MicroVAX I

32-bit Microcomputer

digital

Choose 32-bit Power With Q-bus Economy.

The MicroVAX I system brings VAX power, speed, and high performance to your microcomputer applications.

The MicroVAX I package itself is truly micro in size, with a two-board CPU, two quad expansion slots, I/O ports, power supply, and Winchester and floppy disk storage all in one compact, "underdesk" unit.

For configuration flexibility, you can pick one of three versions: floorstand, tabletop, or rack mount. You can choose the package that suits your application location—whether in the office, in the factory, or in the lab. No special "computer room" environment is needed.

This compact, flexible computer packs "big system" architecture into a micro, to give you some extraordinary benefits. For instance:

Its four-Gbyte virtual address space means that overlays are a thing of the past.

Memory management protects programs by automatically providing each program with its own virtual address space.

Sixteen 32-bit general purpose registers can make program execution more efficient by providing fast temporary storage for temporary variables.

The eight-Kbyte direct-mapped cache memory speeds instruction execution and data references by providing faster access to memory. The CPU accesses new microinstructions every 250 nanoseconds, and requires just 500 nanoseconds to execute.

Also, 21 addressing modes let instructions access memory more flexibly.

Any nonprivileged native-mode code written for any VMS system will execute unmodified on the MicroVAX I. About the only "big VAX" feature missing is PDP-11 compatibility mode.

One of the challenges in producing the MicroVAX I product was to reduce hardware costs yet maintain performance. Part of the solution was to emulate some little-used instructions and data types using microcode-assisted software. The CPU hardware is especially designed to make this emulation most efficient, so that MicroVAX I can give you VAX performance at a size and price never before seen in a VAX system.

Specifically, decimal and packed decimal math instructions were moved to software, as well as some string instructions. Two floating point data types (D, the double precision format, and H, the 128-bit format), and a few others are also emulated.

Of course, MicroVAX I is more than a set of CPU modules: it's the most complete system solution in 32-bit micros. By supporting Q-bus options and interfaces, MicroVAX I computers offer a ready selection of standard Q-bus equipment, including:

- Main memory modules: a 256-Kbyte dual-size board and a 512-Kbyte quad-size board, both based on 64 Kb RAM chips.
- Mass storage devices: the 800-Kbyte RX50 5¼" dual diskette drive, the 10-Mbyte RD51 5¼" Winchester drive, and a 28-Mbyte 5¼" Winchester drive.
- Peripheral interfaces: for hardcopy terminals, plus alphanumeric and graphic video terminals.
- Realtime laboratory interfaces: such as analog/digital converters, analog multiplexers, and digital input.
- Ethernet local area network interface.

The CPU Is Designed for High Performance.

The MicroVAX I hardware uses a special design that includes cache memory, a prefetch buffer, and a two-board CPU with 32-bit internal data path.

The CPU modules communicate through two internal buses, the 8-bit memory control bus and 32-bit memory data bus. The memory data bus is contained in one over-the-board ribbon cable consisting of 32 data lines and ground. This bus provides 32-bit data transfers between the CPU and cache memory.

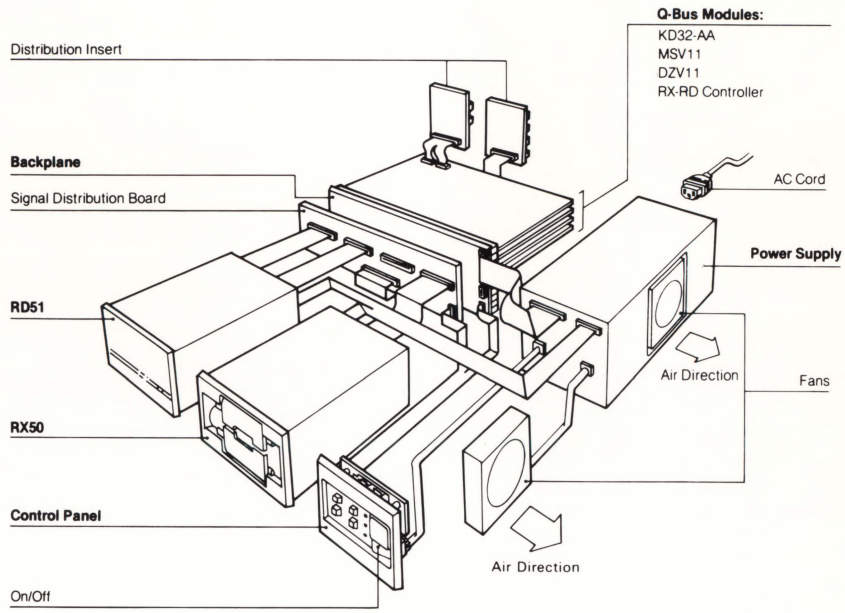
The execution speed of the MicroVAX I CPU requires fast memory access. We shortened the effective memory access time by including a data cache, placing it together with the translation buffer. More than 70 percent of read/write accesses are cache hits, which involve only the internal 32-bit memory data bus.

