

News and Speculation about Personal Computing

Conducted by Sol Libes

Random Rumors: Still no word on when Commodore's new 16-bit microprocessor, the 65000, will be announced, but specifications are starting to leak out. Scuttlebutt has it that the chip will be mounted in a standard 40-pin DIP (dual-inline package) that should allow the manufacturer to hold down its cost. The 65000 will have 24 address bits, allowing it to directly access 16 megawords (32 megabytes) of memory. It will contain sixty-four 8-bit registers and will be designed to provide direct support for high-level languages via descriptors that associate data types with variables. The initial version is expected to have a programmable I/O channel with 22 associated instructions, which will let it service I/O devices without disturbing the main processor. Rumors are circulating that before the microprocessor will be made available to outsiders, the initial production runs will be used for a new computer that Commodore has in the works. . . . It's estimated that IBM sold more than 250,000 Personal Computers during the first year of production, fully half the number of Apple IIs sold in that machine's first 5 years of production. IBM is expected to greatly expand its list of independent retailers of the Personal Computer. . . . According to reports, Motorola is shipping sample 68000 microprocessors rated to run at 16 MHz and the company may distribute a version of Digital Research's CP/M disk operating system for 68000-based machines. . . . Tecmar Inc., Cleveland,

Ohio, is said to be working on a 68000 processor card for the IBM Personal Computer. . . . Any day now, Microsoft is expected to release MS-DOS version 2 (known as PC-DOS on the IBM Personal Computer). It may have multitasking capability. Microsoft is also rumored working on a version that will run as a task under multiuser Xenix so that owners of that operating system will be able to run MS-DOS-based software too. Microsoft may soon have a word-processing program, possibly called Multiword, to complement Multiplan. Microsoft is also rumored to be interested in buying *PC Magazine* from Tony Gold (formerly of Lifeboat). We wonder what that will do to PC's credibility. . . . **MH** . . . American Bell, the new AT&T computer subsidiary, is expected to start releasing a host of new computer products starting early next year. You can anticipate a lot of software, terminals, and minicomputers. Although most of the new products will be directed toward the telephone industry, many will find use in general applications (the terminals, for example, use Motorola's 68000 microprocessor, are said to be highly intelligent, have super graphics, cost about \$1000 each in quantity, and may be well suited for text-editing and work-station use). AT&T denies it, but rumors persist that a 32-bit microprocessor designed specifically to run Unix System III (the latest officially released version) will be introduced. . . . If Timex is successful in mass-marketing the ZX81, expect Sinclair Research to turn over

the new Spectrum color computer to that company, too. . . . Lanx Corporation, San Jose, California, and IMI (International Memories Inc.) are thought to be readying a 100-megabyte 8-inch Winchester-disk drive using vertical recording. . . . Sources say that Shugart Associates is shipping evaluation samples of its new optical mass-storage system to potential customers. Production is slated for late next year. The storage system is said to be of the write-once variety, which means that information written cannot be erased. Because the system has a capacity of 1 gigabyte per optical-disc surface and because the media are removable, the write-once philosophy is easily justified. . . . Look for Panasonic to announce a system compatible with IBM's Personal Computer. . . . IBM is said to be squaring away a souped-up version of the Personal Computer that uses Intel's 8086 microprocessor and has more memory-addressing capability and larger disks. Expect its introduction by year's end. . . . Rumor has it that the well-known Wall Street analyst Benjamin M. Rosen, who publishes the *Rosen Electronics Letter* on the electronics industry, is actively backing a new personal computer venture. Formal announcement of the new company and its product should occur early this month. Stay tuned for more details. . . . **CM**

Commodore Status Report: Commodore Business Machines appears to be try-

ing to compete with everybody by introducing five new machines with list prices ranging from a low of \$179 to a high of \$2995. The low-cost MAX is essentially a game machine, but it does incorporate some of the features of the VIC-20, PET, and the new Commodore 64. It appears to be intended to compete with the Atari Video Computer System.

