MICROCOMPUTER DIGEST

Volume 3, Number 3   **September, 1976**

INTERSIL—AMS MERGER

Intersil Inc. and Advanced Memory Systems Inc. have agreed in principle to merge under the banner of Intersil, Inc. AMS' President Orion Hoch will be the new Intersil president and chief executive.

The merger is cited by several industry sources as an excellent move with each company complementing the other. AMS is a system house with a good cash position but lacking new product strength whereas Intersil is a component firm lacking the needed financial resources to market its new products.

TRANSITRON CLOSES MICRO DIVISION

Transitron has dropped its 16-bit, 6-chip bipolar microcomputer family and closed the doors of its microcomputer division. The decision was made by Dr. David Bakalar, president, after 2½ years and $2 million of development. Repeated delays due to developmental problems in both microprocessor and memory bipolar Schottky process are said to be the reason for the shutdown. Twenty-three of the 27 division employees have been laid off.

MMI DROPS μC SYSTEMS & 4K RAMs

Monolithic Memories Inc. has closed its year old Microcomputer System division and dropped its 4K dynamic MOS RAM.
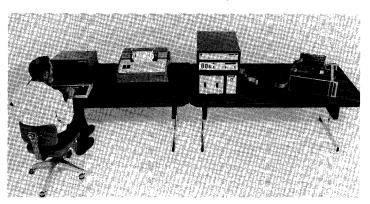
The decision was based, according to an internal office memo to employees, on "market conditions which made the early profitability of either product most unlikely."

Up to 40 employees may be terminated and James Moreton, microcomputer division general manager and Ken Moyle, corporate vice-president of MOS operations, are expected to leave the firm.

CRASH-PROOF UNIVERSAL μC SYSTEM

A unique dual-processor prototyping and development system for microcomputer applications has been announced by Signetics. Called TWIN (Test Ware INstrument), the dual architecture is the first to offer the security of a "crash proof" development environment and an "obsolete proof" capital invenstment, according to the firm.

In competitive systems, application program malfunctions or operator errors can destory or radically alter the resident operating system. Using TWIN, programs under development are completely separate from the operating system, and errors made in the development process cannot alter system integrity or software already completed.

TWIN operational functions are handled by one CPU (2650) referred to as the master. A second, or slave CPU is used for developing programs and interfacing prototype devices. Only the slave CPU must match the users selected microprocessor for "design-in" applications.

In the present system, software is available for using a 2650 microprocessor as the slave. But the hardware architecture is independent of the microprocessor used as the slave. Signetics expects eventually to offer software for its own 3000 bipolar series.

SPECIAL FEATURES

INTERSIL-AMS MERGER

The proposed company should see annual sales by the end of 1976 somewhere between $75 and $100 million. Last year AMS reported $32 million and Intersil reported annual sales of $25.5 million.

Intersil manufacturers the 6100 CMOS family of PDP-8 compatible microprocessor while AMS has agreed to second source Signetics' 2650.

Both companies are located in the San Francisco, CA bay area.

MMI DROPS μC SYSTEMS & 4K RAMS

The microcomputer division folding comes only two months after MMI's 16-bit Micromini 3 was introduced at the National Computer Conference. The computer is built around four MMI 6701 bipolar LSI microprocessors and 22-pin 4K dynamic RAMs. A 32K system had been priced at $2,500 in small quantities.

Irwin Federman, vice-president of finance, reported that although MMI will be phasing out of the microcomputer system market, the company will continue to produce microcomputer boards.

Federman also said that the phaseouts will have no effect on MMI's physical assets, nor will a writeoff of any consequence take place.

MMI had also just announced deliveries of its 57110/67110 microprogram controller (MPC). The MPC can address 512 words of memory using 9 address lines and contains a loop counter to loop on one or more microinstructions. The MPC flag status register can be used to monitor four flags, with separate loading selection for the C flag. The group also includes the N, V, and Z flags.

The 8-instruction device can be used as the central control in any non-arithmetic system employing TTL or bit-slice microprocessors.

CRASH-PROOF UNIVERSAL μC SYSTEM

Up to now, microcomputer users who needed a development system had to purchase one with the certainty that, should they change or upgrade to a new processor, it would be necessary to buy another development system.

A typical TWIN system consists of a development computer with dual PROM programmer, a dual drive floppy disc unit, an operator console, and a TWICE cable. TWICE (TestWare In Circuit Emulator) supports the development, integration and check-out of the user's software and hardware.

TWIN is provided with a full range of supporting software including a disc-based operating system, a text editor, a resident assembler, and extensive debugging and diagnostic capabilities. The dual-processor architecture expands the user's capability to develop microcomputer programs by providing a dedicated CPU to store and manipulate all associated user codes and programs. The other CPU works strickly with TWIN system resident operating commands and programs.

Supported by a sophisticated DOS, the user can easily switch back and forth from independent software/hardware development modes to hardware/software in-circuit emulation modes.

TWIN uses a symbolic assembler-type programming language with a syntax that is typical of minicomputer languages. When software is fully debugged, the object code can be burned into PROM using the TWIN system.

BASIC units feature dual memory expandable from 16 to 64K bytes, a 16-bit bus instruction, RS232 and current-loop interfaces with a transmission rate of 11- to 1200 baud, a TWICE cable and all system software.

TWIN systems are immediately available from stock with a basic price of less than $10,000.

TECHNOLOGY

FAIRCHILD PLASTIC F8 FAMILY

Fairchild Camera & Instrument is readying plastic versions of its complete f8 family for introduction in September.

Prices for the 3850 CPU and 3851 program storage unit will be $9.95, $7.45 for the 3853 static memory interface, $5.95 for the 3854 DMA and $6.45 for the 3861 parallel I/O device.

Fairchild will also be introducing the 3856 program storage unit with 2K ROM available in plastic for $14.95.

It was1 also learned that Fairchild plans to begin shipments of its new single-chip F8 during 1Q77. The 3859 CPU will combine the 3850 and 3851 into a single circuit. The firm will offer the 3859 in both plastic and ceramic for under $20.

CPU, RAM, ROM, I/O CHIP

A single chip, 8-bit microprocessor containing CPU, RAM, ROM, I/O and other functions has been announced by Toshiba. Designated T-3444, the microprocessor is designed as a controller in various consumer and industrial product applications.

