MICROCOMPUTER DIGEST

Volume 3, Number 6 Volume 3, Number 6 / December, 1976

2ND SINGLE BOARD COMPUTER

A second-generation single board computer, the SBC 80/20, is being introduced by Intel. The SBC 80/20 is a complete OEM computer on a single pc board. In addition to all generally required computer functions, the board contains full multi-processor capability, programmable interval timers and interrupt control.

Cont'd on Page 2

MAJOR SOFTWARE SYSTEM

Intel Microcomputer Systems Division has announced a major new software system for the Intel 8080A Microcomputer.

The New system, which is resident on the Intellec^{R} Microcomputer Development System, provides the first comprehensive software package for design with a high-level language and resident compiler along with support software to automatically link program modules together to form an applications program.

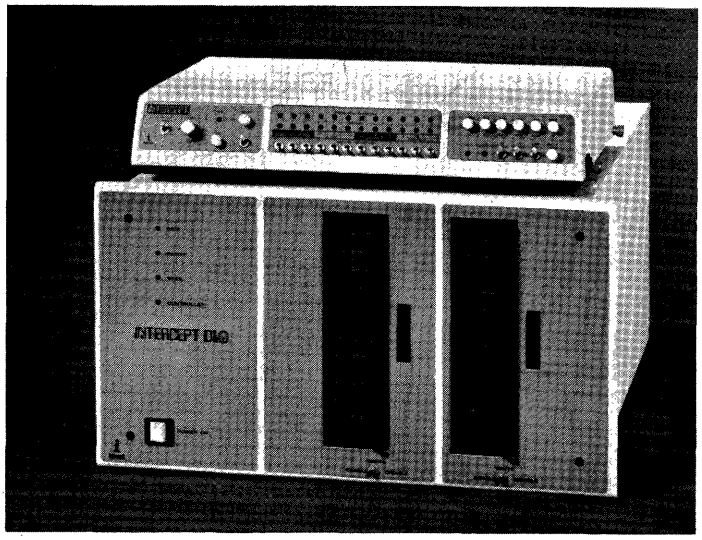
Cont'd on Page 2

DESK TOP LSI—11 COMPUTER

Digital Equipment Corp. has packaged its LSI-11 microcomputer into a new desk top CRT terminal that is interchangeable with the DECedit, Typeset-11 or DECset text editing and typesetting systems.

The new VT71t terminal can store up to 40,000 characters. In addition to the standard typewriter keyboard, it uses two-color 18-key keypads, for test editing and copy dispatching, a 15-inch screen displaying 24 lines of 80 characters, and 16 memory keys for application editing functions. Contact DEC for prices. One Iron Way, Marlboro, MA 01752 (617) 987-5111

INTERSIL FLOPPY DISC SYSTEM



A new floppy disc program development system, 6970-IFDOS, has been announced by Intersil for use with its IM6100 CMOS microcomputer based Intercept prototyping system.

The purpose of the 6970-IFDOS, together with the 4096 words of memory provided with the Intercept system and a ADCII terminal, is to provide rapid software development for IM6100 CMOS microcomputer based systems.

The $5100 6970-IFDOS consists of two interfaced floppy-disc drive mechanisms with all electronics, power supplies and cables necessary to add more than 4 million bits of on-line mass storage to the Intercept prototyping system. It provides IBM 3740-compatible media with mulitple sources, and is fully software compatible with the DEC RX8 flexible disc system for the PDP-8/E minicomputer.

The software components contain a file system, keyboard monitor, text editor, assembler, binary loader, octal debugger, high level language interpreter and utilities.

2589 SCOTT BLVD., SANTA CLARA, CA 95050 • (408) 247-8940

Copyright© 1976 by Microcomputer Associates, Inc., All Rights Reserved. M.R. Lemas, President. Published monthly. Subscription $28.00 per year, overseas $46.00 per year. DARRELL D. CROW, Editor; LILLIAN LAU, Associate Editor; LINDA KOCHANOWSKI, Circulation Editor; RAY HOLT, Applications Technical Advisor; MANNY LEMAS, Applications Technical Advisor.

SPECIAL FEATURES

MAJOR SOFTWARE SYSTEM

(Cont'd from Page 1)

The system supports programming of Intel® 8080 microcomputers, SBC 80 Single Board Computer Systems and other products based on the 8080A Central Processor Unit. The package runs entirely on the Intellec Microcomputer Development System.

The new system consists of two software packages: an advanced version of the PLM-80 Compiler for the 8080A and ISIS-II, a new Diskette Operating System. ISIS-II is a new version of the Intel Systems Implementation Supervisor first released in 1975.

The two packages are supplied on diskettes. The compiler is priced at $975 and the ISIS-II is included with the diskette system hardware. Deliveries will begin in November.

The new PL/M Compiler fully supports modular software design by generating linkable relocatable object code modules. These modules can be automatically joined to each other, or with object code modules produced by a new relocating Macro Assembler contained in the ISIS-II package.

The compiler allows the programmer to define data structures and also give access to absolute addresses. The user can request the compiler to generate reentrant code for any procedure. The compiler will also produce a cross-reference listing on request and optionally print an "innerlist" of generated assembly language after each PL/M statement.

The simulators usually used with cross compilers are no longer required. They are replaced by the Intellec system's ICE-80. With the ICE-80 the designer can debug at a high level, referencing PL/M variable names and PL/M statements by line number during the debugging process.

ISIS-II includes all other subsystems required for modular programming, a new Macro Assembler, Linker, Locator and Library Manager. ISIS-II also contains a Text Editor with string search, substitution, insertion and deletion commands. In addition, it provides access to the System Monitor, which contains diagnostic aids and drives all peripherals.

The Macro Assembler differs from previous 8080 Macro Assemblers primarily in its ability to generate linkable and relocatable code. The designer uses inter-module references similar to those used by the compiler. Also, the assembler provides full macro capability, expanded from the previous version. The new assembler will also produce a cross-reference listing.

With the Library Manager, the system user can create and utilize a library of subroutines or other program modules prepared by the Compiler and Macro Assembler. These are stored in linkable and relocatable form on diskettes, and retrieved automatically by the linker when referenced by the program.

The Linker uses the inter-module references to combine several object code modules into a single object module. After linking, the Locator is used to locate the program at a user specified memory address. 3065 Bowers Avenue, Santa Clara, CA 95051 (408) 246-7501.

2ND SINGLE BOARD COMPUTER

(Cont'd from Page 1)

On-board basic subsystems include the 8080A MPU, system clock, read/write memory, non-volatile ROM, programmable I/O ports, programmable serial data communications interface, multi-master bus arbitration logic, and bus expansion drivers, all on a 6.75 x 12" board.

The SBC 80/20 can operate as a stand-alone general purpose 8-bit computer, as a computer in a distributed network, or in a multi-processor system with up to 16 SBC 80/20's.

It sells for $520 in 100 quantities.

LJM ASSOCIATES
Custom hardware and software development for INTEL 8080, 4040, 4004
6331 Glade Ave., Suite 318 (213) 347-2695
Woodland Hills, CA 91364

MICROCOMPUTER CONCEPTS, INC.
Custom hardware and software development for PACE, IMP 16, SCAMP, 6800
10683 Cranks Rd. (213) 836-2271
Culver City, California 90230

Software Consultant — Intel 8080 Specialist L. John Postas (408) 244-3381.

