MICROCOMPUTER DIGEST

RCA DEVELOPS FIRST CMOS µC

The first microprocessor using low-power reliable CMOS technology has been developed by RCA according to Gerald B. Herzog, Director of the RCA Laboratories Solid State Technology Center in Sommerville, NJ.

The two-chip unit will provide system designers with a low-power CPU that utilizes a technology with a proven capability of successful operation in difficult noise, temperature and power environments.

Chips should be available to equipment manufacturers on a sampling basis this year, Mr. Herzog said.

The microprocessor chips are expected to be used in low-cost, high volume systems, such as process control and manufacturing automation, as well as in automotive control devices, point-of-sale terminals and programmable calculators.

INSIDE THIS ISSUE

NEC ANSWERS INTEL WITH NEW µC

An 8-bit microcomputer has been introduced in response to Intel's 8080, by Nippon Electric Co. of Tokyo, Japan. The microcomputer is NEC's second entry in less than a year. The first, introduced last year, was a 4-bit microcomputer.

The microcomputer consists of a single-chip, parallel CPU, 8K ROM and an 8-bit latch driver for input-output devices along with optional RAMs.

Designated u PD 753 D, the microcomputer has 74 instructions and a basic execution time of 2.5 us with a total memory capability of 64K bytes.

NEC says the u PD 753 D can execute a 16-digit subtraction in 230 us. The company also reports that software for the Intel 8080 can be used in NEC's system without modification.

NEC will also be offering the u PD 404 D, a 1024 x 1 RAM, u PD 412 D, a 256 x 4 static RAM and, in the near future, a 4K RAM.

INTEL OFFERS NEW $12 4K RAM

Intel Corp. of Santa Clara, CA has announced a new 4096-bit RAM priced at $12. This marks the first sharp decline from current 4K RAM prices of $24 to $40 in lots of one hundred.

Intel would not quote prices for lots over 100 inasmuch as they deal on a customer-by-customer basis in high volume OEM business.

Other manufacturers of 4K RAMs indicated that they were surprised by Intel's move, but felt their business would not be disturbed much by the announcement.

CONTENTS

EDITORIAL:

THANK YOU FOR YOUR RESPONSE

This is MICROCOMPUTER DIGEST's second issue. Since we have received an excellent response to our July advertisement, we are extending the free offer throughout this month. Everyone who answers the ad will receive two free issues. We thank you for your encouraging letters.

As time progresses, we will make changes in the MICROCOMPUTER DIGEST to meet our reader's needs and suggestions. We therefore solicit your suggestions, criticism or praises for inclusion in our "Readers Forum". Send your letters to the attention of that department.

We have planned many exciting features which will delve into the role of microcomputers in education, medicine, military, industrial and commercial markets. We will also have special features on microcomputer marketing, design, applications, software, consumer responses and conventions.

We will cover two major conventions, COMPCON and WESCON, in October which will highlight microcomputers. We will also cover conventions to be held in December and February.

In November, we will concentrate on the use, selection, and design of RAM memory systems in microcomputers. An almost unknown application of microcomputers will be discussed in January.

We are presently planning a very exciting series on development systems that will describe all available models on the market. To conclude the series we will have a wrap-up with guidelines for selecting development systems for particular applications.

All in all, we can say that MICROCOMPUTER DIGEST will not only be very informative, but will present to each design engineer, manager, consultant and user a valuable collection of "how to" and "What's going on" articles.

Our special introductory offer expires at the end of October, so subscribe today by sending in the enclosed form.

You will note in this issue several new additions in our People, Literature & Events, and Financial departments. Just a small part of our effort to keep you more informed.

Editor

SPECIAL FEATURES:

Rca Develops First CMOS µC

When operating from a typical power supply of 10 to 12 volts, the machine cycle time (8 clock pulses) will be about 3 microseconds. Assuming a 1-microsecond RAM, the CPU chips will have a 6-microsecond fetch-execute time for any instruction, a DMA rate of 333K byte per second, and an interrupt response time from 3 to 9 microseconds.