The chip will only be offered on the Japaneese market until the firm has studied the export market potential. The T-3444 has been priced at approximately $23.30.

6800 EUROPEAN PACT

Thomson-CSF has signed an agreement with Motorola to become the European second source for the M6800 microprocessor.

The agreement calls for Motorola to supply masks and information concerning the 6800 to Thomson-CSF for present and future microprocessor products.

Motorola currently has alternate source agreements for the M6800 with AMI in the U.S. and Hitachi in Japan.

Hitachi has already begun marketing its version of the fully compatible HMCS6800. Hitachi in addition to fully Motorola compatible support circuits, will be offering five Hitachi developed circuits; a cassette controller, floppy disc controller, DMA controller, CRT display controller, and a clock pulse generator.

The firm is initially concentrating on the Japanese market with export plans for next year.

SYNERTEK SAYS NO TO 1802

Synertek has announced that it has decided against second sourcing RCA's 8-bit 1802 microprocessor as previously reported (MD 4/76).

The move was reportedly based on Synertek's decision to solely concentrate on MOS Technology's 6500 microprocessor family.

As reported in April, Hughes Aircraft's Solid State Products division will second source the RCA CDP 1802. RCA will provide Hughes with process outlines, mask sets, test programs, character data applications and support data for the processor family.

Hughes fully expects to have the CPU memory and interface circuits in production in 4Q76.

The agreement is also said to cover future generation of CMOS and silicon-on-sapphire products, and microprocessor components. Terms of the royalty agreement were not released.

It was also learned that Solid State Scientific is seriously considering whether to become an alternate source for the 1802.

6502 AND 6800 TINY BASIC

Itty Bitty Computers has announced the availability of Tiny BASIC for several 6502 and 6800 microcomputers.

Single copies of the Tiny BASIC programs are priced at $5 which includes an individual license to use them, a 26-page user manual, and a hexadecimal paper tape in the manufacturer's loader format. A hexadecimal listing will be substituted for the tape on request from users.

Tiny BASIC itself does not contain any I/O instructions; three JMPs link Tiny to the user user's I/O routines. These are documented in the manual.

Offerings include TB680R for MIKBUG, EXBUG, and most homebrew 6800 systems with RAM in the first 3K of memory; TB680S for Sphere's 6800 system (includes I/O routines); TB680P for AMI 6800 Prototype Board (includes I/O routines and runs with on-board 1K RAM); TB650K for MOS Technology's 6502 KIM system as well as most homebrew 6502 systems with RAM in the first 4K of memory; TB650J for Microcomputer Associates 6502-based JOLT Microcomputer; and TB650W for the 6502-based Apple system (includes I/O routines).

Only prepaid orders are accepted by the firm. Foreign country orders are to add two dollars.

Video Response Controller

Microcomputer Associates Inc. has announced it is currently marketing and manufacutring the VRC-100 Video Response Controller, a 4004 based device that allows a videocassette player to become an interactive teaching unit.

The VRC-100 applies the basic teaching and testing philosohpies of audio response systems to a video response system. This is unique since the precise control and positioning of helical video tape players is extremely difficult.

The VRC-100 is used in a training film environment and enables a student-operator to respond to questions displayed on a video screen. Student responses are entered through the VRC keyboard. For each set of questions, every response corresponds to a predetermined response address (position) on the tape. The VRC accepts the student response, positions the tape to the required address and resumes playing of the tape.

The VRC can also be used to preposition a tape. A digit display on the face of the unit indicates the current tape address in "counts" from rewind address zero. A second display segment indicates the last "search" address entered for prepositioning the tape.

One optional feature is available with the VRC unit. The encoder option enables recording of response address data on the videocassette audio channel.

The VRC-100 consists of control electronics enclosed in a plastic enclosure approximately 8 x 10 x 4". It attaches to a videocassette player via a cable with connector. All signals required to perform VRC functions are made available at the videocassette player connector by the controller.

The console (face) of the VRC enclosure supports the keyboard and display. The keyboard section includes a ten-key unit (0-9) and ten function keys. The display section consists of two four-digit decimal display segments, each capable of displaying decimal values from 0000 to 9999.

The VRC-100 Video Response Controller performs the following functions:

o Maintains a current videocassette position address and displays this at the console at all times.

o Responds to "search requests from the keyboard, enters and displays

the search address and positions the videocassette accordingly.

o Responds to "play" requests from the keyboard and begins playing the videocassette.

o Responds to "pause" requests from the keyboard, stop videocassette playing and waits for a subsequent request.

o Responds to "clear" requests from the keyboard and clears the current search address display.

The VRC-100 control electronics consist of an Intel MCS-4 microcomputer, a console interface card and power supply. VRC power is supplied via a three-wire AC plug. Power on and off is controlled by the cassette-in switch on the VRC-100 enclosure.

The VRC-100 is currently being applied in industrial training environments, university learning centers, and dealer showroom displays.

Prices begin around $2000 in single units and delivery is 90 days.

The Data Handler

Western Data Systems has just introduced a new microcomputer card called THE DATA HANDLER. The card is based on the MOS Technology 6502 microprocessor.

The high speed operating capabilities of the Data Handler are enabled by the use of an easy to use full function hardware controlled front panel, a large ground plane area (to minimize noise at high operating

speeds) on the P.C.B. and 2102 type RAMS.

Slower accessing memories (EPROMS and ROMS) may be used, although this will reduce the cycle speed to within the limits of other microcomputer kits.

The single 12.75"x10.5" P.C.B. can directly address 65K of memory and contains 1K bytes of static ram of the board with complete address decoding.

THE DATA HANDLER is designed with identical drive capabilities around the 8800 Altair, 100 pin tri-state bus. It is plug in compatible with the long list of Altair peripherals. Expandability can be achieved in a manner identical to the 8800 Altair by using the mother board.

The Handler has dual interrupt lines (one maskabel), slow down circuitry for slow memories, DMA circuitry, and DMA acknowledge control. It also contains one 8-bit parallel input port, one 8-bit parallel output port, separate I/O address control and memory control lines, single voltage (+5V@1.8A) and cycle times to 250ns.