In the meantime, the VIC-20 is selling like hotcakes at discount prices as low as \$229 (list is \$299); however, industry pundits speculate that it will soon be replaced by an upgraded model with a better display, graphics, and sound. The Commodore 64 (\$595 list)—with 64K bytes of memory and a good keyboard—may turn out to be the lowest-cost machine capable of running CP/M. An optional plug-in Z80 cartridge should be available for it sometime next year.

With the introduction of the P128 (list \$995), Commodore finally appears to be replacing the PET computer. The P128 has 128K bytes of memory and is compatible with PET peripherals. The new B128 (\$1695) and BX256 (\$2995) computers appear to be replacements for the CBM 8032. Both have 80-character by 24-line video displays and built-in floppy-disk drives. The B128 carries 128K bytes of memory, while the BX256 has 256K and a second processor, an Intel 8088. Both systems accept up to 640K bytes of memory and have detachable keyboards. These machines seem designed to rival the IBM Personal Computer and Apple III.

Commodore's line of machines is larger than that of any other manufacturer in the industry. Previously, Radio Shack had the broadest line with four different machines. Commodore's new machines present a new price-versus-performance standard and should shake up the industry when they become available in quantity early next year.

Apple Rumors: Apple is expected to announce the long-awaited successor to the Apple II, the Apple II-E, early in January. The II-E should have an 80-column video display and more than 64K bytes of memory—features presently available on the Apple II only through add-on peripherals. It may sell at a slightly lower price than the Apple II, and it's expected to use only 11 integrated circuits (less memory) and incorporate many manufacturing economies. It is believed that the II-E will maintain software compatibility with existing Apple II software.

Apple's long-rumored office-of-the-future using the 68000 microprocessor may be announced next year. In a minimum configuration of the system, code-named Lisa, prices should start at about \$10,000. Apple Computer might wait until late in 1983 to announce a new low-cost system, presently referred to as Macintosh; its base price is estimated at \$1500. Macintosh should have many of the same capabilities found in Lisa. Apple's avowed goal in presenting these new systems is to reduce the time required to learn how to use them to less than an hour and to eliminate the programming bottleneck by providing a large base of off-the-shelf software.

In the meantime, a federal district court has denied Apple's request for a preliminary injunction against

Franklin Computer Corporation. Apple accused Franklin and its Ace Computer of patent and copyright infringement. The Ace 1000 is now being shipped and is purported to be hardware- and software-compatible with the Apple II. Also, the Federal Trade Commission has closed its investigation of alleged unfair business practices by Apple without taking any action. The investigation was initiated after Apple dropped mail-order and over-the-phone dealers.

UCSD p-System Gains Acceptance:

The UCSD p-System, developed by Softech Microsystems, will soon be the standard operating system on the portable Osborne 1 computer. Osborne chose the p-System because it will let users easily transfer software from other systems, such as the IBM Personal Computer, DEC (Digital Equipment Corporation) VT180, and the Apple II—all of which have different disk formats. Softech has introduced an attachment to these computers, called the Universal Medium, that makes it possible to take a disk from one vendor's machine and read it with another's by converting the disk controller's format specifications. The p-System operating system supports BASIC, FORTRAN-77, and Pascal and offers programs to help you develop software to run under it.

Z80 Sales Strong As Ever:

Zilog reports that Z80 microprocessor sales are stronger than ever (probably due to the popularity of the Sinclair ZX81). Recently, Zilog closed two deals to supply other companies with one million processors and three deals for one-half million processors each. In

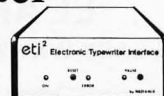
Do You Use a Printer or Modem?

The average microcomputer "moves" data at 120,000 characters a second. A typical disk drive transfers it at 27,000 CPS. Most printers however plod along at 100 CPS and many modems squeak out 30 CPS. That's quite a drop in efficiency not to mention a waste of computing power!



