

# MICROCOMPUTER DIGEST

Volume 3, Number 1

July, 1976

## THE "SUPER 8080" MICROCOMPUTER

Z-80, Zilog's first microcomputer, was introduced at the California Computer Show and includes all the logic circuits necessary for building high performance microcomputer-based products with virtually no external logic, and a minimum number of static or dynamic memories.

Totally software compatible with Intel's 8080A, the 40-pin N-channel, depletion mode, MOS microprocessor has a repertoire of 158 instructions and 17 internal registers including two real index registers. Additional features include built-in refresh for dynamic memory, 1.6 us machine cycle time, and a single 5V power supply and a single phase TTL clock. (cont'd on page 2)

## AMI 6800 PROTOTYPE CARD

American Microsystems, Inc. has introduced a microprocessor prototyping board for hardware and software evaluation of 6800-based microcomputer systems family in specific applications.

The AMI 6800 Microprocessor Evaluation Board (EVK300) features a built-in programmer for the S6834 EPROM microcircuitry. This feature, not offered on competing prototyping systems, gives the AMI board greater capability in developing prototype microcomputer programs. (cont'd on page 2)

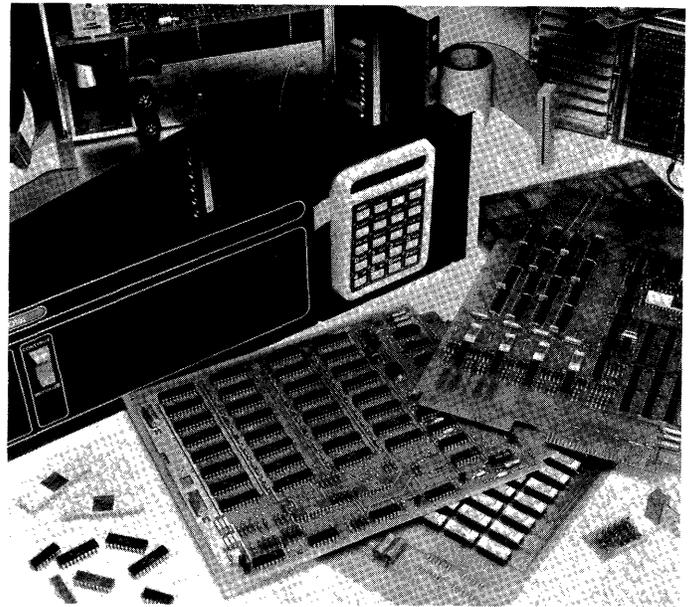
## NATIONAL STUNS INDUSTRY W/8080

The well-known 8080A microprocessor family is now available, along with plans for its most popular support circuits, from National Semiconductor Corp.'s Microprocessor Group, according to Bill Baker, group director.

(cont'd on page 2)

## MICRONOVA MICROCOMPUTER FAMILY

As reported last month, Data General Corp. has introduced a 16-bit microcomputer family with the architecture, software and system performance of a NOVA minicomputer. The family ranges from chip sets to fully packaged computer systems. The microNOVA family is based on a high-performance, Data General designed and manufactured 40-pin NMOS microprocessor.



This microprocessor features a 16-bit word length, NOVA-compatible architecture, 32K main memory capacity and a sophisticated I/O encoding scheme capable of controlling multiple high-performance peripherals.

Main memory is available as dynamic RAM or PROM, for nonvolatile storage of programs. Memories are expandable up to 32K words. Additional drivers, sense amplifiers and transceivers provide full buffering for (cont'd on page 4)



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## THE "SUPER 8080" MICROCOMPUTER

(from page 1)

Zilog claims the Z-80 has 25 to 100% better throughput and that 25 to 50% less memory is needed than with the 8080A.

Zilog has added instructions to allow for additional indexed and relative addressing modes, memory-to-memory block transfers, and a wide range of memory and register rotates and shifts. It also features 16-bit arithmetic and BCD arithmetics.

The Z-80 microprocessor is not a pin-compatible device due to adding new features to the CPU and eliminating the need for the 8224 and 8228 circuits it also replaces. However, Zilog has kept the pinout relatively similar to the 8080 to simplify customer hardware designs.

The Z-80 is available in three forms: chips, card, and as a stand-alone floppy disc system for hardware and software development.

The chip family includes the CPU, PIO (parallel I/O controller), SIO (serial I/O controller), CTC (counter/timer circuit), and a high speed DMA controller.

The PIO and SIO programmable controllers provide direct interfacing to a wide range of parallel serial interface peripherals without the use of additional external logic. Real-time events are controlled by the CTC.

Resident software support include ROM-based executive, RAM-based assembler, text editor, DOS file maintenance, real-time debuggers and PL/Z and BASIC compilers. Offline support include assembler, simulator, compiler and test pattern generator.

Pricing for the Z-80 is \$200 in sample units and \$50 in 1000 lots. Mostek and Zilog announced last month a licensing agreement making Mostek the Z-80 second source supplier.