For an introductory offer the DATA HANDLER BARE BONES kit is selling for $79.95, which includes the Data Handler PC board, 26 keyboard switches, stand, and complete documentation, but none of the MOS components.

The complete kit that includes the 6502 and all its components is also available from Western priced at $169.95.

μC-BASED DIGITAL CONVERTER

Model MN7200 multichannel resolver-to-digital converters now available from Micro Networks, combine an on-board microcomputer with a single A/D converter to greatly simplify the reduction of resolver output signals into digital form.

The basic operation of the new MN7200 is dramatically different and far simpler. The front end of the MN7200 is an AC/DC converter which takes resolver AC output signals and converts them to DC levels which are sequentially fed, through a multiplexer, into a 12-bit A/D converter. The on-board microcomputer initiates each A/D conversion, fetches the data from the digital output of the converter, stores it in memory, and then calculates and reads out the angle in binary form.

The MN7200 is a complete 8-channel, 14-bit multiplexed resolver-to-digital converter. Because of its unique microcomputer based design, total power consumption of the 8 channel system is only slightly greater than a single channel device

designed along conventional lines.

System price is $1,750 in unit quantity; delivery is three to six weeks.

MICROCOMPUTER SOFTWARE

8080 CROSS-ASSEMBLER

Epicom, Inc., is offering the EPIX-80, a cross-assembler program written to support the 8080 type microprocessor user.

The EPIX-80 is written completely in ANSII standard Fortran IV and will operate on any computer with 16K words of memory and a word length of at least 16K bits. The EPIX-80 accepts the standard 8080 source language statements and the object code output format is directly compatible with the Intel MDS System. Additional features of the EPIX-80 include: Symbolic Addressing, Relative Addressing, Constant Generation, 2 or 3 Pass Option, Selectable Symbol Table Size, Selectable I/O Device Assignments, Extensive Pseudo-Insturctions, Listing Output Format, Arithmetic Operand Functions, Alphabetically Sorted Symbol Table List, and Extensive Diagnostic Error Messages.

The EPIX-80 Assembler is available for $500 and comes completely verified in either punched card or punched tape format. A comprehensive users manual, a program source listing and a verification program accompany each EPIX-80 program.

MICROCOMPUTER TIMESHARE

Remote Computing Corporation has announced the availability on timesharing of a general purpose microprogramming language called DAPL. Testing and acceptance by the various 4-bit slice manufacturers has been completed and DAPL is now accessible via Remote Computing Corp's nationwide toll free network. The product currently supports the AMD2900 and Fairchild 9400, and soon to be included are the Motorola 10800 and MMI 6700.

DAPL allows the micorprogrammer to select any of 4 levels to provide a convenient symbolic representation of his microprograms. Macros and symbolic values are allowed at all levels. At Level 0 the microinstructions are formed by sequences of symbolic names, binary, octal, decimal, and hexadecimal numbers. At Level 1 microinstructions are formed as a series of fields, with each field being sequentially assigned a value as in Level 0. Additionally, label tables are allowed for mapping ROMs and PLAs.

Level 2 extends the microinstruction field definition to include symbolic names and default values. Finally, Level 3 allows the microprograms to be expressed in register transfer notation.

DAPL allows microprograms from 8192 words by 256 bits. Free form input with comments arbitrarily interspersed for documentation is featured, along with an interlist command that lists the generated microcode directly beneath the associated microinstruction. A complete variable cross-reference listing with extensive error detection and debugging aids are available. The user may choose hexadecimal or binary object file formats.

In addition to the Intel software presently offered, Remote Computing Corporation will also offer software support for the MOS 6500 in the form of a cross assembler, FORTRAN compiler, and a PL/M like compiler.

DEVELOP-80

MITS DEVELOP-80 is a package for developing assembly language programs for 8080 type microcomputers on the DECsystem 10 timesharing computers.

The package consists of a macro assembler, an 8080 simulator, a modified version of the DDT debugging package, and various support programs. Special features include cross reference assembly listings, a high speed simulator, symbolic debugging, and execution profiles for speed optimization.

MITS has priced DEVELOP-80 at $750.

MEMORIES AND PERIPHERALS

HERUIKON FLOPPY DISC

The Heruikon Corporation announces the addition of floppy disc equipment to its line of OEM microprocessor components.

The MLP-8065 disc controller provides IBM compatible data formating and control for one to six individual drives. Designed to interface directly to Heruikon's MLP-8080 system bus, the MLP-8065 responds to all standard disc commands including read, write, and seek. The controller has a data address register which a-lows data transfers to and from any portion of the MLP-8080 system memory.

Disc systems are available stand alone, or as a component in the Heurikon HIT-5000 intelligent terminal system. Disc drive software support is available to handle command execution and error recovery.

Applications software for specific user requirements can also be made available.

DIGITAL CARTRIDGE RECORDER

North Atlantic's Qantex Division announces the dual Model 2710 portable digital cartridge recorder, featuring a complete and autonomous data storage system that uses the 3M DC300A Data Cartridge as the tape storage medium. The recorder comes with interfaces for DEC PDP-11, DEC LSI-11, Nova, and other popular minicomputers, as well as the Intel 8080 microprocessor, and includes power supplies, formatter, and interconnecting cables.

Both of Model 2710's 3M cartridge recorders read and write at 1600 bits-per-inch phase encoded, operate at 30 inches/second tape velocity, hence provide 48,000 bits-per-second (6,000 bytes/second) data rate. The unit records to ANSI or ECMA standards, provides 1-through-4 tracks of data on each 3M cartridge's quarter-inch tape. Typical tape length per cartridge is 300 feet, providing potential storage capacity of 300 x 12 x 1600 = 5.76 megabits, or 720,000 bytes total storage capacity. The two recorders in each Model 2710 suitcase provide rewind and high speed bidirectional search at 90 inches-per-second, come with integral interface and formatter as standard equipment.

Model 2710, with two drives, is priced singly for less than $3900, complete with interface, formatter, and internal cables, plus a common power supply for both recorders. The unit is also offered as an OEM recorder with appreciable discounts for quantity purchases.