The architecture of COSMAC (Complementary-Symmetry Monolithic-Array Computer) is based around a 16 x 16 scratch pad register array; any reference to memory is made via one of these 16 registers. Addressable memory is 65,536 8-bit bytes. An 8-bit two-way data bus interconnects the processor, any mixture of RAM and ROM, and the peripheral devices.

Three of the 16 registers are used as DMA pointer, interrupt servicing program counter, and general stack pointer, but otherwise the registers are freely usable for data storage (two independent bytes each), address pointers, and program counters. Instructions are provided to move data between the registers, 8-bit accumulator, memory, and the peripherals, to increment or decrement registers, to do 8-bit logic arithmetic, for conditional branch and for servicing interrupts and interrupt mask.

COSMAC is currently implemented on two large chips, almost 250 mil per side each. Each requires roughly 3000 devices. When logic is finalized, a 1-chip version is expected to have a chip size below 200 mil per side.

NEC Answers Intel with New µC

A cross assembler, simulator and program development kit using the NEAC-4 will also be available. The system is scheduled for shipment in October. Prices for the CPU chip begin at $216.67 for 100 to 249 quantities. Present plans do not include distribution of the microcomputer in the U.S.

Intel Offers New $12 4K RAM

Dubbed the 2107A, the N-channel RAM has a maximum access time of 300 ns with a read cycle of 500 ns and a write cycle of 700 ns. The device is housed in a 22-pin package and requires +5, -5 and +12V power supplies. The RAM is TTL compatible and, for system applications requiring battery operation, the 2107A may be ordered with a special low-power data retention option.

Intel reports that the RAM is available off-the-shelf at Almac/Stroum, Cramer, Hamilton/Avnet, and Sheridan Sales.

TECHNOLOGY:

Two-Chip Microcomputer

General Automation of Anaheim, CA is marketing their LSI-16 microcomputer. The two-chipper, which uses SOS (silicon-on-sapphire) technology, consists of an ALU and a CROM (control read-only-memory).

The microcomputer is software compatible with GA's SPC-16 minicomputer and is mounted on a 7-3/4 inch x 11 inch circuit board. A second board is available with the addition of optional features.

Fourteen software programs are available for the LSI-16, which had originally been developed for the SPC-16. The microcomputer is designed for use in high-volume dedicated applications in industrial automation.

Bipolar µC Believed to use I^2L Process

Transitron Electronics Corp. of Wakefield, MA is reportedly developing a bipolar microcomputer, but company sources will not say whether the chip uses integrated injection logic (I^2L). However, the system's low number of chips (four) does seem to indicate the I^2L high density process is being used.

According to TEC, the system will consist of four 4-bit RALUs and a control ROM that will not be accessible by the user. The firm points out that user accessibility to the control ROM is not necessary, since the microcomputer will incorporate a firm microprogrammed instruction set.

The system will include full software support packages. Twelve main registers (eight are general pupose) enable users to program the 16-bit machine easily. Indications are that it will be FORTRAN programmable and possibly quite efficient since Transitron is believed to have acquired Data General's PL/1 project staff. The microcomputer is expected to be ready early next summer.

Japanese Firms Shifting to µC

Increased price competition and expected relaxed government import restrictions have caused Japanese calculator chip manufacturers to gradually shift toward CMOS, microprocessors, MOS RAMs, electronic watch circuits and industrial ICs.

Although many Japanese firms deny they are dropping out of the race or hurting, many spokesmen for the companies have admitted that new production and development efforts are shifting toward other fields.

American calculator-chip makers have drastically reduced prices and announced even lower prices for Fall. To data, Japanese companies have indicated that they will continue to follow the American companies price per price. Aside from the price offensive, American IC firms will be allowed complete freedom sometime near the end of the year to import ICs into Japan. IC imports are presently restricted, but the Japanese government has promised all import controls will be lifted by year end.