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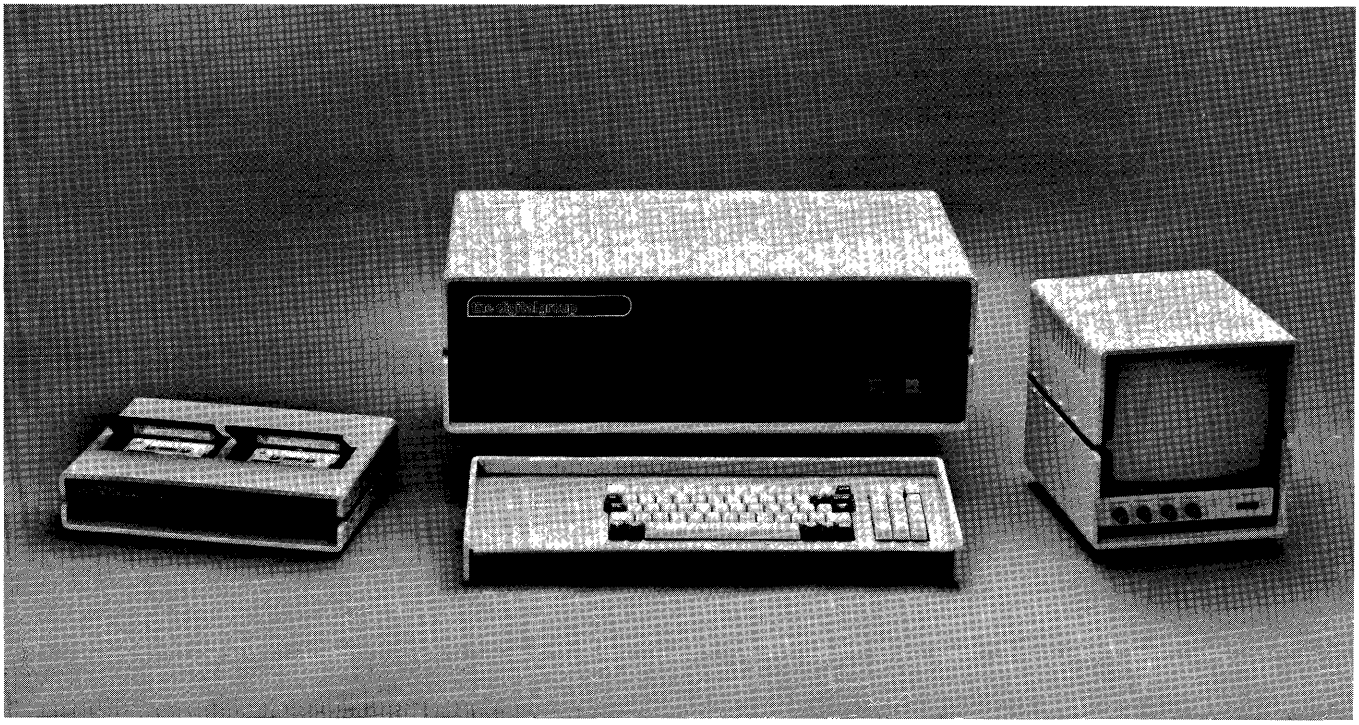
Made for each other



by the Digital Group...who else?

There's a simple reason why a system from the Digital Group looks like it belongs together: It was designed that way. And the look is fantastic.

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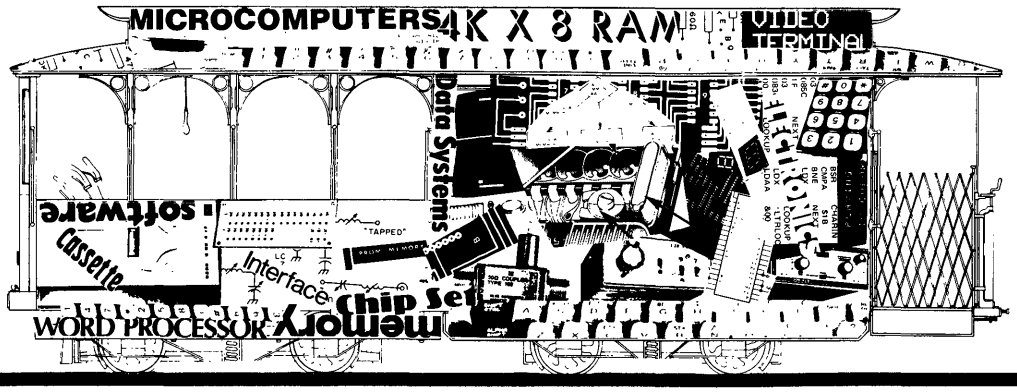

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- Microprogrammable Microprocessors for Hobbyists
- Program & Data Input via Optical Scanning
- Floppy Disc Systems for Personal Computers
- Computer Games: Alphanumeric & Graphic
- Computers & Systems for Very Small Businesses
- Personal Computers for the Physically Handicapped
- Personal Word-Processing Systems
- Software Design: Modularity & Portability
- Several Sections Concerning Standards
- Other Sections for Club Leaders, Editors, Organizers, etc.

▪ **Co-Sponsors** include amateur, professional, & educational groups:
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  Southern California Computer Society
- Both Area Chapters of the Association for Computing
- IEEE Computer Society, Santa Clara Valley Chapter
- California Mathematics Council
- Stanford University's Electrical Engineering Department
- University of California at Berkeley's Lawrence Hall of Science
- People's Computer Company, & Community Computer Center

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MICROCOMPUTER BASED PRODUCTS

μPAL 2650 DEVELOPMENT SYSTEM

Processor Applications' LTD uPAL 2650 development system includes chassis, power supplies, high-speed tape reader, CPU board, parallel I/O interface card, and 8K bytes of RAM. Software includes the uPAL Monpal system monitor, the uPAL Fixit editor and the uPAL Micro assembler. When the last two are supplied in their optional ROM versions, floppy disc performance is achieved.

The character string editor provides users with complete control of text pointers and the ability to find, delete, change, or write any character string in the text buffer.

The Micro assembler features variable length sysmbols and allows the use of externally defined symbols.

Available from stock, the uPAL 2650 is priced at $5250. 2801 East Valley View Ave., West Covina, CA 91792 (213) 965-8865.

CHROMATOGRAPHY DATA ANALYZER

Laboratory Data Control has incororated a Motorola 6800 with a chromatography data processor for liquid chromatography analyses. Available in two models; the instrument's price starts at $4,950.

LINK-200

Link-200, a business timesharing multi-terminal system containing a Monolithic Memories' microprocessor, 32K bytes of MOS main storage, a 10-microbyte Western Dynex disc drive and a 960 character CRT has been introduced by Randal Data Systems.

The system is in volume production with the basic unit priced at $20,000.

