

MICROCOMPUTER DIGEST

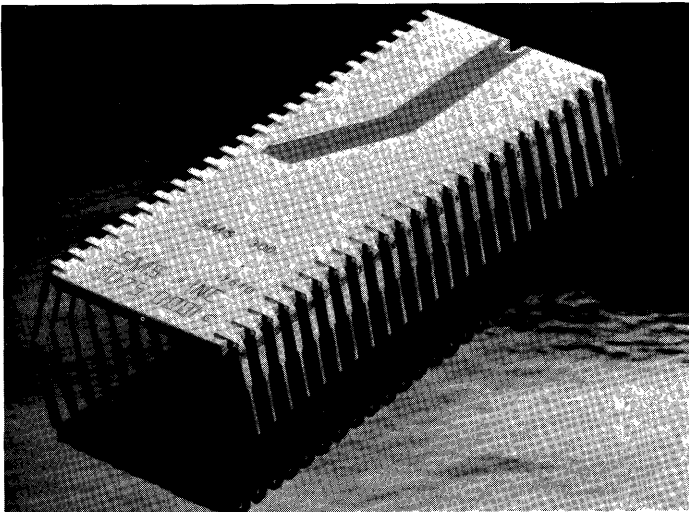
Volume 2, Number 12

June, 1976

SMS REDESIGNS MICROCONTROLLER

Scientific Micro Systems has improved the processing speed of its bipolar microprocessor and has introduced two new I/O interface components.

The SMS 300 central processing unit (CPU) now provides minimum system cycle time of 250 ns. This is the total time required to fetch, decode and execute any instruction, SMS says. When the company's line of Micro-Controller systems were introduced in 1974, the device had a 300 ns cycle time.



SMS says the faster cycle time permits direct control of double-density floppy discs. The processing power of the SMS 300 allows firmware control of such functions as calculation of CRC and disc formatting, which normally require additional integrated circuits.

The SMS 300 CPU treats I/O registers and has the ability to directly manipulate and test groups of bits within 8-bit bytes in a single cycle.

(cont'd. on page 2)

NEW MOTOROLA - AMD AGREEMENT

Advanced Micro Devices has upgraded its license agreement with Motorola Semiconductor so that it now includes transfer of technical information for making AMD's proprietary Am-2900 series of bipolar microprocessor parts.

Under the terms of the new agreement, for an undisclosed sum, Advanced Micro Devices will supply detailed technical assistance for all circuits in the family. This agreement follows similar pacts signed with Raytheon Semiconductor and the SESCOSEM Division of Thompson-CSF in Europe.

The original agreement, signed with Motorola in October, provided a limited exchange of information with no payments from Motorola.

MOSTEK TO SECOND SOURCE Z-80

Mostek and Zilog have announced a microcomputer second-source pact.

Under terms of the agreement, Mostek will second-source Zilog's Z-80 microcomputer family of components, and the two companies will "jointly define and develop memories suitable for the microcomputer market and additional peripheral chips for the Z-80 family," according to the announcement.

"The agreement involves long-term financial commitments from Mostek for rights to certain Zilog technology," according to Federico Faggin, Zilog president.

Faggin and Ralph Ungermann, executive vice president, said the agreement is unique in the industry. "It's not a 'paper tiger' like some of the other second source agreements that have been made. Zilog is a generation ahead in microcomputer technology, and Mostek is an acknowledged leader in the MOS/LSI field, with high volume production capacity."



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SPECIAL FEATURES

SMS REDESIGNS MICROCONTROLLER

(from page 1)

The two new I/O units are the SMS 362 and SMS 363 IV (interface vector) bytes. Both feature external clocking and input latches which operate asynchronously with CPU timing. This eliminates the need for additional MSI edge-triggered latches when capturing transient data, the company says. The SMS 362 and 363 components enable the CPU to be directly interfaced with up to 4096 I/O lines. The SMS 362 has tri-state outputs, while the SMS 363 is an open collector device.

The new SMS components are available within 30 days ARO. In quantities of 100, prices are \$90 and \$8 each for the CPU and the IV bytes, respectively.

TECHNOLOGY

GI PRODUCING EUROPEAN 5-CHIP μ P

Produced at General Instrument's Glenrothes, Scotland division, the series 8000 is a five chip microprocessor family.

A minimum configuration consists of two chips: the LP8000 CPU and the LP6000 program-storage unit. The microprocessor has 48 eight-bit registers, no provisions for interrupt and 48 I/O lines available for driving displays, interfacing to keyboards and other peripherals. The LP6000 contains 1K x 8 ROM, program counter, two 8-bit I/O ports and a four register subroutine stack.

The other three chips consist of the LP1030 clock generator, the LP1000 memory interface, and the LP1010 I/O circuit.

The basic two chip system will be priced under \$60 in 100 unit quantities. Both units will be second sourced by AEG Telefunken in Germany and SGS-ATES in Italy.

8-BIT 9900 COMING

Reports from Texas Instruments reveal that the firm will be announcing an 8-bit and a 4-bit version of their recently introduced 16-bit 9900 microprocessor. The chips will have the same basic architecture and will be software compatible with the 9900.

TI is also upgrading its P-channel MOS TMS 1000 microprocessor to an N-MOS version that will require only one 5-V supply.

MICROCOMPUTER BASED PRODUCTS

COSMAC MICROCOMPUTER

A self-contained microcomputer, available in kit or assembled form, has been based on RCA's COSMAC microprocessor.

Designated the UT1800, Infinite Inc. says the system can be used as a training device in the use of computers and for evaluating the application of microcomputers.

Access to an external bus allows connection to a variety of peripheral devices, including an add-on memory. Keyboard programming is built in, and there is a digital display for address, memory contents and I/O prototyping. The 1800 offers front-panel control of interrupt, DMA, and I/O flags. Its 256-byte RAM is expandable to a 4096 byte RAM or ROM on board.

