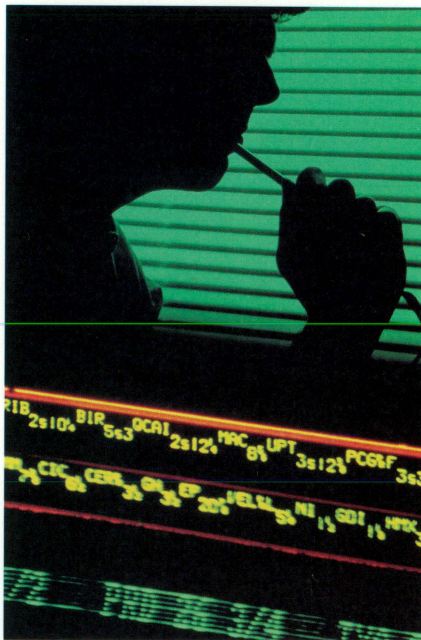
## SUPERIOR PRICE/PERFORMANCE

The broad range and well-balanced performance of VAX VMS systems contribute to a level of price/performance that meets your needs for top-notch computing at the lowest cost. While building upon the strengths of the family of VAX VMS systems, Digital is actively developing new technology that will keep you and your VAX systems on the cutting edge for years to come (see page 11).

## OPEN COMPUTING THROUGH STANDARDS

Digital is an open systems company that supports your goals of open computing. With standards and Network Application Support (NAS), Digital enables more computers and people to work together, so your organization is productive and competitive. We now tie together applications running across the widest range of desktops, operating systems, and large-system resources. And, through the support of standards such as OSF/Motif<sup>®</sup>, OSF/DCE, POSIX and X/Open<sup>™</sup> branding, VAX VMS systems will have maximum applications portability as well. With these standards, VAX VMS will become the world's first commercial strength open system (see page 12).

## Dependable Systems for Total Data Protection



### High Availability for Critical Applications

A system with high availability offers high uptime and protects your data. The VMS operating system provides VAX systems with an inherently high level of system availability that your critical business applications demand. You can also increase availability in the following three ways:

- Dual-host or DSSI storage systems interconnect VAXcluster systems and allow two systems to share one another's disks. If one system goes down, the other can still access the disks on both systems.
- CI VAXcluster systems connect up to 96 VAX systems and a nearly unlimited number of storage devices to offer high uptime. VAXcluster systems offer efficient, economical resource sharing and expand easily when you upgrade or add new systems.
- VAXft fault-tolerant systems offer the highest levels of system availability wherever you need it. These systems have a fully redundant implementation of the VMS operating system and no single point of hardware failure.



**P**ut a VAX VMS system to work and you've got a commercial strength workhorse—secure, reliable, and dependable down to the last transaction.

You need this reliability for your system because the mission-critical applications that you rely on to run your business are too important to trust to just any computer system. They demand the dependability of a VAX VMS system. With a VAX system running the VMS operating system, you get a commercial strength system with data protection, dependability, and integrity features that no organization can afford to be without.

### Your Data Is Safe on a VAX VMS System

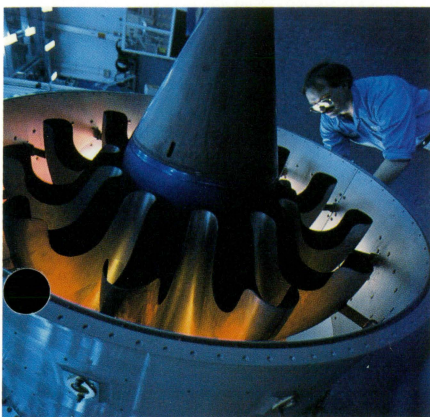
VAX systems are designed for uptime. Our leading-edge engineering and manufacturing technologies produce dependable systems with fewer parts to maintain. Built-in features ensure data integrity, security, and reliability. For example, error correction code (ECC) automatically detects and corrects many types of memory errors without disrupting operations.

VMS Volume Shadowing increases data availability by creating and maintaining up to three copies of important disks. Your work is never interrupted by a disk failure because if the primary disk fails, the system automatically uses another copy or even creates yet another shadow copy. Thus, information is always accessible and a major cause of downtime and lost data is eliminated.

The RMS Journaling feature speeds recovery time by recording all transactions and storing them in journal files. Should a failure occur, the journaling feature can efficiently redo or undo a series of file operations to restore a file to its original state.

#### **A Complete Production Environment**

The VMS operating system supports products integral to a successful production environment, including several transaction monitors, database management systems, and interconnect products. And, embedded within the VMS operating system are the DECdtm distributed transaction manager features. DECdtm services implement an optimized two-phase commit protocol that allows multiple systems or databases to be updated as an indivisible unit. Database integrity is ensured and application performance is increased.



Keeping a system tuned for top performance is a key requirement in all types of computing environments. Digital offers an extensive portfolio of software products and service offerings to help with all aspects of system management including operations, data center administration, media and file management, security, and network management.

VAX systems offer security features that support your organization's need for privacy, confidentiality, integrity, and accountability. The VMS operating system includes user-identification and access control lists, audit trails, and a 50,000-word password dictionary that inhibits break-ins.

#### **Outstanding Service and Support**

For complete dependability you need more than a great product. You need unsurpassed service and support throughout the lifetime of the product. At Digital, customer service begins when we design and build our products. Service means creating a reliable computer system that keeps on running. Designing quality into every component. And being the vendor you can depend on to be there when you need help.

Every day of the year, 24 hours a day, Digital's Customer Support Centers in 450 locations worldwide offer state-of-the-art hardware, software, and network solutions. Services such as remote diagnosis allow us to show up with a replacement before a part gets the chance to wear out. And, besides supporting our own equipment, Digital provides first-class service for other vendors' equipment. Our Enterprise Integration Services smooth out the entire process of planning, designing, implementing, and managing a complete solution for your computing needs.

**VAX systems have a history of delivering the right solutions. A VAX system coupled with the VMS operating system provides just the right balance of CPU power, I/O throughput, and storage to handle your toughest jobs. And it brings total data protection to the computing style that fits your business—whether it's timesharing, client/server, fault tolerance, centralized, distributed, or anything else.**



## Exceptional Flexibility and Growth

**W**ith commercial strength VAX systems, you can always adapt to changes in your marketplace. This single family of systems includes within its ranks members equipped to handle whatever type of computing your organization needs. Because all the family members are 100-percent compatible, the investments you make in one system are protected when you upgrade or change your computing strategy in any way. And what if your business future is uncertain? A VAX system is flexible enough to keep you on top when unforeseen changes—mergers, acquisitions, growth into new territories, strategic alliances—occur.

**VAX systems are offered as single-user workstations; work group, departmental, or data center systems; servers; clients; fault-tolerant systems; mainframes; and large VAXcluster systems. From top to bottom, all run the same VMS operating system, the same languages, and the same applications.**

### One Family, Unlimited Options

Their versatility makes VAX systems perfect for a wide variety of tasks. As client/server computing is becoming more and more popular, VAX systems have made their mark both as servers and as clients. VAX systems master the intricacies of client/server computing as they have mastered timesharing, batch, high availability, fault-tolerance, transaction processing, realtime, and supercomputing.

Your computer system should be optimized to your organization's needs without forcing you to modify business practices so the system can handle them. The entire VAX family is versatile enough to suit your diverse needs—

from the small, startup business interested in a MicroVAX system for the price of a PC, to the multinational corporation with wide area networks of VAXcluster systems containing VAX mainframes and supercomputers.

### Investment Protection and Enhancement

Growth options are built into each level of the VAX family, allowing the value of your computing investment to continue to grow over time. A VAX system gives you the ability to react to unpredictable changes in the marketplace. And even if you start out using the VMS operating system and UNIX becomes a requirement, you can switch operating systems without switching hardware. With VAX systems, you can always take advantage of new applications or shift computing resources when your priorities change.

Suppose that you open a new office overseas that needs to communicate constantly with the home base. Or you need to distribute processing from the central mainframe at headquarters to local branches. Perhaps you've merged with a company that uses another vendor's computers and you need to hook up your systems with theirs. Your VAX systems will adapt to all these changes without forcing you to change the way you do business. If your organization



VAXstation 3100



MicroVAX 3100



MicroVAX 3300



VAX 4000

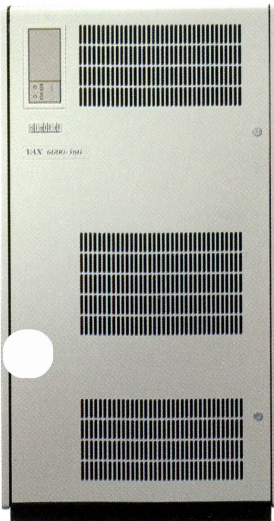
experiences unforeseen growth and change, you can be confident that your VAX systems will grow and change with you—protecting and actually enhancing your investments in hardware, software, and, most importantly, personnel.

### Eight Ways to Grow with a VAX System

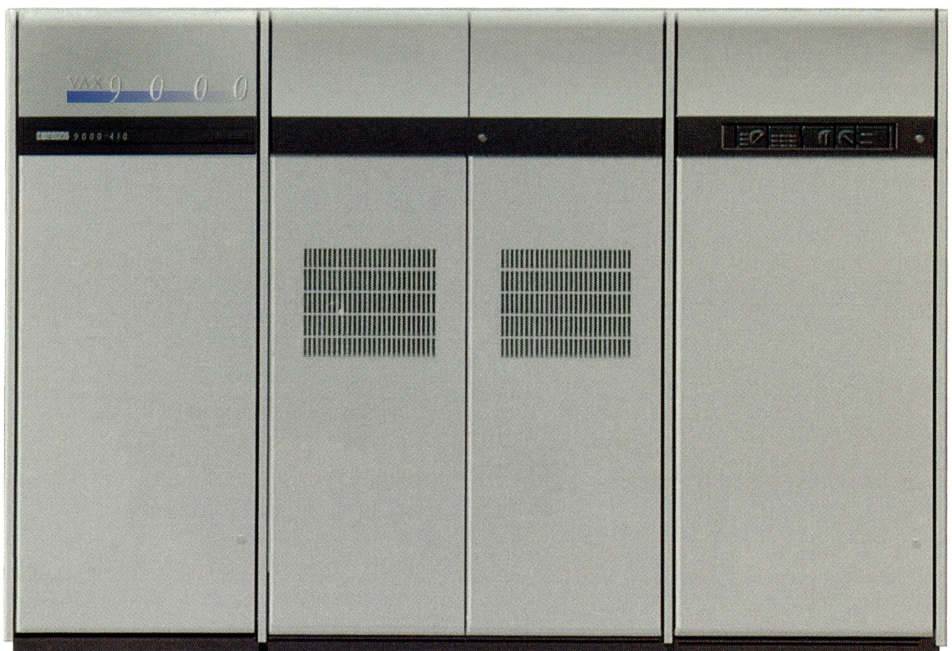
VAX systems offer eight ways to grow that are either unique to Digital, such as VAXcluster systems, or that are based on technologies for which Digital is the industry leader, such as networking. VAX systems can grow

- From small desktop systems all the way to large VAX mainframes. Or you can distribute applications from a large VAX system to several smaller ones.
- With symmetric multiprocessing or faster processors, allowing you to expand performance up to 20 times in the same cabinet.
- By dual-hosting two systems—increasing data availability and performance.
- With VAXcluster systems, which let you cluster together up to 96 VAX systems to act as one huge system that offers higher availability and uptime.
- Through local or wide area networks that can grow as large as you need them.
- With fault-tolerant VAXft systems for the highest level of data integrity and system availability.
- With VAX vector capabilities that offer a breakthrough in super-computing price/performance for compute-intensive applications.
- Into the future with new systems and capabilities, including aggressive technologies such as RISC.