Sharp, Hitachi, NEC, Mitsubishi Electric and Toshiba have disclosed new and expanded efforts in microprocessor development.

MICROCOMPUTER-BASED PRODUCTS:

Furnace to Use IMPs

Lindberg of Watertown, WI has announced it will be building diffusion furnaces with built-in microcomputers that will soon become a standard product.

Lindberg has declined to identify the first customer; however, industry sources claim that the RCA Solid State division has bought the furnaces for work in the Navy's Trident program.

The furnaces will be delivered late in October and will use National's microcomputer. Valued at about $250,000, the contract calls for furnaces that are expected to be built in a four-tube stack configuration with one microcomputer for every eight tubes.

Lindberg says they presently build solid-state timing systems using IC logic; however, the microcomputer can perform this function and replace the entire series of cards using discrete logic circuits. Plus, the microcomputer card can do much more.

The firm says that the addition of the microcomputer would increase the furnace cost by about $500 per tube, but then the customer can automatically handle insertion/withdrawal of the load, all timing functions, temperature functions, and respond or react to error signals.

The company has had some resistance in selling the idea to their customers, mainly because of a lack of understanding. The company is endeavoring, however, to show customers how microcomputers can automate the diffusion process and at the same time make it easy on themselves.

Lindberg feels microcomputers will eventually open future, extensive use of computers in furnaces.

Qualifier Uses µC to Test IC Chips

A new tester recently announced by Fairchild Systems Technology of Palo Alto, CA uses a microcomputer to aid in the testing of integrated circuits.

Designated Qualifier 901, the system does not use conventional program entry methods, but uses durable plastic cards, called QUAL-CARD instead. The card is factory-coded for an optical reader which loads the program into the tester for each particular type of device.

The standard unit is capable of testing 16-pin devices, but is field expandable for 24-pin units. The Qualifier 901 can be used for parametric testing and for power dissipation, fan-out and noise-margin testing. Extensive testing of a device with unique parametric limits on input/output pins with different fan-in/fan-out properties is accomplished by using programmable states and a high-speed Grey counter.

Test time for 16-pin combinational devices is typically 60 msec and 200 msec for sequential devices.

To insure users that an indicated failure is not in the tester or program but in the device under test, a comprehensive self-test is performed by the microcomputer every time the tester is turned on or a new program is loaded. The microcomputer checks all registers, memories and data paths. Once the self-test has been completed successfully, the qualifier then accepts and tests DTL, TTL or CMOS circuits.

Price for the Qualifier 901 begins at $6950 for 16-pin devices, and $8350 for customer expandable 24-pin devices. Program cards vary between $20 to $60 each.

NEW BRITISH μC SCIENTIFIC CALCULATOR

To reduce the time and expense in performing complex, routine calculations and yet maintain complete control of the calculation process, Olivetti of London England has introduced their P652 modular microcomputer system.

The basic machine uses a microcomputer to add increased capabilities to a scientific calculator for trigonometric and logarithmic calculations, as well as special mathematical or statistical calculations. Included are matrix inversion and operations with complex numbers that can be handled by in-built routines. All input data and results are printed out.

The system's basic 4K memory can be extended to 71K. Additional peripherals include a tabulated printout facility, a graph plotter, and punched tape input/output. Electronic measuring instruments for direct data input can be easily added.

Olivetti has made available a software library for programs covering most scientific technical applications. The company also has a special software team available to write programs when problems cannot be solved through the use of library programs.

THREE FIRMS ANNOUNCE CONTROLLER LINE

Three manufacturers of IBM-compatible disc drives will introduce controllers to cover the design range from hardwired logic and microprocessor control to LSI microcomputers.

Potter of Long Island, NY will incorporate a Computer Automation LSI-2 microcomputer in its intelligent key-to-disc system. The system will also use a Burroughs Self-Scan alphanumeric display, a 500 line-per-minute printer and two IBM floppy disc drives for data entry display and printout. Basic price of the system is about $15,800.