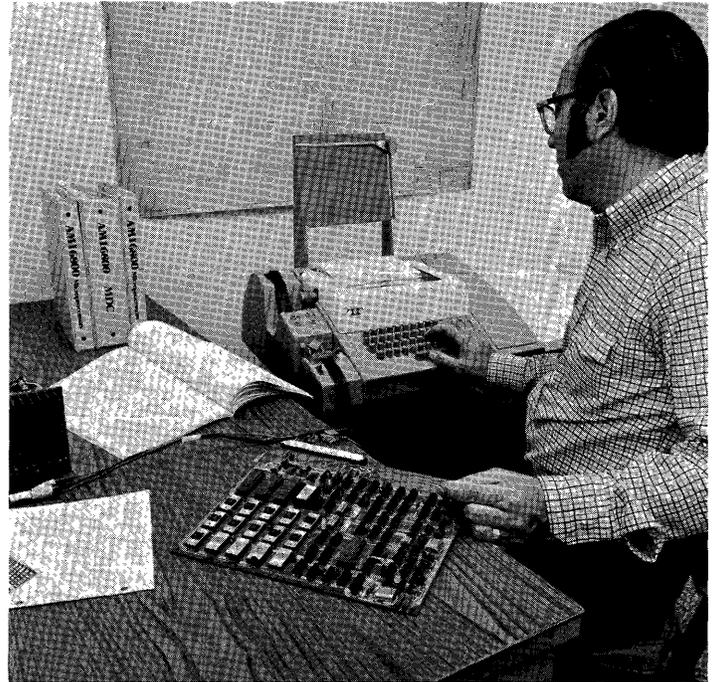
## AMI 6800 PROTOTYPE CARD

(from page 1)

The board also serves as a general purpose microcomputer for low volume systems by the

utilization of up to 58 I/O lines and expansion up to 56K bytes of user memory.

The AMI board, which is 10-1/2" x 12" and has two 86-pin edge connectors, can also be used for evaluating incoming microcircuits and for programming EPROM's on a limited production basis. Communication to the board is done through a TTY. Computer timesharing facilities are used to translate source-to-object code.



A high-level interpretive computer language called AMI6800 Tiny BASIC is furnished to EVK300 users. It resides in the EPROM at no extra charge. And Prototyping Operating System Program (PROTO), residing in the ROM is supplied with the board.

The board is available in three package options: kit form with the PC board and a minimum quantity of parts (EVK100-\$295); expanded kit with 512 x 8 EPROM (EVK200-\$595); and the expanded kit fully assembled and tested having 2K bytes EPROM with Tiny BASIC (EVK300-\$950).

## NATIONAL STUNS INDUSTRY W/8080

(from page 1)

The National microprocessor, INS8080A, is

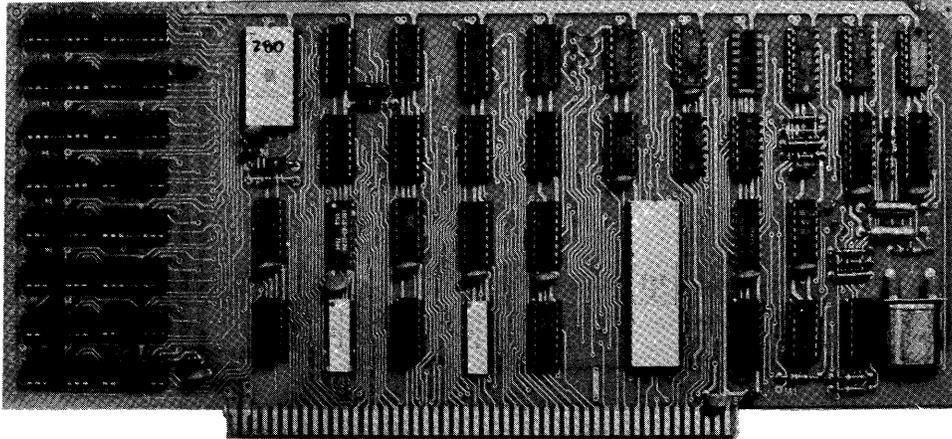


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# SUPER CHIP!

## The Z-80 CPU by Zilog



## From The Digital Group, of course.

If you are considering the purchase of an 8080-based system, look no further. The Z-80 has arrived. A new generation 8080 by the same individuals who helped design the original 8080 — combining all the advantages of the 6800, 6500 and 8080 into one fantastic little chip! And, the Z-80 maintains complete compatibility with 8080 software.

What's even better . . . the Z-80 is being brought to you by The Digital Group — people who understand quality and realize you expect the ultimate for your expenditure. With the Z-80, combined with the Digital Group System's video-based operation, you're at state of the art. There's no place better.

Take a look at some specifications:

### Z-80 FEATURES

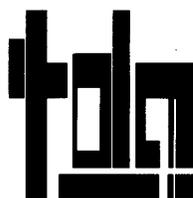
- Complete compatibility with 8080A object code
- 80 new instructions for a total of 158
- 696 Op codes
- Extensive 16-bit arithmetic
- 3 Interrupt modes (incl 8080), mode 2 provides 128 interrupt vectors
- Built-in automatic dynamic memory refresh
- Eleven addressing modes including:
  - Immediate
  - Immediate extended
  - Page Zero
  - Relative
  - Extended
  - Indexed
  - Register
  - Implied
  - Register Indirect
  - Bit
  - Combination of above