**VMS is the popular, feature-rich operating system optimized for all VAX computers—from VAXstation workstations to VAXcluster systems, and from the first VAX system introduced in 1977 to the latest VAX system announced. VMS applications written for one VAX system run on any other.**



VAX 6000



VAX 9000

## Performance Leadership in Open Networks

With our tradition of technical innovation, intelligent network management, unbounded growth, and steadfast commitment to open standards, Digital networking gives you a way to tie your company together without tying you down.

**N**etworks in the 1990s must provide easy access and analysis of shared information. Digital is a leader in driving industry standards and building standards-compliant solutions that consistently protect our customers' investments. Digital's commercial strength VAX systems have proven themselves in networked distributed computing, going beyond mere physical networking connection to provide true peer-to-peer communications and distributed applications.

### Digital Networking: A Standard of Excellence

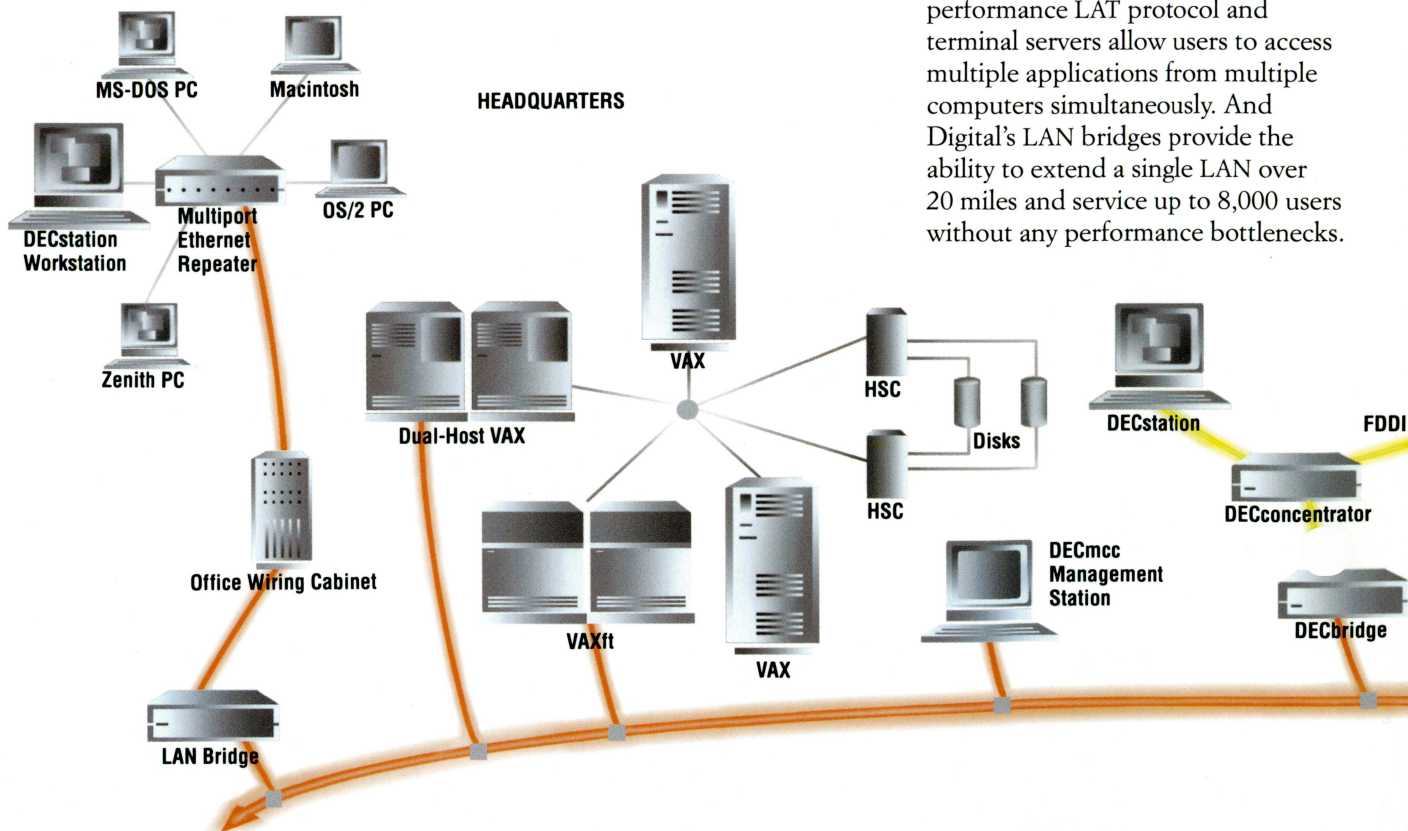
Digital networks have always been designed to conform to standards. As a result, all VAX network and application software remains compatible despite hardware and system software changes—protecting your investment in both software and training.

Digital supports multiple network standards (e.g., IEEE 802.3, ANSI FDDI) and higher-level protocols (e.g., DECnet/OSI, TCP/IP, X.25). This support enables us to integrate different network topologies and computing environments, forming networks with complete multivendor interoperability.

### Ethernet Local Area Networks

Digital's IEEE 802.3/Ethernet is the multivendor local area network (LAN) standard. Digital's Ethernet LANs—which can operate over all common transmission media—provide 10 Mb/s communications within a building or cluster of buildings. They connect terminals, PCs, workstations, printers, servers, VAX systems, DECsystem RISC systems, and the systems and components of other vendors.

Digital's Ethernet LANs also offer increased performance features not found in other LANs based on alternative standards. Digital's high-performance LAT protocol and terminal servers allow users to access multiple applications from multiple computers simultaneously. And Digital's LAN bridges provide the ability to extend a single LAN over 20 miles and service up to 8,000 users without any performance bottlenecks.



### FDDI High-speed Backbone

Digital also builds products that comply with the ANSI Fiber Distributed Data Interface (FDDI) standard. FDDI is a very high-speed network that provides 100 Mb/s data networking. FDDI is accepted as the next worldwide open standard for general-purpose LANs.

FDDI is used as a high-speed backbone for interconnection of multiple 802.3/Ethernet LANs. The standard also supports direct system interconnection to the FDDI LAN, enabling high-performance systems and workstations to take advantage of the bandwidth, reliability, and span of FDDI. With FDDI connections, you can set up disaster-tolerant clusters so remote backup sites can take over in the event of fire, flood, or other disaster.

### Wide Area Networks

When you need high-speed long-distance or worldwide communications, connect your 802.3/Ethernet LANs to form a single, integrated network with Digital's wide area network (WAN) products. Digital's standards-based WAN products provide

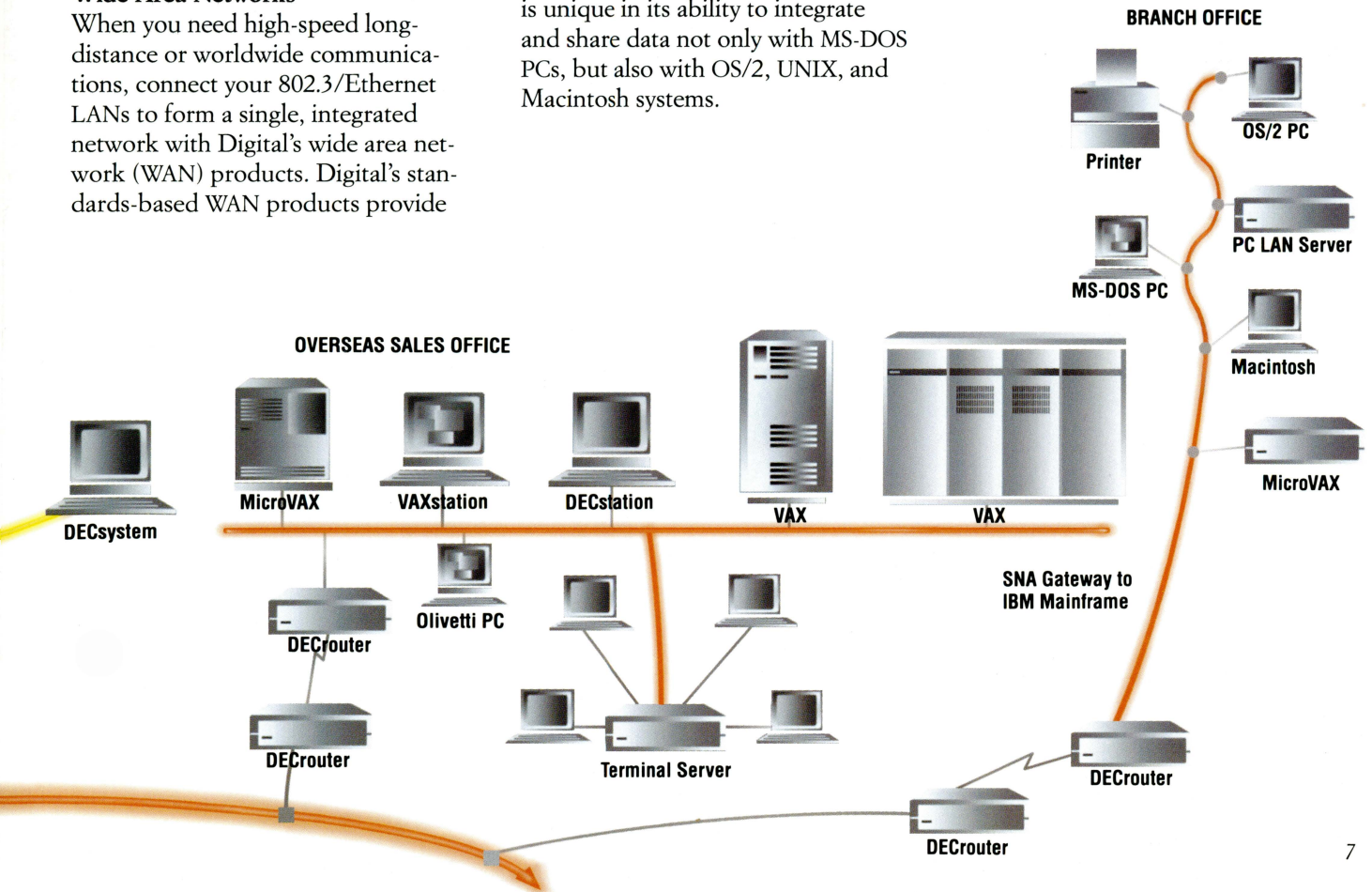
connectivity and interoperability with DECnet, SNA, OSI, and TCP/IP networks all over the world. Our distributed network applications also deliver ISO/OSI X.400 electronic messaging and Electronic Data Interchange (EDI) to facilitate worldwide public networks.

### PC Networking

Digital's PC networking products and Network Application Support (NAS) products connect PCs for sharing files, applications, printers, electronic mail, and other network services. They also link PCs with IBM systems through DECnet to SNA gateways. Digital's PATHWORKS PC networking software enables VAX systems to manage and control groups of PCs with centralized application, file, and data services running on VAX and other systems. Digital is unique in its ability to integrate and share data not only with MS-DOS PCs, but also with OS/2, UNIX, and Macintosh systems.

