

DEC PDP-11 Family

Product Enhancement

Since May, Digital Equipment Corporation has announced several enhancements to their PDP-11 family of 16-bit computers including Ethernet availability and the DECnet/SNA Gateway system, the DZSII statistical multiplexer, RA81 and RA60 disk drives, new packaged versions of the PDP-11/44, price reductions for the PSP-11/23 PLUS and PDP-11/24 systems, the Micro/PDP-11 microcomputer system, a new pricing and license plan for PDP-11 operating systems, the Micro/J-11 high-end microprocessor, the TSVO5 magnetic tape subsystem, new laboratory software application packages, and the new IIMDS turnkey systems.

DEC has announced a three-year program to make available a broad range of *Ethernet* hardware and software products that will be integrated into Phase IV of the Digital Network Architecture (DNA). Ethernet is a high data rate, peer oriented, baseband communication system that uses a common bus. It is ideally suited for local networks in universities, office buildings, manufacturing plants, and laboratories. Ethernet has been designed to be a cost-effective approach for linking professional workstations and terminals to distributed computer systems and other shared resources. The three-year program provides a full range of networking products for local area networks (LANS) and global networks. The products will include: physical channel hardware; communications controllers and servers; and supporting software. Digital's first Ethernet hardware product will be the DEUNA, a UNIBUS communications controller designed to interface between the transceiver cable and UNIBUS computer buses on VAX-11 and PDP-11 computer systems. The physical channel hardware includes transceivers, repeaters, and cabling. Communication servers will include X.25 and SNA gateways, DECnet routers, and terminal servers. Phase IV DECnet support will be provided for VMS, RSX, TOPS-20, and P/OS operating systems. The scheduled availability of most of these products will begin in early to mid 1983.

DECnet/SNA Gateway is a dedicated computer system that will enable PDP-11 and VAX-11 computers linked by DECnet to communicate with IBM computer systems. *DECnet/SNA Gateway* will incorporate a small PDP-11 minicomputer and gateway software. Systems connected to the gateway via DECnet can access the gateway's functions with optional software modules. By selecting the appropriate modules, users will be able to configure the most efficient system links to meet specific application requirements. Initial program modules for the gateway will include network management, a remote job entry (RJE) capability, an interactive 3270 facility, and an applications program interface. These will enable the *DECnet/SNA gateway* to link the SNA application environment to the complementary environment of DECnet applications. *DECnet/SNA Gateway* will be available from DEC within a year.

DZSII is a terminal concentrator that connects up to eight asynchronous terminals to a PDP-11 or VAX-11 computer system via a single, synchronous, full-duplex communication link. The new concentrator is a statistical multiplexer that allocates the bandwidth of a communication line dynamically among users in proportion to the communication traffic each generates. The *DZSII* increases line utilization and efficiency, resulting in cost reductions over other types of multiplexers. *DZSII* is priced at \$4,050 with deliveries 60 to 90 days after receipt of order.

DEC's *RA81 and RA60* are rack-mountable disk storage units with fixed and removable media. Both offer advanced storage architecture designed to improve performance, data integrity, and system uptime. The RA81 high performance Winchester disk stores 456 megabytes of user data in a 10.5 inch high enclosure. A triple-drive RA81 cabinet-mounted option with almost 1.4 billion bytes of formatted user space occupies about five square feet of floorspace. The RA81 drive will initially be sold in VAX-11/750 systems and as an add-on to PDP-11 systems. The RA60 is a 10.5 inch high disk drive with a 205 megabyte removable disk pack. Up to three drives can be packaged in Digital's waist-high disk cabinet. The RA60 will initially be available in PDP-11/44 minicomputer systems. The RA81 and RA60 disk drives are priced at \$19,000 and \$15,000 respectively. The triple-drive RA81 add-on is priced at \$50,000. Digital has also announced a 13 to 20 percent price reduction on the RA80, its 121 megabyte Winchester disk. The single unit price is \$14,000.