No price was given by the firm.

SINGLE BOARD 2650 COMPUTER

Built around the Signetics 2650 microprocessor, Applied Microtechnology's AMT 2650 microcomputer is a one-card, self-contained machine that sells for \$195 in small quantities.

The unit contains a 256 RAM expandable to 32K bytes. Programming is by means of front-panel switches, and two fully buffered, TTL-compatible output-data ports provide interfacing with the user's hardware. Delivery time for the AMT 2650 is 30 days ARO.

μ C FLOPPY DISC SUBSYSTEM

A microcomputer controller from Data Systems Design provides the 210 with complete DEC PDP-11, LSI-11 and PDP-8 instruction set and media compatibility. The system is completely interchangeable with the RX8/RX11 disc system.

The package includes two or four diskette drives, microcomputer controller, interface to the minicomputer, control panel with individual write-protect switches, power supplies, and all cables.

Systems Design's diskettes are fully IBM format compatible.

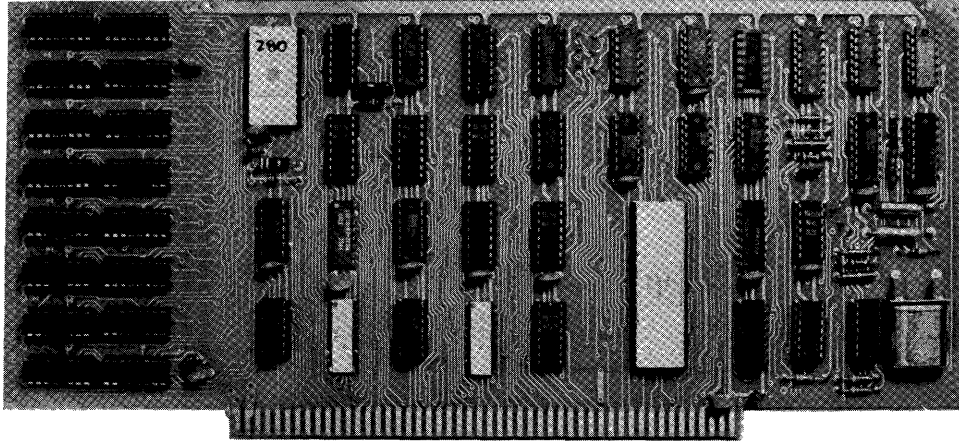


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SUPER CHIP!

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

AMI 6800 PROTOTYPING CARD

American Microsystems is offering their AMI6800 prototyping card to assist hardware and software developers in using the S6800 microprocessor. It can also be converted to a general purpose microcomputer by adding I/O devices and memory.

The board is on a 10½" x 12" card and has two 86-pin edge connectors, one for micro-computer bus expansion and one for I/O. Features include 2K bytes of ROM and EPROM, 768 bytes user RAM, 256 bytes dedicated RAM, totally buffered MPU, restart address selection and serial and parallel I/O ports.

Prices vary between \$225 and \$950 depending upon configuration. Availability is off the shelf.

PROGRAM DEVELOPMENT STATION

A program development station just announced by Data Test Corp. permits interactive program development without auxiliary computer equipment or software.

Features of the Model 8010 include cassette tape for bulk storage of test programs, high-speed memory, full keyboard facilities and complete parity check on all data transmissions.

The 8010 provides standard 1K x 16-bit memory and is expandable to 4K words. A simple test language is utilized, requiring minimum programming skills. Internal logic accepts data from serial or parallel input devices. When used as a test program memory, data rates are up to 1 MHz.

6502 μ C WITH KEYBOARD & DISPLAY

Ebka Industries has introduced the Familiarizer, a single board microcomputer with built-in hexadecimal keyboard and display. Hardware includes MOS Technology's 6502, 1K bytes of RAM, two 8-bit I/O ports, and a 256-byte PROM containing the monitor program. The RAM can be expanded to 64K bytes and on-board PROM to 1K bytes.

A step-by-step programming manual brings users up to speed. Special function cards and add-on memory interfaces are available.

In kit form the microcomputer is priced at \$229. An optional power supply is available for \$58.

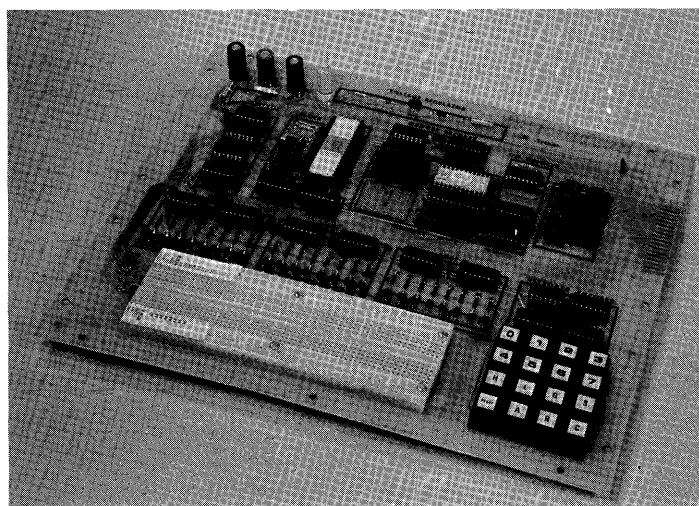
MINIMICRO DESIGNER

A small, inexpensive microcomputer using the popular 8080A has been developed by E&L Instruments, Derby CT. The new MiniMicro Designer is aimed at both engineering and

educational users who may not have microcomputer experience.

The MiniMicro Designer is designed to fill the price/performance gap between chips and large systems requiring terminals and additional hardware. The new system is backed by three modules of self-paced text and experiments, plus over 500 pages of experimental text in E&L's Bugbook III.

The MiniMicro Designer has a keyboard for data entry and a solderless breadboarding area. The system is expandable for the 8080A's full capability.