For those memory accesses that do use the Q-bus, block mode capability is exercised whenever possible to match the 16-bit Q-bus with the 32-bit cache and internal data paths. Only one address (at the base of the block) is needed to transfer a 32-bit data longword on the Q-bus.

We also included a 16-byte-deep prefetch buffer. All instructions go into cache before going onto the prefetch buffer, so that instructions that are used again very soon involve no memory access at all. This is excellent for executing small loops.

Thousands of Q-buses Are Already Doing I/O.

MicroVAX I is compatible with a variety of existing Q-bus backplane options and memories already supplied by Digital and other vendors. In fact, more interfaces, options, and devices exist for the Q-bus than any other microbus in the world. It is a standard in the industry. You may already have an investment in Q-bus hardware; if so, then you can now make that investment pay off in future 32-bit applications. If you're now contemplating design starts, you'll find out just how practical and economical the Q-bus advantage can make your application.



MicroVAX I Exploded View

A four-row, eight-slot backplane incorporates the 22-bit Q-bus for I/O with a variety of options at data rates up to 2.5 Mbytes per second. Block mode data transfers give the Q-bus its high performance. The backplane can accept either quad- or double-height modules. You have your choice of two quad-height families of Digital memory modules, 256 Kbytes or 512 Kbytes of RAM storage.

The CPU communicates with peripheral devices on the Q-bus through standard Q-bus pinning. Four patch panels make it easy for you to connect devices and select data transmission rates from 50 to 19.2K baud without opening the system unit. One panel connects the console terminal, two panels are available to support four EIA communication lines each, and another panel is available for attaching communication gear such as Ethernet.

The Smallest VAX Is Engineered for Quality.

MicroVAX I is engineered for quality, with Digital's high manufacturing standards ensuring that its reliability is fully realized.

The modular, 230-watt power supply includes such features as thermal shutdown, overvoltage and overcurrent protection, ac input transient suppression, and three Q-bus signals. The power supply guarantees a minimum four millisecond powerdown time.

Built-in diagnostics and error correcting features, many of which can be run concurrently with normal processing, ensure that if a failure does occur, it can be corrected quickly. Consequently, downtime is minimized, service calls reduced, and your maintenance costs lowered.

System Software Is Key to Your Growth and Well-Being.

We've created a MicroVAX software product family that gives you the most valuable "extra" in the software business: choice. To get the most out of a microcomputer system where space and performance are at a premium, you want to choose the software that comes closest to your needs. The greater your range of choices, the better your system will serve you.

MicroVAX I operating sytems and software packages have been planned carefully to present you with the most useful choices in the industry. Its general purpose operating system, MicroVMS, is a modular version of VMS, well-known worldwide for its broad range of capabilities and user-friendliness. For UNIX programmers there is MicroVAX ULTRIX, Digital's version of Berkeley UNIX, the popular operating system originally developed on Digital's computers.

In addition to operating systems, MicroVAX I supports many programming languages and software products. Software packages exist for such applications as office systems and database management.

A special toolkit called VAXElan turns MicroVAX I into an outstanding computing system for dedicated time-critical applications such as laboratory data aquisition and factory automation. VAXElan is a set of software tools for creating concurrent multitasking programs in PASCAL, plus a library of software modules. These modules make a streamlined software executive that supplies necessary services to the application without the overhead of a general-purpose system.

Compatibility Makes—or Breaks—a Network.

It's clear that MicroVAX I offers the most complete system solution in 32-bit micros, and its VAX advantage pays off big in compatible communications and distributed processing.

Anyone who needs to pool processing power and distribute information across a network knows the fundamental importance of making systems compatible. Digital Network Architecture (DNA) is a flexible and far-reaching design for communication that links systems to share programs and data. DNA functional components are defined within several distinct layers. Each layer performs a set of network functions via network protocols.

Based on DNA, DECnet communication software links Digital's computers into networks for resource sharing and distributed processing. DECnet networks can dynamically route information from system to system along the most efficient path from source to destination. Establishing links this way eliminates the need for a single, direct physical link between each pair of systems. Adaptive routing lets the network change the course of messages to bypass problem links and to balance message loads evenly throughout the network.

In addition to wide area DECnet networks for distributed processing, the Ethernet local area network allows MicroVAX I systems to unite their computing resources in a small geographical area. Also available are products to connect MicroVAX I systems to other manufacturers' equipment, such as IBM's.

Don't Just Pick a Processor. Select a System.