### Digital's Network Management Leadership

Digital's standards-based Enterprise Management Architecture (EMA) and DECmcc management products allow integrated management of networks, systems, and applications in a multi-vendor environment. Digital's network management tools allow transparent network management, change, and growth—without disrupting the network's dynamic nature. Network management is also built into DECnet software, so you can monitor and manage the network configuration, isolate faults, back up and restore systems on the network, and monitor network performance.



## Over 10,000 Applications and the Best Tools to Write Your Own



**VAX VMS systems are designed and built with exacting software development requirements. The result is an environment in which applications can often be developed in half the time.**

**T**he uses for VAX VMS systems are nearly endless. VAX systems can be found in every type of organization, academic institution, or research environment. Customers with unique application requirements find that VAX systems are the best platforms for software development. Two common uses for VAX systems are in client/server environments and in production environments—where they handle day-to-day, business-critical applications.

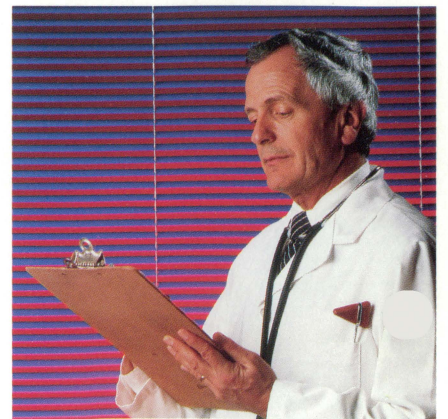
The portfolio of commercial strength applications written for VAX systems contains over 10,000 VMS and 1,000 ULTRIX products. With POSIX, UNIX applications can be ported to VAX VMS systems with the same ease as porting to any other UNIX system. The OSF/DCE gives applications developers the tools they need to develop distributed, operating system-independent applications. These technical and commercial applications have been developed by Digital, third parties, and customers for every type of business and organization. The huge number of VAX systems in the marketplace ensures a continuing wealth of applications from which to choose. Examples of applications available for VAX systems include the following:

- Corporate and Retail Banking
- Factory Automation
- CAD/CAM/CAE
- Office Automation
- Inventory Control
- Credit Analysis
- Environmental Engineering
- Database Management
- Earth Resource Engineering
- Hospital Administration
- Laboratory Data Acquisition
- Manufacturing Resource Planning
- Econometric Modeling
- Cellular Phone Management

### **Digital's COHESION Environment for CASE—A Single Environment for All Your Development Needs**

Digital's COHESION environment addresses the development, deployment, and management of software. COHESION includes services and support, an architectural foundation based on NAS, a comprehensive integration strategy, and a complete family of CASE tools that support all phases of the software development life cycle. As part of COHESION, CASE ties together tools, languages, and utilities, as well as tools for coordinating your development team. Digital's CASE strategy addresses the needs of client/server, production, and development environments. It is comprehensive and flexible, to encompass the differing needs of commercial and technical environments. And it is open, based on industry standards.

The excellence of Digital's COHESION environment is one of the reasons why VAX systems have such an enormous library of applications. You can select from the available applications or use the VAX languages and tools to develop your own. Many customers even use VAX systems to develop applications that they plan to port to and run on other vendors' platforms.



## Setting the Standard for Client/Server Computing

Client/server computing is a natural evolution of the style of computing first introduced by Digital. By expanding on the concept of timesharing, Digital continues to set the standard for the industry. Digital-driven movements in design automation, factory automation, office automation and the use of more intelligent PCs and workstations have provided the most recent emphasis on client/server computing.

Based on Network Application Support (NAS), Digital's client/server strategy offers the functionality of a complex multivendor network with the simplicity of a single system—the best of both worlds.

VAX based client/server computing provides competitive advantages for your organization. It provides the ability to improve individual and system productivity, improve security and availability of information, use past investments, leverage current investments, minimize cost and enable the use of future technologies. In short, VAX client/server computing environments improve service to the user community while protecting the assets of an organization.

Digital provides the broadest range of client and networked server products and integrates them with one another, and with products from other vendors. Client platforms include terminals, X Window System terminals, PCs, workstations, and VAX and DECsystem systems. VAX networked server platforms include base systems as well as systems preconfigured for specific applications such as integrating work groups or performing vector processing.

Digital's servers fill many needs—simple functions that can be handled by PC servers, more complex PC LAN server functions, high-speed UNIX-based server functions, or those that need the high functionality and commercial strength offered by VAX systems. All Digital servers interoperate, so you can easily reach whatever online resources you need, no matter what system they are located on.

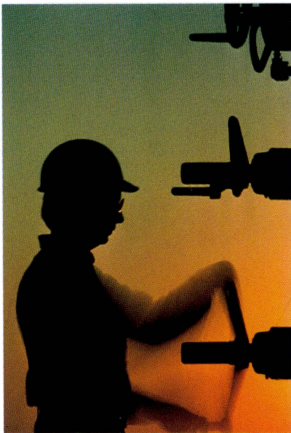


**VAXserver platforms provide the dependability, flexibility, networking, applications, and tools that are needed in commercial strength computing environments. Use them to suit your business style—centralized or decentralized, as general purpose servers running your applications, or as platforms to build customized solutions using Digital's application-specific server packages.**

### **Business-critical Production Computing**

Production systems run the computing applications that are vital to the day-to-day operation of an organization. Such business-critical, time-sensitive applications as information management, order entry, billing, inventory control, material requirements planning, scheduling, financial accounting, and funds transfer are the lifeblood of an enterprise's operation, and key to its productivity. They demand reliable, powerful production systems to keep them—and the organization they support—up and running.

You can't afford problems with your production system. VAX systems running the VMS operating system provide the high levels of reliability, availability, and unmatched service you depend on. If you encounter changes in the way your company runs its business, your VAX system can keep up because it easily adapts to change. The broad range of the family and the ease of growing from one member to the next without replacing software make major changes easier to handle. A VAX system even accommodates your needs to move from a centralized to distributed style of computing (or vice versa). You can rest assured that your VAX system is keeping your business flowing smoothly.



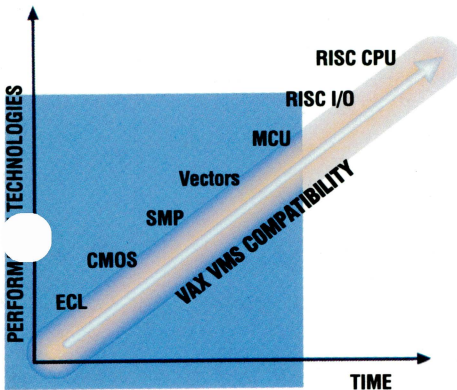
Digital's DECtp transaction processing offers an unbeatable combination of high-availability computing and distributed transaction processing with scalability, networking, application development, and system management. Customers in areas such as healthcare, telecommunications, manufacturing, retail, and finance can reap the benefits of transaction processing applications from Digital and prominent third-party vendors.

With DECdtm services embedded in VMS, Digital extends its strength in transaction processing into distributed environments. By distributing large, centralized TP applications, you can move local data closer to users, achieve higher overall throughput, and integrate branch office systems into centralized "back office" applications.



## Superior Price/Performance

**T**he true price of a system takes into account not just the initial cost, but investments you make in personnel, training, growth, facilities, and maintenance. Likewise, the performance is more than just the CPU speed: it's how the system performs for your specific, unique needs. VAX systems come with a level of price/performance that translates into the best computing solutions for your money.



### Low Cost of Ownership

VAX VMS systems provide a low cost of ownership not only because of their low initial cost, but also because they are less expensive to operate and maintain than comparable systems from other vendors. Computing with VAX systems is cost-effective because its leadership multivendor integration maximizes investments you already made in systems, software, and human resources. You don't have to throw away other vendors' equipment or reprogram and retrain.

With Digital's VAX systems you also benefit from lower software development costs and inexpensive system growth through symmetric multiprocessing, dual-hosting, and clustering. The cost benefits of computing with Digital are especially apparent when you examine the high levels of functionality that VAX systems deliver.

### Broad Range of Systems with Balanced Performance

A VAX system is a wise investment for today and for the future. VAX systems comprise the broadest family of 100-percent compatible computers available, so you can choose the best workstation, departmental system, data center system, or mainframe for your organization. It's a cost-effective approach to computing, because you

never have to purchase more computing power than you need, yet you still keep your options open.

A fast processor is a key ingredient for high-performance computing, but processing speed alone is not enough. Your day-to-day applications need a balance of CPU power, I/O throughput, and storage capacity. Digital designs and builds VAX systems so you can choose the best combination for your particular needs. Whether you need transaction processing, office processing, or CAD/CAM, VAX systems deliver the balance you need for the most efficient, maximum use of your system.

### Future Technology (RISC)

Digital is aggressive when it comes to delivering new ways to improve the performance and price/performance of VAX systems without compromising our history of compatibility. You can be assured that these benefits will be passed along to you, so that you and your VAX system can continually grow—keeping your competitive edge sharp.

The future of Digital's systems is based on increased system performance with a lower cost of computing. In the past, we've added new technology—ECL, CMOS, SMP, vectors—as it becomes available. And we made sure it was compatible with earlier technology. RISC I/O technology has recently been added to the I/O subsystem to further accelerate VAX system performance.

As the next step in the continuum, we will phase in leadership RISC CPU technology beginning in two to three years. VAX VMS systems based on RISC technology will be compatible with today's VAX VMS systems, so you can feel confident that the investment you make in VAX VMS systems today will be enhanced tomorrow.

## Open Computing through Standards

Digital is the only major systems supplier to provide open systems in all of its product lines. Digital's focus on standard interfaces rather than just standard products allows our customers to benefit from the highest levels of product functionality without sacrificing vendor independence.

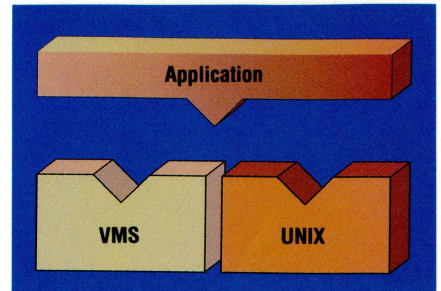


Organizations worldwide are looking at ways to take advantage of the movement towards more open systems. While users and system managers demand the flexibility and portability that open systems provide, they often do not want to give up the availability, reliability, and manageability of their proprietary operating system. VAX VMS is the only software environment in the industry that offers the best features of both Open Systems and proven commercial strength functionality and quality.

### A Standard of Excellence in Open Computing

VAX VMS is becoming the world's first commercial strength Open System. Digital continues to invest in extending the functionality that VMS has long been known for, while at the same time, "opening up" the operating system to comply to key IEEE, OSF,<sup>™</sup> X/Open,<sup>™</sup> and ISO standards and specifications.

By adhering to standards, an open system provides solutions to your business needs, whether those needs are interoperability with other systems, application portability, user portability or a combination of these. You determine your particular needs, articulate them, and design a system using standards to meet them. VMS provides both the standards-based building blocks and commercial-strength technology to solve your particular business needs.



Today's VAX VMS already supports the standards needed for leadership multi-vendor integration. In the near future, other standards will be added to provide portability as well, including the OSF Motif<sup>™</sup> user interface and the POSIX 1003.1, 1003.2 and 1003.4 application portability standards. VAX VMS will then apply for XPG3 X/Open branding, the "stamp" that certifies openness. These standards will add UNIX-like portability, while retaining the underlying quality and functionality of VMS. It's the best of both worlds.