The MiniMicro Designer is available in a variety of kits and assembled units, all with the educational modules. Prices start at \$125. Delivery is from stock.

TI OFFERING μ P LEARNING MODULE

A preassembled microprocessor learning module developed by Texas Instruments can provide the novice with the hands-on experience and hardware/software relationships essential for learning and applying concepts. The module is priced at \$149.95 and can teach or demonstrate microprogramming, simple algorithms and fixed instructions.

The TI microprogrammer Learning Module consists of a 4-bit static parallel processor, is manually programmed, has VLED bus monitors, push-button manual clock, and offers a 40-pin socket for expansion. The microprogrammer instruction manual covers the basic and advanced concepts of microprocessor design and suggests follow-on applications to demonstrate further microprocessor advantages. (cont'd on page 5)

Three follow-up kits will be available in the near future: a programmable ROM controller, a RAM and an I/O controller.

A μ C CHESS OPPONENT?

Mostek Corp. demonstrated at the 73rd annual American Toy Fair in New York City a hand-held chess algorithm calculator. The player enters his moves into the unit via a keyboard and the calculator, after analyzing the position of the pieces, responds with countermoves which are indicated on an 8-digit display.

The assembled version will be offered by Cardinal Industries early this summer at a suggested retail price of \$120.

INFORMATION CONTROLS 8080 μ C

A complete 8080A microcomputer system is available in either pre-assembled kit form or as a fully assembled and tested unit. Prices start at \$1,000 for the system from Information Control Corp. with delivery in 30 to 60 days.

The full system includes an assembler, editor and monitor; high-speed magnetic-tape cassette I/O; alphanumeric display; and optional line printer. Also a special debug package allows a complete test of the microcomputer prior to program storing in PROMs.

MONITOR/DEBUG MODULE

A monitoring and debugging module, designed by Swivetek, is format compatible with Motorola's debugging software. MADIC operates with any EIA RS232 compatible terminal and requires no interface adapters. User accessible subroutines and individual commands for altering run time registers are contained in ROM.

The circuit board, including the ROM, is intended for both prototyping and commercial use and full documentation is supplied.

The MADIC is available for both 6800 and 6502 microprocessors at \$125.

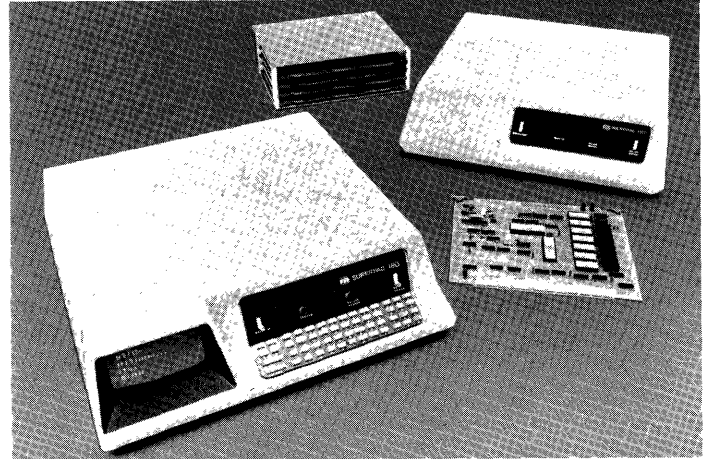
Swivetek is also offering a complete microcomputer system with the MADIC, 6800 or 6502, 256-byte RAM and serial interface for \$275. Delivery is stock to 3 weeks ARO.

MICROCOMPUTER BUILDING BLOCKS

Process Computer Systems has unveiled the SuperPac 180 which includes the PCS 1806 microcomputer as well as a self-contained keyboard interface and CRT control module. The unit has display memory, character generation, timing and video electronics. The SuperPac 180 provides 16 lines of 16 or 64

characters, 1024 directly addressable character locations, programmable cursor, blink and reverse video capabilities.

The MicroPac 180 is a low-cost, rack-mountable industrial microcomputer system priced at \$695 in quantities of 50.



The PCS 1810, another member of the 180 family, is a single-board microcomputer which includes power fail/auto restart and battery backup that can support its 256 bytes of CMOS/RAM (expandable to 1K bytes) for up to 10 days. It is priced at less than \$300 in quantities of 50. Based on the 8080A microprocessor, the PCS 1810 also includes a crystal-controlled clock, sixteen 3- to 30 V digital inputs, sixteen 30 V, 500 mA digital outputs, RS232/20mA current loop serial port, external interrupt, five interval timers, provisions for 3K bytes of EROM/ROM, and DMA capability. Users can build onto this basic one-board microcomputer system by adding memory and I/O, as well as peripheral and communications options. The PCS 1810 also may be used in the SuperPac 180 or MicroPac 180 configuration.

The full blown system, PCS 1806, comes with 1K byte RAM, provision for 7K EROM/ROM, eight TTL inputs and eight outputs, and is otherwise similar to the PCS 1810. The PCS 1806 sells for \$265 in quantities of 50.

For low-end, low-cost applications, both the PCS 1806 and PCS 1810 will be offered with a basic four-slot chassis and power supply for \$450 in quantities of 50.

F-8 DEVELOPMENT SYSTEM

Technical Communications Inc.'s new M-8 Educator development system provides a CRT communications terminal and microprocessor controller in a single unit. The system features the Fairchild F-8 microprocessor and includes a 53-key (Hall-Effect) keyboard, 64 x 31 CRT display, 110-baud TTY-compatible

(cont'd on next page)

serial I/O, 300 or 600-baud TTL serial I/O, composite video output signal for remote CRT and 2K of RAM, expandable to 32K.

The microcomputer has a debug/monitor with user-callable I/O subroutines, two 8-bit TTL compatible output ports and two input ports.

Optional units for the terminal include a firmware resident assembler, cassette tape storage module and PROM programmer. The stock unit costs \$1795 in single-piece lots and can be delivered in 6 to 8 weeks.