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this quantity, Z80 prices are typically around \$3 a piece. Zilog claims that it is currently supplying 60% of the Z80 market, that Mostek supplies 20%, and that SGS and Sharp chip in the remaining 10%. Zilog expects to ship about 6 million Z80s this year, up from 4 million last year. This means that about 10 million Z80s will be sold this year.

Dataquest, a market-research outfit, recently reported that 50% of the new microcomputer products introduced at the recent National Computer Conference contained Z80s. Current Zilog Z80s are rated for 6 MHz and 8 MHz operation. Zilog expects to introduce a low-power CMOS (complementary metal-oxide semiconductor) Z80 next year.

Personal Computer

Rebate Offered: Following the example of the auto companies, Texas Instruments inaugurated a \$100 rebate on its 99/4A computer, which now retails for \$299. This is believed to be an attempt to reduce an inventory rumored at between 40,000 and 50,000 units. It also steps up the price war that has developed in the low-cost consumer-oriented segment of the personal computer market. It is likely that Commodore, Atari, and Tandy will respond with a new round of price cuts if Christmas sales begin to falter.

Tandy Broadens Distribution Via Dealers:

Bowing to the increased competition in the low-end personal computer arena, Tandy (Radio Shack's parent company) has authorized 60 RCA consumer-product distributors to market the TRS-80 Color Computer (it will be called the TDP System 100 and its enclosure will be

white instead of grey) through about 2000 independent dealers. This should put Tandy in a better position to compete against Texas Instruments, Atari, Commodore, and Timex, which have lined up such mass merchandisers as K-Mart and Sears Roebuck. This should provide an incentive for independent software developers to write software for the machine. It's likely that Tandy will distribute some other low-end computer products through this network.

Latest 32-Bit Microprocessor News:

The June 1982 issue of *Computer Architecture News* reported on some benchmarks recently run at Berkeley comparing the latest microprocessors with Digital Equipment Corporation's VAX, a popular and powerful minicomputer. The results, expressed in fractions of a VAX, are that Intel's iAPX-432, a 32-bit, 4-MHz, multiple-chip processor, is equal to 0.05 VAX; Intel's 8086, running at 5 MHz, is equal to 0.4 VAX; and Motorola's 68000, at 8 MHz, is equal to 0.6 VAX and, at 16 MHz, it's 1.75 VAX.

Several universities already have systems based on Intel's iAPX-432 running and are developing software. A group at the University of Washington is developing an object-oriented language/operating system designed to run on one to four 432 microprocessors and to be a network component. The project, called Eden, is intended to build a powerful environment for computer-science research.

Intel is rumored to be redesigning the 432 so that it will be faster and easier to make; this probably involves some changes in the processor's architecture. Intel has also launched an intensive effort to design the iAPX-386, a

32-bit microprocessor that will be upward-compatible with the 16-bit 8086 and its successors, the 80816 and 80286. This move is in response to the strategy of Motorola, National, and Zilog, whose forthcoming 32-bit processors will be software-compatible with their 16-bit processors.

Elite Corporation, Wichita Kansas, is believed to be the first company to announce a system based on the new National Semiconductor 16032 microprocessor (a multiple-chip set). A desk-top system using the Motorola VME bus, Elite's computer system will have a \$12,400 base price.

AMD (Advanced Micro Devices), currently a second source for many Zilog microprocessors, has announced that it will not second-source Zilog's forthcoming 32-bit Z8000 microprocessor. Rather, it will second-source Intel's new 32-bit iAPX-386.

DEC has introduced a 16-bit microprocessor with 32-bit architecture, called the Micro/J-11. Its software is compatible the firm's PDP-11 minicomputer and contains on-board memory management to address up to 4 megabytes of memory.