Delivery for single items is 5 weeks, increasing to approximately 7 weeks for batches of 20 complete installations.

μC Audio Response System

The Vocal Interface Division of Federal Screw Works, a supplier of data communications equipment has announced the availability of a new product called the VOTRAX LVM-50, a peripheral system for microcomputers, minicomputers and large business mainframes.

The LVM-50 is a compact, solid-state multiplexed audio response system. It provides multi-line audio output and Touch Tone input handling capabilities for a wide range of business machines.

Outstanding features include: variable word and message length for maximum flexibility; custom vocabulary consisting of words, phrases and even the voice of the customer's own choosing; support of a wide range of audio response data sets-Vocal Interface Audio Response Modem, Bell 407A, Bell 407B, and several commercially available 403 Type units plus full-feature support of the Bell TRANSACTION*TELEPHONE, Automatic Call Distributor and Call Directors.

Although the LVM-50 offers tremendous cost and technical advantages, it is simple to install and operate the company reports. This is made possible by the use of an LSI microcomputer in the System Controller to simulate the operation of an asynchronous RS232C terminal on the host computer's communications port. All transactions between the LVM-50 System Controller and the host computer are conducted using standard data formats without the need for elaborate support software or special interfacing hardware.

A 16-line, 32 word system may be purchased for under $1,000 per line.

TI I/O Controller

Texas Instrument's new TMS 5501 multifunction I/O controller can replace five or more standard support circuits for the 8080/8080A microprocessors. Operating under the microcomputers software control, the chip provides for transmission of serial data, input and output of 8-bit parallel data, interrupt servicing, and interval timing. Asynchronous serial data are handled at baud rates from 110 to 9600, selectable by software. Eight-bit output and input ports transfer data to and from the microprocessor and other system components.

The TMS 5501 establishes priorities for eight interrupts and generates the appropriate RST instruction for the 8080. Interrupts are individually maskable by software.

Hi-Speed Lo-Power 16K ROM

AMI has introduced what it believes is the highest speed and lowest power MOS 16K ROM available.

Designated the S6831 (Series/A/B/C), the 2048 x 8 N-channel silicon gate depletion load ROM has a maximum access time of 450 ns and consumes only 150 mW average power.

"The S6831 has been designed for broad compatibility as the highest performance memory for a wide range of microprocessors and other advanced applications," says Joe McDowell, director Standard/Memory Products Division.

For example, the S6831 doubles the memory capacity of the AMI S6381 ROM with the mere elimination of a chip enable and the addition of a single address line. The S6831A is pin-out compatibel with the Intel 2316A and 8316A. The B version is pinout compatible with the Intel 2316B, 8316B and the Motorola 68317, and the C version with the Electronic Arrays 4600.

The S6831 series is available in plastic or ceramic packages for delivery 8 weeks after receipt of a verified program. 1,000 unit pricing for the S6831 in plastic is $14 per unit. Masking charge for each pattern is $1000.

8-Bit, 8-Channel DA Chip

A complete 8 channel, 8-bit data acquisition system in a 32-pin hermetic DIP is now in production at Micro Networks.

The tiny hybrid circuit includes nine ICs plus a number of discrete semiconductor chips mounted on a thin-film nichrome resistors.

Over the full temperature range, 0° to 70°C, linearity is ± 2 LSB. At 25°C ambient absolute accuracy is ± 1 LSB. Typical acquisition time of 5 ns, aperture of 50 ns, and A/D conversion time of 6 ns add up to a typical throughput rate of 90,000 conversions per second. Each of the MN7100's eight channels accepts signals in the ± 10 volt range and offers an input impedance of 10 megohms.

The MN7100 is a complete system that includes multiplexer. address counter,

sample-and-hold, eight-bit A/D converter and an internal clock, which can be easily over-ridden when an external clock is used. For applications requiring more than eight channels, a multiplex enable and sample-and-hold input is provided.

Price of the MN7100 is $195, dropping to $140 in hundreds; availability is two to four weeks.

INTERSIL-SILICONIX AGREEMENT

Intersil, Inc. is now second-sourcing Siliconix LD110/LD111/LD114 analog and digital A/D processors.

The LD110/LD111 A/D chip set features a 3½ digit multiplexed BCD output format. The LD111/LD114 chip set features both multiplexed and serial 3½ digit BCD output formats.

The LD110 and LD111 will be available in 16-pin plastic packages and 16-pin ceramic packages. The LD114 will be available in 28-pin ceramic packages.

The LD111 is currently in full production. Production will begin on the LD110 and LD114 in June with full production levels scheduled for August.

Pricing in quantities of 100-999 begin at $5.55.

NEC EXPANDS RAM LINE

Three memories, including two new 4K RAMs and a high-speed bipolar RAM, have been added to the memory product line of NEC Microcomputers Inc.

The three products are the uPD410, a 4K x 1 static RAM; the uPD414, a 4K x 1 dynamic RAM; and the uPB2205, a 1K x 1 bipolar, TTL compatible RAM.

The uPD410 is pin-compatible with NEC''s uPD411 dynamic RAM, and has a 100 access time. This is a clocked static device, which allows standby power of typically 50mW maximum. The 410 is fabricated using N channel, silicon gate MOS technology, and requires +12, +5, or -5 V supplies. The device will be available in volume in the fourth quarter of 1976, and comes in an industry-standard 22-pin Cerdip package.

The uPD414 is a 16-pin dynamic N-channel MOS RAM that uses a single transistor dynamic storage cell and dynamic circuitry to achieve high-speed and low power dissipation. The 414 is pin-compatible with

existing 16-pin devices, and will be available in quantity during the fourth quarter of 1976 in both cerdip and plastic packages.

The uPB2205 is a (50ns access time) bipolar memory that serves as an alternate source to the Fairchild 93415A memory and equivalent devices. The 2205 is fully decoded, has open collector output and comes in a 16-pin cerdip package. Production quantities will be available in the third quarter of 1976.

SEMI RAM

A 1024x4 static RAM, SEMI 4104A, designed to be voltage and speed compatible to the fastest 8080A microprocessors available, has been announced by EMM/SEMI.