MICROCOMPUTER SOFTWARE

8008/8080 CROSS ASSEMBLER

Information Processing Techniques have designed their Intel 8008/8080 cross-assembler to run on the Nova minicomputer. The cross-assembler also includes a simulator for program debugging.

The assembler accepts user programs written in 8008/8080 assembly language and provides octal or hex listings plus hex paper object tape output, printer, or direct-line transmission for loading RAMs.

The assembler runs in 16K to 32K without disc. Price in paper-tape or auto-load magnetic tape version is \$450.

8080 CROSS PRODUCTS FOR IBM 360

The MASM 80, a cross-assembler for the 8080 microprocessor designed to run on an IBM 360/370, has been announced by Well Test Data. The MASM 80 program is written in FORTRAN/BAL and executes its operations in under 100K of memory.

Well Test Data is offering a source deck and documentation set of \$55. Extra features of the MASM 80 include direct punching of BNPF decks for PROM programming, object code listing in both octal and hex and ASCII constant generation with the parity bit either set or reset.

ASSEMBLER LINKING LOADER

INTALL, an assembler linking loader system for Intel 8080 programs, has been announced by Industrial Programming, Inc.

Currently available for DEC, Data General and Interdata minicomputers, INTALL comprises two programs: a macro assembler and a linking loader. The assembler accepts Intel's source program format and produces relocatable object code. The linking loader forms an 8080 load module by linking together the relocatable object code to form separately assembled subprograms. INTALL generates a cross-referenced symbol table and

the loader generates a load module map.

The one-time licensing fee for INTALL is \$2000.

INTEL MACRO CROSS ASSEMBLERS

Designed to run on 16-bit computers, a macro cross assembler from Xener Corp. is available for Intel's 4004, 4040, 8008 and 8080 microcomputers.

The coding format is said to be identical to that required by Intel's cross assembler for 32-bit computers; thus firms which have been using Intel's cross assembler are not required to recode existing programs.

Additional features are cross reference, selective listing, extended error messages, and forms control. The cross assembler is currently being used on DEC, Data General and IBM computers.

6800, F8, 2650 SOFT SUPPORT

A set of FORTRAN IV macro-assemblers and simulators for the 6800, F-8 and 2650 microprocessors is available from Microtec. The support software will run on any 16-bit computer with at least 16K words of memory.

Standard features include symbolic addressing, relative addressing, constant generation, a macrofacility, conditional-assembly statements, list and punch control pseudo-ops, and diagnostic error messages. Simulator commands allow the programmer to set breakpoints, trace program flow, display and patch memory locations, display and modify simulated processor registers, simulate I/O routines and interrupts, and monitor timing.

For \$800 Microtec will supply the program on one of several media, detailed documentation, source listing and test program.

MEMORIES AND PERIPHERALS

I/O KIT MATES SELECTRIC TO μ C

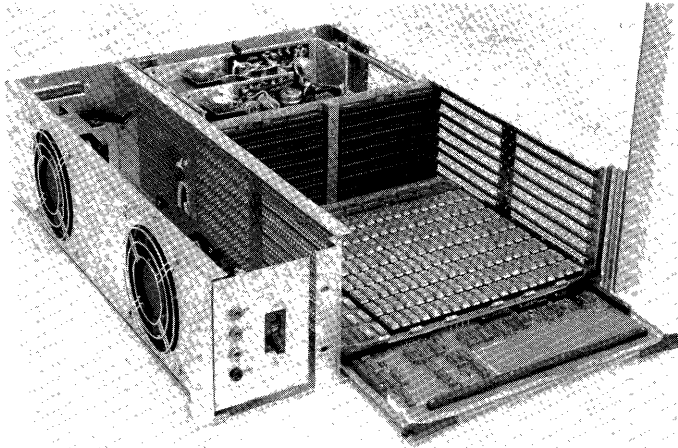
A new Input/Output Kit which utilizes the IBM Selectric typewriter is now available for the home computer hobby market from Edityper Systems Corp.

The Edityper Selectric I/O Kit provides an important, economical interface to microcomputers, home computer units planned for the future, etc.

The Edityper Kit consists of switches and solenoids which attach to the bottom of any standard IBM or Remington Selectric typewriter, thereby providing the computer hobbyist with an inexpensive I/O device.

The kit is priced at \$395 with delivery from 6 to 8 weeks. All orders must be made direct to the factory by check or money order.

1 MEGABYTE OEM MEMORY



Control Data Corp. has announced development of what it called the computer industry's first one-megabyte OEM semiconductor memory contained in two cubic feet.

The 94550 module is a dynamic random access memory that uses 4096-bit MOS storage devices to provide an extremely high density array card of over 1.3 million bits. The system is configured to utilize only 5¼" of standard 19" rack mount.

The memory system has a 450 ns cycle time and a 325 ns access time, w/mb. Prices and delivery schedules will be announced shortly.

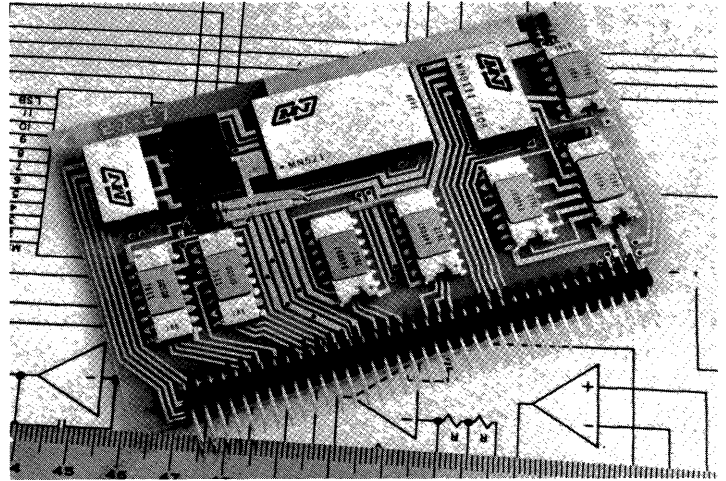
DATA ACQUISITION SYSTEM

A miniature data acquisition system that can connect directly into a computer bus has been introduced by Micro Networks Corp. According to product marketing manager, Bruce R. Smith, the buffering of selected outputs with tri-state gates allows the new data acquisition system to interface directly with microprocessors and computers.