Bubble Memory Growing In Popularity: With the introduction of several portable microcomputer systems, the demand for bubble-memory devices has increased dramatically. The result is that Intel is reportedly increasing production capacity for bubble-memory devices. Intel's bubble-memory facility is working around the clock, in three shifts, trying to keep up with the increasing demand. Motorola and Intel have signed a 5-year pact to jointly develop a new generation of bubble devices with a common pin-out and a standard architec-

ture. The first device will have a capacity of 1 megabit, and it will be followed by a 4-megabit device.

Motorola will second-source Intel's current line of bubble-memory devices. This will be Intel's first second source and Motorola's third attempt at second-sourcing bubble memories. Motorola had previously entered into agreements with Rockwell International and National Semiconductor, only to have these companies abandon the bubble-memory business. Intel has also been discussing second-sourcing with Hitachi.

EEPROMs and Adaptive Microprocessors:

Intel, Seeq, General Instrument, National Semiconductor, and Hitachi are expected to begin shipping 16K-byte EEPROMs (electrically erasable programmable read-only memories) that require only a 5-volt power supply. This may signal the beginning of the end for ultraviolet-erasable EPROMs (most PROMs used today are programmed electrically, but must be exposed to ultraviolet light to be erased). EEPROMs are expected to sell for 8 to 10 times the cost of today's EPROMs, but they should drop to about twice the EPROM's price by 1985. Sometime next year, 32K-bit EEPROMs should become available, and 64K-bit devices should appear in 1985. Seeq has disclosed that it plans to introduce a 256K-bit CMOS (complementary metal-oxide semiconductor) part in 1985 and will then move on to a 1-megabit CMOS device.

Current EEPROM devices are so expensive because the EE (electrically erasable) memory cell is about 4 times as large as the modern EPROM's memory cell. Man-

ufacturing EE devices is considered the most complex semiconductor process today; however, some of the cost is offset by the fact that EEPROMs can be housed in low-cost plastic packages, while EPROMs must be housed in ceramic packages with an expensive quartz window.

Seeq also expects to introduce an EEPROM-backed version of Zilog's Z8 microprocessor, which, in effect, creates an adaptive microprocessor that can learn, remember, and change its microcode. Presently, microprocessors are not capable of doing anything other than what the designer thought of beforehand.

CP/M Versus Unix:

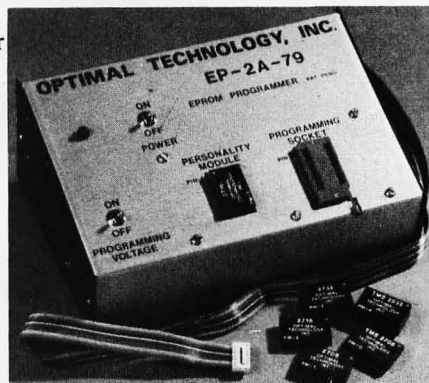
Finally, we are beginning to

see microcomputers being sold with Unix as the standard operating system. Western Electric does not permit other companies to use the name Unix, even though many have Unix licenses. One example of that is the Xenix operating system, which was developed by Microsoft under a license from Western Electric. Microsoft claims that Xenix is an enhanced version of Unix. Naturally, people are beginning to compare the price and performance against other 8-bit disk operating systems such as Digital Research's CP/M and MP/M, a multiuser version of CP/M.

Several trends are emerging from these comparisons. For example, 16-bit Unix systems have base prices of more than \$10,000 and, in typical multiuser configurations, may cost \$20,000 or