The SEMI 4104A STATIC RAM offers 200 ns access time and 350 ns cycle time. The 350 cycle time, or selected faster cycle times, permits application in data communications buffer memories. The SEMI 4104A features the same low standby power and brownout protection as the SEMI 4200 (4Kx1) static RAM.

The SEMI 4104A is available for immediate volume deliveries and the price for the 200 ns RAM is $18.75 each in 100 quantities.

WINTEK ANNOUNCES EROM PROGRAMMER

Wintek Crop. has added an EROM programmer module and a ROM module to its WINCE line of microcomputer modules. The EROM programmer is a $195 alternative to the $3000 EROM programmers now available.
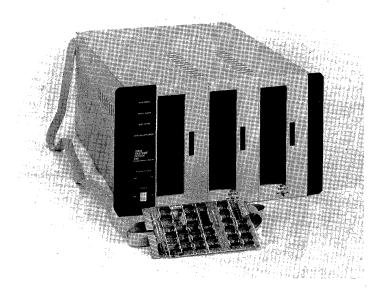
The WINCE EROM programmer module is a single card programmer for the 2704 (512x8) and the 2708 (1028x8) ultra-violet erasable read only memories.

The WINCE ROM module allows WINCE system memory expansion to 65K bytes of ROM. Each ROM module has room for 16 2708's or MCM68708L's 1028x8 ultra-violet erasable read only memories. The ROM module can be supplied with from 1 to 16 sockets and/or EROM's. EROMS can be supplied programmed to customer specifications.

The WINCE EROM programmer and ROM modules are on standard 4½ x 6½" cards with standard 44 pin, 22 position read outs and are fully compatible with the WINCE control, RAM and data acquisition modules.

MEMORY SYSTEM

Data Systems Design's 210 Diskette Memory System is both DEC instruction set compatible and IBM 3740 format compatible. Diskette formatting and write protect are standard features of the unit. An 8-bit bipolar microcomputer controls all data transfers, monitors read/write head positionings,* and performs data error checks. Self-test microcode verifies that the system is error free.

The DSD 210 utilizes a digital phase-lock-loop data separation circuit for maximum data reliability. The interface card plugs directly into one I/O slot on the LSI-11 bus. The system is available with single double, or triple Shugart drives.

The company reports that the DSD 210 is the only DEC compatible, LSI-11 floppy disc system yet on the market.

Deliveries are within 30 days. Prices for complete systems start at $2795 in single quantities.

MICRONOVA FLOPPY DISC

Ball Computer Products has introduced a stand-alone floppy disc subsystem designed expressly to interface with Monolithic Memory Inc.'s new micro-Nova processor, and Data General's Micro-Nova.

The 3190G floppy disc system consists of two floppy disc drives and a single board controller. The system connects to the I/O bus, and does not have to reside within the Micro-Nova computer. In addition, the 3190G's chassis will pass the I/O bus to other peripherals, if desired. The entire 3190G is compact, occupying only 7"
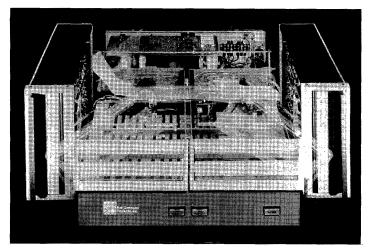
vertically in a standard 19" rack.

The floppy disc drives feature a storage capacity of 3.2 million bits (IBM compatible), ferrite read/write heads, superior track seeking accuracy due to a positioner that uses 3-step movement track to track, a D.C. motor with direct drive spindle for user speed control and a precision steel chassis for higher date reliability.

The drive has a start/stop time of 5 seconds maximum, a seek time of 10 ms track to track and a transfer rate of 250K b/s.

Features of the controller include read-before-write address verification, polynomial divisor CRC, diagnostic mode, and individual write protect.

The controller board will interface up to 8 disc drives, and can also accommodate a real-time clock and TTY interface.

Ball's 3190G floppy disc system, a package including two floppy disc drives and controller, is end user priced at $4,700 in single quantities. OEM prices and quantity discounts are available. Deliveries are immediate.
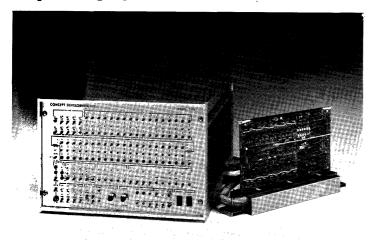

BENCH-TOP RAM TESTER

A bench-top RAM Tester, the CDI Model T-115, provides the user with high speed, low-cost memory testing suitable for production, acceptance, and in-coming inspection, as well as many functions useful in characterizing new memory designs.

Concept Development, Inc's. model T-115 Memory Tester can test configurations up to 512K x 20. It is a stand-alone self-contained system including a performance board, test fixture and power supplies, ready to test the user's memory. Multiple memory types may be tested by adding different plug-in performance boards.
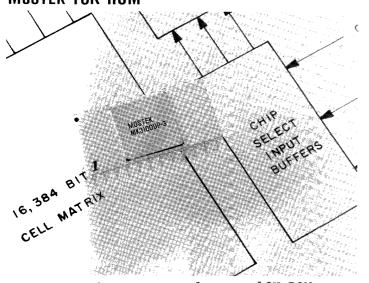
Schottky logic and three-state computer type busses provide a new level of flexibility previously unavailable in table top memory testers. The basic CDI T-115 tester sequences programs automatically at an 8

MHZ rate with out data breaks or cycle stealing. It includes six industry standard core and four semiconductor memory programs; all may be individually selected or sequenced automatically. The unit may incorporate up to fifteen mixed core and/or semiconductor programs.

The basic system is priced at $15,900; delivery is 6 to 8 weeks.
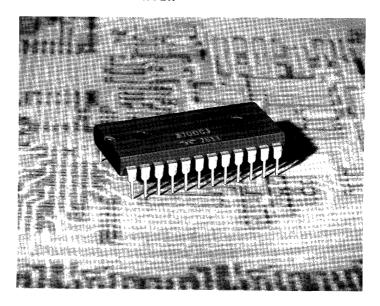
MOSTEK 16K ROM

Mostek has announced a new 16K ROM featuring maximum access time of 500 ns with a +10% tolerance on the single +5 V supply. Organized in a 2K x 8 configuration, the new circuit, designated MK 310000P-3, is a pin-for-pin replacement for the Intel 2316A/8316A and the General Instrument RO-3-8316A. The MK 310000P-3 is fully TTL compatible, has a maximum power dissipation

of only 330 mW and is completely static.