In addition to the tri-state buffers, the MN7002 16-channel, 12-bit system is expandable to 256 channels, while retaining the capability of operation in either single-ended or true differential modes.

Micro Networks offers the MN7002 with a new right-angle connector that allows the OEM to mount the system parallel to a mother board. Other key specifications of the MN7002 are similar to the recently introduced MN7000, a lower cost version without expandability or tri-state buffering. Measuring only 2.9 x 4.5 x 0.35 in. thick, the

MN7002 is available in standard and military temperature ranges. Designed to operate without external adjustments, it is fully specified over its full temperature range.



Linearity is ± 1 LSB maximum over the entire range and cross-talk is -80 dB or more for operation in either 16-channel, single-ended, or 8-channel, true-differential operating modes. Under all conditions, input impedance is 100 megohms or better.

In single unit quantities, the MN7002 is priced at \$495, while the military temperature range version, MN7002H, is \$865.

REPLACES 8080 CIRCUIT

Parasitic Engineering is now offering a permanent fix-kit for the Altair 8800 CPU clock for only \$15. The kit consists of a special bipolar MSI integrated circuit that operates from 0 to 70°C and has tight pulse width specifications. The MSI chip replaces MITS 74123 IC-Q circuit.

SIGNETIC OFFERING 4K RAM BOARD

Signetics has announced availability of a 4K byte, static MOS RAM board designed for use in the development of 2650 microcomputer-based systems.

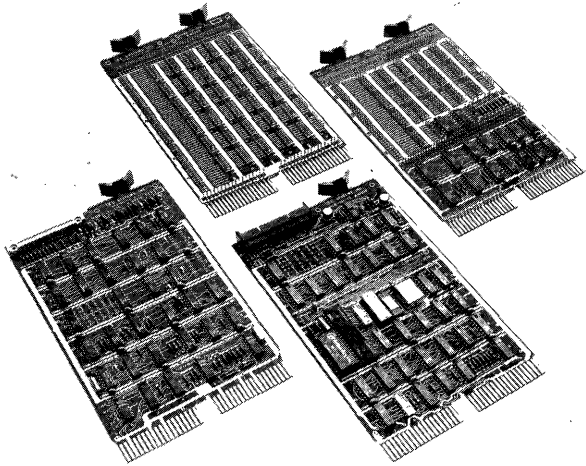
The board contains 32 MOS RAM devices organized as 4K x 8. The 2650 PC2000 memory board can be used to extend the memory capacity of a 2650 PC1001 prototyping card which normally has 1K bytes of ROM and 1K bytes of RAM. In addition, the board contains all necessary hardware to accomplish parallel data transfer through two parallel I/O ports, with fully buffered address and data buses for further I/O expansion.

The complete board, unless an RS232 interface option is selected, operates with a single 5-V supply. A standalone prototyping

(cont'd on page 8)

card can accommodate in excess of 900 bytes of user program; used in conjunction with the memory board, the user program can be extended to approximately 5K bytes.

LSI/11 INTERFACE & LOGIC MODULES



A wide range of interface and logic module products for DEC's LSI-11 microcomputer has been introduced by MDB Systems, Inc.

They include a general purpose interface, GP direct memory module, and universal dual and quad wire wrap modules. Peripheral controllers are available for line printers, card readers, and paper tape equipment as well as asynchronous and synchronous single line adapters. Also a programmable real-time clock is available.

Dynamic RAM modules for the LSI-11 are in 4, 8, 12 and 16K by 16 sizes. EPROM, PROM and ROM memory modules are also available. Hardware accessories include a back-plane/card guide assembly, jumper cable assembly, bus terminator module and a systems monitoring unit.

An MDB LSI-11 price list is available on request; delivery is 14 days ARO or sooner.

LAMBDA ENTERS μ C MARKET

Lambda Electronics has entered the microcomputer power supply market with their MPU-1 and -2 units. Outputs for the -1 are 5-V and 12-V, $\pm 5\%$ adjustable, and 9-V to 12-V, $\pm 5\%$ adjustable; outputs for the -2 are 5-V and 12-V adjustable and 9-V fixed.

All of the supplies contain three hybrid overvoltage protectors that can maintain triple voltage tolerance over 71°C temperature range. Features include dual input voltage for domestic and overseas use, electrolytic capacitors for reliability, herme-

tically sealed IC regulators, Darlington silicon power transistors, hermetically sealed semiconductors, and vacuum impregnated magnetics.

The MPU-1 is priced at \$125 in lots under 100 and \$106 for over 100 quantities. The MPU-2 is \$195 and \$165 respectively.

8 μ C OEM POWER SUPPLIES

An eight-model line of multiple-output IC-regulated power supplies intended for OEM use in microcomputers have been announced by Sola Electric.

The units feature fully isolated, independent outputs to prevent interaction between microcomputer logic circuits. Four dual-output models and four triple-output models provide the most popular output-voltage combinations. Several units have an output that is adjustable to conform to precise voltage requirements.

Prices range from \$49.95 to \$84.95 and the supplies are available from stock.

HARDWARE MULTIPLY/DIVIDE

Designed for 8080 systems, the GNAT 8005 hardware multiply/divide module operates at speeds of either 2.3 or 5.0 μ s. This compares with the usual 220 to 400 μ s with software multiple/divide.