On the other end of the scale, Shugart, the largest IBM-compatible floppy drive supplier is hardwiring their eight-drive disc controller. The company says it will be either software or switch programmable in record length and track gaps. The company sees no need to use a microcomputer in the controller for some time and said that features such as simultaneous sector seeking on a drive were not included.

In the fourth quarter, Diablo will announce a microprocessor-driven controller. The system will be designed as a general purpose computer interface with a factor option of either fixed sectors or IBM-compatible variable record lengths. The company said the microcomputer operating speed is ideal to the data rate coming from the floppy disc. They also feel that multiple searching on all drives is not a good idea since it would encourage users to think of using floppy discs as a computer-accessed data base with multiple-pass sorting and merging.

EDITING CRT TERMINAL OFFERED

OMRON is marketing their microcomputer controlled CRT terminal system. The company says the terminal has made editing extremely easy since the OMRON 8025 can delete, enter, store, change, or transmit individual characters, lines, columns, forms, half-pages or whole pages. The system can also be used for data entry, inquiry, retrieval, communications, credit verification, instrumentation, and manufacturing or process control.

By adding a cassette storage and printer, the 8025 becomes a remote batch terminal. Memory with up to 16K bytes in combination of ROM, RAM, PROM is available. The company says the user can change the system's software with a high-level language to make operations easy, efficient and direct.

MEMORIES AND PERIPHERALS:

3 New Products Added in μC Line

Process Computer Systems Inc. of Flint, MI has announced three new products to be used with their CM4400 microcomputer. They are the PM5100 Microcomputer Control Panel Set, the CM4501 Memory Board Module, and the CM4503 Memory Board Module.

The CM5100 has an interrupting capability which may be enabled or disabled, and is entirely software driven. A ROM that contains the PCS control panel driver program is available as an accessory. The CM5100 is designed to allow hands-on operation of the CM4400 CPU in debugging and trouble shooting new programs.

The CM4501 Memory Board Module provides the CPU with provisions for 1K to 4K bytes of RAM.

The CM4503 Memory Board Module is capable of providing the CM4400 with 4K bytes of ROM in 256 bytes. The basic module has 16 sockets to hold the erasable ROM chips. The user has the option of selecting as many ROM chips (up to 16) as required to meet his needs.

The CM4501 and CM4503 may be used with other CM45xx series memory modules to provide up to 64K bytes of memory.

New 16,384-bit MOS ROM Announced

Electronic Arrays of Mt. View, CA has introduced the EA 4900, a 16,384-bit MOS ROM that will be second-sourced by Texas Instruments and Mostek.

The new single-chip ROM will be aimed at the microcomputer, minicomputer, data terminal and programmable calculator markets. The company says that both TI and Mostek will provide a pin-for-pin replacement.

The ROM is packaged in a 24-pin ceramic or silicone-molded DIP. It is organized as 2K x 8 bits and has a maximum access time of 950 ns.

The device is priced at $28 in lots of 100 and delivery is 6 to 8 weeks ARO.

Fairchild Readies 1K RAM

Fairchild Camera & Instrument Corp. of Mt. View, CA is shipping sample quantities of its 2102 N-channel 1K static RAM to customers for evaluation.

The RAM incorporates Isoplanar processing, is fully compatible with competing RAMs, and has access times as fast as 350 ns.

According to Philip R. Thomas, general manager of the company's MOS Products Division, Fairchild will be offering three speed-range versions of the 2102. The three versions and guaranteed access times are: the 2102 at 650 ns, the 2102-1 at 450 ns, and the 2102-F at 350 ns. Devices with the same access times that meet MIL-STD 883 (-55° to +125°C) are also available.

All RAMs are packaged in a 16-pin DIP, plastic or ceramic, require only a single +5V supply, and are fully TTL-compatible. The chip-select pin provides a tri-state output which allows OR-tying of outputs and individual package selection.