### The Benefits of Portability

VMS application portability will enable you to employ the robust features of VMS VMS in your standards-conforming computing environment. For instance, you can move applications from a UNIX environment to take advantage of VMS clustering, journaling, recovery, fail-over, security, data integrity, availability, networking, software development environment, and scalability. Conversely, you can move open VMS applications from the VAX environment to other standards-based systems in your organization. Not only does VMS support for open standards provide you with increased flexibility and access to new applications, it also protects your existing hardware and software investments.

**Applications that are ported to VMS automatically benefit from the richness of the VMS environment—data integrity, volume shadowing, VAXclusters, reliability, scalability, and more.**

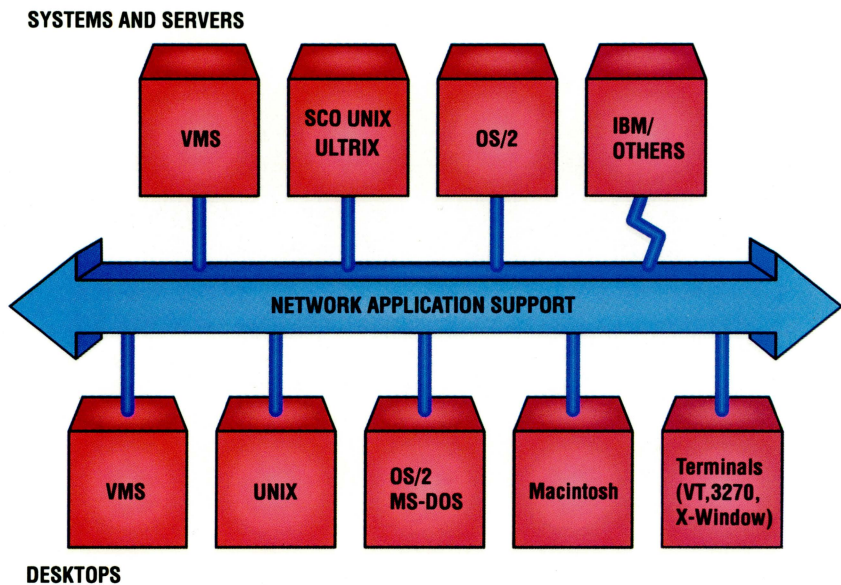
The openness of VAX VMS computing also protects your valuable investments in personnel skills and training. When the tools and interfaces people use are based on standards, there's no need for retraining when moving from tool to tool. Learning curves are minimized, and return on investment maximized thanks to the common standards the tools and interfaces share.

**Leadership Multivendor Integration with NAS**

The typical organization has many different types of computer systems, each focusing on the type of work it does best. But problems arise when you try to tie different types of systems together . . . when you try to get them to share information back and forth. Digital's Network Application Support (NAS) solves this problem. NAS is a set of products based on industry standards for using and developing integrated applications running in a distributed multivendor environment.

NAS lets you take graphics from an Apple® Macintosh,® a Lotus® spreadsheet from an MS-DOS® PC, a drawing from a UNIX workstation, data from an IBM mainframe, and a scanned image from a VAX system and integrate them all into a single report. You can send it electronically to others anywhere on the network and even include up-to-the-minute connections to source data.

The flexibility of NAS allows you to use applications running on the desktop device of your choice, whether it's a PC from IBM, Apple, COMPAQ,® Olivetti,® or Digital; a workstation from Digital or other UNIX® suppliers; an X Window terminal; or other terminals. You benefit from a wide choice of system resources including Digital VAX systems running the VMS or ULTRIX operating systems, DECsystem computers, and systems from IBM or Cray.® The choice of networking software is yours too—whether it's DECnet, OSI, TCP/IP, or another protocol.



**Digital's Network Application Support (NAS) lets you integrate applications and share information across your multivendor environment.**

**No other system comes close to VAX systems in providing the combination of VMS commercial strength and NAS multivendor computing, including the coming application portability of POSIX.**

## VAX Solutions

The following section gives you a closer look at Digital's VAX solutions:

<b>VAX Systems for the Desktop, Office, and Data Center</b>	<b>Page</b>
▪ VAXstation Workstations	15
▪ MicroVAX 3000 and VAX 4000 Systems	16
▪ VAX 6000 Systems	18
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<b>Additional Digital Systems for the Desktop</b>	
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## VAXstation Systems: Highly Productive Workstations Compatible with the Entire VAX Family

The VAXstation 3100 family consists of five models: Models 30, 38, and 76 for workstations, and Models 40 and 48 for workstations/serverstations. The systems are differentiated by storage capacity, CPU speed, type of memory, and graphics performance. They offer a choice of three graphics options: single-plane monochrome system, 8-plane entry-level color graphics system, or 8-plane high-performance color graphics system (SPX). The SPX systems provide up to 10 times the graphics performance of the other VAXstation 3100 models.



VAXstation 3100 Model 38 SPX

	SPECmark	Maximum Memory Capacity	Maximum Disk Capacity	Graphics	I/O Throughput
VAXstation 3100 Models 30 and 40	2.7	32 MB	6.6 GB	2D	1.5 MB/s
VAXstation 3100 Models 38 and 48	3.7	32 MB	6.6 GB	2D	1.5 MB/s
VAXstation 3100 Model 76	6.6	32 MB	6.6 GB	2D	1.5 MB/s

### Wide Range of Applications

Low-cost VAXstation 3100 workstations are ideal for a wide range of commercial and technical application environments. VAXstation 3100 systems support a broad scope of application software—from PC applications such as Lotus® 1-2-3® to high-performance graphics required for CAD/CAM/CAE. VAXstation 3100 systems support thousands of workstation applications, including those based on the OSF/Motif, DECwindows, and VWS/UIS interfaces; and VMS and X applications. The systems also have access to industry-standard MS-DOS applications through Digital's SoftPC software.

### Configuration Choices

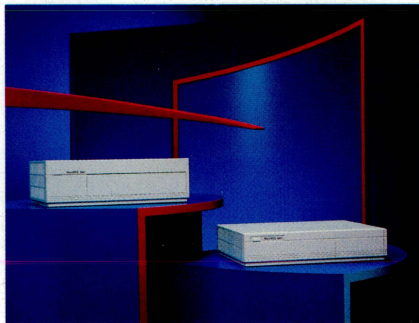
The Model 76 system uses single in-line memory modules, so memory can be expanded up to 32 Mbytes in 4-Mbyte increments. A choice of monochrome and color monitors is available, along with the 19-inch flat panel monitor. With a dual-monitor adapter cable, VAXstation 3100 systems can use two monitors at the same time, providing a larger screen area.

For your convenience and easy installation, VAXstation 3100 systems can be ordered with factory installed software, enabling you to start your system in minutes.

## MicroVAX 3000 and VAX 4000 Systems: Superior Price/Performance with Built-in Flexibility for Open Office Environments

### MicroVAX 3100 Models 10e and 20e

This compact, entry-level, multi-user VAX system offers strong performance, storage expandability, and extensive communications at personal computer prices. It comes in two models to give you a choice of expansion options. It is ideal for local processing or transaction processing in retail stores and branch offices; multi-vendor desktop integration; distributed transaction processing, data collection, and communications in a corporate network; computer-integrated manufacturing; and PC LAN management.

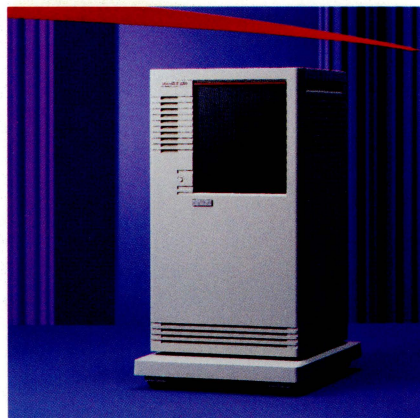


MicroVAX 3100, Models 10e and 20e

	Relative CPU Performance	Maximum Memory Capacity	Maximum Disk Capacity	Maximum I/O Throughput
MicroVAX 3100 Models 10e and 20e	3.5	32 MB	4.8 GB	1.5 MB/s
MicroVAX 3300	2.4	52 MB	14 GB	4 MB/s
VAX 4000 Model 200	5.0	64 MB	21 GB	4 MB/s
VAX 4000 Model 300	8.0	224 MB	28 GB	8 MB/s

### MicroVAX 3300

As an entry-level Q-bus standalone system or networked system in an open work space environment, the MicroVAX 3300 system can support small work groups or departments running commercial or technical applications. The system has diverse uses, including office processing, project management, scientific research, shop-floor control, and software development. With a simple CPU board change, the MicroVAX 3300 can be upgraded to achieve VAX 4000 Model 200 CPU and I/O performance.



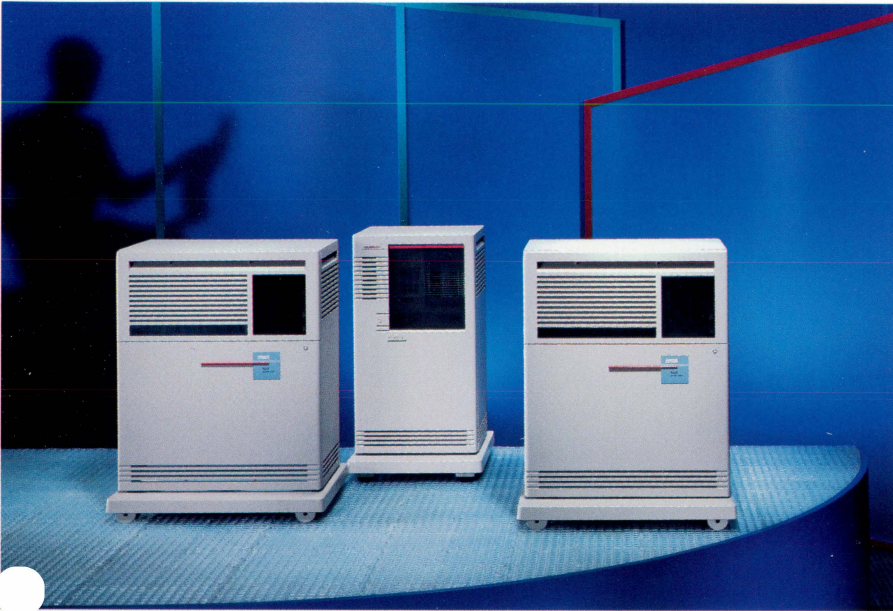
MicroVAX 3300

### VAX 4000 Model 200

Designed for the office environment and general-purpose use, the VAX 4000 Model 200 is a lower cost, lower capacity variant of the VAX 4000 Model 300 system. It is designed especially to handle the demands of production transaction processing environments. It also excels when I/O-intensive file and application demands are high. Embedded in this system is the same industry-leading DSSI disk and Ethernet RISC technology that has made the VAX 4000 Model 300 system a top performer. The VAX 4000 Model 200 is an upgrade target for MicroVAX 3300, 3400, 3800, and 3900 customers who are looking for a 30 to 100 percent increase in processor performance and a two-fold increase in I/O performance. Other Q-bus systems can upgrade to VAX 4000 Model 200 performance with a CPU board upgrade.

### VAX 4000 Model 300

The VAX 4000 Model 300 is Digital's most powerful open office system. This well-balanced system brings VAX power and high performance out of the computer room and into the open work space. Features such as a dedicated high-speed I/O subsystem and embedded disk and Ethernet adapters enable it to support well over 100 users, a first for open office systems. The VAX 4000 Model 300 system comes



VAX 4000 Model 200  
(large and small cabinets)  
and VAX 4000 Model 300

in multiuser, server, realtime, and rack-mount variants. Both the multiuser and server configurations are available in single system and dual-host configurations. In any environment, the VAX 4000 Model 300 is a perfect system for running distributed applications—transaction processing, software development, database, inventory control, office automation—and managing deployed applications.