To assure fast ROM pattern turnaround Mostek uses a procedure called "contact programming" whereby ROM wafers are processed through the majority of necessary masking steps and held in inventory until customer patterns are received. The final processing steps can then be accomplished within a very short period.

Pricing for the MK 310000P-3 is $14.95 at 1000 pieces.

8-BIT A/D CONVERTER

Teledyne Semiconductor has announced the availability of its 8-bit monolithic A/D converter in a plastic package for use in commercial environments.

The single chip CMOS A/D converter, features differential and overall linearity error less than ¼ LSB. One significant feature includes low power dissipation typically less than 20mW. No active auxiliary components are needed with it, and its latched parallel outputs are ideal for inputting to microcomputers and other digital logic.

The converter, designated 8700CJ in a 24-pin plastic DIP, is priced at $9.95 in 100 unit lots, and is available for immediate delivery.

SEVEN μC SUPPLIES OFFERED

Alpha Power, Inc. is offering seven models in four case sizes of their latest open-frame microcomputer power supplies.

The 3-output Model 1CMP for 8080 systems delivers 5V at 1A, 12V at 0.25A and 5V at 0.4A. All of the units have full protection including current foldback and OVP, and operate on 105-125/210-250V, 47-63 Hz.

Prices start at $31.96 in 100 lots.

FULLY INTERCHANGEABLE SUPPLIES

Deltron Inc.'s line of microcomputer power supplier are fully interchangeable with Lambda's.

The MPS-1 is rated 5Vdc at 3A, 12Vdc at 0.6A, and 9 to 12Vdc at 0.6A, or 5Vdc at 0.138A. The MPS-2 is rated at 5Vdc at 7A, 12Vdc at 1A, and 9Vdc at 1.2A, or 5Vdc at 0.75A.

Both units are fully protected against overload and overvoltages and are mechanically interchangeable with other competitive units.

Deltron reports that the MPS-1 is priced at $77 in single unit quantities and $88 for the MPS-2.
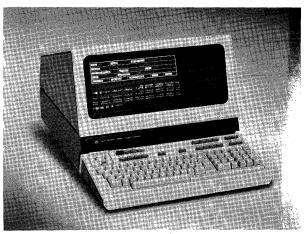
FLOPPY POWER

Power One's 3-output Model CP-162 supply will power 2 floppy-disc systems simultaneously. Outputs are +24V at 5A, +5V at 3A and -5V at 0.6A--All with overvoltage protection.

The 24V regulator can deliver up to 6A for 500 ms upon initial system power-up. Following power-up, 5A is available for normal run operation and track-to-track head positioning. Standard features include 115/230V ac input, built-in overload and over-voltage protection, ± 0.05% regulation and remote sensing. The CP-162 is priced at $120.

MSI PRINTER

MSI Data Corporation will introduce the new Model 3150 Label Printer at its exhibit during the Super Market Institute Convention at the Convention Center in Dallas TX.,

MSI's 3150 Label Printer is a medium-speed highly reliable line printer for printing alpahnumeric data and the MSI Bar

MSI's 3150 automatically generates 16 different character sizes, ranging from .111" to 1.776" high, or .095" to 1.520" high. It uses standard, pin-fed forms and prints an original with up to four copies (either carbon or carbonless). The printer employs a tractor feed, and its width is continuously adjustable to accept forms 4.0" to 14.875" wide.

Included in the purchase package of the MSI 3150 is the printer, the interface board for the Data System IV, the line coupler, and the software (less than 8K memory). The MSI 3150 will be available in quantities in July 1976; delivery is 60 days ARO.

HARDWARE FLOATING POINT UNIT

A hardware floating point unit that is plug-compatible with the Intel MDS and SBC microcomputers has been introduced by Applied Cybernetics.

The system provides, as callable subroutines, engineering and scientific calculation capability.

ENDLESS LOOP TAPE SYSTEMS

Endless loop tape systems for use with microprocessors such as the Intel 8080, Motorola 6800 and the single-drive Betatype 321 and dual drive 322, are complete with all motor controls, read/write electronics, and formatting logic to attach to a standard I/O port. Recording medium is an endless loop, certified computer-grade magnetic tape cartridge measuring 1.565 x 2.65 x 0.2" and weighing 0.5 oz. Storage capacity of the Batatech, Inc. unit is 52K bytes at a density of 600 bits/in.

EDUCATION

September

20-21　Military Microsystems　$395　Washington D.C.　Integrated Computer Systems Inc.

20-24　SC/MP Applications　$395　Santa Clara CA　National Semiconductor Corp.

21-23　SC/MP Applications　$395　Orlando FL National Semiconductor Corp.

21-23　SC/MP Applications　$395　Montreal Canada　National Semiconductor Corp.

21-24　Western Electric Show & Convention Los Angeles CA　IEEE

22-23　Bit-Slice Microprocessors and PLA's $395　Washington D.C.　Integrated Computer Systems Inc.

23-25　Microcomputer Interfacing Workshop Virginia Polytechnic Institute Institute and State University

25-26　Hands-On-Microcomputer Course　$700 Palo Alto CA　M&E Associates

27- 1　IMP/PACE Applications　$395　Santa Clara CA　National Semiconductor Corp.

27- 1　Microprocessor Fundamentals　$395 Miami FL　National Semiconductor Corp.

28　2650 Microprocessor Design　Free Seattle WA　Elmar Electronics

28　F8 Microprocessor Seminar　Free Baltimore MD　Mostek Corp.

28-29　Industrial Microcomputer Control　$395 Newark NJ　Integrated Computer Systems Inc.

28-30　SC/MP Applications　$395　Syracuse NY National Semiconductor Corp.

28-30　SC/MP Applications　$395　Pittsburgh PA　National Semiconductor Corp.