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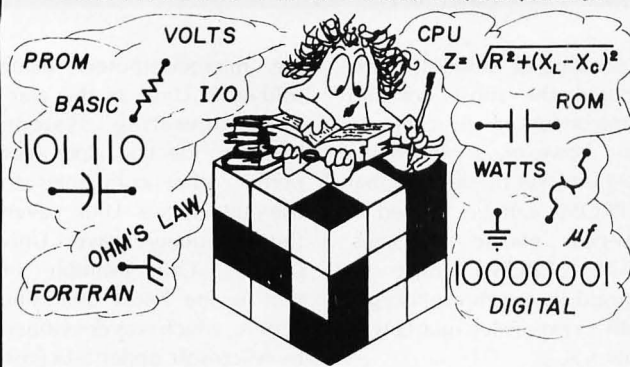
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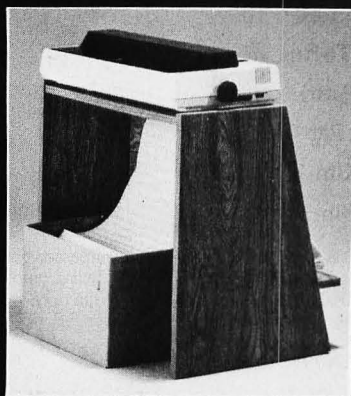


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more. On the other hand, multiuser CP/M-based systems (MP/M) usually cost less than half of that. Microsoft is rumored working on a Unix system for the Radio Shack Model 16 (a version of the TRS-80 Model II that has both 16- and 8-bit processors); the operating system will accommodate three users. This is the least expensive Unix/68000 combination in sight.

CP/M, a single-user operating system, was created in 1974. It was designed to run with memory systems as small as 16K bytes, so it was engineered to take up only 6K bytes of memory. It has grown in size, and version 3, due for release shortly (with added features), will be a little larger still, having been designed to run in systems that average 48K bytes or larger. In turn, CP/M-based applications software runs very nicely in small-memory systems (we are at the point today where anything less than the 64K-byte maximum of most 8-bit machines is considered small memory).

Unix systems, however, require several times more memory (16 bits wide). It is not uncommon for Unix operating systems to occupy more than 50K words (100K bytes) of memory. Hence, Unix systems characteristically require a minimum of 128K words, and most Unix suppliers recommend a minimum of 256K, which accounts for a good deal of the increased cost.

The operating speed of the multiuser Unix-like systems now available leaves something to be desired in terms of response time. The problem appears to be a combination of the large amount of operating-system code being executed and the fact that most of the work is handled by one processor. Suppliers are trying to cope with this by introducing a second pro-

cessor, typically a Z80, to manage all I/O operations. Math processors and memory-management devices are used to off-load these tasks from the main processor. Both Motorola and Intel will soon have versions of their 16-bit processors with virtual-memory-management facilities to improve multiuser performance. These approaches, coupled with additional fine tuning of the software, are expected to improve the performance of 16-bit Unix systems. In the meantime, 8-bit multiuser systems have also been improved.

The great popularity of CP/M is directly attributable to the huge amount of applications software available for it (much in the public domain). Another factor is a disk-format standard (8-inch single-density) that lets CP/M users exchange software without hassles and allows commercial suppliers to easily distribute CP/M-based software. Although a large body of Unix-based applications software had been developed at universities, little of this has yet been transported to 16-bit Unix systems. Additionally, the lack of a disk-format standard and differences between various Unix operating systems not only makes exchanging software difficult but vendors have trouble selling software for these systems. The system purchaser must, therefore, rely on a supplier for his or her software needs. At this time and for the near future, the result is that an applications-software void for these systems exists. I expect that it will take a long time to fill that void.

The Unix user interface leaves a great deal to be desired, according to some views. It has difficulties with consistency and command syntax and it lacks prompts and helpful error messages. To a great extent, this is also

true of CP/M. Both systems were originally intended to serve system and software developers in scientific and engineering communities. The expectation now is that Unix systems will be used in business and commercial applications. Some Unix-system suppliers are attempting to cope with the problem by adding menu screens. They also plan to overcome Unix's lack of security by adding record- and file-locking schemes. This, however, will result in a lack of consistency among different Unix implementations.