PACKAGED 80/10

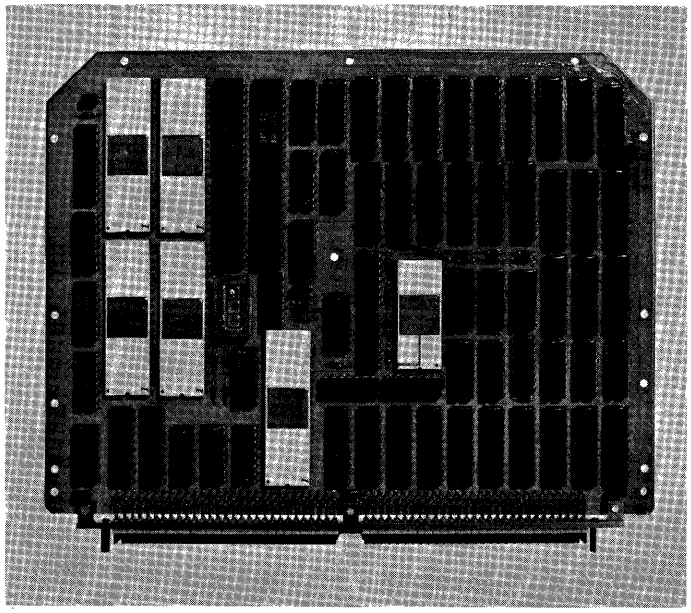
Intel's OEM Computer Systems Group is offering the System 80/10, a low cost completely packaged 8080 microcomputer system with resident memory, programmable I/O, system monitor, power supplies and OEM front panel.

Based on the Intel SBC 8010, the system contains all the memory and I/O hardware required for a wide range of OEM applications. Up to three optional memory and/or I/O expansion boards can be added.

The system is aimed primarily at OEMs, system software suppliers, and users who do their own programming and require low to moderate volume.

Available from stock single-unit price is $1,495 with OEM quantities less than $1,000.

RUGGED/MILITARY PROCESSOR



Applied Technology's ATAC-M CPU is a one-card high-performance unit designed for rugged/military environments and is based on the AM 2901 bipolar microprocessor. Sophisticated techniques allow a microprogrammed general register architecture on a single 6" x 8" board and include floating-point and byte-string operators. The pipelined architecture permits execution of basic instructions (RRAdd) in 250ns including instruction fetch, decode, and execution. A one-card Arithmetic Extension Unit is in final design which will provide improved performance on 32 bit fixed and floating point operations. (408) 732-2710.

AUTOMATIC TRUCK TRANS.

Built by British Leyland's Bus and Truck division, a prototype 8000-based controller for automatic truck transmission is proving to be quite advantageous over conventional controllers. It's main asset: software programs for self-testing with the aid of digital readout equipment. However the firm is said to be looking for a CPU offering better noise immunity.

TRAFFIC CONTROLLER

Netherlands cities are rapidly changing to traffic-control systems to include microcomputers. In Eindhoven, a system displays recommended vehicle speeds at six intersections. One rather complex intersection requires constant modification of the control sequence because of numerous changes in traffic patterns.

MESSAGE HANDLER

Sidereal Corporation has premiered its latest system, MICRONET II. The microcomputer based system is a fully automated message handling system with editing, directory, multiple addressing, automatic answerback verification and timer date stamp. PO Box 1042, Portland OR 97207 (503) 227-0111.

PROM PROGRAMMER

Designed for machine-language programming of microcomputers with octal-oriented instruction codes, $780 Model DE80 features a keyboard, remote byte input, program verification and 1Kx8 RAM memory. It can create correct and duplicate programs for the 2704, 2708, 8704 and 8708 EPROMs. A hexadecimal version is also available from Digital Engineering Co. 860 Huntington Dr., San Marino, CA 91108 (213) 570-0987.

F8 MICROCOMPUTER

An F-8 microcomputer fully assembled and tested with 1K byte of RAM, 1K byte of firmware and 32 bidirectional latched I/O ports is being marketed by Pronetics Corp., Model 810 is TTL compatible. Two independent external interrupts, 2 independently programmable interval timers and flexible terminal interface are featured on the $169 card. 6431 Preston Crest, Dallas, TX 75230 (214) 270-8626.

8080/6800 COMPATIBLE

Interdata 5/16 single board computer is compatible with the I/O busses of the 8080 and 6800 microcomputers.

Another I/O bus connects to Interdata peripherals and is compatible with the manufacturer's processors and software. The board includes a full 16-bit processor with 16 general-purpose registers, 114 instructions, and 8-K bytes of NMOS dynamic RAM.

COMPACT MODULAR SYSTEM

The Model EC-1000 is a compact modular system developed for applications in process control, material handling and other production machine functions. It employs a microcomputer module containing 320 x 4 RAM and 1024 x 8 PROM. Logic applications are accommodated by 16 TTL inputs and 16 TTL outputs. Pomona, CA.

M-8Z CONTROL CPU MODULE

The Electronic Products Division of the Warner & Swasey Company has announced deliveries of a new CPU module for its System 8 series of M-8z microcomputers, and M-8z, a single board (4½" by 4½") micro-programmable CPU.

The micro-programmable M-8z allows the user to emulate an existing 8-bit computer instruction set, or define his own unique instruction set.

The M-8z comes complete with a micro-assembler program (written in FORTRAN) available on Dialcom time-sharing (or at extra charge on punched cards or paper tape), and a microprogramming manual.

The M-8z can interface with all System 8 module cards. The $285 price includes a set of blank instruction chips, ready for programming. Delivery is 30 days ARO. 7413 Washington Ave., S., Edina, MN 55435 (612) 941-4454.

POST DATA PROCESSOR

A microcomputer based unit that functions as a post data processor for digital voltmeters, counters, ratiometers and other electronic measurement instruments is being marketed by Electro Design, Inc. It accepts up to eight channels of TTL-level parallel BCD data and processes it according to 16 preselected conversion functions. It then displays the computed result and simultaneously outputs that result to a printer. 8141 Engineer Rd., San Diego, CA 92111 (714) 277-2471.

AED/PACE/MEMORY SYSTEM

Based on the National Semiconductor Pace microprocessor, AED/Pace/Memory System is packaged on one 6"x9" card. Features of the card developed by Advanced Electronics Development include: 16-bit instruction, 8- or 16-bit data words, 45 instructions, common memory and peripheral addressing, four general purpose accumulators and a 10-word stack.

The card has six vectored priority interrupt levels and programmer accessible status register. Instruction execution time is 10 ms. Containing single phase true and complement crystal clock, card operates with a 5-to 12-V supply. Memory is 256 x 16 R/W, with sockets for 3K x 16 p/ROM/ROM. Also included are start-up circuitry, split busing for data I/O addresses, socket for CPU, address latches, and card edge connectors. 880 Boston Post Rd,, Old Saybrook, CT 06475.

$7,000 STUDENT INSTRUCTOR

A compact microcomputer designed primarily for use in schools and colleges has been announced by NCR Corporation.

The 7200 Model VI includes a microprocessor and 24K bytes of RAM, of which 4K bytes can be used for student programming. The 7200 also features a 9-inch visual display screen, alphanumeric and numeric keyboards, and a magnetic-cassette tape recorder for storage and retrieval of programs and data. A second cassette recorder is available as an option.

Supplied with the $6,795 microcomputer are a complete set of aids. These include a reference manual, operator's handbook and the BASIC Library Catalogue. Deliveries are 1Q75. Dayton, OH 45479 (513) 449-2150.

SMART DUAL FLOPPY DISC

A newly introduced dual floppy disc based computer system is based on the Intel 8080 with a disk operating system that includes a Basic language compiler. The processor system, with 16K bytes of random access memory, will sell for $8,500. The Intelligent Computer System's computer, contained in a desk-top unit, operates two RS232 ports for CRT and printer channels at rates of up to 9,600 BPS. The memory is expandable to 64K bytes, with up to 4K bytes of ROM. Mtn. View CA.