28　Signetics 2650　Seattle WA　Elmar Electronics

29　Signetics 2650　Denver CO　Elmar Electronics

29　F8 Microprocessor Seminar　Free Richmond VA　Mostek Corp.

29-30　Application of Microprocessors in Instrumentation & Control Systems Chislehurst Kent England　SIRA Instruments Ltd.

29- 1　Microcomputer/Microprocessor Workshop　$375　Honolulu HI　Adtech Inc.

30　Signetics 2650　Mt. View CA　Elmar Electronics

30　F8 Microprocessor Seminar　Free Lynchburg VA　Mostek Corp.

30　2650 Microprocessor Design　Free Palo Alto CA　Elmar Electronics

30- 1　Software/Systems Development　$395 Newark NJ　Integrated Computer Systems Inc.

October

3- 8　Advanced Programming　$395　Santa Clara CA　National Semiconductor Corp.

4- 8　SC/MP Applications　$395　Coral Gables FL　National Semiconductor Corp.

5- 7　SC/MP Applications　$395　Dallas TX National Semiconductor Corp.

5- 7　SC/MP Applications　$395　Houston TX National Semiconductor Corp.

6- 8　Microcomputer/Microprocessor Workshop $375　Honolulu HI　Adtech Inc.

7- 8　Software/Systems Development　$395 Washington D.C.　Integrated Computer Systems Inc.

12　F8 Microprocessor Seminar　Free Miami FL　Mostek Corp.

12-13　Industrial Microcomputer Control $395　Boston MA　Integrated Computer Systems Inc.

12-14　Euromicro, Second Symposium on Micro Architecture　Venice Italy

12-14　SC/MP Applications　$395　Minneapolis MN　National Semiconductor Corp.

12-15　Micro/Minicomputer Exhibit　Frankfurt Germany　U.S. Dept. of Commerce

13　F8 Microprocessor Seminar　Ft. Lauderdale FL　Mostek Corp.

13-15　Second International Conference on Software Engineering　San Francisco CA　IEEE

14-15　Software/Systems Development　$395 Boston MA Integrated Computer Systems Inc.

18-22　PACE Applications　$395　Coral Gables FL　National Semiconductor Corp.

19-20   Industrial Microcomputer Control
         $395 St. Louis MO Integrated
         Computer Systems Inc.

19-21   SC/MP Applications $395 Detroit
         MI National Semiconductor Corp.

19-21   SC/MP Applications $395 Charlotte
         NC National Semiconductor Corp.

19-21   Mini/Micro Conference and Exposition
         San Francisco CA

21-22   Software/Systems Development $395
         St. Louis MO Integrated Computer
         Systems Inc.

24   Computerfest $3.50 Vienna VA
         AMRAD

25-29   Microprocessor Fundamentals $395
         Santa Clara CA National Semiconduc-
         tor Corp.

26-27   Industrial Microcomputer Control
         $395 San Francisco CA Integrated
         Computer Systems Inc.

28-29   Software/Systems Development $395
         San Francisco CA Integrated Computer
         Systems Inc.

SPONSORING ORGANIZATIONS AND CONTACTS:

Adtech Inc., P.O. Box 10415, Honolulu HI
(808) 941-0708

AMRAD, Gerald Adkins, 1206 Livingston St. N.,
Arlington VA 22205

Elmar Electronics, 2288 Charleston Road,
Mr. View, CA 94040   (415) 961-3611

IEEE/CS, Executive Secretary, P.O. Box 639,
Silver Springs MD 20901

Integrated Computer Systems Inc., P.O. Box
2368, Culver City CA 90230,   (213) 559-9265

M&E Associates, 10439 N. Stelling Road,
Cupertino, CA 95014

Mini/Micro Computer Conference, Robert D.
Rankin, Rankin Exposition Management, 5544 E.
La Palma Ave., Anaheim CA 92807, (741) 528-
2400

Mostek Corporation, 1215 W. Crosby Raod,
Carrollton, TX 75006,   (214) 242-0444

National Semiconductor Crop., 2900 Semicon-
ductor Dr., Santa Clara CA, 59051,   (408)
732-5000

SIRA Institute Ltd., South Hill, Chislehurst,
Kent BR7 5EH England

U.S. Dept. of Commerce, Washington D.C.,
20230, (202) 377-3748

Virginia Polytechnic Institute and State
University, Contact: Harold Walsh, American
Chemical Society, 1155 16th Street N.W.,
Washington D.C. 20036

FINANCIAL

EARNINGS

Digital Equipment Corp.	1976	1975	%
July 3			
Share Earning	2.11	1.46	44.5
Earning	26,814K	17,420K	53.9
Sales	231,995K	160,542K	44.5
Year			
Share Earning	5.94	3.85	54.3
Earning	32,400K	46,000K	59.6
Sales	736,288K	533,774K	37.9

Intel Corp.	1976	1975	%
June 30			
Share Earning	.52	.35	48.6
Earning	5,504K	3,613K	52.3
Sales	50,624K	31,501K	60.7
6 Mths.			
Share Earning	.99	.71	39.4
Earning	10,507K	7,305K	43.8
Sales	96,108K	61,866K	55.3

National Semiconductor	1976	1975	%
May 31			
Share Earning	.34	.33	3
Earning	4,498K	4,295K	4.7
Sales	88,166K	57,160K	54.2
Year			
Share Earning	1.44	1.34	7.5
Earning	18,953K	16,748K	13.2
Sales	325,097K	235,457K	38.1

Raytheon Co.	1976	1975	%
June 27			
Share Earning	1.51	1.26	19.8
Earning	23,008K	18,971K	21.3
Sales	598,751K	572,028K	4.7
6 Mths			
Share Earning	2.69	2.32	15.9
Earning	40,908K	34,872K	17.3
Sales	1,171,167K	1,101,977K	6.3

RCA Corp.	1976	1975	%
June 30			
Share Earning	.70	.34	105.9
Earning	53,700K	26,800K	100.4
Sales	1,320,400K	1,155M	
6 Mths			
Share Earning	1.14	.55	14.3
Earning	88M	43,800K	100.9
Sales	2,567,900K	2,245,300K	14.8

Rockwell International	1976	1975	%
June 30			
Share Earning	.85	.73	16.4
Earning	32,500K	27,400K	18.6
Sales	1,312,100K	1,185,700	10.7
9 Mths			
Share Earning	2.34	1.89	23.8
Earning	88,300K	70,700K	24.9
Sales	3,806,400K	3,536,600K	7.6

Texas Instruments	1976	1975	%
June 30			
Share Earning	.98	.49	100
Earning	22,569K	11,295K	99.8
Sales	392,198K	330,961K	18.5
6 Mths			
Share Earning	1.91	1.10	73.6
Earning	43,856K	25,287K	73.4
Sales	761,565K	663,718K	14.7

MICROCOMPUTER CONSULTANT SEMINARS

Recognizing the advantages of a close working relationship betwen microcomputer manufacturers and consultants, PATCA, the Professional and Technical Consultants Association, is co-sponsoring a series of advanced seminars on microcomputer systems, devices and software.