Two new PDP-11/44 minicomputer system packages employing advanced-technology disk and 64K memory chips, and price reductions of up to 24 percent for PDP-11/23-PLUS and PDP-11/24 systems have been announced by DEC. The larger of the PDP-11/44 packages includes one ➤

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▷ megabyte of ECC MOS (64K) memory, RA60 disk unit, TSII magnetic tape drive, and operating system license, and is priced at \$71,300. Up to three additional RA60 drives can be added at an individual price of \$15,000. The single-cabinet PDP-11/44 configuration includes the RA80 121 megabyte Winchester disk and the RL02 removable-cartridge drive, for a total of 131 megabytes of fixed and removable storage. The price for the system package with one megabyte of 64K ECC MOS memory and operating system license is \$60,300. New 64K bit chip ECC MOS add-on memory modules are also available for PDP-11/44 systems, enabling internal memory expansion up to four megabytes and a 13 percent performance improvement for write operations. The 64K memory can be intermixed with existing 16K memory on the same controller. The price for each 1MB increment is \$4,900.

Price reductions for PDP-11/23-PLUS and PDP-11/24 computers apply to both systems and OEM box configurations. A PDP-11/23-PLUS system, with 512K bytes of memory, two RL02 removable-cartridge drives, and operating system license, is priced at \$20,750, down 15 percent from comparable configurations. A PDP-11/24 system, with 256K bytes of memory, two RL02 removable-cartridge drives, and operating system license, is now \$27,200. The PDP-11/23-PLUS box configuration, with 256K bytes of memory, is reduced to \$7,950, a 24 percent reduction from the previous price of \$10,500. The PDP-11/24 box configuration is reduced to \$14,000, down 20 percent from the previous \$17,400.

A new microcomputer system based on the PDP-11/23-PLUS central processing unit, the *Micro/PDP-11*, combines CPU, memory, 10.8 megabytes of disk storage, controllers, and power supply in one 5 1/4 inch high box. The *Micro/PDP-11* system is a full-fledged PDP-11 processor with 22-bit addressing capability and runs standard PDP-11 operating systems such as RSX-11M-PLUS, RT-11, CTS-300 and RSTS commercial operating system, DSM-11 (Digital Standard MUMPS), and Micro Power/Pascal. Designed as a general-purpose system primarily for OEM applications in commercial and technical fields, the *Micro/PDP-11* system contains an extended LSI-11 bus backplane and supports LSI-11 bus-compatible hardware options. For timesharing, small business, and office applications, it will support two to eight users. The system includes the PDP-11/23-PLUS CPU, two serial I/O ports, 256K bytes of parity memory, 5 1/4 inch Winchester disk unit with 10MB of storage, 5 1/4 inch dual floppy disk drive with a total capacity of 800KB, universal power supply, seven-slot LSI-11 bus backplane, and an I/O connector panel for extended cables.

Two packaging styles will be available: a finished enclosure for horizontal tabletop placement, with an attachable floor mount for vertical placement adjacent to or under a desk; and a 19-inch wide, rack-mountable box with a 5 1/4-inch high RETMA form factor. Both are priced at \$9,200 for single units. A packaged system, in the tabletop/floor mount configuration with a four-line asynchronous multiplexer and operating system license, is priced at \$10,225. Volume deliveries of all configurations will begin in the spring of 1983.

A pricing and new license plan for use of Digital's operating systems on PDP-11 processors has been announced by DEC. The new plan gives customers access to seven major PDP-11 operating systems: RT-11, CTS-300, RSX-11S, RSX-11M, RSX-11M, RSX-11M-PLUS, RSTS/E, and DSM-11. A license is required for DEC micro and minicomputer processors. Fees begin at \$100 for the MICRO/T-11 and \$800 for MICRO/J-11, LSI-11/2 and LSI-11/23 microprocessors, and range up to \$2,000 and \$3,000 for PDP-11/24 and PDP-11/44 minicomputers, respectively. Quantity discounts are available for volume customers such as OEMs. For MICRO/T-11 purchases in quantities of 1000, each license is \$15; for MICRO/J-11 microprocessors in 1,000-unit quantities, each license is \$100. Digital also offers source code for user modification and a wide range of host development systems in the PDP-11 and VAX computer families.