μC FLOPPY DISC TESTER

Three Phoenix company has introduced a microcomputer controlled version of its FD-33M floppy disc tester.

The design uses an Intel 8080 to provide tester flexibility and allows users to program the unit for their own analysis. 10632 N. 21st Street, Phoenix, AZ 85029 (602) 944-2222.

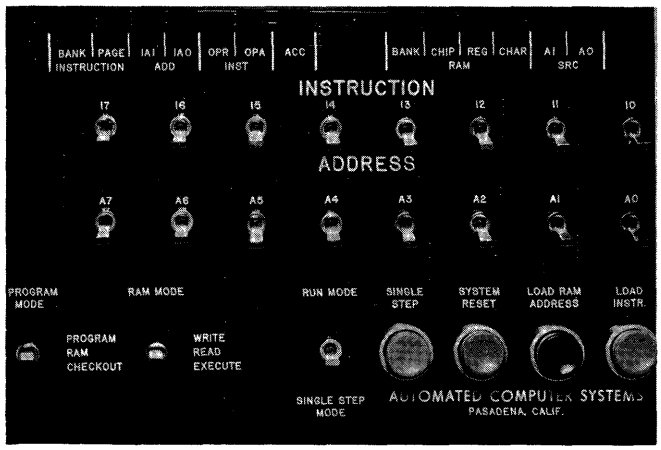
PRINTING TERMINAL

MI^2 Corp has used an Intel 8080 in their new 1200 Baud, switchable half/full duplex asynchronous, interactive printing terminal.

The DESIGN 2400 KSR/T, uses a Programmable Protocol Interface Board to meet multi-terminal demands while providing a wide flexibility in communications.

A company spokesman states that users can transmit data from 75-9600 bps selectable, in half duplex, echoplex, or full duplex modes, with print speeds up to 180 characters per second. 1212 Kinnear Road, Columbus, OH 43212 (614) 481-8131.

4040 SYSTEM ANALYZER



Automated Computer System's 4040 microcomputer system's 4040 microcomputer system analyzer can be used as a microcomputer control display panel, as a hard/software development tool, as a production check-out tool or as a field service maintenance tool.

The system analyzer provides full hex display and control of all ACS-4040MC microcomputer operations. Used as a program development tool, the system analyzer offers a cost-effective alternative for 4040 real time software development. Used as a production check-out or field maintenance tool, the system analyzer is effectively used as an in-circuit emulator.

Price is $600 with delivery 30 days ARO. 2361 Foothill Blvd. Pasadena CA 91107 (213) 449-0616.

PAPER TAPE DUPLICATING
Shepardson Microsystems
10601 S. De Anza Blvd., Cupertino, CA 95014
(408) 257-2996

LOGIC ANALYZER

Scanoptik's Logicorder 32, logic analyzer can handle 32 channels of digital data—enough for a microprocessor system's buses and a few auxiliary lines. The analyzer displays the activity in the unit under test in hexadecimal notation on the screen of a std. oscilloscope.

Priced at $895, the Logicorder 32 stores two "pages" of data, each page consisting of 32 words. It requires an external source of ±5V power or can plug into a Tektronix TM-500 series mainframe. PO Box 1745 Rockville, MD 20850 (301) 977-9660.

MICRO WORD PROCESSOR

Wang Laboratories has introduced a family of microcomputer-based word processing systems in the $12,00 to $75,000 range.

At the low end, Word Processor 10 is a stand alone diskette CRT system aimed at the single user and for small cluster sites.

The Word Processor 20, allows the user to operate any combination of up to three typing work stations and printers from its dual-diskette storage station.

Word Processor 30, is a 10-million byte disc storage system that permits up to 14 typing work stations and printers. Tweksbury, MA.

STAND-ALONE COMPUTERS

Data Terminals 7 Communications (DTC) Campbell, CA, announces the DTC Micro File MK II and MK IV microcomputer systems.

The MK II is a stand-alone computer that has a dual, second generation, flexible disc with over 600,000 characters of storage.

There are two RS232 serial I/O ports. One that handles a data terminal and the other a data communications line (both at independent speeds ranging from 110 to 9600 baud). A comprehensive software operating system provides sophisticated file management and utilities for data transmission/reception. User memory is 8K RAM expandable to 56K. A powerful Text Editor and Automatic Letter Writer are standard packages supplied with the base system.

The MK IV is identical to the MKII except that it has two dual drives (4 disc) expanding the online capacity to 1.2 million bytes.

Priced at $4295 for the MKII and $6750 for the MKIV, delivery is 30-45 days ARO.

HEART-MONITORING BICYCLE

A heart-monitoring bicycle exerciser called Dunavit and manufactured by Keiper of Rockenhausen, West Germany, was publicly demonstrated for the first time at the WESCON electronics trade show this week.

Based on a PPS-4/2 microcomputer, the Dynavit accepts inputs of age, weight, and sex to calculate a loading on the machines pedals.

The microcomputer contains algorithms developed by Keiper in its program memory which compares the monitored heart rate input with normal and flashes a green light that all is well. If your pulse rate becomes too rapid, a red light flashes, warning you to either slow down or stop, or to reduce the pedal loading by pushing a button on the console. The machine can also calculate and display calorie loss during exercising. PO Box 3669, Anaheim, CA 92803

SC/MP DEVELOPMENT SYSTEM

Offered by National Semiconductor, the LCDS kit is not only an easy to assemble microcomputer, but can also second as a low-cost SC/MP development system. Priced under $500 the kit is built around a mother board that is used as both backplane and application-card cage.

The main board provides a 16-key pad for program entry, seven control switches, six LED digit display, and a 20 mA loop interface. Control and debug programs are also provided. Users can enter simple programs in hex, display data, MPU status and control program execution. Additional slots can accomodate system-expanding memory and I/O cards. LCDS runs off +5V and -12V supplies. 2900 Semiconductor Dr., Santa Clara, CA 95051. (408) 732-5000.

COSMAC EVALUATION KIT

A kit of components for building a microcomputer based on the CDP1802\COSMAC microprocessor is available from the RCA Solid State Division. This evaluation kit, CDP18S020 contains PC board, byte input and output ports, a terminal interface, a ROM containing a utility program and RAM for user program storage. Control logic and built-in displays provide facilities required for program debugging. A user-supplied terminal and a power supply are also required.

The PC board includes 30 additional memory sockets with prewired memory addresses and decoded chip-select signals so that up to 4k of RAM can be accommodated by the addition of more CDP1822 memories. The utility program in the 512 ROM performs memory inspection and modification and start of program execution at a given location, as well as communication terminal interfacing. A dedicated 32-byte RAM is used by the utility program for register storage. A battery-backup option is provided.

Additional I/O capability is incorporated in a byte input port and a byte output port on the CDP1822.

A 6"x4" area of the board is free for user added I/O devices. ICs of various pin count can be inserted and wired to an uncommitted 44-pin connector built on the board. Complete documentation is provided with the $249 Evaluation Kit. RT. 202 Sommervile, NJ 08876

WAFER HANDLER

GCA has introduced a microcomputer controlled wafer handling system that transports silicon wafers up to 5 inches in diameter through various processing stages automatically. A basic "hands off" system is priced around $22,000.