- New Instructions (highlights):
  - Block move up to 64k bytes memory to memory
  - Block I/O up to 256 bytes to/from memory directly
  - String Search
  - Direct bit manipulation
- 22 Registers — 16 general purpose
- 1, 4, 8 and 16 bit operations

### DIGITAL GROUP Z-80 CPU CARD

- 2k bytes 500ns static RAM
- 256 bytes EPROM bootstrap loader (1702A)
- 2 Direct Memory Access (DMA) channels
- Hardware Interrupt controller
  - Supports all 3 modes of interrupt
  - Mode 2 supports 128 interrupt vectors
- Data and Address bus lines drive 30 TTL loads
- Z-80 runs at maximum rated speed
- Single step or single instruction step
- EPROM de-selectable for full 64k RAM availability (programs may start at location 0)
- Complete interchangeability with Digital Group 8080A, 6800 and 6500 CPUs

The Z-80 is here. And affordable. Prices for complete Digital Group systems with the Z-80 CPU start at \$475. For more information, please call us or write. Now.



THE DIGITAL GROUP INC.  
P.O. BOX 6528  
DENVER, CO 80206  
(303)861-1686

a direct pin-for-pin and function-for-function replacement for the Intel device.

"The 8080A rounds out our microprocessor line and fills the last major gap in the product line-up," Baker said. "The 8080A fits beautifully between the cost-effective 8-bit control-oriented SC/MP and the versatile 16-bit PACE processor. It's our entry into the broad byte-handling and communications segment of the microprocessor market."

"We decided to build and market the 8080A because it has clearly become the industry's most popular general-purpose microprocessor," Baker added. "With National's volume capability and manufacturing efficiency, our decision to make and market the 8080A will confirm it as the definite industry-standard microprocessor."

The 8080A is National's first N-channel MOS microprocessor and is currently the most complex device which the company has yet fabricated with its N-channel process. National reports they intend to build all of the most popular support circuits in the family (INS8224, INS8228, INS8212, INS8255), as well as initiating programs to support 8080A users with hardware, software, and development tools.

Sample quantities of National's 8080A family components are now available from factory stock, and orders are being accepted through the company's distributors and sales representatives. When ordered in 100 lots, the CPU is priced at \$19.95. In 1977, the price in volumes greater than 10,000 will be less than \$12 each.

## MICRONOVA MICROCOMPUTER FAMILY

(from page 1)

large-system memory and I/O operations.

The microNOVA family also encompasses a list of support products including asynchronous and diskette interfaces and a new diskette-based operating system, DOS, a compatible member of the RDOS family. Available support includes training programs, full documentation and field service.

The microNOVA mN601 CPU is a 40-pin N-channel silicon-gate (NMOS) chip that is produced in Data General's Sunnyvale, CA, semiconductor facility.

It features the NOVA 16-bit multi-function instruction set, multiple addressing modes, hardware multiply/divide, hardware system stack with automatic limit protection, and a parallel 16-bit memory bus.

A 40-pin intelligent I/O Controller (IOC) at each device interface accepts fast signals from the microNOVA CPU and routes them into a parallel 16-line bidirectional data bus for I/O operations. This allows the microNOVA to maintain the I/O functionality of the 47-line NOVA parallel I/O system without an excessively high pin count.

The mN603 IOC has provisions for addressing up to 61 devices. The IOC features a program I/O facility with six I/O commands per device: it incorporated controller start, clear and function pulses; has integral data channel control logic; and 16-bit word -count/current address registers.

MicroNOVA software includes program-development tools such as the diskette-based DOS; utilities like macro assembler, relocatable loader and super editor; and Data General's real-time, multimasking operating system, RTOS; symbolic debugger; and FORTRAN arithmetic libraries, which can be invoked by FORTRAN programs or used as utility routines for assembly language programs.

MicroNOVA development software is included at no charge with a development system that consists of a microNOVA minicomputer, a diskette-subsystem, and an ASCII terminal system. MicroNOVA run time software is available on any system that includes appropriate microNOVA hardware.

The microNOVA card contains a microNOVA chip set with full buffering and 4K RAM all on a single 7-1/2 x 9-1/2" PC board. Additional RAM memory is available in 4K- or 8K word boards; PROM in 2K- or 4K-word increments. Board-level packaging components consist of a backplane/card-frame assembly that holds nine PCBs, a power supply assembly, and accessories.

An asynchronous interface supports Data General terminal printers and video displays, and a microNOVA controller interfaces to Data General's diskette subsystem. Other boards include a general-purpose wiring board for custom interfaces, a PROM-burner and an extender board for easily accessible maintenance and troubleshooting.

The chassis-level microNOVA can be used as a fully packaged MOS minicomputer for OEM product flow, or it can be configured with flexible diskette and DOS as a program or interface development system for the OEM's internal use.

The microprocessor chip is priced at \$225 in single unit quantities and \$95 in 100 lots. The CPU/4K single board microcomputer with 9-slot chassis, 4K memory, operator panel and power supply is \$1995.

