

DEC VAX-11 Systems Product Enhancement

VAX cluster

DEC has introduced a new loosely coupled multiprocessor system, called VAXcluster, which combines hardware and software to globally share data. A VAXcluster system contains as many as 16 VAX-11/780, VAX-11/782, and VAX-11/750 processors and storage subsystems, linked by a high-speed, dual-path Computer Interconnect (CI) bus.

The VAXcluster system was designed for easy, modular system growth, support for more users, and increased availability and survivability—if a component should fail. The use of message-oriented interconnect allows users to configure a large number of processors and storage systems. Also, the use of multiple copies of the operating system in a loosely coupled configuration enables the VAXcluster system to survive a host computer, disk controller, or disk disruption.

Hardware components of a VAXcluster system include VAX-11/780, VAX-11/782, and VAX-11/750 processors; a dual-path CI bus; an intelligent CI interface for each processor; a Star Coupler for physical interconnection of processors and storage subsystems; and a mass storage controller, which consists of an HSC50 (Hierarchical Storage Controller) intelligent subsystem with associated disk storage devices.

The CI bus is a dual, redundant data path that consists of two transmit and two receive cables, each with a 70-megabit-per-second bandwidth. This bus accommodates up to 16 nodes in a computer room environment; each node may be either a VAX processor or a storage subsystem consisting of an HSC50 intelligent mass storage controller with up to 24 disk drives. Processors are connected to the CI bus through micro-coded, intelligent controllers, called CI interfaces.

Each CI interface is connected to both paths of the CI bus and uses whichever path is available. Cluster throughput is enhanced when utilizing both paths; if either path becomes unavailable, traffic is automatically shifted to the remaining path.

The Star Coupler is the common connection point for all nodes in a VAXcluster configuration, accommodating CI cables with a maximum length of 45 meters in a radial or star arrangement. The Star Coupler will be delivered in an eight-node version with upgrade capability for an additional eight nodes.

The HSC50 is a self-contained, intelligent, mass storage subsystem that serves as the interface for VAX host computers and a set of disk devices. Three HSC50-compatible disk drives are currently offered. They are the RA80 121M-byte Winchester disk drive, the RA60 205M-byte removable disk pack drive, and the RA81 456M-byte Winchester disk drive. Each disk interface will support four disk drives, with a maximum of 24 disks per HSC50. Typical VAXcluster systems will include two HSC50 subsystems, with dual-ported RA60, RA80, and/or RA81 disk drives connected to each HSC50. The dual port provides a second path to stored data and enables switch-over of storage devices in case of a subsystem failure.

Cluster operation will be managed under new versions of the VMS operating system to be released beginning in the Spring of 1983. The first phase will include two releases of VMS software: the first (version 3.3) supports clusters of VAX-11/780 and VAX-11/782 processors and HSC50 subsystems with RA60/RA80/RA81 disk storage. The second phase (version 3.4) will extend support to the VAX-11/750 processor. Future releases of VMS software will take full advantage of the VAXcluster potential for data protection and fault tolerance.

DECnet-VAX communication software is compatible with VAXcluster system software, and enables a VAXcluster processor to function as a node in a long-distance DECnet network. The DECnet-VAX interface can also be used within a VAXcluster system with the CI bus as the main communication link.

The pricing follows for VAXcluster components: the CI780 interface (for VAX-11/780 and VAX-11/782 systems) is priced at \$19,500; the Star Coupler, equipped to receive eight nodes, is priced at \$7,500—an upgrade kit for expansion to 9-16 nodes is \$5,500. The above components are in current shipment.

The CI750 interface for VAX-11/750 systems, including a cabinet, is priced at \$18,500; deliveries will begin in September. The price for the HSC50 intelligent storage controller is \$32,500, with disk channels set at \$7,100 each. Deliveries are scheduled for June.

VAXclusters are offered in a series of "system building blocks," which include VAX-11/780 or VAX-11/782 processors, basic VAXcluster components, a choice of disk options, and a subsequent VMS operating system license. As required, customers can obtain documentation and media for \$2,640 and a package which includes installation, 90-day warranty, and training credits for \$7,360.

DEC VAX-11 Systems Product Enhancement

Existing VAX-11/780 or VAX-11/750 configurations can be upgraded to VAXcluster systems for prices beginning under \$200,000. An entry-level VAX-11/750-based VAXcluster system can be purchased for less than \$300,000.

VAX/VMS Version 3.3 is now available; this version provides support for clusters of VAX-11/780 and VAX-11/782 processors and shared access to the HSC50 subsystem with RA60, RA80, and RA81 disk storage. Delivery of VAX/VMS Version 3.4, which extends support to VAX-11/750 processors, will begin in August 1983.

11/780 Memory Expanded and Prices Cut

Digital Equipment has also announced that 64K-bit chip memory is now available for the VAX-11/780, expanding this system's memory to 32 megabytes. In addition, DEC has reduced 64K RAM memory for the VAX-11/750, VAX-11/730, and the small PDP-11 and LSI-11 computers that use the LSI-11 bus.

The 64K memory for the VAX-11/780 is packaged on array boards which connect to a new memory backplane in the same manner as the earlier 16K-bit boards. A new memory controller has also been introduced to support the 64K-bit technology. Since 16K- and 64K-bit memory cannot be mixed on the same system, current users of the 11/780 with 16K memory can upgrade by replacing their existing memory configurations with 64K-bit memory arrays and the new controllers.

The price of a new VAX-11/780 including two megabytes of 64K-bit memory and a controller is \$28,900; an 11/780 with four megabytes of new memory and a controller costs \$36,000. These new VAX-11/780 systems are currently being delivered. Add-on 64K-bit memory modules are priced as follows: two megabytes at \$9,000, four megabytes at \$17,000, six megabytes at \$24,000, and ten megabytes at \$34,000. Add-ons and controllers for existing 11/780 systems will be available during the summer of 1983. Monthly maintenance is \$29 per megabyte.

Add-on 64K RAM memory for the VAX-11/750 and VAX-11/730 computers is available in amounts ranging from one to ten megabytes. The new prices are: one megabyte for \$4,900, two megabytes for \$9,000, three megabytes for \$13,000, four megabytes for \$17,000, and ten megabytes for \$34,000.

A 64K RAM memory upgrade kit is offered to owners of existing VAX-11/750 systems with 16K memory. The kit contains one megabyte of memory and a controller; its cost is \$10,000.

Price reductions for 64K RAM parity memory for LSI-11 bus-compatible PDP-11 systems apply to both dual-height and quad-height modules. A dual-height, 128K-byte option is priced at \$1,000; the 256K-byte options, mounted on either dual-height or quad-height modules, cost \$1,250; and a 512K-byte, fully populated quad-height module is now \$2,000.

All VAX-11/750, VAX-11/730, and LSI-11 bus-compatible memory options are available for delivery within 30 days after receipt of order.