Two Firms Plan Joint RAM Venture

Honeywell of Waltham, MA and Nippon Electric Co. of Japan have announced a joint development agreement involving the 4096-bit MOS RAM. Indications are that NEC will build the parts but it is unclear whether the RAM will be sold in the U.S. or if it is solely for the computers that NEC will build for the Japanese market.

Heavy Competition Mount in 1103 Race

Competition in the 1103 RAM memory race increases as two California semiconductor firms announce faster and cheaper devices.

American Microsystems, Inc. of Santa Clara, CA has announced the 1103X, which has a 120-ns access time and 270 ns cycle time. Meanwhile, Rockwell's Microelectronic Device division of Anaheim, CA has announced a 1,024-bit RAM. The company says the access time is less than 200 ns. This is Rockwell's first entry into standard parts business. Both companies have announced availability sometime in the fourth quarter.

IC Tester From Fairchild

Richard Hunt, marketing director of the Systems Technology Division of Fairchild Camera & Instrument Corp., Palo Alto, CA has introduced two improved versions of its Sentry 500 and 600 automated, computer-controlled, integrated circuit test systems.

Designated the Sentry 510 and 610, each utilizes modular construction and common hardware, with software and peripheral options that are compatible with other Sentry models.

The Sentry 510 employs low-cost peripherals and a production-oriented, high-throughput software structure for high-volume production or incoming inspection testing of ECL, TTL, or MOS/LSI devices. Foreground/background software permits program generation with no interruption of testing. A multiple overlay structure allows the use of "canned" packages for binning, parameter distribution, manual analysis, time measurement, and diagnostic capabilities.

Fairchild says the Sentry 610 combines the software of its predecessor with enhanced tester hardware and improved specifications for characterizing and testing bipolar logic as well as MOS/LSI. A disc and 9-track magnetic tape provide data logging and data analysis capabilities for testing complex logic.

Sentry 510 prices start at $125,000 and the Sentry 610 begins at $180,000. Shipments of both systems will start this month and deliveries are 9-120 days ARO.

Software Support for Intel µC Family

MICROTEC of Sunnyvale, CA is offering an assembler and a simulator for Intel's 8008, 8080 and 4004 microcomputer families. The programs, written in FORTRAN IV, can be easily run on nearly any computer supporting FORTRAN.

The assemblers provide symbolic addressing, relative addressing, constant generation, and other features. The simulators provide a flexible set of commands that enable users to set breakpoints, trace program flow, display and patch memory locations.

Prices begin at $500 for the assemblers, and at $650 for the simulators.

PEOPLE, LITERATURE AND EVENTS:

East Coast Application House Formed

Microcomputer Systems, an independent division of ILC Data Device of Bohemia, NY has been formed to develop and market microcomputer assemblies, dedicated processors, customer microprocessor-controlled systems and protable microcomputers.

Under the direction of Ted Berg, vice-president and general manager of the new division, Microcomputer Systems will concentrate on such systems applications as instrumentation and control, automatic data logging, automatic test, and intelligent remote sensors.

The company will temporarily operate out of Hicksville, NY.

National Extends Training Overseas

National Semiconductor of Santa Clara, CA has announced that Warren Point Ltd., of Welwyn, England, will provide all user training and microcomputer application courses in the United Kingdom.

The capability of the firm will range from introductory courses to support for specific applications, such as digital interface design and instrumentation.

Recent Literature

Survey of Microprogrammable uP's Reveals Ultimate Software Flexibility -- 3rd in a series
by Jerry L. Ogdin, Microcomputer Technique, Inc.
EDN, July 20, 1974

Mr. Ogdin has presented an introduction into the class of microprocessors called microprogrammable microprocessors. Four machines are considered: National's GPC/P set, Burrough's Mini-D, AMI's 7300, and Teledyne's TDY52A. Each machine, having its own method of implementing the microprogram storage is presented in detail. As pointed out by Robert Cushman, EDN's special features editor (as an insert to this article),

microprogrammability can be implemented with ROMs (Read-Only Memories) or PLAs (Programmable Logic Arrays). Mr. Cushman continues and explains the difference between the two approaches. National's GPC/P uses a PLA while AMI's 7300 uses a ROM. This article is a good overview into the architecture of microprogrammable microprocessors.