The price for the 8005 2.3 μ s module is \$275 and \$225 for the 5 μ s version. GNAT computers also reports that versions for the Altair 8800 and the Intel MDS system are available. Delivery is 45 days ARO.

KEYBOARD PROGRAMMABLE RAM

Aimed at reducing microprocessor program development costs, Sunrise Electronics' KPRAM (keyboard programmable random access memory) is effectively a PROM emulator.

The KPRAM is a random access memory coupled with a 16 pad keyboard that plugs directly into the user's PROM socket. Hexadecimal data is entered into the KPRAM by the keyboard and the memory address is selected by toggle switches. Eight LED's just above the keyboard display information on the data bus continuously or the contents of memory on command.

5v/12v MICRO SUPPLY

A \$49 three-output microcomputer power supply has been announced by Elexon Power Systems.

The μ PS-35 outputs 5 V at 3 A, 5 V at 6 A and 12 V at 0.3 A. It delivers full rated current from 0 to +55°C with 115/230V, 47- to 63-Hz inputs.

Standard features include IC regulation, isolated outputs, remote sensing, foldback current limiting and spike suppression.

8080/6800/F8 SUPPLIES OFFERED

Scarpa Laboratories has designed power supplies specifically for the Intel 8008 or 8080, the Motorola M6800 or the Fairchild F-8 microcomputers. The open-frame modules feature short-circuit-proof operation as well as over-voltage crowbar protection. This latter feature protects the costly microprocessor and memory chips from being wiped out if a regulator fails. A husky 6 or 10 A at 5 V is provided.

Prices range from \$45 to \$75 and delivery is stock to 2 weeks.

PEOPLE, LITERATURE AND EVENTS MOSTEK BEGINS SECOND F8 TOUR

Mostek Corp. has announced plans to take the F-8 technical seminar on a second 19-city tour beginning June 15. The initial series was presented earlier this year.

The Tour II Series has been expanded to one-day technical presentations covering important elements of the F-8 system, advantages of the design, the F-8 family of circuits, programming techniques, development aids, software support, as well as a thorough discussion of F-8 application capabilities and current uses. The seminars are being presented by MOSTEK application engineers headed by Van Lewing, Mostek microcomputer manager. A comprehensive F-8 work manual will be provided for all participants. Attendance fee is \$20. (See Education Section for a full schedule of F-8 Seminars.)

PEOPLE ON THE MOVE

HOMER T. MEADERS has been named Communications Director of WEMA.

MICHAEL A. EBERTIN has been named operations director for calculator, game and micro-controller products at National Semiconductor Corp.

CAMERON PEDEGO, sales manager in the Michigan region for National Semiconductor Corp., has been named area sales manager for southeastern states, reporting to Don Beadle, director of sales.

DONALD R. BEALL has been named president of the Electronics Operations of Rockwell International Corp. and is being named a corporate vice president.

TAKI OSHIMA, employee of Advanced Micro Devices since January, has been named Director of International Sales.

The Memory Systems Division of Intel Corp. announced that GARY WEBB, formerly division sales manager, has been promoted to European sales manager.

After 14 years in electronics, Intersil's president MARSHALL COX says that he is stepping aside to decide what to do with the next 14. No successor has yet been named.

JOSEPH J. McDOWELL, recently director of Microcomputer Products for American Microsystems, Inc., has been promoted to the position of director, Standard/Memory Products.

WILLIAM H. DAVIDOW, general manager of Intel Corp.'s Microcomputer Division, has been elected a vice president of the corporation, according to Andrew S. Grove, Intel executive vice president.

H. Dean McKay, Chairman of the Board of A. H. Systems, Inc., has announced that GEORGE SENKO has been named president.

National Semiconductor has expanded its Canadian marketing effort by adding two reps and a distributor: VANTAGE CORP., KAVTRONICS LTD., and BOWTEK ELECTRIC LTD., respectively.

MICROCOMPUTER SOFTWARE

Texas Instruments is now offering a book to aid microprocessor users in understanding software design.

According to TI, the \$12.95 text begins by defining basic terms, machine architecture, and a detailed analysis of instructions and addressing modes. Succeeding chapters are said to "fully investigate the process of generating software....designing the support and documentation required....designing a simple machine to demonstrate how to program a problem." The book concludes by stepping the reader through four sample programs.

The book is available through TI's Learning Center, P. O. Box 5012, M/S 54, Dallas, TX 75222.

8080 RELIABILITY REPORT

Intel has published a 14-page report that covers test results, field reliability data and failure mechanisms on the 8080 microcomputer. Included are complete device descriptions, block diagrams and test curves.

Designated "Reliability Report RR-10," the document may be obtained by writing on company letterhead to the Marketing Services Department.

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HANDBOOK

Tab Books has announced a new selection available at newstands, Microprocessor/Microprogramming Handbook. Authored by Brice Ward, the 294 page book sells for \$9.95 in hardback and \$6.95 in paper.

μC TESTING STUDY

Omnicom Inc. is offering a detailed four volume reference investigating the choice of logic testers for microcomputer-based products.

The four volumes cover in-circuit test techniques, economics, vendor analysis and the complete brochures and data sheets for all currently available equipment. The four volume set is priced at \$295.

NEW 2650 APPL. NOTES

Signetics Corp. has released several new application notes for its 2650 microprocessor: 2650 Initialization (MP51), Low Cost Clock Generator Circuits (MP52), Software Support for Use with GE's Mark III Timesharing System (SP54), Conversion Routines (AS54), Simulator, Version 1.2 (SP53), and Binary Arithmetic Routines (AS53).

INTEL SPEC

Intel Corp. has published a 1976 Data Catalog covering the company's microcomputer and memory products.

The 12 sections cover RAMs, ROMs, serial memories, memory support circuits, memory systems, development systems, software, time keeping circuits and the following microcomputer systems: MCS-80, MCS-40 and the Series 3000.