## MICROCOMPUTER BASED PRODUCTS

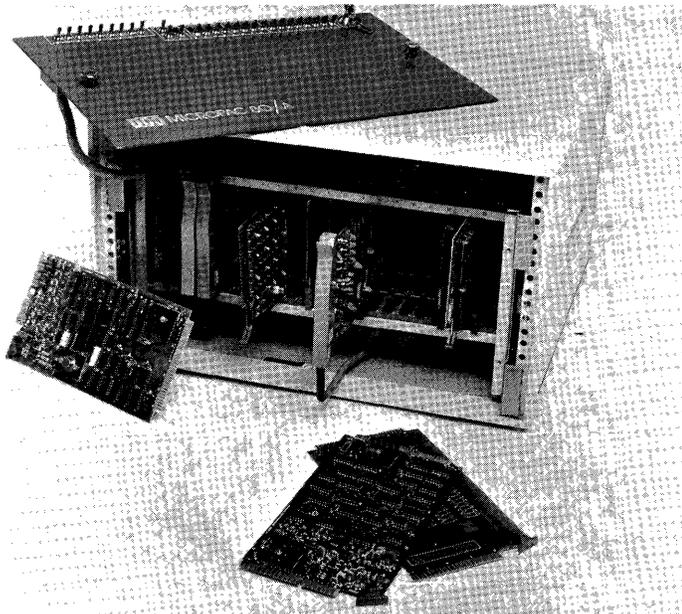
### 12-BIT MICRO ACTS LIKE PDP-8/E

A 12-bit microcomputer, designed around the Intersil IM6100 microprocessor, offers software compatibility with the Digital Equipment Corp. PDP-8/E minicomputers. The microcomputer, PCM-12, is available in kit form for \$400 to \$600, depending on options.

Manufactured by PCM, the microcomputer has a bus-oriented architecture to insure flexibility and future expandability. A TTL-compatible 80 line bus accommodates up to 15 cards for device interfaces and additional memory. The basic kit comes with 4K memory (expandable up to 32K), CPU, control panel, TTY/CRT terminal interface, cassette recorder interface, cabinet and power supply. All board interconnects are handled by a backplane bus and a single ribbon cable.

The PCM-12 can execute most PDP-8 software, including assemblers, editors, debug routines and advanced languages like BASIC and FORTRAN—much of which is available over-the-counter.

### ENERGY CONSERVATION



A new automated energy conservation system designed to reduce power consumption in commercial buildings by as much as 25% has been developed by Systems Technology, Inc. According to William Buyers, president, the system is the first to use a microcomputer to monitor and control the operation of electrical equipment for the more efficient management of power consumption.

Buyers explained that the system reduces both normal and peak power consumption loads. The microcomputer, a standard MicroPac 80 manufactured by PCS, works in conjunction with a minicomputer to automatically turn heating and cooling equipment on and off each day, as well as minimizing the use of this equipment when power consumption approaches a peak demand level.

Buyers also pointed out that automated energy management systems are now cost effective for any building with power bills in excess of \$5,000/month. In the past, bills usually had to exceed \$10,000 for systems of this type to be economical. System deliveries are expected to begin in the second quarter of 1976.

### μC AIDS HONEYWELL COMPUTERS

Smooth customer transition from Honeywell Series 200/2000 to Series 60/Level 66 large-computer systems without expensive program and file changes are facilitated by a new hardware-software conversion package, Honeywell Information Systems announced.

Hardware and firmware components of CM 66 can be connected to any standard Level 66 configuration. The system handles all Series 200/2000 instructions except input-output instructions which are executed through Level 66, while the processor interface adapter of the microprocessor accesses the standard Level 66 MOS memory.

### 6800 FLOPPY DISC SYSTEM

Plug-compatible with all serial asynchronous RS232C equipment, the series 7000 Dyna-TermDisc floppy disc system has two I/O ports, with individual speed selection from 75 to 9600 baud.

One port is interfaced to any RS232 terminal; the other to a data set or minicomputer I/O port.

Dynallogic Corp. Ltd. has designed the system around the Motorola M6800 microprocessor which allows incorporation of an optional editor feature which turns a dumb CRT into an editing and data entry device.

### FRONT PANELS USING μC

Harrel Inc. has designed their digipanel using microcomputers to facilitate and increase control capabilities. Digipanel is a complete panel for display and alarm of

temperatures, pressures, vacuum, rpm and other parameters.

The setpoint of each parameter is on a front panel thumbwheel switch and the actual value is shown on the digital readout located above the switch. A central alarm is actuated whenever the value of any parameter deviates from the setpoint by more than a predetermined amount.

## MICRO SYSTEM WITH PRINTER

Beacon Computer Corp.'s Model B6800 microcomputer consists of a 500 character per minute printer, 42 character keyboard, tape reader, tape punch, card memory, BEA-BUSS card extender, all cables, power supplies and full documentation. Unit price of the B6800 is \$1,250.

## 12-BIT MICROCONTROLLER

Based on the firm's TLCS-12A microcomputer, Toshiba has announced the TOSMATIC 12A microcontroller.

The system consists of a CPU, 1K PROM, 256 words of RAM and a process I/O device.

TOSMATIC is expected to be used for position control, cutter control and automatic thickness control in rolling mills; automatic operational control for coking furnace trucks; weighing and moisture control in paper mills; pumping and filter bed control at water service facilities; etc.

Features of the microcontroller include full maintenance accessibility thru the front of the device; a watchdog capability built in to detect hardware failures and shut off the output; a dedicated PROM controller to erase or write in the PROM on an individual card basis; and the condition of each unit can be checked from the console even when in operation.