High-Level Language Simplifies Microcomputer Programming
by Gary A. Kildall, Naval Postgraduate School and author of PL/M
Electronics, July 27, 1974

Mr. Kildall presents Intel's high-level programming language for microcomputers called PL/M. PL/M is designed to simplify microcomputer programming while minimizing design and development time. The basic parameters of a high-level language are presented along with simple examples of high-level code versus assembly level code. Advantages of PL/M over assembly language are mentioned throughout the article. A must article for anyone responsible for programming a microcomputer-based application.

How to Design a uP-Based Controller System
by Jonathan Titus, Titus Labs
EDN, August 20, 1974

The author presents an application of uP's to a traffic control problem. The application is centered around an Intel 8008 and is discussed in four steps, 1) flow diagramming, 2) interface hardware, 3) writing the software, and 4) hardware/software integration. A good presentation of typical tradeoffs when designing a uC-based product.

Microprocessor Architecture
Computer, July 1974

This issue of the IEEE's Computer highlights microprocessor architecture in four articles. The first article, "Microprocessors Present and Future," by Ted Laliotis reviews some current artchitectures and discusses how they differ. The future is looked at in terms of "extra" features, bipolar processors and nanoprocessors.

The second article, "Considerations in Choosing a Microprogrammable Bit-Sliced Architecture," by George Reyling, Jr. discusses the significance of National Semiconductor's GPC/P byte slice chip set for the user.

The third article, "Microprocessor Design For Intelligent Point of Sale Terminals," by Joseph H. Herr describes the capabilities of an existing terminal processor and compares them to a commercially available microprocessor chip.

The fourth article, "LSI Microprocessors and Microcomputers: A Bibliography" by Ann R. Ward attempts to compile all articles, books, conference papers, seminar notes, and technical reports on LSI microprocessors which have been published in English from 1970 to April 1974. The Bibliography has been organized chronologically to emphasize the exponential growth of activity in this field.

Diverse Industry Users Clamber Aboard The Microprocessor Bandwagon -- a special feature of Electronics, July 11, 1974

Electronics magazine has put together a collection of six articles covering application and design areas most likely to be saturated by the microprocessor. Areas covered include industrial, communications, consumer/commercial, computers, instruments, and design. An additional article by Bill Davidow, manager of microcomputer systems for Intel Corp. discusses the design and cost advantages of microprocessor-based systems for the user.

Each article introduces the application area as it exists today and then discusses examples of current microprocessor-based systems and their potential impact on the market. Application areas included traffic control, instrumentation, numerical control, typesetting, inventory control, entertainment games, computer peripherals, and intelligent terminals. The articles are an excellent coverage of current and potential microcomputer-based product markets.

EDUCATION:

MICROCOMPUTER COURSES, SEMINARS, CONFERENCES.
Date, title, cost, location, sponsoring organization (addresses on pages 10-11).

August

Arr   Intro to Microprocessors half-day arranged Harvey Electronics Woodbury, NY

1- 2   Pro-Log System Design Course $150 Chicago, IL   Pro-Log Corp.

5- 6   Pro-Log System Design Course $150 Dayton, OH   Pro-Log Corp.

5- 9   Microprogramming/Microprocessors Programmable Controllers $225 College Station, TX   Texas A&M University

6- 7   Microprocessor-Based Systems Design $295   Palo Alto, CA   Andy Hish Assoc.

7- 9   Intro to Microcomputers/ Engineering Applications $300   Berkeley, CA University of California

8- 9   Microprocessor-Based Communications Systems Marketing $345   Las Vegas, NV   Andy Hish Assoc.

8- 9   Pro-Log System Design Course $150 Rochester, NY   Pro-Log Corp.