Copies may be obtained by sending a \$2 check or money order to Marketing Services.

NEW RCA DATA BOOKS

The SSD-200D two-volume, 1,232 page set of Solid State Databooks is now available on RCA Solid State Division's complete standard line of linear integrated circuits, COS/MOS integrated circuits, microprocessors, memories, discrete MOS devices, power transistors, silicon-controlled rectifiers, triacs, rectifiers, diacs, RF and microwave power devices, and high-reliability integrated circuits and discrete devices.

The SSD-200D series contains complete technical data on all standard types in the RCA inventory as of May 1, 1976, plus abstracts on all application notes relating to those devices.

Databooks may be order in volume at \$6 each, or the two volume set may be ordered for \$10.

LEARNING TIMESHARE BASIC

Hewlett-Packard is now offering "Learning Timeshare BASIC," a 60-page booklet that is a first course in computer programming. The text incorporates each new word of BASIC into a useful sample application.

The text is kept simple, often colloquial, mixed with illustrations, and is priced at \$3.

INTELLIGENT TERMINAL REPORT

The Auerbach Guide to Intelligent Terminals covers 54 devices in chart form. The specification charts provide the major features and technical specifications of each terminal in detail to allow side by side comparison.

Detailed analyses of 32 intelligent terminals selected for market visibility are provided. The product reports include a description of the system, the performance characteristics of the terminal, plus configuration and compatibility information. A directory of suppliers is also included. The Guide, 239 pages, is available for \$24.95.

EDUCATION

June

- 15-16 Military and Aerospace Microprocessor Systems \$395 Asbury NY Integrated Computer Systems, Inc.
- 15-17 How To Design With Programmed Logic \$300 Pittsburg PA Pro-Log Corp.
- 15-17 M6800 Microprocessor Course \$430 Nashville TN & Phoenix AZ \$395 Motorola
- 17-18 Bit-Slice Microprocessors, PLA's and Microprogramming \$395 Asbury NJ Integrated Computer Systems, Inc.
- 21-23 M6800 Microprocessor Course \$430 Philadelphia PA Motorola
- 21-24 Advanced Programming \$395 Santa Clara CA National Semiconductor Corp.
- 21-24 IMP-16/PACE Applications \$395 Miami FL National Semiconductor Corp.
- 21-24 MCS-80/ICE-80 \$350 Santa Clara CA & Boston MA Intel Corp.

June

- 21-24 SC/MP Applications \$395 Dallas TX
National Semiconductor Corp.
- 22-23 Military and Aerospace Microprocessor
Systems \$395 Washington DC Inte-
grated Computer Systems, Inc.
- 24-25 Bit-Slice Microprocessors, PLA's and
Microprogramming \$395 Washington
DC Integrated Computer Systems, Inc.
- 28-29 Military and Aerospace Microprocessor
Systems \$395 Seattle WA Integrated
Computer Systems, Inc.
- 28-30 Series 3000 \$350 Santa Clara CA
Intel Corp.
- 28- 2 How To Design With Programmed Logic
\$350 Monterey CA Pro-Log Corp.
- 29- 1 M6800 Microprocessor Course \$430
Las Vegas NV Motorola
- 30 Interfacing to Microprocessors Free
Palo Alto CA Elmar Electronics
- 30- 1 Bit-Slice Microprocessors, PLA's and
Microprogramming \$395 Seattle WA
Integrated Computer Systems, Inc.

July

- 1 F8 Microprocessor Seminars \$20
Philadelphia PA Mostek Corp.
- 6-7 Military and Aerospace Microprocessor
Systems \$395 Toronto, Ont. Inte-
grated Computer Systems, Inc.
- 8-9 Bit-Slice Microprocessors, PLA's and
Microprogramming \$395 Toronto, Ont.
Integrated Computer Systems, Inc.
- 19 Microprocessor Fundamentals \$395
Santa Clara CA National Semiconduc-
tor Corp.
- 20 F8 Microprocessor Seminars \$20
Seattle WA Mostek Corp.
- 21 F8 Microprocessor Seminars \$20
Portland OR Mostek Corp.
- 26-30 IMP/PACE Applications \$395 Santa
Clara CA National Semiconductor
Corp.
- 26-30 Mini and Microcomputers. Their
Structures, Characteristics and
Applications \$375 University of
Michigan

- 28 Intel Microprocessor Applications
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Carrollton, TX 75006, (214) 242-0444

Motorola M6800 Training, Ron Bishop, BB102,
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FINANCIAL

SEMI SHIPMENTS PEGGED AT \$5B

Semiconductor industry officials expect worldwide shipments in 1976 to approach a record \$5 billion, a healthy 24% increase over 1975.

This consensus was revealed in the third annual Semiconductor Forecast published by WEMA, the trade association for the electronics industries.

The WEMA report predicts worldwide semiconductor shipments will exceed \$4.98 billion this year compared with \$4.02 billion during 1975. The total is expected to rise to \$5.9 billion in 1977 and \$6.6 billion in 1978.

For the first time in history, shipments of integrated circuits are expected to exceed shipments of discrete devices during 1976. The two categories ran almost even for 1975—\$2 billion for discretetes and \$1.9 billion for IC's. During 1976 the market for IC's is expected to total \$2.5 billion compared with \$2.4 billion for discrete devices.

Of the total world output of semiconductors expected in 1976, about 46% will be consumed in the U.S. Among the major product groups covered by the forecast, MOS devices are expected to jump 35% in shipments during 1976 to a total of \$1.1 billion. Digital bipolar devices will rise 25% to \$841 million and linear devices by 35% to \$583 million. A wide range of discrete devices will enjoy an aggregate increase of 17% to a total of \$2.45 billion.

The 8-page WEMA Semiconductor Forecast includes detailed figures for various product types and the world market is broken down into major geographical areas. Copies are available to non-members at \$2 each.