TOUGH OEM APPLICATIONS

Designed for tough OEM applications, a 6800-based board with 8K memory can operate by itself with up to 384 bytes of on-board RAM or with up to seven 8K memory boards. Features of the CPU offered by M&R Enterprises include serial I/O ports, RS232 and 20 mA current loop interfacing and DMA. The oscillator has a 1 MHz crystal and the unit comes with a MIKbug ROM in an optional ROM socket. The socket can also accept a users custom programmed ROM. PO Box 61011, Sunnyvale, CA 94088.

μC BASED DIGITAL WATCH

Time Computer is developing a microcomputer based digital watch that can perform virtually any function desired. The micro appropriate inputs and outputs is said to be able to provide calculations, an alarm, interval timing, or whatever is used. The Pulsar unit will use commercially-available microcomputers programmed with custom software.

WAFER SAW CONTROLLED BY μC

Micro Automation, Inc. is producing a new semiconductor wafer dicing saw that is controlled by a microcomputer. The Model 1000 programmed dicing saw cuts silicon wafers that have diameters of up to 5.25 in. The microcomputer does the necessary calculations to profile the circular wafer. 3170 Coronado Dr., Santa Clara, CA 95051 (408) 988-2180.

MICRO UPS SPEED

Tally Corp. has achieved throughput speeds in excess of 200 lines per minute on their new Model T-1602 160 CPS Matrix Printer. An internal microprocessor computes the shortest distance to the next print position. The $315 unit prints left to right and right to left, slews at 8.5 inches per second, and moves the print head at an accelerated rate when not printing. 8301 S. 180th St., Kine WA 98031 (206) 251-5644.

6502 CONTROLLERS

Sykes Datatronics, Inc., has introduced two versions of their microcomputer based flexible disc drives. OEMkits are also available. The Series 9000 double density disc drive sells for $2,800 with a single drive and $3,400 with a dual drive. All units have a micro 6502 based controller. Rochester, NY.

PRO LOG ADDS 8080 CARDS

Pro Log has introduced two new single board 8080 microcomputers. The 8821 is a printed circuit card which implements the 8 bit 8080A microprocessor as a fully TTL buffered microprocessor with clock, reset and 3-state data and address busses. The card also includes 1K bytes of RAM and capacity for 4K bytes of PROM, external memory control and I/O control. The 8821 provides capability for a minimum 2 card system. The 8821 can be expanded to a system that uses the full capability of the 8080A microprocessor.

The single card PLS-881 comes complete with 8080A microprocessor, 1K of RAM storage, I/O and sockets for 4K bytes of PROM program memory, interrupt input, crystal clock, three 8-bit output ports and two 8-bit input ports. 2411 Garden Rd., Monterey CA 93940 (408) 372-4593.

PORTABLE ANALYZER

The portable microcomputer analyzer system designated MAS-80 is effectively an in-circuit emulator for the 8080 with a full front control panel. The user not only monitors but can also control his 8080 project without developing special modules or test devices. The MAS-80 is priced at $1,195 and is available from California Micro Computer, 9323 Warbler Ave., Fountain Valley, CA 92708.

INTELLEC HARD/SOFT PACKAGE

Texas Microsystems Inc. has announced a hardware/software package for the Intellec 8/Mod 80 users to program high density 2704/2708 PROMs. The 2730 PROM Programming System includes all software, documentation, two boards with ribbon connector, and programming tape required to prepare interface PROMs for utilization of the conversion system. No wiring changes are required.

The programming system is priced at $365 with delivery from stock. 3320 Bering Dr., Houston, TX 77057 (713) 789-9820.

MEMORIES/PERIPHERALS/SUPPORT

MICROCOMPUTER SUPPLY

Dynage Inc.'s microcomputer supply has outputs of 5V at 6A, 12V at 1.5A, and from 5V at 1A to 9V at 1.5A (adjustable). The Model 3MA-MP can power the CPU plus memory and peripheral modules.

All outputs have independent overvoltage protection that is temperature compensated and adjustable. The supply is priced from $175. 1331 Blue Hills Ave., Bloomfield, CT 06002 (203) 243-0315.

DIGITAL CASSETTE RECORDER

A read/write digital cassette recorder designed for microcomputer applications has been introduced by Memodyne.

Model 2333 reads and writes 7-bit ASCII or 8-bit parallel data on standard Philips type cassettes at rates up to 50 characters/second.

Priced at $775, the unit is said to be TTL and C/MOS compatible with internal power supply.

MASTERMIND MEMORY MODULES

Memory Systems, Inc. has announced the Mastermind series of memory modules for DEC's LSI-11 microcomputer.

Two models are initially being offered: the 2000-8 with 8K x 16 for $875 and the 2000-16 with 16K x 16 for $1,450. Both boards are said to have 500 ns access time with an 800 ns cycle time.

6802 CONTROLLER DUE

Motorola is planning the 6802 single chip controller for introduction next year. The chip will house an 8K ROM, 256-bit RAM and enough I/O capability to service either as a stand alone controller in high volume applications or as a peripheral controller in large 6800-based systems.

ANALOG/DIGITAL CONVERTER

The newest addition to the MITS Altair 8800 system is the 88-Analog/Digital Converter—a 12-bit card which permits the Altair to measure analog voltages often encountered in scientific and industrial applications with an accuracy of one part in 4096.

The 88-ADC is completely bus-compatible with the Altair 8800a or 8800b and is easily accessed using 8K BASIC.

A 24-channel multiplexer (88-Mux) card is available as an option which may be used to replace the on-card, 8-channel multiplexer.

The 88-ADC will be available within 60 days of order placement at $524 (assembled only). 2450 Alamo S.E., Albuquerque, NM 87106.

TWO NEW STATIC 4K RAMS

Two new 4K static RAM products, the 4801 and 4804, have been introduced to the market by SEMI.

The devices are configured as 1Kx4, and 4Kx1, and are housed in 18 pin packages. A single device is said to replace four 2102s. Typical device power at room temperature is 225 mW with performance at 450 ns maximum for both access and cycle time, at 70 C.

In 100 lots each device is $15.10. 12621 Chadron Ave., Hawthorne, CA 90250 (213) 644-9881.

MICRO PRINTER KIT

A printer kit for microcomputers, remote terminals and instruments is offered in an evaluation configuration by Hycom Inc.

Model CE21AP prints 126 cps using a nonimpact 5 x 7 dot-matrix technique. It includes a power supply and separate interface card with 64-char. buffer—all packaged in a 5x7x3-in. cabinet for $399. Digital input is a char-serial, bit-parallel ASCII data stream. 16841 Armstrong Ave., Irvine, CA 92714. (714) 557-5252.

ROM CARD

The ROM/1 is Sphere's latest addition. The $156 4K ROM features fully buffered address lines that present only one load to the CPU and three state I/O. Specially programmed PROMs are available. 940 N. 400 East, North Salt Lake, UT 84054.

64 X 8 STATIC RAM

A 64 x 8-bit n-MOS static RAM, TI's 4036 is designed to provide maximum cost per package count for terminal and controller systems requiring 128 words or less of RAM. Organization of the device matches needs of byte-oriented CPU systems such as TMS 8080 or 9900. Like those systems, the RAM has common I/O bus which is fully TTL compatible. Address, R/W control, output enable, and chip enable are TTL compatible.

MOSTEK ANNOUNCES 16K RAM

Mostek's new 16K RAM, MK 4116P-2 features 150 ns access time and 375 ns cycle time. An additional speed version, -3, is also available and offers 200 ns access time and 375 ns cycle time.