12-13   Microprocessor-Based Systems Design $295   Las Vegas, NV   Andy Hish Assoc.

12-16   Minicomputers & Microprocessors $295   Montreal, Quebec Technology Service Corp.

14-16   Intel MCS-4 Workshop $350   San Jose, CA   Intel Corp.

19-20   Introductory Workshop $325   New York, NY   Microcomputer Technique, Inc.

19-21   Intel MCS-8/80 Workshop $350   San Jose, CA   Intel Corp.

20-22   Pro-Log System Design Course Indianapolis, IN   Pro-Log Corp.

20-23   National Microprocessor Workshop $395   San Jose, CA   Compata, Inc.

21   Programming Languages and Software $150   New York, NY   Microcomputer Technique, Inc.

21   Introduction to Microprocessors $150   New York, NY   Microcomputer Technique, Inc.

22-24   Intel PL/M Workshop $350   Palo Alto, CA   Intel Corp.

26-27   Microprocessor-Based Systems Design $295   Denver, CO   Andy Hish Assoc.

27-29   Pro-Log System Design Course Palo Alto, CA   Pro-Log Corp.

September

Arr   National Semiconductor's Microcomputers half-day, arranged Harvey Electronics   Woodbury, NY

6   Minicomputers and Microprocessors $425   Houston, TX   Technology Service Corp.

3- 6   Intel MCS-4 Workshop $395   Boston, MA and Dallas, TX   Intel Corp.

4- 5   Advanced Microcomputers Applications and System Evaluation $160   Berkeley, CA   University of California

4- 5   Microprocessor-Based Systems Design $295   Anaheim, CA   Andy Hish Assoc.

6   Trends in Microcomputer Hardware, Software, and System Engineering $80 San Francisco, CA University of California

9-12   Intel MCS-8/80 Workshop $395 Boston MA and Dallas, TX Intel Corp.

9-13   Minicomputers and Microprocessors $425 Washington, DC Technology Service Corp.

10-13   COMPCON 74/EAST Washington, DC IEEE Computer Society

10-13   Various Sessions on Microprocessors and Microcomputers Los Angeles, CA WESCON

15-20   Microprocessors and Minicomputers Interfacing and Applications $295 Blacksburg, VA Virginia Polytechnic Institute

16-17   Microprocessor-Based Systems Design $295 Palo Alto, CA Andy Hish Assoc.

17-20   Intel MCS-8/80 Workshop $395 Boston, MA and Dallas, TX Intel Corp.

17-20   National Microprocessor Workshop $395 San Jose, CA Compata, Inc.

23-26   Intel PL/M Workshop $395 Boston, MA and Dallas, TX Intel Corp.

26   Computer Technology 4-unit Course Santa Clara, CA Univ. of Santa Clara

26-27   Electronic Warfare System Applications Dayton, OH Andy Hish Assoc.

29- 1   Seventh Annual Workshop on Microprogramming Palo Alto, CA SIG MICRO

October

1- 3   SEMICON East 74 Uniondale, NY Semiconductor Equipment and Materials Institute

1- 3   Semiconductor Test Symposium Cherry Hill, NJ IEEE Computer Society, Philadelphia Section

3- 4   Microprocessor-Based Systems Design $295 Dallas, TX Andy Hish Assoc.

7- 8   Microprocessor-Based System Design $295 Anaheim, CA Andy Hish Assoc.

7- 9   EASCON 74 Washington, DC IEEE Computer Society

8-11   Intel MCS-4 Workshop $395 Philadelphia, PA and Los Angeles, CA Intel Corp.

14-17   Intel MCS-8/80 Workshop $395 Philadelphia, PA and Los Angeles, CA Intel Corp.

22-25   National Microprocessor Workshop $395 San Jose, CA Compata, Inc.

22-25   Intel MCS-8/80 Workshop $395 Philadelphia, PA and Los Angeles, CA Intel Corp.

28-29   Electronic Warfare System Application Palo Alto, CA Andy Hish Assoc.