#### Dual-host Capability

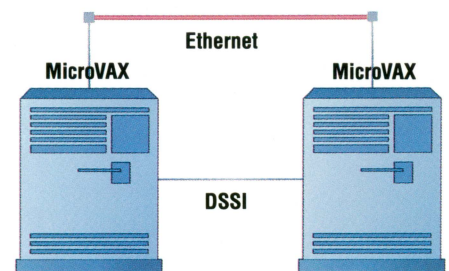
A dual-host system provides high data availability and two independently functioning CPUs. A dual-host system consists of two systems (two Q-bus MicroVAX 3000 and/or VAX 4000 systems, or two VAX 6000 systems) connected by a DSSI storage bus. The two systems share one another's disks across this bus, providing two paths to access data and thereby increasing data availability. Should one CPU in a dual-host system fail, data is available through the second path and all operations can resume immediately.

A dual-host system is a two-node DSSI storage systems interconnect VAXcluster system. The DSSI bus performs a similar function as the computer interconnect in a CI VAXcluster system. Both DSSI and CI clusters run the same software, but they differ in the DSSI and CI specifications and in the number and kinds of systems supported.

Dual-host systems are commonly used as boot nodes for local area VAXcluster systems or as multiuser systems with terminal servers. Packaged dual-host systems are available, or you can create a system by adding the required components.

#### Realtime

Special configurations of the MicroVAX 3300 and VAX 4000 systems are available for realtime applications. The rtVAX systems are packaged with a VAXELN runtime license. They are ideal for applications such as data acquisition and control in which predictable performance and quick response time are crucial.



*The Simplest Dual-host System*

## VAX 6000 Systems: High Performance, Powerful I/O, and Great Expansion for Data Center Computing

### Commercial Strength Solutions for Data Center Computing

VAX 6000 systems are designed and engineered with the rigorous demands of data center computing in mind. Their high processing power balances well with features such as large memory and storage capacities, RISC-based I/O, and FDDI networking. And they offer the availability and growth options data center managers are looking for.

In your data center, VAX 6000 systems are equally comfortable functioning as servers connecting hundreds of PCs, database engines retrieving and adding data to massive databases with blinding speed, and transaction processing systems processing millions of transactions for a widely distributed user base. VAX 6000 data center systems might also be dedicated to other applications, such as office automation for your entire enterprise. Or sophisticated software development that takes advantage of multiple operating environments.

VAX 6000	Relative CPU Performance	Maximum Memory Capacity	Maximum Disk Capacity	Maximum I/O Throughput
Model 310	3.8	512 MB	Over 5 TB	80 MB/s
Model 410	7.0	512 MB	Over 5 TB	80 MB/s
Model 510	13	512 MB	Over 5 TB	80 MB/s
Model 520	Up to 25	512 MB	Over 5 TB	80 MB/s
Model 530	Up to 37	512 MB	Over 5 TB	80 MB/s
Model 540	Up to 49	512 MB	Over 5 TB	80 MB/s
Model 550	Up to 61	512 MB	Over 5 TB	80 MB/s
Model 560	Up to 72	512 MB	Over 5 TB	80 MB/s

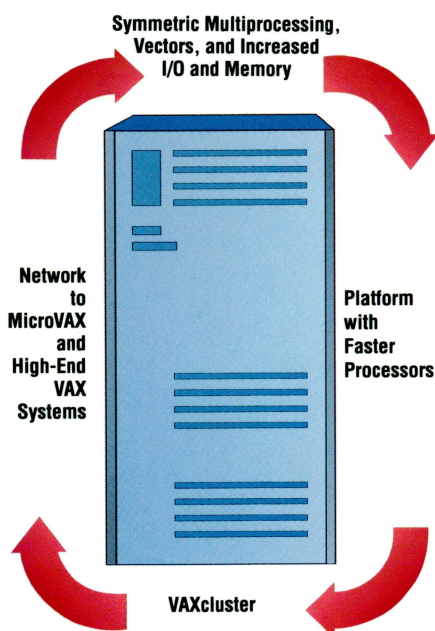
### Unique Platform Strategy for Present and Future Growth

The key to VAX 6000 systems growth is a unique modular platform strategy—featuring symmetric multiprocessing (SMP)—that designs out obsolescence. You can quickly and easily expand performance up to twenty times in the same cabinet in minutes by simply adding or changing modules. Memory and I/O expand in the same easy way. You can also increase availability and storage capacity by placing a VAX 6000 system in an entry-level dual-host configuration based on DSSI technology, or a high-performance CI VAXcluster system. The VAX 6000 platform strategy means lower growth costs and better protection for your computing investment.

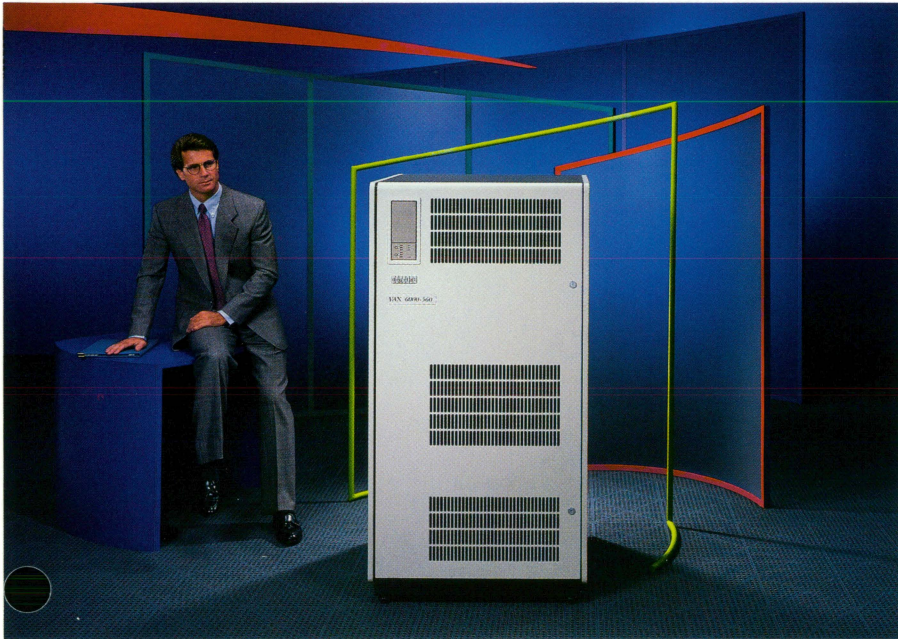
But that's not all. The same modular platform design will allow you to upgrade to new performance levels as each new generation of technology is introduced. This means that you can remain on the forefront of technology as you grow with VAX 6000 data center systems.

### Powerful I/O Engine for Intensive Data Management

The VAX 6000 system's bandwidth of up to 100 Mbytes per second comes from a balanced I/O approach that encompasses the entire system, from the CPU, buses, and storage controllers, to the disks and software tools. The design breaks through I/O bottlenecks and optimizes performance throughout the system. With this advanced I/O design and very large memory and storage capacities, the VAX 6000 system is equipped to handle the most demanding data center applications.



*The VAX 6000 Platform Strategy offers many ways to grow—meeting all your data center computing needs*



VAX 6000 System (All VAX 6000 models are in the same modular platform.)

The I/O design begins with the combination of an XMI high-speed system interconnect, advanced memory interleaving, DSSI and other high-performance controllers. This flexibility means that I/O capabilities can be expanded as demands grow. A wide selection of disk devices, including low-cost RF72 disks, completes the I/O design. Features such as disk striping, multiple spindle storage arrays, volume shadowing, and solid state disk technology boost I/O performance and data availability for critical applications.

#### **VAX Vectors—A Breakthrough in Supercomputer Price/Performance**

VAX 6000 Model 400 and 500 supercomputers can incorporate one to four integrated vector processors that accelerate performance to a peak of 360 MFLOPS single precision and 180 MFLOPS double precision.

.6000 supercomputers offer extremely high performance at affordable prices for a wide range of tough jobs such as seismic analysis or finite element analysis. Or you can use the

VAX 6000 vector option to increase the speed of your numeric-intensive FORTRAN applications.

#### **Unmatched Versatility**

Besides being the industry's most expandable systems, VAX 6000 systems are flexible enough to fulfill many different needs. They can be configured as timesharing systems (running either the VMS or ULTRIX operating systems), database/transaction processing systems, software development systems, vector compute servers, VAXserver systems, VAXcluster systems, and rtVAX realtime systems. A rackmount VAX 6000 system is available for environments in which constrained packaging is a requirement.

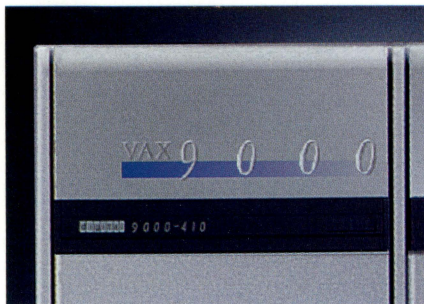
# VAX 9000 Systems: Mainframes and Supercomputers with the Flexibility of the VAX Style of Computing

## High-performance Computing for the '90s

In the VAX 9000, Digital brings together two worlds: the extraordinary flexibility of VAX networked computing; and the sheer information processing power of advanced mainframe and supercomputer systems.

The most powerful and reliable VAX systems ever built, the VAX 9000 series protects the investments made by current VAX owners by enabling them to extend their applications to the highest levels of computing without having to recompile source code, convert precious data, or retrain their staffs. That's because the VAX 9000 is a true VAX system, delivering total compatibility with the entire family of VAX systems.

Within the VAX 9000 series there's a wide range of capability. From single processor systems to multiprocessor configurations, from cost-efficient supercomputer servers to multiuser mainframes, the VAX 9000 series has a model to meet virtually any high-end demand. And the flexibility to upgrade when demand grows.



VAX 9000	Relative CPU Performance	Standard Memory Size*	Maximum Disk Capacity	Maximum I/O Throughput
Model 110 (server)	40	128 MB	Over 7 TB	80 MB/s
Model 210	40	256 MB	Over 7 TB	80 MB/s
Model 310 (server)	40	128 MB	Over 7 TB	80 MB/s
Model 410	40	256 MB	Over 7 TB	160 MB/s
Model 320 (server)	Up to 79	256 MB	Over 7 TB	80 MB/s
Model 420	Up to 79	256 MB	Over 7 TB	160 MB/s
Model 330 (server)	Up to 118	512 MB	Over 7 TB	160 MB/s
Model 430	Up to 118	512 MB	Over 7 TB	320 MB/s
Model 340 (server)	Up to 157	512 MB	Over 7 TB	160 MB/s
Model 440	Up to 157	512 MB	Over 7 TB	320 MB/s

\*Maximum memory capacity is 512 MB for all models.

## Flexible Choices for Customized Solutions

The VAX 9000 series includes 20 models, representing a wide range of computing—both in terms of performance and application.

The VAXserver 9000 Model 110 offers the lowest-cost entry into this family. This server system can give a network of VAX users a mainframe compute engine with 40 times the performance of a VAX-11/780 system.

The VAXserver 9000 Models 310, 320, 330, and 340 offer a range of power up to about four times the Model 110, accomplished by the addition of CPUs in a symmetric multiprocessing configuration.