Features of the 4116 include low power of 462 mW active and 20 mW standby; ±10% tolerance on all power supplies (+12V, ±5V); Shottky-TTL compatible, low capacitance inputs, 128 refresh cycles; on-chip address and data registers; and several flexible timing/operating modes. In addition to the usual read, write, and read-modify-write cycles the new 16k is capable of delayed write cycles, page mode operation and RAS-only refresh

Prices in 100 quantities are $100 for the dash 2 and $50 for the dash 3. 1215 W. Crosby Rd., Carrollton, TX 75006 (214) 242-0444

MITS PROM PROGRAMMER

Mits new 88 PROM Programmers, designed to work with the Altair 8800 systems, will program standard 1702A PROMs in less than three minutes.

The $456 programmer has a self-contained power supply, but requires an 8800 computer with an 88-PMC, an S10 or 2S10 and a terminal. The programmer is available only in an assembled version. 2450 Alamo S.E., Albuquerque, NM 87106.

LOW POWER STATIC RAMS

Two low-power 4k static RAMs with speeds to 250 ns have been added to the MOS memory family of Advanced Micro Devices.

These circuits, the AM/91L30 and AM/91L40 are organized as 1024 x 4 and 4096 x 1. The units offer latched outputs and output drive equivalent to two full TTL loads. Prices start at $12.55 at 100 pieces. 901 Thompson Place, Sunnyvale, CA 94086 (408) 732-2400

LSI-11 ACCESSORIES

New accessory hardware from MDB Systems for the DEC LSI-11 microprocessor is double capacity backplane assembly housing eight quad modules or sixteen dual modules.

The MDB unit has ten, not six, terminal posts for standard LSI-11 and custom power supply requirements. The design includes full length card guides for maximum mechanical support as well as a prewired multilayer printed circuit LSI-11 backplane. Priced at $295 delivery is 14 days ARO. 1995 N. Batavia St., Orange, CA 92665 (714) 998-6900

SIGNETICS SECOND SOURCES RAM

A 4k Dynamic RAM identical in specifications and in its 22-pin configuration to the Intel 2107B and the Texas Instrument 4060 RAMs has been introduced by Signetics. The 4k xl device, designated 2680, is fabricated using N-Channel silicon gate MOS technology.

The 2680 is priced competively with delivery two to four weeks in quantities up to 5,000. 811 E. Arques Ave., Sunnyvale, CA 94086 (408) 739-7700

MICROPROGRAM SEQUENCER

Signetics has introduced the 8X02, a low power Schottky LSI device designed for use in high-performance microprogrammed systems. The basic function of the 8X02 is to control the fetch sequence of microinstructions. The unit is capable of addressing up to 1k words of microprogram, expandable to any microprogram size by conventional paging techniques. External page registers, when they are provided, can be controlled entirely or partially by microprogram.

Housed in a 28-pin package, the device sells for $19.45 in 100 lots. 811 E. Arques Ave., Sunnyvale, CA 94086 (408) 739-7700

INTERFACE PRICE REDUCED

Date Translation has reduced the price of its Analog I/O System Interface, the DT1751 to $895. The Analog board was designed for Intel's SBC 80/10. 23 Strathmore Rd., Natick MA 01760 (617) 655-5300.

ANALOG I/O SUBSYSTEM

An anlog I/O subsystem compatible with Intel's SBC-80/10 has been introcuded by the Instruments and Systems Group of Analog Devices.

The RTI-1200's data acquisition section includes a CMOS multiplexer, a programmable gain amplifier, a sample-and-hold amplifier, and a 12-bit A/D digital converter. The basic version offers either 16 single-ended or 8 deferntial analog inputs, and an on-board expander option doubles the number of available input channels. Prices start at $629. Box 280 Norwood, Massachusetts 02062 (617) 329-4700.

AUTO LOAD BOARD

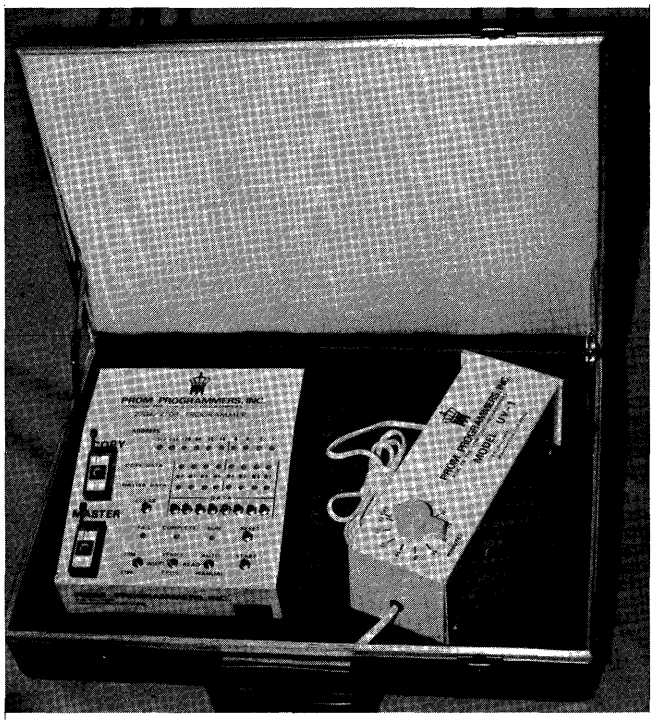
A new auto-load board, compatible with the Altair 8800 is now available from Computer Kits, Inc. Power-Start is said to eliminate keying in of bootstrap programs; eliminates the need to reset sense switches; and allows the Altair 8800 to operate without a front panel. $145 kit, $295 fully assembled with ROM. 68 Post St. Suite 506, San Francisco, CA 94104 (415) 391-1498.

PROM PROGRAMMERS SERIES

Prom programmers, Inc. is offering a series of PROM programmers that can assist the user in any level of system sophistication required.

Programmers are available for 1702A, 2708, 4203, 4204 and 4702 type erasable PROMs. The machines can copy, prepare or edit master; display copy and master data and address on a series of LEDs; and verify the copy PROM.

Two basic models are available--a Read/Modify/Write unit sells for $795 and a Copy Model sells for $695.



The system will interface with any microcomputer allowing the user to develop his program on a development system and then dump BNPF code directly onto PROMs, all without the use of papertape. However, tape can be used via the development system.

The user can also change copy PROM code from that of a master through the editing functions provided by front panel control switches. Box 4608, Mt. View, CA 94040. West Coast Only: 122 Saratoga Ave., Suite 28, Santa Clara, CA 95050 (408) 247-9891.

μC TIME CARD

Lincoln Semiconductor announced a new "uC Time Card" that provides a microcomputer with easy access to the time of day, hours, minutes, and seconds.

The card uses an I/O port to communicate with the host computer and can program settable and readable time with no extra switches. The kit fits the S100 Hobbyist Standard Bus and contains all the necessary ICs to drive a 3" high, six digit LED display. $395 kit, $145 assembled at 1249 Birchwood Dr., Sunnyvale, CA 94086 (408) 734-8020.

SC/MP TERMINAL

An inexpensive hand-held terminal for use with the 8-bit SC/MP microprocessor kit has been developed by National Semiconductor Corp. to eliminate the need for a costly teletypewriter system. It allows user to evaluate the SC/MP CPU, and analyze a variety of application software.