28-31   Intel PL/M Workshop Philadelphia, PA and Los Angeles, CA Intel Corp.

SPONSORING ORGANIZATIONS

Andy Hish Assoc., 9710 Cozycroft Ave., Chatsworth, CA 91311 (213) 998-0222

University Extension, University of California at Berkeley, 2223 Fulton St., Berkeley, CA 94720 (415) 642-3112

Compata, Inc., 1333 Lawrence Expy., Santa Clara, CA 95051 (408) 246-6575

Harvey Electronics, 60 Crossways Park West, Woodbury, NY 11797 (516) 921-8700

IEEE Computer Society, 345 East 47 St., New York, NY 10017 (212) 752-6800

Intel Corp., Microcomputer Systems Training Program, 3065 Bowers Ave., Santa Clara, CA 95051 (408) 246-7501

Microcomputer Technique, Inc., 11227 Handlebar Rd., Reston, VA 22091 (703) 620-9676 -- Offers discount for attending more than one seminar.

Pro-Log Corp., 852 Airport Rd., Monterey, CA 93940 (408) 372-4593 Also offers in-house courses for $1500 (2 days, 16 students maximum).

SIG MICRO, Michael Galey, Dept. H-90, IBM Corp., San Jose, CA 95193

Technology Service Corp., 225 Santa Monica Blvd., Santa Monica, CA 90401 (213) 451-8778

Texas Engineering Extension Service, Texas A&M University, F.E. Drawer K, College Station, TX 77843 (713) 845-7621

University Extension, University of Santa Clara, Santa Clara, CA 95051

Virginia Polytechnic Institute & State University, Department of Chemistry, Blacksburg, VA 24061

WESCON, 3600 Wilshire Blvd., Los Angeles, CA 90010 (213) 381-2871

FINANCIAL:

IRELAND READY FOR MOS VENTURE

The Irish Republic is shopping among U.S. companies for an electronic firm that is more than just as assembly operation. They are looking for a completely independent operation which will require production, engineering and management skills, according to a recent Electronics magazine article.

The Irish Industrial Development Authority is not just browsing. They want an MOS plant. The article states that Ireland is ready to offer prospective companies several real incentives, including "... a diversified labor supply that includes unskilled, skilled and technically trained workers, engineers, and managers; freedom from income tax on exports for 15 years; cash grants up to 50% for fixed assets; personnel training grants; reduced rate loans; and ready-built factories and, of course, a common language."

MODEST RECOVERY IN 1975

A recent Merrill Lynch Review concluded that the economic recovery for 1975 will be "very modest" and that compared with economic conditions in most foreign countries, the U.S. difficulties also appear to be only "modest".

The report said that economists at Lionel D. Edie expect the recession to continue throughout the remainder of 1974. However, corporate profits continue to be strong despite current economic conditions. Inventory profits, a by-product of inflation were noted to be continuing at high levels. But next year, according to the report, lower rates of inflation, lower inventory profits, decline of approximately 11 to 12% in both pre-tax and after-tax profits is anticipated, even though domestic operating profits may rise by as much as 4%.

Economic advisors feel that the new Administration will adhere to policies of tight money and budget constraints to combat inflation.

The article noted that the tight monetary constraints in Japan and some European countries have slowed economic growth, and in some cases caused actual recession. But then, it was noted that inflation and interest rates around the world are usually much higher than in the United States. Inflation and high petroleum prices were given as causes of balance-of-payment deficits for most industrialized countries. Indications are that many foreign governments will be facing even more difficult policy decisions in the coming year.
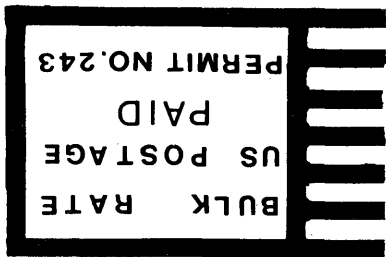
WE'RE HERE TO SAVE YOU TIME

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