Multuser, Multiprocessor Systems Flourish: On several occasions, I have expressed concern over the slow operation of multi-user (timesharing) microcom-

puter systems. This sluggishness is a by-product of the traditional way of using a single processor to handle multiple users. With each additional user, the processor must work harder, and it quickly reaches what some call the "Von Neumann bottleneck": the computer processes instructions serially at a finite speed, so as different users' work is switched in and out of memory, the system appears to slow down.

The alternate approach, which is rapidly gaining popularity, is to use multiple processors on a common bus so that each user has his or her own processor and memory. Each user shares resources via the bus and has access to facilities such as the disk system and printer. In effect, this creates a network of processors within one computer system. Each user is effec-

tively independent of the bus except when he or she wishes to communicate with other users or peripheral devices by means of the bus. Such systems are already in operation on Z80-based computers using the S-100 bus (also known by its IEEE-696 standard specification) using CP/M, CP/NET, and TurboDOS and on a new system from Colonial Data Services. In operation, they have already proved to have a better performance record than most multiuser computers with single 16-bit processors.

Where Is The Japanese Microcomputer Invasion? The Japanese have long been expected to become a major force in the American personal computer marketplace. This has yet to

develop, and many marketing experts are wondering why. About 70 companies are already manufacturing personal and small-business computers in Japan but, as yet, less than 20 are exporting products to the U. S.

Those companies that have introduced systems into the U. S. market have done so in a very low-keyed and cautious manner. Some have shown systems at trade shows but have not yet begun selling them. A number of industry analysts speculate that the Japanese are testing the American market and experimenting with different forms of hardware and software. Although the hardware is being designed and manufactured in Japan, the software, in most cases, is of American origin. This is particularly true in respect to operating systems,

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languages, and business programs. The Japanese are, however, proving quite original in creating computer games.

The Japanese may not make major inroads into the American personal computer market for another year or two (or possibly three?). Some market analysts are predicting that in 5 years the Japanese will control half of the American personal computer market. This prediction is based on the assumption that such companies as Sony, NEC, Sanyo, Hitachi, and Matsushita Electric (maker of Technics and Panasonic equipment) will capitalize on their tremendous marketing capabilities.

Asian Copying Situation Worsens:

Apple Computer is actively combating the production of illegal copies of the Apple II in the Far East by filing court suits against companies in New Zealand, Taiwan, and Hong Kong. So far, these suits do not appear to have had any effect, because the copied computers are becoming increasingly available in Far Eastern countries. In Indonesia and Singapore, reportedly swarming with bogus Apples, prices are said to be as low as \$500.

Counterfeit Apples can be purchased assembled, in kit form, and even as bare printed-circuit boards, without integrated circuits. The boards are identical to the genuine Apple II board, with the exception that the ROM (read-only memory) sockets have been reconfigured to accept standard 2716-type EPROMs (erasable program-mable ROMs). Peripherals such as the 80-column video cards, Microsoft's Softcard (with the Z80 microprocessor), language cards, and so on are being copied too.

Tandy has also filed suit against a number of Hong Kong firms for copying TRS-80 firmware. The situation with software is reportedly worse: virtually any game can be bought for \$0.50 above the cost of a blank floppy disk and popular business-applications software is being sold at tremendous discounts.

TV And Movies Turning To Computer Graphics:

Television stations and movie studios have discovered that computer-generated images expand creative horizons and, in many cases, reduce production costs. TV studios are using more and more computer graphics to animate commercials, create channel logos, and to zoom program titles into place or put them through wondrous transformations.

Movie studios are using computers to create backgrounds for scenes, as well as for special effects. Instead of building full-size props or miniature models, computers now generate three-dimensional images, and the live action is then superimposed on the backdrop images photographically. The images are produced on color video screens having upwards of 2 million pixels (picture elements) and then captured on film. Movement is animated on a theater screen by flashing a sequence of thousands of images, with each being slightly different from the preceding one. Previously, each of the images had to be individually made by an artist, but now the computer quickly and easily constructs each frame at substantially less cost.