## 4040 MICROCONTROLLER

Dianatek Corp. has designed a microcontroller around the Intel 4040 microprocessor. This controller incorporates up to 1356 bytes of PROM, 320 bytes of RAM, 10 I/O ports and requires only a single 15V supply. All microprocessor functions are brought out to a card edge connector.

Two other card edge connectors access CMOS I/O ports. The PC board is complete with crystal clock and switches for single-step check and reset of program. Price of the bare board with documentation is \$36. Parts kit, less microprocessor chip set, is \$39.

## GENERAL PURPOSE OEM CARDS

Data Works Instrumentation's Model 226 general purpose microprocessor card is based on the 8080 microprocessor. It contains DMA and data bus drivers, status latches, crystal clock and 8-bit vectored priority interrupt.

All 8080 control lines are buffered and are available on the dual 62-contact edge connectors. The microcomputer card operates from +5V and  $\pm 15V$  supplies and each output is buffered to drive 48 TTL loads. Priced at \$295 for single units, Model 226 is one of a series of logic and memory cards now offered by Data Works.

## BI-DIRECTIONAL MATRIX PRINTER



The new "optimized" bi-directional matrix serial printer that increases throughput two to three fold has been introduced by Tally Corp. The Model 1202 uses an internal 8080A microprocessor to compute the shortest distance to the next print position. The 120 cps unit prints left to right and right to left, slews at 7 ups, and moves the print head at an accelerated rate when not printing.

The newest member to the Tally T-1000 series, the Model 1202, will also offer a standard upper/lower case ASCII character set and an optional self-test routine. The self-test option prints an ASCII pattern and line feed routines to ascertain printer operation and allow off-line forms set-up.

The Model 1202 prints an original plus four carbon copies and handles form widths from 4 to 15 inches. Other features include a convenient snap-in ribbon cartridge, dual tractor engagement, half-space dot matrix characters for high print quality and an optional electronic VFU.

Unit price for the Model 1202 starts at \$2830. Quantity discounts are available. Delivery is 90 days ARO.

## 8080 PROGRAM ANALYSIS

A program analyzer for 8080 systems allows software to be debugged and run in the system's hardware without the use of a computer simulator. Available from Data Works Instrumentation, Model 640 contains a 4-digit hexadecimal display that shows either the program address or data-bus contents. Controls are provided for stepping the program from a selectable address, cycling through loops, and examining bus contents by instruction step or cycle.

The unit can be plugged directly into any of the company's microcomputer cards or the analyzer can be adapted to other 8080 systems by attaching the proper signals to the inputs.

Priced at \$650, the analyzer can be delivered in 2 to 4 weeks.

## $\mu$ C TELECOMMUNICATIONS TERMINAL

Sidereal Corp. has introduced a new standard 4-row keyboard, ASR terminal. Micro Net is controlled by a microcomputer and can simultaneously access TWX, TELEX, Timeshare, DDD satellite, private lines and computers with simple keyboard instructions.

Micro Net can also access other receiving terminals and communicate directly with them, bypassing expensive code conversion. According to a Sidereal spokesman, Micro Net simplifies all communications procedures with a standard format, 4-row typewriter keyboard. Message preparation is standardized on one Micro Net-created tape. The new terminal automatically produces a printed copy of the taped message. Standard keyboard procedures also automatically dial and redial receiving terminals, virtually eliminating the need

for an operator to stand by unsuccessfully attempting to access often busy lines.

Micro Net also has a built-in, self-diagnostic capability.

Sidereal offers two models, the Micro Net 33 and the Micro Net 35. Both models are available immediately for lease or purchase.

## MICROCOMPUTER SOFTWARE

### BSO OFFERING CROSS-ASSEMBLERS

A series of microcomputer cross-assemblers, developed by Boston Systems Office, Inc., feature assembly software written completely in MACRO. The assemblers are available on a commercial timesharing network.

The series is for the Intel 4004, 4040, 8008 and 8080, Fairchild F8, Motorola 6800, Mostek 6500 series, Texas Instruments 9900 and 1100, and National Semiconductor PACE microprocessor. Assemblers also are available for TI8080, NEC 8080, and Mostek F8; plans are to develop similar software for other microprocessors. Software is available for sale or lease for running on DEC-system-10 and PDP-11 computers.

### F-8 CROSS ASSEMBLER FOR PDP-8

Logic Systems is offering a cross assembler for the Fairchild F8 microprocessor that is designed to run on a PDP-8 computer with a minimum OS/8 operating system.

The assembler will handle any size program with a maximum of 600 labels. Features include: shorthand or free form input data, formatted list output, binary code in "Fair-Buf" loader format, and a simplified instruction set.

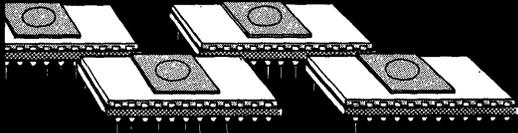
The assembler requires only 8K of memory.