The VAX 9000 Model 210 is ideal for dedicated compute-intensive applications. Like the Model 110, the Model 210 is a single CPU configuration, but it is a multiuser system rather than a server. It has twice the standard memory and comes with the Commercial Instruction Set option as standard.

The VAX 9000 Models 410, 420, 430, and 440 are the top-of-the-line mainframe systems, delivering up to 157 times the performance of the VAX-11/780. Like the Model 210, these models are multiuser systems and include the Commercial Instruction Set as standard. And as with the 300 series models, the 400 series offers increments of power based on the number of processors used.

## Supercomputer Performance with Fully Integrated Vector Processing

The VAX 9000 supercomputer models are similarly varied. With integrated vector processing standard, they span from the entry-level VAXserver 9000 Model 110VP system to the Model 440VP top-of-the-line mainframe supercomputer system, offering up to 2,000 times the performance of the VAX-11/780 on vectorizable applications and up to 157 times the scalar performance.



Supercomputer servers are available with up to four symmetric multiprocessing units, each with a vector processor, to handle the most demanding backbone compute loads for scientific and engineering networks. The same variety is offered in multi-user configurations too. System users who previously relied on batch interfaces to specialized supercomputers for number-crunching can now have a supercomputer server that integrates seamlessly with their workstation networks.

#### **Performance Options for Both Commercial and Supercomputer Applications**

All VAXserver 9000 models offer a commercial instruction set option that provides packed-decimal-string support in hardware and firmware that processes typical COBOL applications from 10 to 200 times faster. VAX 9000 systems and servers attain supercomputer performance levels with the addition of the vector processing option. This makes the VAX 9000 suitable for the most demanding engineering and scientific applications.

#### **Additional Power and Availability from VAXcluster Technology**

Like any VAX system, all VAX 9000 systems can be incorporated into Digital's unique VAXcluster systems. With multiple integrated systems, VAXcluster systems offer high levels of system availability and tremendous growth potential. These configurations help to make the VAX 9000 a secure long-term investment.

#### **VAX 9000 Systems: The Way of the Future—Available Today**

With over 10,000 applications available, high-performance throughput, and all the benefits of the Digital style of computing, the VAX 9000 is clearly the best choice for your mainframe and supercomputing needs today—and tomorrow.

## VAXcluster Systems: Higher Availability and Performance for Large-scale Computing

Only Digital offers clustering—the ability for a collection of processors and storage elements to operate as one system. Special reliability and availability features make VAXcluster systems truly unique in the industry. CI VAXcluster systems let you link together as many as 96 VAX systems and share huge databases of over 7,000 gigabytes (7 terabytes) to form the largest computer systems in the industry. Or you can use a DSSI bus to link two systems into a DSSI cluster. In all types of clusters, all data is available to all systems on the cluster.

### High Uptime and Economical Growth

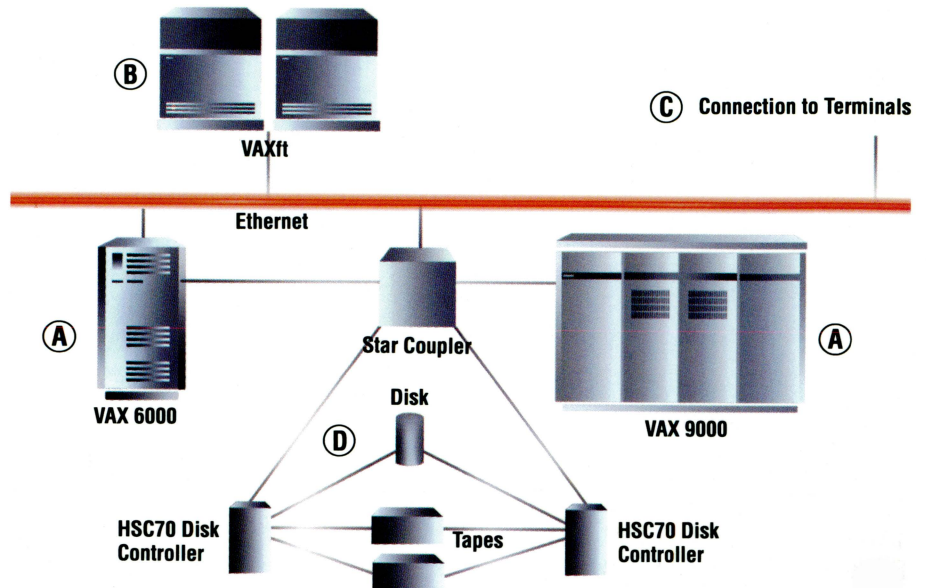
In a VAXcluster system, single points of failure can be minimized to ensure higher availability and uptime. If one processor goes down, the others can take over without disrupting users or applications. Yet you are able to manage and use the cluster centrally as though it were a single system.

VAXcluster systems answer future needs for growth. VAXcluster technology offers an economical means of expanding computing resources in gradual steps, exactly as needed, without disrupting your business operations. You never have to replace older systems. You can simply add new VAX systems and VAXstation workstations to a cluster when your requirements grow.

### A Range of VAXcluster Options

Digital offers four types of clusters:

- DSSI storage interconnect—Dual-host configurations can link MicroVAX, VAX 4000, and VAX 6000 systems through a low-cost DSSI bus that allows users to reach disk-based data through both members of the dual host.
- FDDI—With FDDI networking you can create clusters that are disaster-tolerant. They are spread out across multiple geographic locations so if a problem occurs at one site, the others can continue to process critical applications.



▪ Ethernet—Entry VAX systems can be configured in local area, or Ethernet VAXcluster systems. This is a common way to link VAXstation workstations into an enterprise-wide computing environment. These small system clusters can easily be hooked into CI or DSSI VAXclusters to create larger mixed interconnect clusters.

(A) Two VAX nodes: VAX 6000 and VAX 9000, both benefiting from higher availability. (B) VAXft node used as a fault-tolerant front-end processor providing the highest level of availability. (C) Terminal server to allow terminal access to all clustered systems. (D) Disk controllers with dual-ported disks and tapes for higher data availability.

▪ CI computer interconnect—VAX 6000 and 9000 systems configured in CI VAXcluster systems benefit from extremely high data availability thanks to configurations that eliminate potential single points of failure. CI VAXcluster systems can grow to accommodate a nearly unlimited amount of disk storage.

## VAXft Systems: Price/Performance Leadership Across a Family of Fault-tolerant Systems

### Fault-tolerant Systems for Every Application

The VAXft series is a family of fault-tolerant computer systems that meets the performance, capacity, and availability demands of a wide range of applications running under the VMS operating system. Performance for online transaction processing applications ranges from 6 to 25.6 transactions per second (TPS). Using VAXft systems, VAX system users can configure the most dependable production systems available today.

In addition to its dependability, the VAXft series is fully compatible with all other VAX and VAXcluster systems. Fault-tolerant capabilities can be introduced to enterprise-wide computer systems wherever they are needed, without rewriting existing applications.

VAXft systems are full implementations of a hardware-intensive fault-tolerant architecture. They provide continuous processing together with the highest levels of data and computational integrity. Today the series offers four levels of performance, packaged in a range of server and multiuser desk-side, data center, and rack-mountable configurations, to deliver fault-tolerant systems for a broad spectrum of applications.

	Relative CPU Performance	Maximum Memory Capacity	Maximum Disk Capacity	Maximum I/O Throughput
VAXft Model 110	2.4	96 MB	4 GB	8.0 MB/s
VAXft Model 310	3.8	128 MB	12 GB	8.0 MB/s
VAXft Model 410	6.0	128 MB	12 GB	8.0 MB/s
VAXft Model 610	6.0	128 MB	24 GB	16.0 MB/s
VAXft Model 612	12.0	128 MB	24 GB	16.0 MB/s



*The Complete VAXft System Family (clockwise from top left, Model 610, Model 612 with expanded storage, Model 310/410, Model 110 rackmount, and Model 110 pedestal).*

## UNIX Computing in a VAX-based Organization

While Digital's open VAX VMS environment provides the ability to bring UNIX applications to VAX VMS systems, Digital is a full service vendor for both VMS and ULTRIX systems. This means that you can choose the operating system best suited to your needs. You can also use both operating systems in a single computing environment. That's why we offer VMS/ULTRIX Connection software on VMS systems. It forms a bridge between these two environments and protects your investments in both.

Part of the NAS product suite, the VMS/ULTRIX Connection is a layered software product on the VMS operating system that provides TCP/IP and NFS networking for VMS systems. It provides resource sharing—networking, file access, remote terminal access, and application development—between VMS systems and UNIX or ULTRIX systems via the Internet protocols suite. With the VMS/ULTRIX Connection, UNIX users benefit from a distributed computing environment with all the exceptional reliability and uptime features associated with the VAX family.

	Integer MIPS <sup>1</sup>	SPECmark	Maximum Memory Capacity	Maximum Disk Capacity	Maximum I/O Throughput
DECstation 2100	11.0	8.3	24 MB	6.2 GB	4.0 MB/s
DECstation 3100	15.0	11.3	24 MB	6.2 GB	4.0 MB/s
DECstation 5000 Model 200	24.0	18.5	120 MB	18.0 GB	93.0 MB/s

<sup>1</sup> Million instructions per second based on a combination of Dhrystone, grep, yacc, diff, and nroff benchmarks.



DECstation 5000 Model 200



DECstation 3100

### DECstation Workstations—UNIX-based RISC Systems

In addition to the VAX workstation family, Digital offers a complete family of UNIX-based systems using Reduced Instruction Set Computer (RISC) technology. Based on both hardware and software industry standards, the DECstation workstation family offers fast, high-performance computing and superior graphics capabilities in a complete UNIX environment. The DECstation workstation family offers you exceptional price/performance, from the DECstation 2100, the lowest-cost 16-inch color RISC/UNIX workstation in the industry, to the DECstation 5000 Model 200, providing an unprecedented combination of power and expandability plus accelerated 2D and 3D graphics. (See the DECstations and DECsystems brochure for more information on the entire DECstation and DECsystem families.)

## Digital's Integrated Personal Computing: Lending the Resources of Your Organization

Digital's PC integration products and services integrate DOS, OS/2, and Macintosh personal computers into your organization's information systems strategy without sacrificing the individual's benefits of industry-standard personal computing. With these products you get resource sharing, multivendor compatibility, simplified system management, and a clear growth path.

You can access PC-generated information stored on a VAX system from other VAX systems, terminals, and workstations as well as PCs. You are assured of having the latest company data for accurate reports because you can retrieve it any time.

PATHWORKS PC integration software allows VAX systems to act as application, data, and resource servers to groups of DOS and OS/2 personal computer clients. Similar services are available to users of Macintosh systems. All users have equal access to the server and shared printers, and to the "personal" processing power provided by the PCs.



DECstation 333c

	Technology	Maximum Memory Capacity	Maximum Disk Capacity
DECstation 316sx	Intel 80386sx, 16 MHz	16 MB	320 MB
DECstation 320sx	Intel 80386sx, 20 MHz	16 MB	320 MB
DECstation 320+	Intel 80386, 20 MHz	16 MB	640 MB
DECstation 325c	Intel 80386, 25 MHz	16 MB	640 MB
DECstation 333c	Intel 80386, 33 MHz	16 MB	640 MB
DECstation 425c	Intel 80486, 25 MHz	16 MB	640 MB
DECstation 433t	Intel 80486, 33 MHz	64 MB	4.6 GB

Digital's European PCs offer slightly different characteristics:

DECstation 316	Intel 80386sx, 16 MHz	13 MB	400 MB
DECstation 320	Intel 80386sx, 20 MHz	14 MB	400 MB
DECstation 325	Intel 80386, 25 MHz	18 MB	400 MB
DECstation 425e	Intel 80486, 25 MHz	64 MB	800 MB
DECstation 433t	Intel 80486, 33 MHz	64 MB	4.6 GB

### Digital PCs: Industry-standard Personal Computing Integrated into the VAX Environment

Digital's industry-standard PCs offer outstanding speed and graphics in MS-DOS and OS/2 applications working standalone or as part of a networked work group. Through Network Application Support (NAS), these systems are integrated into Digital's world of enterprise-wide computing.