Today more than ever before, it's important that your micro be more than just any processor coupled with any programming. Your applications demand a tight meshing of hardware and software for maximum performance. Your future growth demands continued support and product development over the long term. You can't be satisfied with just part of the equation or half of the answer.

That's why MicroVAX I is your system solution today and tomorrow. Joining the VAX family of systems lets you move easily up a product line of compatible micros and superminicomputers that all share one architecture. It's the best way to prepare for growth. Where will you be in the years to come? Will you be developing new, more powerful products? Adding more users and resources to your organization? Whatever the directions your growth may take, MicroVAX I lets you concentrate on capability and compatibility right now.

For tomorrow.

To Find Out More...

To find out more about MicroVAX I products from Digital, contact your sales representative or write to:

Media Response Manager
Digital Equipment Corporation
200 Baker Ave.
Concord, MA 01742

A New Breed of Micro. A New Breed of VAX.

Digital's new MicroVAX I system brings you 32-bit performance in a micro package. It's perfect for any microcomputer job that requires 32-bit computing power, from dedicated realtime applications to small office systems and small business data processing.

Even more important, MicroVAX I brings you the VAX advantage.

Now one computer architecture, VAX, accommodates your computing needs from microcomputers to mainframes. So your software investment is protected even while your computing needs grow. So your communications network can put the right computing power just where it's needed, efficiently. So you can count on continuing service and support from the second-largest computer company in the world.

As the smallest member of the VAX line, MicroVAX I gives you the same software advantages that made VAX famous—at a microcomputer size and price. In fact, the array of MicroVAX I system software is unmatched in 32-bit micros, and includes a general purpose operating system, a realtime programming toolkit, and a Berkeley UNIX* operating system.

When you add it all up, MicroVAX I may have just what you're looking for. 32-bit performance. The VAX advantage. Unmatched software power. Micro size and price.

It's a microcomputer bred especially for your future.

Highlights

- Entire system unit—including 28-Mbyte disk, dual 400-Kbyte diskette drive, 230-watt modular power supply, eight-slot Q-bus backplane, and I/O ports—fits easily under a desk.
- Memory mapping provides four Gbyte virtual address space using a 512-entry translation buffer.
- Memory management provides program protection through separate address spaces.
- Sixteen 32-bit general purpose registers can make program execution efficient.
- Eight Kbyte direct-mapped cache memory speeds instruction execution and data references.
- Vectored hardware and software interrupts on 32 levels improve I/O response.
- Operating systems include MicroVMS for general purpose multiuser support and MicroVAX ULTRIX for UNIX programming.
- VAXElan programming toolkit supplies development utilities and executive for dedicated, time-critical applications.

* UNIX is a trademark of Bell Laboratories.

Specifications

Electrical

Line Voltage:
120 Vac nominal, single phase, 3-wire, 88–128 V RMS.
240 Vac nominal, single phase, 3-wire, 176–256 V RMS.

Line Frequency:
47–63 Hz for either input voltage range.

Input Line Current:
120 Vac: 4.4 A RMS.
240 Vac: 2.2 A RMS.

Inrush Current:
90 A peak for half cycle of the input line for either voltage range.

Real Input Power:
320 input maximum at full-rated DC output load of 230W.

Circuit Breaker:
Input circuit breaker rating is 7 A for either input voltage range.

Output Power:
(combinations not to exceed 230 W)
+5 V ±3%; 4.5 – 36 A.
+12 V ±3%; 0 – 6 A.
+9 V ±3%; 0.45 A.
+12 V±3%; 0.45 A.

Panel Controls:
AC ON/OFF
HALT
RESTART
FIXED DISK WRITE PROTECT

Panel Indicators:
RUN
DC OK
READY
REMOVABLE DISK WRITE PROTECT 1
REMOVABLE DISK WRITE PROTECT 2

Mechanical

Width, Height, Depth Dimensions, Rack Mount:
48.3 × 13.3 × 63.5 cm (19 × 5.25 × 25 in).

Width, Height, Depth Dimensions, Floor Stand:
25.4 × 62.3 × 68.5 cm (10 × 24.5 × 27 in).

Width, height, Depth Dimensions, Tabletop:
54.6 × 15.2 × 68.5 cm (21.5 × 6 × 27 in).

Weight (chassis only):
22.68 kg (under 50 lbs).

Operating Temperature:
15 – 32 °C (59 – 90 °F) at sea level.

Operating Humidity:
20 – 80% relative humidity, noncondensing.

Options

Memory:
512 Kbyte parity MOS memory quad card.
256 Kbyte parity MOS memory quad card.

Storage:
RQDX1 Controller module.
RD51 10-Mbyte Winchester drive.
Integral 28-Mbyte Winchester drive.
RX50 800-Kbyte (dual 400 Kbyte) floppy drive.

Communications:
DEQNA dual-height Q-bus-to-NI adapter.

digital

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