### PL/M 6800 COMPILER

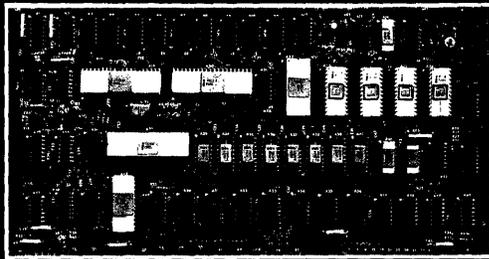
The new PL/M 6800 Compiler, available directly from Intermetrics or through General Electric Information Services computer network, is a one-pass compiler which produces optimized object code in a format directly usable by the Motorola MINIBUG/MIKBUG and EXbug Loader Function. The compiler includes a number of user-controlled features such as source program listing, object code listing, assembler code listing and symbol table dumps.

The price for PL/M6800 is \$1000 from Intermetrics.

# With these four chips



# and the SBC 80/10



## You save from \$4,000

## and get all the software development capabilities you need.

That's right. You don't need an Intellec® MDS to make the new Intel® 80/10 completely capable of handling all your software development needs. Now, you only need RDP2, our new software development package. Simply drop it into place **within** the SBC 80/10, and you get all the software development capabilities you need.

Check the specs (and the cost):

- **Assembling** is 2 times faster than Intel's® MDS Resident Assembler.
- **Availability** is instantaneous; the RDP2 software never needs to be loaded.
- **Contents** are complete: all the software editing, debugging and assembling tools needed to produce SBC 80/10 software is included. And the software is provided on proms which reside on the SBC 80/10 Board itself.
- The entire unit is **completely tested**, fully warranted and ready for immediate delivery (and we invite dealer inquiries).

Price is a **cost-effective** \$995.00—compare that with the \$5,000 to \$12,000 you'd expect to spend for a complete software development system!

Simplicity, reliability and cost-effectiveness: they're part of the standard designing at EXTENSYS. Give our software package a try and you'll see what we mean.

And keep us in mind—you'll be hearing of our good ideas.

For further information contact Sam Holland:

**extensys**  
corporation

592 Weddell Drive, Suite 3  
Sunnyvale, CA 94086  
(408) 734-1525

## RESIDENT SINGLE-PASS ASSEMBLER

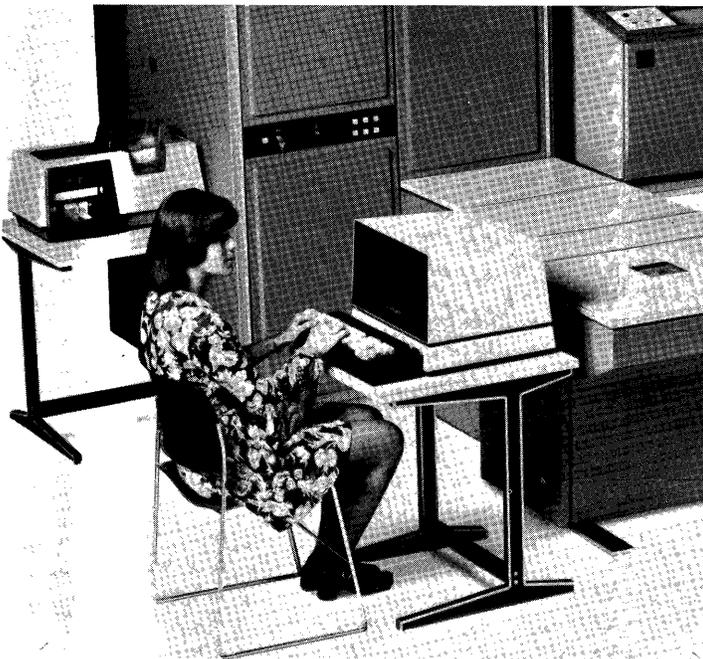
Micro Systems Software is offering a one-pass assembler that runs in resident mode on an 8080, assembles a compatible sub-set of the Intel language and generates machine code directly into memory for immediate execution. It occupies less than 2K bytes of memory and can be placed in PROM/ROM.

Features include a bias-address offset for storing machine code, and three output print options: print object and source, print object only, and no print. Price is \$495.

## MEMORIES AND PERIPHERALS

### LSI TEST SYSTEM

A computer-controlled, 120-pin semiconductor test system designed specifically for testing high-complexity LSI devices such as microprocessors, calculators and high-density memories, was introduced at the Electro/76 Show by the Systems Technology Division of Fairchild Camera and Instrument Corp.



With the capability of testing up to 120 pins at speeds up to 10MHz, the Sentry IV system facilitates testing and characterization of advanced semiconductor devices regardless of technology—bipolar TTL, DTL, ECL or MOS static or dynamic P-channel or N-channel, or CMOS.

The Sentry IV system offers up to 12 timing generators for data and clock timing; four additional timing generators for output

strobe, each programmable from 10 ns to 10 ms with 160-ns resolution; and test periods ranging from 100 ns to 40 ms.

### CRT IMAGE STORED IN 4K RAM

A CRT display memory, the Intel in-477, stores an entire video image on a single board built with 4K RAMs.

The memory locations can be accessed both randomly and sequentially at data rates up to almost  $20 \times 10^6$  b/s. This allows the in-477 to be used in special image processing applications and to refresh CRT displays of virtually any size and image format.

The board is 15" square, operates on standard power supplies of +5, -5 and +12V and is completely TTL compatible. Maximum power dissipation is less than 25W.

Price for the in-477 is \$1725 in 100+ lots.