The systems based on 80386 and 80486 technology are also available in server configurations that provide NAS-based file and print services to DOS work groups and OS/2 clients.



DECstation 325c

## Digital Terminals and Printers for VAX Systems

**P**roductivity on the desktop means having the best tools at hand. Digital offers a variety of high-quality terminals and printers.

### VT Terminals

The economical VT320 terminal features single-session operation. The dual-session VT330+ and VT340+ terminals handle graphics; the VT340+ also offers color. The VT420 is a low-cost, dual-session terminal with the ergonomics and performance needed for demanding client/server environments. It offers full-formed fonts, high resolution, and extra display lines.



*VT420 Terminal*

### VT Windowing Terminals

The VT1200 windowing terminal offers the features—menus, icons, and mouse interaction—commonly associated with more expensive PCs and workstations. The terminal displays applications from any Digital or non-Digital host that implements the X Window System standard.



*VT1300 Color X Window System Terminal*

The color VT1300 X Window System terminal offers high resolution and performance. Through DECwindows and the X Window System users' interfaces, it provides access to thousands of applications previously available only with a workstation. It supports TCP/IP and DECnet protocols, and can be upgraded to a VAXstation 3100 Model 30 system.

### LA and LJ Desktop Printers

Digital offers a variety of desktop dot matrix and network laser printers to accommodate all your printing needs. The DEClaser printers are available in four models and include features such as PostScript® DEC ANSI and simplex/duplex printing. For fast color output choose either the LJ250/LJ252, which prints up to 255 colors, or the ColorMate PS, which prints color PostScript output. For personal printing, the LA70 and the LA75 are ideal solutions for either video terminals, DECstation PCs, or workstations. For high-volume printing in either monochrome or color, the LA324 MultiPrinter includes a multitude of features.

### PrintServer Network Laser Printers

When you need a printer for the whole department, choose the PrintServer 20 or, for the entire organization, the PrintServer 40 Plus. Both print crisp, clear text and graphics quickly and quietly. The PostScript-based PrintServers include resident typefaces and are supported by industry-standard electronic publishing software.

### LG and LP Lineprinters

Digital offers a full range of high-speed impact printers. The LG31 prints text and graphics at 300 lines per minute. The LG01/LG02 computer room lineprinters output text and graphics at up to 600 lines per minute. The LP37 is a heavy duty lineprinter that has up to 1,200 lines per minute in open offices and computer rooms. The LP29 “workhorse” prints up to 2,000 lines per minute for continuous data processing demands.



*DEClaser 2100 and 2200 Printers*

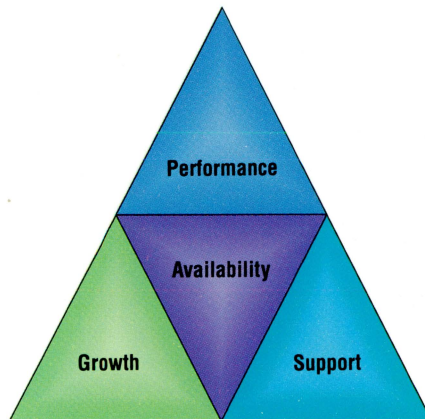
## Digital Storage Solutions for VAX Systems

**D**igital's wide range of storage products offers high-performance solutions that enhance all VAX systems. Engineered especially for Digital systems, our storage products offer the right solution to match your application needs. As processors get faster, our storage solutions continue to provide a perfect match for computing at the best price.

Digital Storage Architecture (DSA) makes storage as innovative as VAX computers themselves. Out of Digital's wide selection of DSA devices, a total storage solution can be customized to meet a wide range of applications needs. For the open architecture of Digital's workstations and small systems, Digital offers Small Computer Systems Interface (SCSI) disks and tapes. A SCSI-based subsystem offers the optimal price/performance for the needs of the single-user workstation or smaller multiuser system.

### Compatible Growth

Digital's architectural approach means that a new product works consistently with the way the old one did, while offering more performance, lower price, or both. From desktop to data center, you are ensured of investment protection, easy growth, high capacity, high performance, and low cost of ownership. For additional computing power, as your organization grows and changes, add whatever devices you need to maintain your system at peak performance levels.



*Elements of Storage Solutions*

### Unsurpassed Performance

High-performance storage solutions enhance VAX systems and bring VAX and VAXcluster I/O performance in balance with CPU performance. Digital's high-capacity storage arrays provide a choice of capacity and performance for data center and mainframe VAX and VAXcluster systems. Digital also offers a storage array subsystem with DSSI-based unattended backup, which is integral to the storage array.

For even greater performance of standalone and VAXcluster systems performing I/O-intensive computing applications, Digital's solid state disk combines the benefits of high-speed memory with the storage capacity and data recovery of a disk. It provides data access an order of magnitude faster than traditional magnetic devices. This lightning performance eliminates I/O constraints and complements the massive storage capability of Digital's RA and SA disk family.

Robust storage-management software tools—the VAX Performance Analyzer (VPA), the System Performance Analyzer (SPA), and the Storage Library System (SLS)—help to manage data location and access. These tools allow data to reside on storage devices that maximize system and application performance.

### High Availability

DSA features offer unparalleled availability and integrity. For intensive data availability requirements Digital has a storage solution to match your needs. VMS Volume Shadowing software provides high-level data availability and redundancy capabilities for both CI-based VAXcluster systems and dual-host configurations.

### Dependable Support

Digital's storage products are supported with VAXsimPLUS software, which is a cutting-edge predictive maintenance tool. VAXsimPLUS software predicts potential failures and suggests corrective maintenance to achieve high availability.



*SF 200 Storage Array*



**The Digital commitment to production system computing extends the commercial strength of VAX VMS systems into your most critical business applications. VMS features for production systems ensure that applications are always available, system recoveries are swift, transaction services are distributed, data is accurate, and information is exchanged openly.**

**V**AX systems are complemented by excellent software solutions—operating systems, programming languages, development tools, office solutions, and thousands of software applications available from Digital and third parties.

### VMS Operating System

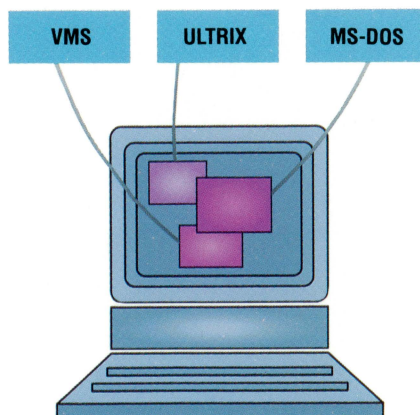
The VMS operating system is Digital's popular multifeature commercial strength operating system for VAX systems from VAXstation workstations to VAX 9000 mainframes. Its strengths include support for key open computing standards (see pages 12 and 13), VAXcluster systems, peer-to-peer distributed processing, networking, system management, security, symmetric multiprocessing, and a DECwindows user interface. Desktop VMS software is also available to give nontechnical VAXstation users a simplified VMS operating system environment.

The VMS operating system provides a seamless environment for critical applications. From a single platform you can integrate all your computing resources and share them across your entire enterprise—even across global networks. Its flexibility guarantees an open growth path that protects your computing investments, past and future.

Its consistent, easy-to-use interface is designed to support key programming, graphics, windowing and data interchange standards to promote maximum portability for your applications. VMS is also designed to give you maximum interoperability, so you can share data and functions among VMS, UNIX, OS/2 and MS-DOS systems, all running the same common programming interface. The flexibility of VMS allows you to tailor it to the needs of both centralized and distributed environments.

### ULTRIX Operating System

The ULTRIX operating system is Digital's implementation of the native mode UNIX operating system for DECsystem and VAX systems. It of all the advantages of the Berkeley Software Distribution (BSD) UNIX software and incorporates the best elements of AT&T's® UNIX System V. Digital's enhancements to the ULTRIX operating system include symmetric multiprocessing (SMP), security features designed directly into the operating system, and larger disk and memory capacity than other UNIX products. Through Network Application Support (NAS) services, ULTRIX implements key industry standards such as POSIX, ANSI SQL, and the X Window System; and conforms to X/Open and Open Software Foundation environment specifications.





### Realtime Solutions

Digital's VAXELN Realtime Software Toolkit supports dedicated realtime applications such as process control, simulation, or high-speed data acquisition. And Digital offers rtVAX systems—system building blocks preconfigured with VAXELN software.

### The DECwindows Interface

The DECwindows environment means users can access and display ULTRIX, MS-DOS, and VMS-based applications on the same display device at the same time. Based on the X Window System, the DECwindows desktop environment cuts across Digital's operating system and hardware families with a consistent user interface that has the same "look and feel" from one system to the next. DECwindows supports the OSF/Motif graphical interface for both VMS and ULTRIX environments.

### DECtp Transaction Processing Solutions

Digital provides a complete range of software for your transaction processing needs. Embedded in the latest version of the VMS operating system are two transaction processing products: a VAX Rdb/VMS runtime license for database management and DECdtm software for updating multiple databases using a two-phase commit protocol. Layered software products include the DECintact and VAX ACMS transaction processing monitors, DECtrace for collecting and reporting, DEC RdbExpert for optimizing physical database performance, DECscheduler for automating the execution of repetitive production jobs, VAX DBMS for database management, and DECforms for creating application interfaces.