DEC's *MICRO/J-11*, a 16/32-bit microprocessor fabricated in CMOS technology, is housed in a 60-pin package and puts the full functionality and capability of the PDP-11/70 computer in one package. It is fully compatible with all PDP-11 operating systems and represents the new high end of Digital's microprocessor line. The *MICRO/J-11* features the full PDP-11 instruction set, including the extended instruction set (EIS), single-and double-precision floating-point instructions (FP11) and microcode-implemented debugging commands (micro ODT). The microprocessor has ▷

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- an on-chip memory management unit that can address up to four megabytes of physical memory, and will support cache memory, multiprocessing, and co-processing. The MICRO/J-11 is implemented in CMOS and requires less than one watt of power. The architecture of the MICRO/J-11 employs a 32-bit internal data path, pipelined design, and a 20 megaHertz clock for high performance. The microprocessor has full PDP-11 memory management and protection. The MICRO/J-11 will be targeted to OEMs for incorporation into systems and devices requiring maximum processing power. It is fully compatible with all PDP-11 operating systems and represents the new high end of Digital's microprocessor line. Engineering samples of the MICRO/J-11 will be available in spring 1983, unit-priced at \$450.

The *TSV05 Magnetic Tape Subsystem* for PDP-11/23 and PDP-11/23 PLUS microcomputers features a front-loading design that can store up to 46 megabytes of unformatted data on a standard 10.5-inch reel of half-inch tape. Data is phase-encoded at a 1,600 bps density on nine tracks using ANSI-standard format. The subsystem is housed in one 40-inch high cabinet and attaches to the PDP-11/23 series cabinet. The TSV05 contains tape transport, power controller, and 21 inches of rack-mountable expansion space. It is priced at \$9,995.

Five laboratory application program packages for PDP-11 and VAX-11 computer systems were announced by DEC's Laboratory Data Products (LDP) group. Developed by independent software specialists, the packages are designed to fill specific application needs in laboratory data management, signal processing, and data acquisition, conversion, and analysis. The programs will be distributed through Digital's External Application Software (EAS) Library. The new program packages are RS/1, an integrated data management package for input, analysis, and output of data; RDE, a forms-based data entry capability; ILS, a signal processing package; DACS, a software interface for a laboratory subsystem to PDP-11 or VAX-11 computers; and IAE, an interactive analysis editor to edit speech parameters for hardware and speech synthesizers.

RS/1 is priced at \$18,750. RDE is priced at \$4,000 if ordered with RS/1, or \$5,000 if ordered alone. ILS is priced from \$13,000 to \$20,000, depending on the operating system. DACS is priced at \$4,000.

Finally, a new series of microcomputer systems for developing real-time application programs on LSI-11/2, LSI-11/3, and SBC-11/21 microcomputers has been announced by DEC. The new turnkey *11MDS* systems have been specifically configured to write, build, and debug application programs written in either the Macro-11 assembly language or MicroPower/Pascal. An 11MDS system consists of a terminal/processor-based system with associated development software. Hardware consists of an LSI-11/23 processor with 256KB of memory mounted in a VT103 terminal, 1MB dual floppy disk drive, and a receive-only line printer. Specific software packages optimized for development in the desired programming language—Macro-11 or Pascal—complete the system.

The Macro-11 software package employs a pre-sysgened version of the RT-11 operating system with special software to facilitate downline loading and debugging programs in the target microcomputer. A virtual terminal utility, VTERM, enables the user to log on to a PDP-11 or VAX host. The software package also supports both BASIC and FORTRAN and other RT-11 layered products. The MicroPower/Pascal software package consists of a modified RT-11 operating system, globally optimizing Pascal compiler, symbolic debugger, modular executive kernel, and system build utilities. The compiler supports an extension of the Pascal language standard defined by Jensen and Wirth.

The Macro-11 version of 11MDS is priced at \$12,900; the MicroPower/Pascal version at \$14,900. □