SIEMENS PREDICTS EUROPEAN SALES

Microprocessor sales in Western Europe should increase from \$21 million this year to \$155 million in 1980 and nearly \$800 million by 1985 according to a forecast from West Germany's Siemens AG. The company fully expects to snare close to a third of the total West European market.

Siemens AG, with microprocessor designs of its own and others designed by Intel, is predicting sales of \$6.6 million for 1976, \$55 million for 1980 and \$260 million in 1985.

μ P/ μ C BUYERS SURVEY

Survey of Microprocessor/Microcomputer Buyers is a joint market research report prepared by the publishers of Computer Design magazine and International Data Corp.

The authors summarized data into the following content areas: microprocessor/microcomputer usage, function, product status and vendor and model selected; suitability of microprocessor/microcomputer offerings; vendor, model and reasons for choosing specific memories; software incorporated and whether it was purchased or developed in-house; testing methods; use of peripherals and opinions of those available; and future plans for using microprocessors/microcomputers.

LOGICAL ACQUIRES CREATIVE COMPUTER

Creative Computer, a supplier of microcomputer software and educational material, has been acquired by Logical Services Inc., a manufacturer of microcomputers.

Timothy Barry, Creative Computer president, said that its microcomputer software course, Modu-Learn, would continue to be distributed by Logical and that no changes in the course are anticipated as a result of the acquisition.

Robert Ulrickson, President of Logical, said "acquisition will strengthen Logical's software capability and complement its SERVANT-8 microcomputer product line."

Offices will be consolidated at Logical's 711 Stierlin Road, Mountain View CA 94043 location. (415) 965-8365.

NSC EXPANDS HINKY POS SALES

A new release for Datachecker electronic P.O.S. systems has just been received by National Semiconductor Corp. from Hinky Dinky Stores in Omaha, Nebraska.

The release consists of equipment for three Hinky Dinky stores in Omaha. A complete alpha system, which includes an alpha-numeric printer, display and telecommunication system, will be in operation at one location by June 6. T-2500 standalone terminals with polling sub-systems will be installed at two other stores and are expected to go live in late July and mid-September.

COMPANY ADDRESSES FOR THIS ISSUE

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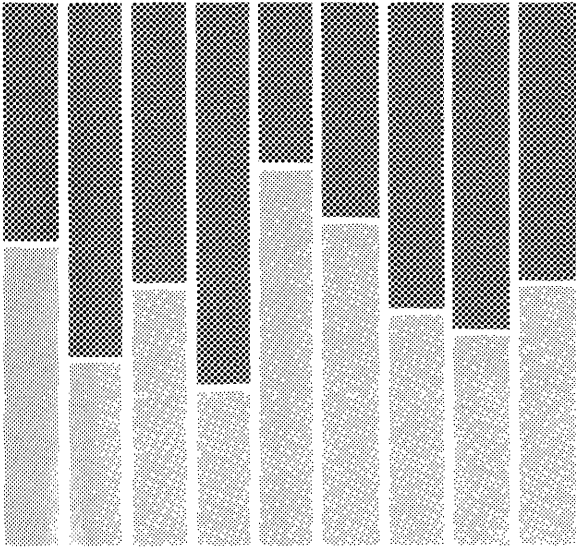
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INTERFACE



NEW DEVICES TO LINK SYSTEMS TOGETHER



The title, "Interface", has been applied within the electronics industry to a variety of IC functions that do not conveniently fit into either the Linear integrated circuits category or any other specific logic family. Integrated Circuits manufacturers disagree on which functions fit into this generic classification.

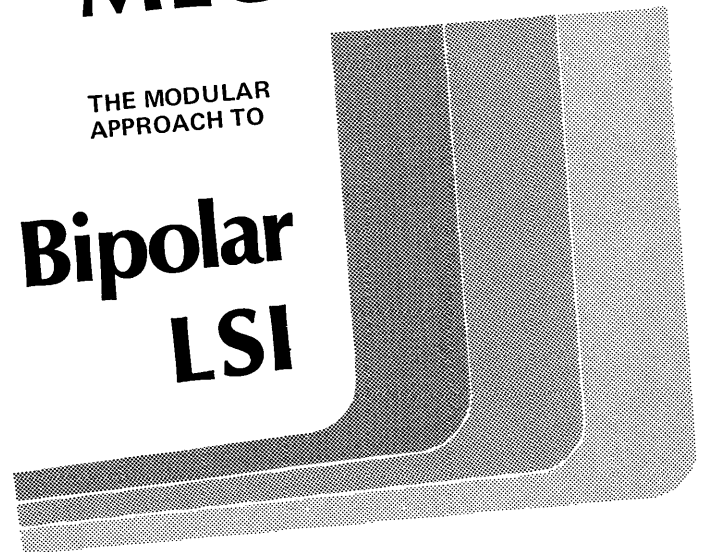
Interface devices are intended to link the gap between available circuit functions when configuring advanced systems. The rapid progress in new electronic components such as NMOS RAMs and MPU requires the use of special circuit elements not restricted to any particular processing technology.



MEGALOGIC

MEGALOGIC encompasses several design approaches to bipolar LSI. One approach is the gate array, which in conjunction with a highly-efficient computer-aided design system (CAD) makes it possible to quickly translate a set of circuit requirements to a comparable set of working chips.

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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 Brown² - 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.

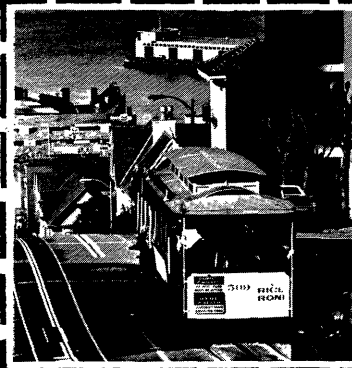
PLUS . . . tutorial sessions on minis and micros and a special session for computer hobbyists!

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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.



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