The first seminar is also sponsored by the Zilog Corp. and its rep firm, Thorson Co. It will be held on September 23, 1976 from 8:30 a.m. to noon at the Marriot Hotel in Santa Clara, CA.

The second, co-sponsored by Signetics, will be held on October 5, 1976 at 9 a.m. at the Signetics plant.

The seminars are open without charge to microcomputer consultants on written application. Attendance will be limited to 50. Interested consultants should apply on company letterhead to: PATCA, 2680 Bayshore Frontage Rd., Mt. View, CA 94043.

COMPANY ADDRESSES FOR THIS ISSUE

Alpha Power Inc., 9020 Eton Ave., Canoga Park, CA 91304   (213) 998-9873

Betatech, Inc., 110 Great Rd., Bedford MA 01730

Concept Development, Inc., 3198-G Airport Loop Dr., Costa Mesa, CA 92626 (714) 557-1811

Data Systems Design, 1122 University Ave., Berkeley Ave., CA 94702   (415) 849-1102

Deltron Inc. Wisshickon Ave., North Wales, PA 19454

Epicom Inc., P.O. Box 1415, Maitland, FL 32751 (305) 645-2142

Heurikon Corp., 700 W. Badger Rd., Madison, WI 53713   (608) 255-9075

Intersil Inc., 10900 N. Tantau, Cupertino CA 95014   (408) 257-5450

Itty Bitty Computers, P.O. Box 23189, San Jose CA 95153   (408) 578-4944

Micro Networks Corp., 324 Clark St., Worcester MA 01606 (617) 852-5400

Mits Inc. 6328 Linn N.E., Albuquerque, NM 87108 (505) 265-7553

MSI Data Corp, 340 Fischer Ave., Costa Mesa, CA 92627   (714) 549-6000

North Atlantic Qantex Division, 200 Terminal Dr., Plainview, NY 11803   (516) 681-8600

Power-One, Inc., 531 Dawson Dr., Camarillo, CA 93010   (805) 484-2806

Remote Computing Corp., 1 Wilshire Bldg., Ste 1400, Los Angeles, CA 90017   (213) 629-2532

Vocal Interface Division, Federal Screw Works, 500 Stephenson Hgwy, ste 102, Troy MI 48084

Western Data Systems, 3650 Charles St., Ste 2 Santa Clara, CA 95050   (408) 984-7804

Wintek Corp., 902 North 9th St., Lafayette, IN 47904   (317) 742-6802

MICROCOMPUTER DIGEST

Mini//Micro

COMPUTER CONFERENCE AND EXPOSITION

October 19-20-21, 1976
Brooks Hall/Civic Auditorium, San Francisco

A Major Computer Conference in a Major Computer Market

THE CONFERENCE PROGRAM:

Minicomputers and microcomputers--low cost and versatile--are putting convenient and effective computer power at our fingertips in a vast array of products that will affect every facet of our lives, making minis and micros the fastest growing segment of today's and tomorrow's data processing industry. Designed into systems ranging from traffic lights and numerical control, to paint mixers and kitchen appliances, they offer a new versatility and striking competitive advantages in the end products. We'll examine these aspects-- and much more--in the conference rooms at the 1976 MINI/MICRO COMPUTER CONFERENCE & EXPOSITION.

Approximately twenty sessions consisting of eighty papers covering both application and design topics are planned.

Some session titles (and organizers) to date would include:

1. Distributed Processing with Minis.
    (Dan Zatyko - General Automation)
2. Military Applications for Microcomputers.
    (Joe Genna - Delco Electronics)
3. The Effect of LSI Technology on Memory Systems.
    (Dan Bowers - Bowers Engineering)
4. Interfacing the Analog World to Minis/Micros.
    (Larry Brown - Calex)
5. Integrating OEM Peripherals into Computer Systems for End-use.
    (Martin Himmelfarb - Digital Design)
6. Microcomputer Software and Hardware Development Aids.
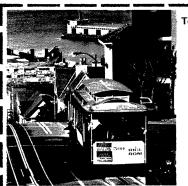   (Dave Millet - NEC Microcomputers)

7. History to Current Development of Memory Peripherals for Mini and Micro Computers.
    (Bill Frank - Cal Comp)
8. The Make or Buy Decision.
    (Robert Van Naarden - DEC)
9. Microcomputer Applications; Logic Replacement; Minicomputer Replacement, New Products.
    (Jerry Ogdin - Microcomputer Techniques)
10. Industrial Applications for Microcomputers and Microcontrollers.
    (Ian Ebel - Control Logic)
11.-20. Being organized.

PLUS . . . tutorial sessions on minis and micros and a special session for computer hobbyists!

Conference Program Committee — Chairman: Robert J. Frankenberg (Hewlett Packard); Co-Chairmen: Justin Rattner (Intel Corp.); Manny Lemas (Microcomputer Associates).

THE EXPOSITION:

The exposition floor space in both the Civic Auditorium and Brooks Hall will feature a full spectrum of product displays by leading computer suppliers. Minicomputer and microcomputer systems and sub-systems will be available for "hands-on" demonstration, along with a wide array of computer peripheral devices, software aids and information. This 1976 MINI/MICRO COMPUTER EXPOSITION is expected to be the largest such event in the greater San Francisco area in almost ten years.

If you design mini-micro computers, sub-systems, peripherals, or components, use them in your business--or plan to--the hundreds of product displays will also be of valuable interest to you.