The keyboard kit comes complete with manual, all required ICs, resistors, keyboard display cable connector assembly, wire wrap connectors, precut wires, and a hand-held wire wrap tool. The heart of the SC/MP kit is a ROM firmware package (512 bytes) which replaces the "Kit Bug" ROM originally supplied with SC/MP kit and which allows use of the hexadecimal keyboard to execute programs, to modify or examine the contents of memory and the SC/MP registers and to monitor program performance. The keyboard is arranged as an 8x4 matrix array, but only 20 of the possible 32 keys are used. The price is $95 . 2900 Semiconductor Dr., Santa Clara, CA 95051 (408) 737-5000.

8-BIT D/A CONVERTER

Micro Networks Corp. has developed an 8-bit digital-to-analog converter in an 18-pin DIP package that includes an internal reference and output amplifier, as well as a storage register. Priced at $39 in singles, input circuitry is TTL-compatible and output voltage is accurate within 1 LSB over the full temperature range. Worst-case settling time is 3 us.

When the converter enable input is high, input data is held and the analog output remains constant. When enable is low, the digital input is passed. 324 Clark St., Worcester MA (617) 852-5400.

EDUCATION

MICROCOMPUTER COURSES, SMINARS, CONFERENCES. Date, title, cost, location, sponsoring organization (addresses on this page).

January

10-13 Microprocessors Fundamentals NSC $395 Coral Gables, FL 305 661-7971
11-12 Microprocessor in Mfgr. and Control $395 Cincinnati, OH Int. Comp. Sys.
11-14 F8 Microprocessor $300 San Jose, CA Fairchild Micro Systems
13-14 Microcomputer Software/Systems $395 Cincinnati, OH Int. Comp. Systems
14-18 Microprocessors and Microcomputers: Theory and Applications $425 George Washington University WA D.C.
17-20 Microprocessors Fundamentals NSC $395 Santa Clara, CA 408 247-7924
17-21 SC/AMP Application NSC $395 Coral Gables, FL 305 661-7971
18 LSI-11 Technical Seminar Free Palo Alto, CA DEC
18-19 Microprocessors in Mfgr. and Control $395 Toronto, Canada Int. Comp. Sys.
18-20 Microprocessors $365 Hampton, VA George Washington University
20-21 Microcomputer Software/System $395 Toronto, Canada Int. Comp. Systems
21-27 SC/AMP Application NSC $395 Santa Clara, CA 408 247-7924
24-26 Integrated Circuits and Applications $360 Washington D.C. George Washington University
24-27 PACE Application NSC $395 Coral Gables, FL 305 661-7971
25-28 F8 Microprocessor $400 Miami, FL Fairchild Micro Systems
30- 3 Advanced Programming NSC $395 Coral Gables, FL 305 661-7971

February

8- 9 Microprocessors in Mfgr. and Control $395 Newark, NJ Int. Comp. Systems
8- 11 F8 Microprocessor $300 San Jose, CA Fairchild Micro Systems
10-11 Microcomputer Software/ System $395 Newark, NJ Int. Comp. Systems
14-17 SC/AMP Application NSC $395 Coral Gables, FL 305 661-7971
21-24 Microprocessor Fundamentals NSC $395 Santa Clara, CA 408 247-7924
21-24 PACE Application NSC $395 Coral Gables, FL 305 661-7971
24-25 Microprocessors and Design Automation San Francisco, CA TC on Design Automation of the Computer Society
28- 3 Advanced Programming NSC $395 Coral Gables, FL 305 661-7971
28- 3 COMPCON Spring '77 San Francisco, CA COMPCON
28- 3 PACE Application NSC $395 Santa Clara, CA 408 247-7924

March

7- 10 Microprocessor Fundamentals NSC $395 Coral Gables, FL 305 661-7971
8- 11 F8 Microprocessor $400 LA Fairchild Micro Systems
14-17 SC/AMP Application NSC $395 Coral Gables, FL 305 661-7971
21-24 Microprocessor Fundamentals NSC $395 Santa Clara, CA 408 247-7924
21-24 PACE Application NSC $395 Coral Gables, FL 305 661-7924
22-25 F8 Microprocessor $300 San Jose, CA Fairchild Micro Systems
23-25 Fourth Annual Computer Architechture Symposium College Park, MD Dr. B. Wald
28-31 Advanced Programming NSC $395 Coral Gables, FL 305 661-7971
28-31 SC/AMP Application NSC $395 Santa Clara, CA 408 247-7924

April

2- 5 SC/AMP Application NSC $395 Santa Clara, CA 408 247-7924
6- 8 Microcomputer '77 Oklahoma City, OK Dr. S. C. Lee, University of Oklahoma
18-21 Microprocessor Fundamentals NSC $395 Santa Clara, CA 408 247-7924
18-21 Microprocessor Fundamentals NSC $395 Coral Gables, FL 305 661-7971
19-22 F8 Microprocessor $300 San Jose, CA Fairchild Micro Systems
25-28 Advanced Programming NSC $395 Coral Gables, FL 305 661-7971
25-28 PACE Application NSC $395 Santa Clara, CA 408 247-7924

May

3- 6 F8 Microprocessor Houston $400 Fairchild Micro Systems
9- 11 EUROCON '77 Venice, Italy Eurocon
16-19 PACE Application NSC $395 Coral Gables, FL 305 661-7971
23-26 Advanced Programming NSC $395 Coral Gables, FL 305 661-7971
24-26 International Minicomputer, Microcomputers and Microprocessors '77 Geneva Switzerland Industrial and Scientific Conference Management

Sponsoring Organizations and Contacts:

COMPCON Spring '77 P. O. Box 639, Silver Spring, MD 20801

DEC, 2565 Walsh Ave., Santa Clara, CA 95050 (408) 984-0200

Eurocon '77, AEI, Viale Monza 259, 20126 Milian, Italy
Fairchild Micro Systems, 1725 Technology Dr. San Jose, CA. 95110 (408) 998-0123
Industrial and Scientific Conference Management, 222 W. Adams St., Chicago, IL 60606 (312) 263-4866
George Washington University, Continuing Engineering Education Program, Washington D.C. (202) 676-6106
Integrated Computer Systems, Inc., 445 Overland Ave., Culver City,CA 90230 (213) 559-9265
Dr. S. C. Lee, School of Electrical Engineering University of Oklahoma, Norman, OK 73019
National Semiconductor Corp., 2900 Semicondutor Dr., Santa Clara, CA 59051 (408) 732-5000
Pro-Log Corp., 2411 Gardern Rd., Monterey, CA 93940 (408) 372-4593
TC on Design Automation of the Computer Society, Dr. W.M. vanCleemput, Stanford Univ. Digital Systems Labs., Stanford, CA 94305
Dr. B. Wald, Communications Science, Naval Research Lab., 4555 Overlook Ave., Washington D.C. 20390

PEOPLE, LITERATURE AND EVENTS

MICROCOMPUTER HISTORY

Trace the growth. Feel the throbbing pulse of the microcomputer revolution. Relive the great moments of the Micro Year with an attractively bound edition of MICROCOMPUTER DIGEST, Volume 2 (July, 1975 to June, 1976).

A limited supply--100--has been published. So for your complete record of microcomputer history during one of the most decisive and advancing technological era ever, send $39.50 check or money order to "Annual", 2589 Scott Blvd., Santa Clara, CA 95014. Supply is limited and orders are filled on a first-come-first-serve basis.