### Information Management Solutions

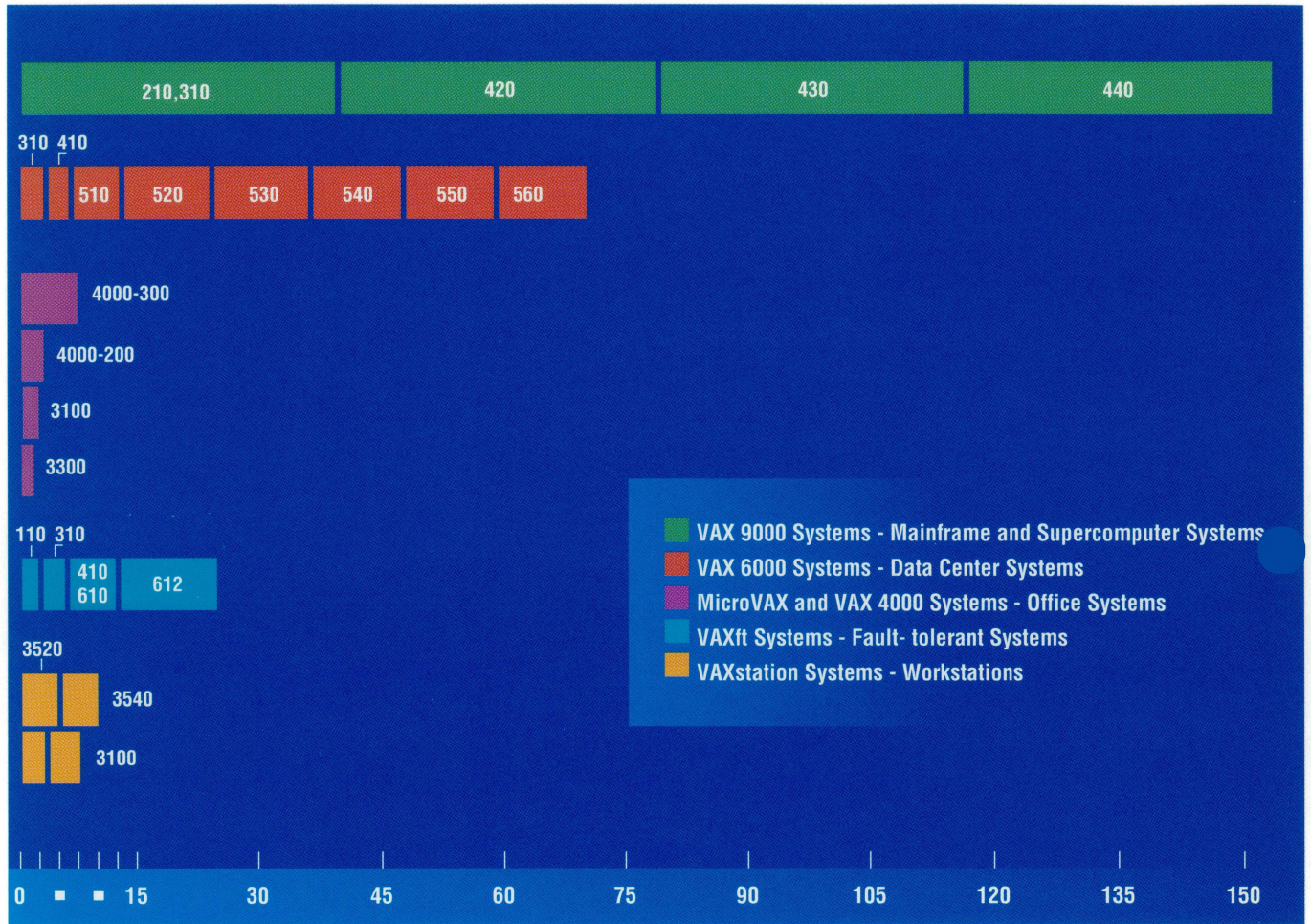
Digital's information-management solutions include VAX Rdb/VMS, a full-function relational database-management system with the speed to handle high-volume production and transaction processing applications. VAX TEAMDATA and VAX RALLY, two more companion products, gather information from databases to custom-tailor new applications. The VAX DATATRIEVE report generator retrieves data from Digital and IBM databases.

### Office Solutions

The ALL-IN-1 system, based on NAS services, is the cornerstone of Digital's office-computing strategy. ALL-IN-1 delivers core services such as electronic file cabinet, document processing, and electronic messaging as well as advanced capabilities for accessing, manipulating, and presenting information to the desktop. It also allows users to create and integrate a wide range of business and office applications—increasing individual and work group effectiveness.

# VAX System Positioning

## Broadest Range of 100-percent Compatible Systems in the Industry



PERFORMANCE RELATIVE TO A VAX-11/780

The charts on the following pages allow you to compare the features and performance of each VAX system.

### For More Information

Digital has more than 1,200 sales, service, manufacturing, engineering, and administrative offices and does business in 82 countries. Please contact your local Digital sales representative for more information.

# VAX System Comparison Chart

System	VAXstation 3100 Models 30, 40, 38, 48 and 76	MicroVAX 3100	MicroVAX 3300	VAX 4000 Model 200	VAX 4000 Model 300	VAXft Systems Models 110 through 612	VAX 6000 Systems Models 310 and 410	VAX 6000 Systems Models 510 through 560	VAX 9000 Models 210, 410 through 440
Relative Performance × VAX-11/780*	Models 30, 40: 2.8 Models 38, 48: 3.8 Model 76: 7.6	3.5	2.4	5.0	8.0	Model 110: 2.4; Model 310: 3.8; Model 410: 6.0; Model 610: 6.0; Model 612: 12.0	Model 310: 3.8 Model 410: 7	Model 510: 13; Model 520: Up to 25; Model 530: Up to 37; Model 540: Up to 49; Model 550: Up to 61; Model 560: Up to 72	Models 210, 410: 40 Model 420: Up to 79 Model 430: Up to 118 Model 440: Up to 157
Technology	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	ECL/MCU
In-cabinet CPU Upgrade Kit	N/A	N/A	To VAX 4000 Model 200	N/A	N/A	Model 310 upgrades to Model 410	Each VAX 6000 system upgrades to any higher VAX 6000 system	Each VAX 6000 system upgrades to any higher VAX 6000 system	Each VAX 9000 system upgrades to any higher VAX 9000 system
Number of Processors	1	1	1	1	1	Models 110, 310, 410, 610: 2 × 2 redundant processors; Model 612 equals 2 Model 610s	1	Model 510: 1; Model 520: 2; Model 530: 3; Model 540: 4; Model 550: 5; Model 560: 6	Models 210, 410: 1 Model 420: 2 Model 430: 3 Model 440: 4
Maximum Vector Processors Supported	N/A	N/A	N/A	N/A	N/A	N/A	Model 310: 0 Model 410: 1	Model 510: 1; Model 520: 2; Model 530: 3; Model 540: 4; Models 550, 560: 0	Models 210 VP, 410 VP: 1 Model 420 VP: 2; Model 430 VP: 3; Model 440 VP: 4
Peak Vector Performance per Processor	N/A	N/A	N/A	N/A	N/A	N/A	45 MFLOPS (double precision) 90 MFLOPS (single precision)	45 MFLOPS (double precision) 90 MFLOPS (single precision)	125 MFLOPS
Maximum Memory Support	32 MB	32 MB	52 MB	64 MB	224 MB	Model 110: 96 MB; All other models: 128 MB (mirrored memory)	512 MB	512 MB	512 MB
<b>Mass-storage Capacity</b>									
Maximum Disk Capacity	6.6 GB	4.8 GB	14 GB	21 GB	28 GB	Model 110: 4 GB; Models 310 & 410: 12 GB; Models 610, 612: 24 GB	Over 5 TB	Over 5 TB	Over 7 TB
VAXcluster I/O Servers (HSCs)	N/A	N/A	N/A	N/A	N/A	N/A	Up to 124	Up to 124	Up to 150
<b>I/O Bus Capacity</b>									
Maximum I/O Throughput	1.5 MB/s	1.5 MB/s (SCSI)	4 MB/s (1 DSSI) 3.3 MB/s (Q-bus)	4 MB/s (1 DSSI) 3.3 MB/s (Q-bus)	8 MB/s (2 DSSI) 3.3 MB/s (Q-bus)	4.0 MB/s per DSSI bus	80 MB/s	80 MB/s	Model 210: 80 MB/s; Models 410, 420: 160 MB/s; Models 430, 440: 320 MB/s
Bus Type	Asynchronous SCSI	1 Internal SCSI Port 1 External SCSI Port	1 DSSI bus 1 Q-bus	3 DSSI 1 Q-bus	4 DSSI bus 1 Q-bus	Models 110, 310, 410: 2 DSSI Models 610, 612: 4 DSSI	1 XMI, 4 CI, 12 DSSI, 5 VAXBI	1 XMI, 4 CI, 12 DSSI, 5 VAXBI	Model 210: 1 XMI, 8 CI, 4 VAXBI Models 410, 420: 2 XMI, 10 CI, 8 VAXBI Models 430, 440: 4 XMI, 10 CI, 14 VAXBI
<b>Communications</b>									
LAN Support	Standard	Standard	Standard	Standard	Standard	Standard (redundant connection)	Standard	Standard	Standard
Ethernet Adapters	1	1	Up to 2	Up to 3	Up to 3	Model 110: 2 (1 redundant); All other models: Up to 4 (2 redundant)	Up to 6	Up to 6	Model 210: Up to 4; Models 410, 420: Up to 8; Models 430, 440: Up to 16
<b>High Availability</b>									
CI VAXcluster System Support	N/A	N/A	N/A	N/A	N/A	N/A	Optional	Optional	Standard
Dual-host Support	N/A	N/A	Optional	Optional	Optional	Model 612, Model 610 with upgrade	Optional	Optional	Standard
Ethernet VAXcluster System Support	Standard	Optional	Optional	Optional	Optional	Optional	Optional	Optional	N/A
<b>System Software</b>									
	VMS ULTRIX (except Model 76 and SPX systems) VAXELN (except Model 76)	VMS ULTRIX VAXELN	VMS ULTRIX VAXELN	VMS VAXELN	VMS VAXELN	VMS	VMS ULTRIX VAXELN	VMS ULTRIX	VMS ULTRIX
<b>Processor Features</b>									
Floating-point Arithmetic (F,D,G,H†)	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Cache Size	1 KB on chip, 32 KB on board Model 76: 2KB on chip, 128 KB on board	1 KB on chip	1 KB on chip	6 KB on chip	2 KB on chip, 128 KB on board	Model 110: N/A; Model 310: 1 KB on chip, 32 KB on board; Models 410, 610: 6 KB on chip, 128 KB on board; Model 612: equals 2 Model 610s	Model 310: 1 KB on chip, 256 KB on board; Model 410: 2 KB on chip, 128 KB on board	2 KB on chip/processor, 512 KB on board/processor	128 KB per processor, 8 KB instruction cache per processor
Cache Cycle Time	Models 30, 40: 90 ns on chip, 180 ns on board; Models 38, 48: 60 ns on chip, 120 ns on board; Model 76: 28 ns on chip, 56 ns on board	60 ns on chip	100 ns on chip	35 ns on chip	28 ns on chip, 56 ns on board	Model 110: N/A; Model 310: 60 ns on chip, 120 ns on board; Models 410, 610, 612: 35 ns on chip, 70 ns on board	Model 310: 60 ns on chip, 120 ns on board; Model 410: 28 ns on chip, 56 ns on board	16 ns on chip, 48 ns on board	16 ns

\*VAX-11/780 = 1

†Emulated by software in VAXstation, MicroVAX, VAX 4000, VAXft Series,  
and VAX 6000 systems

N/A = not applicable

Performance is highly dependent on configuration, application, and operating environment. Individual workloads should be carefully  
evaluated before making performance estimates for specific applications. In this chart no warranty of system performance  
is expressed or implied.

Details on configurations are found in the *VAX Systems and DECsystems Systems and Options Catalog*.



## Digital History

- 1957** Digital Equipment Corporation begins operations.
- 1960** PDP-1
- 1970** PDP-11
- 1977** VAX-11/780  
VMS Operating System  
DECnet  
Digital's revenues exceed \$1 billion.
- 1982** ALL-IN-1
- 1983** MicroVAX Systems  
Ethernet  
VAXcluster Technology  
ULTRIX Operating System  
VAXELN
- 1984** VAXstation Workstations  
IBM Interconnect Products  
VAX 8000 Systems
- 1985** DECnet-DOS for IBM PCs
- 1986** VMS Services for MS-DOS  
DECconnect
- 1988** Network Application Support (NAS)  
OSF  
VAX 6000 Systems  
DECtp  
DSSI and Dual Hosts  
Digital's revenues exceed \$10 billion.
- 1989** DECwindows  
DECstation and DECsystem Products  
Vector Processing  
VAX 9000 Systems
- 1990** VAXft Systems  
VAX 4000 Systems  
PATHWORKS software for OS/2 and Macintosh  
COHESION for CASE environments  
FDDI  
DECmcc Network Management

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