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terest Group on Computers and the Physically Handicapped), a subgroup of the ACM (Association for Computing Machinery), has set up a hotline for people seeking information on computer and high-technology aids for the blind, deaf, or motor impaired. The number is (503) 357-4354.

Computer To Pinch Car Thieves:

Great Britain's Home Office, Scientific Research and Development Branch, has developed a system in which a TV camera is linked to a computer that contains the latest data on stolen cars. As a car passes by the camera, the computer reads its license plate, determines if the car is stolen, and alerts the police to a stolen vehicle within seconds. A prototype has already been demonstrated, and the Home Office expects the system to be in operation soon.

Customs Service Impounds Chess Computer:

Intent on stopping the flow of sensitive technology to the Soviet Union, the U. S. Customs Service recently seized and impounded Belle, the world-champion chess computer. Ken Thompson, the Bell Laboratories scientist who built Belle, was taking it to Moscow for a chess exhibition at the time. The Commerce Department said that Belle, winner of the 1980 World Computer-Chess Championship tournament, might be of military use to Moscow.

When asked to comment, Thompson said, "the thing plays chess ... that's all." He added that the only way it could be used militarily would be "to drop it out of an airplane. You might kill

somebody that way."

A Commerce Department spokesman said Thompson would be subject to a penalty for violation of the Export Control Act. The penalty ranges from a cash fine to losing the computer altogether.

Thompson, noting that all the parts used in Belle are easily purchased in this country, added, "I just don't see the point of all this."

Random News Bits:

Centronics, which originally slated the introduction of its Quietwriter printer for the spring of 1981, has begun showing the unit to potential customers, but still hasn't given any word on delivery. The Quietwriter uses a stylus to print in much the same manner that a human uses a pen to write on paper. . . . Atari recently introduced ERIC (Electronic Retail Information Center), really a "computer salesperson" consisting of an Atari 800 tied to a videodisc player. It asks prospective customers to answer a few questions, then it selects one of 13 different sales presentations on the disk. . . . Zilog has begun providing samples of the Z8003 and Z8004, enhanced versions of the Z8001 and Z8002. When used with the Z8015 paged MMU (memory-management unit), the new microprocessors will give the processors paged virtual-memory capability. . . . Computerland Corporation and Kanematsu-Gosho Limited, Tokyo, have entered into an agreement to open Computerland stores in Japan. Ten stores are expected to be opened next year, with an eventual total of 250 planned. Currently, there are a little more than 800 computer stores in Japan, most of which are geared toward the hobbyist. . . . Consumers

Union, publisher of *Consumer Reports*, is reportedly working on a study of personal computers. . . . IBM is selling a 68000-based system via its recently acquired Danbury, Connecticut, subsidiary, IBM Instruments. The computer uses the Versabus and comes with a multi-tasking operating system. Price is \$5700. . . . Did you know that there are almost 600 database systems accessible to computer users by telephone and that the number of systems is growing at a very healthy rate? The *Directory of Online Data-bases*, from Cuadra Associates, Santa Monica, California, lists them all.

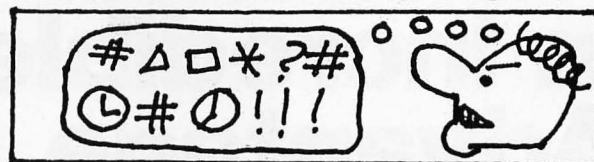
Quotation Of The Month: "Eight Things Your Computer Won't Do: 1) A

computer won't save you money. 2) A computer won't make your organization run right. 3) A computer won't solve every problem. 4) A computer won't run itself. 5) A computer won't always be right. 6) A computer won't protect itself. 7) A computer won't meet all its own needs. 8) A computer won't become obsolete." Joe Makower, "Plugging Into The New Computers," *Eastern Review*, June 1982, published by East/West Networks.

MAIL: I receive a large number of letters each month as a result of this column. If you write to me and wish a response, please include a self-addressed, stamped envelope.

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