### CORE MEMORY FOR NATIONAL UP

Plessey Microsystems has introduced the PM-MP8 stand-alone core memory system. The memory has been designed to fulfill both RAM and PROM functions in microcomputers.

Configured either as a 16K x 8 or 8K x 16 memory, the system is fully compatible with National Semiconductor's IMP-16C, -16P, -8C, -8P and PACE microprocessors.

It can also be used to replace the IMP-16P/004A RAM or as an add-on memory module, and features a separate I/O data bus, 3-state outputs, access time under 450 ns, and programmable address select.

An optional memory control card which enables the memory system to be used with the IMP-16L and other 16- and 8-bit microprocessors provides write protect to prevent inadvertent program modification, data protect for memory contents during power-up and power-down sequences.

### MICROCOMPUTER CORE MEMORY

Ampex Corp.'s new Model MCM 1000 micro-computer core memory provides 450 ns access to 1024, 2048 or 2096 x 8-bit data words and full cycle operation in 1300 ns.

Each self-contained memory module includes timing and control, data and address registers, decoding and drive circuits and TTL negative interface. A data-save feature prevents loss of data upon power interruptions. Two sizes are available.

The MCM 1000 is priced at \$500 in quantity.

## LSI-11 MEMORIES

Memory Systems Inc. is now offering two accessory boards for DEC's LSI-11 microcomputer.

The two boards, one with 8,192 words of 16-bits each and the other with 16,384 words offer access times of 500 ns and cycle times of 800 ns. The units are tentatively priced at \$1,450 for the 16K board and \$879 for the 8K version.

## AMI 512x8 EPROM

A 24-pin, high-speed static 512 x 8-bit EPROM, designed for use in bus-organized S6800 systems, is now available from American Microsystems, Inc.

The S6834 memory features UV erase time of less than 10 minutes and a full write time of less than one minute. The device dissipates 750 mW when using +5 and -12V power supplies. It features 3-state outputs and a typical access time of 500 ns.

A 750 ns version, the S5204A, is also being offered.

The S6834 is priced at \$35.90 while the S5204A is tagged at \$27.90. Both prices are for 100 lots.

## VIDEO RAM

The MTX-816 video RAM (VRAM) provides a direct link between microcomputers and the video input of a television or CRT. To the microcomputer, the input side of the 3 x 4 x 0.6 inch module looks like an ordinary 128 x 8 RAM with connections to the 7-, 9- or 10-bit address and 8-bit data buses.

The output is a video signal that displays an 8 x 16 field of ASCII upper and lower case letters and symbols. Manufactured by Matrox Electronic Systems, the VRAM requires only +5V at less than 1W. Price is \$95 in quantity.

## PROM/ROM SIMULATOR

A new PROM/ROM simulator from ElectriCom will simulate a 32 x 8, 256 x 4 or 512 x 4 PROM/ROM on each of 2 channels or a 512 x 8 format on 1 channel. In addition, the RS-4000 can be loaded from keyboards, preprogrammed PROM/ROM or optional TU-150 paper-tape reader.

Features include 6-function text editor,

replaceable output connector sockets, and address/data display. The RS-4000 is priced at \$1970.

## 2704/2708 PROGRAMMER

A versatile programmer for the Intel 2704 (4K) and 2708 (8K) erasable PROMs requires only 70 seconds to program and verify one of the 4K memories and only 140 seconds for an 8K device. Verification is done automatically with Curtis Electro Devices, Inc.'s unit by using an internal RAM.

The RAM may be loaded manually by using eight data switches and an octal address switch or automatically from a master ROM, ROM simulator, or minicomputer. Eight status lamps on the model PR-2708 programmer allow visual verification and adjustment of the contents of the erasable PROM.

The PR-2708 is housed in a 16 x 10 x 4" metal case, and sells for \$998.

## IN CIRCUIT ROM EMULATOR

A ROM emulator that can be connected directly to any ROM or PROM socket to emulate any configuration up to 1K x 8 is now available from Genesys. Access time at the attachment point is 50 ns.

The GENRAM RE8192 loads and operates from an RS232C or current-loop interface at rates up to 19,200 baud. It recognizes only addresses and data-field control characters, and can load individual locations. Options provide compatibility with slower ROM simulators. Faster access times will be available soon.

The unit is tagged at \$1776.

## 60 PROM ERASER

Up to 60 erasable PROMs of the MM5203Q, 1702A and 2708 and similar types can be handled by Turner Designs' new Model 30-000 PROM eraser.

Devices are loaded on removable metal trays that also prevent electrostatic damage. An adjustable time, calibrated in minutes and with a hold feature, controls operation. Output at 2537 Å is 7000 uW/cm<sup>2</sup>. A door interlock prevents accidental exposure and a specially designed UV-lamp envelope protects users from ozone.

The unit is priced at \$295.

## MICROCOMPUTER LINE PRINTER

A low cost, 160-char/s line printer with EIA and asynchronous bit-parallel ASCII interface cards, has been designed for use with most microcomputers by the Binary Corp.

Self-contained in a 10 x 10 x 4" package that includes power supply, the device uses a Sharp electric-discharge printer to provide 20-col printout on 2.25"-wide paper. Its standard 64-char set includes full alphanumerics.