MICROFAIR INTERNATIONAL

The Board of Directors of WEMA, trade association for the electronics industries, has announced plans to sponsor a comprehensive educational seminar and product exhibit on microprocessors/microcomputers at the new O'Hare Exposition Center in Chicago next fall.

Called MicroFair International, the week-long event, October 17-21, will focus on applications in a wide variety of industries--automotive, process control, machine tools, consumer electronics, medical equipment and the heavy industrial equipment.

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(In-house development equipment)
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Danville, California 94526

PEOPLE ON THE MOVE

MARSHALL G. COX has been named to the new post of Vice-President, Europe for Advanced Micro Devices.

EDWARD L. LAWSON, JR. has been appointed Standard Logic Marketing Manager at Signetics.

KENNETH OSHMAN, president of Rolm Corp. has been elected 1977 chairman of the board of WEMA, trade association for the electronic industries.

Zilog has occupied its new administrative and manufacturing headquarters building in Cupertino, CA. The new, 32,000 square foot facility gives Zilog volume production capabilities for its microcomputer product line, as well as housing the company's administrative offices.

ROBERT B. STAIB, president of Realistic Controls Corp. has announced the signing of agreement with Unified Technologies Inc. of Islington, Ontario appointing RCC as sole U.S. Distributor of FORT/80.

TEKTRONIX Inc. has signed a contract for an undisclosed amount with Millennium Information Systems, Inc., signaling Tek's entrance into the microprocessor design aid business.

FINANCIAL

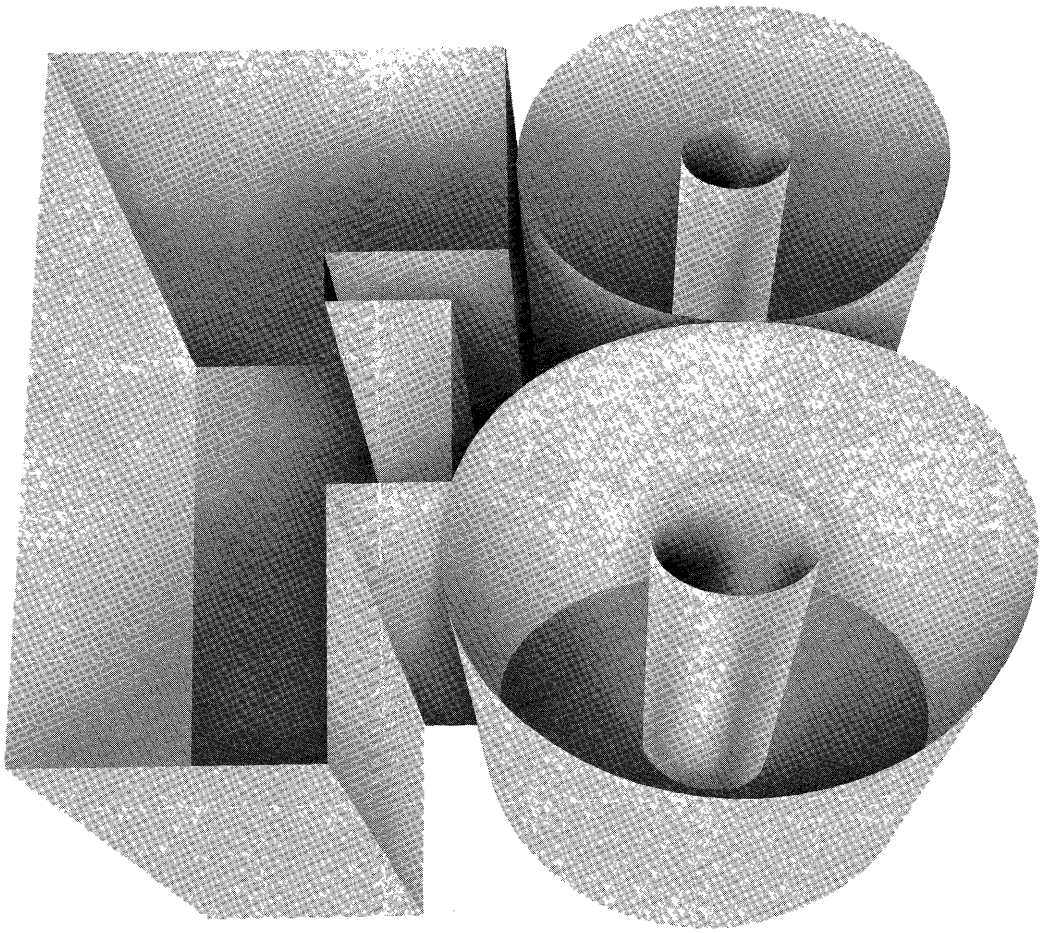
SEMI SALES UP IN SEPT.

U. S. Semiconductor companies enjoyed a record $337 million sales volume during September recording the highest sales total of any month this year.

Dollar volume of September shipments was 21% ahead of August with sales of discrete devices rising 25% to $134 million and sales on integrated circuits by 19% to $203 million. This brought the year-to-date cumulative shipments to $2.5 billion.

These figures were revealed in the monthly Semiconductor Marketing Statistical report published by WEMA, trade association for the electronics industries. Data is supplied by 49 U.S.-based semiconductor manufacturers, and includes estimates of sales and booking of non-participationg companies.

Orders booked during September totaled $342 million, about 12% ahead of August bookings.



Savvy.

FAIRCHILD

Need some microprocessor savvy? For just $9.95 you can get all of it you need in a CPU. That's because $9.95 gets you Fairchild's 3850 (the F8 CPU).

Who needs microprocessor savvy? You do if you manufacture controller oriented or "low end" applications like electronic games, machine and motor controls, printer controls, keyboard controls, or traffic control systems.

Fairchild's F8 CPU chip combined with F8 program memory is the perfect microprocessor system for your applications whether they be high volume or low volume.

High Volume Applications

Features of the F8 are shown by this typical high volume system using the CPU (3850) and the PSU (3851) chips:

- 32 I/O lines
- 1K bytes of Program Memory
- 64K Bytes of RAM
- 1 Interrupt Level
- 1 Programmable Timer
- On Board Clock

Additional capability can be added to this system if needed.

Low Volume Applications

The F8 chip set is also ideal for low volume applications. It can be optimized to save engineering and program development time by selecting the right number of I/O lines, program memory size, RAM size, interrupt levels, and programmable timers.

Wyle Distributors—They've Got The Savvy

The key to optimized use of the F8 is proper configuration of the microprocessor before programming and production. That's where Wyle's technological centers come in. Providing the expert service needed to help you choose just the right F8 configuration to fit your application, they will help you realize maximum savings in development time. Give Bill Scharenberg or Dennis Stick a call; they stock the F8 microprocessor, and they've got the savvy to help you get the most out of it.

Fairchild MSD Products by Wyle.

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Denver, CO (303) 287-9611

Dennis Stick (213) 322-8100
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San Diego, CA (714) 565-9171
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- 8 BIT MICROPROCESSOR (SEE BELOW)
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- 2K × 8 PROM or 4K × 8 MASK ROM SOCKETS
- 24-32 BIDIRECTIONAL I/O LINES
- INTERRUPTS
- DMA CAPABILITY
- POWER-ON AUTO START
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- ASSEMBLED AND TESTED

A CARD NEVER BEFORE EQUALLED
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YOUR CHOICE OF MICROPROCESSORS

8080A
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6800
2650

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2650 OEM

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