## CASSETTE TAPE TRANSPORT

A low cost, variable-speed cassette tape transport, the Phi-Deck, features 4-motor control, remote control capabilities, fast start/stop, <30-s rewind, as or battery operation, and variable speed from 0.4 to 10 in./s.

Power requirements for the unit manufactured by Triple I, are 7 Vdc at 600 mA avg. Four separate motors control take-up, rewind, play or record, and head engagement. Options such as EOT/BOT sensing, record/play, read/write, electronics, and cassette-in-place sensing are available.

## LSI UNIBUS ADAPTOR

A Unibus adaptor from Associated Computer Consultants combines the DEC LSI-11 and Unibus into 1 bus. Fitting directly into the H9270 backplane, this quad-width pc board provides a bidirectional data rate of 659K words/sec, 28K words of memory and peripheral device address space.

The \$650 price includes a cable which interconnects the bus via an edge connector.

## PEOPLE, LITERATURE AND EVENTS

### \$900,000 XINCON III ORDERS

The Xincom Systems Division of Fairchild Camera and Instrument Corporation has received more than \$900,000 in initial orders for its Xincom III semiconductor memory test system.

Customers who have committed to Xincom III third-generation distributed multi-processor architecture for their memory test requirements include Advanced Memory Systems, General Electric, General Instrument, Intersil, and Fairchild's MOS Division and Bipolar Memory and ECL Division.

## CRAMERKIT BROCHURE

Cramer Electronics, has issued an informative new spec sheet that offers descriptions, features, components, and specifications for its selection of Cramerkit line. Cramerkits are now available based on Intel 8080A, Texas Instruments TMS 8080 and TMS 9900, Motorola 6800, AMD 9080-1, RCA COSMAC and Mostek F8 Microprocessors.

## GUIDE TO TELEPRINTERS

A new guide to help business communications users evaluate and select printing communications terminals is now available from AUERBACH Publishers Inc.

The AUERBACH Guide to Teleprinters covers the major features of over 130 of the most current teleprinters on the market. A market overview of teleprinters suggested selection criteria and application potentials are also provided.

The Guide offers detailed, analytical descriptions of 35 major terminals, covering the manufacturer, specific product features, limitations, competitive performance, compatibility, and maintenance characteristics. A directory of suppliers is included.

The new AUERBACH Guide to Teleprinters, 166 pages, is available for \$24.95.

## PEOPLE ON THE MOVE

Appointment of JOHN A. EKISS as director, MOS Manufacturing Operations for RCA Solid State Division was announced by Philip R. Thomas division vice president, MOS Integrated Circuits.

Ramtek Corporation, has named two new vice presidents, JOSEPH G. MORRIS, Marketing, and GAYMOND W. SCHULTZ, Engineering.

RICHARD B. RUBENSTEIN has joined American Microsystems, Inc. in the newly created position of product/technology planned coordinator.

LIONEL MARTIN has been named Manager of Technical Operations for Zentec Corporation.

BERNARD T. MARREN has resigned from AMI as president and chief executive officer of the company.

National Semiconductor Corp. has appointed OMEGA ELECTRONIC SALES, INC., Huntington Valley, Pennsylvania as its exclusive Sales Representative for the territory of Eastern Pennsylvania, Southern New Jersey and Delaware.

**EDUCATION**July

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Toshiba (Tokyo Shibaura Elec. Co.), 280 Park Ave., New York, NY 10017

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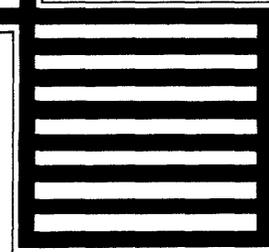
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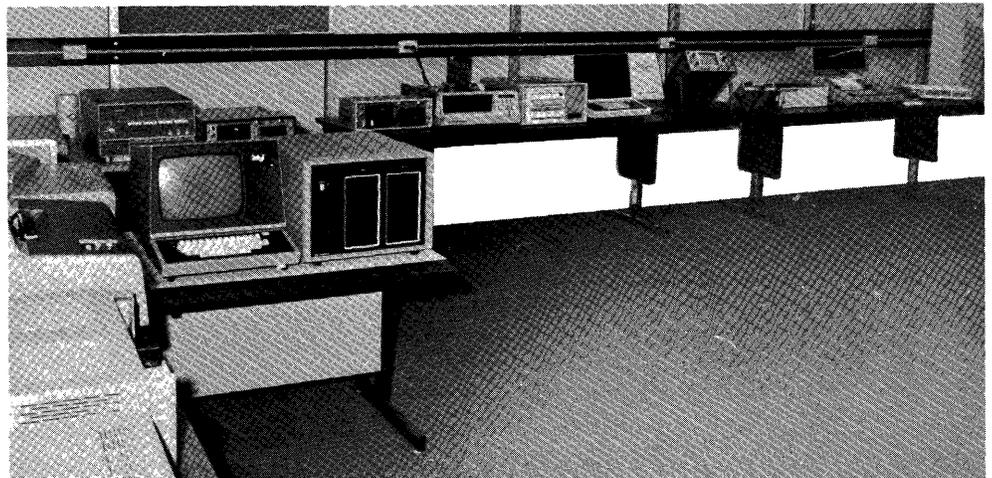
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