

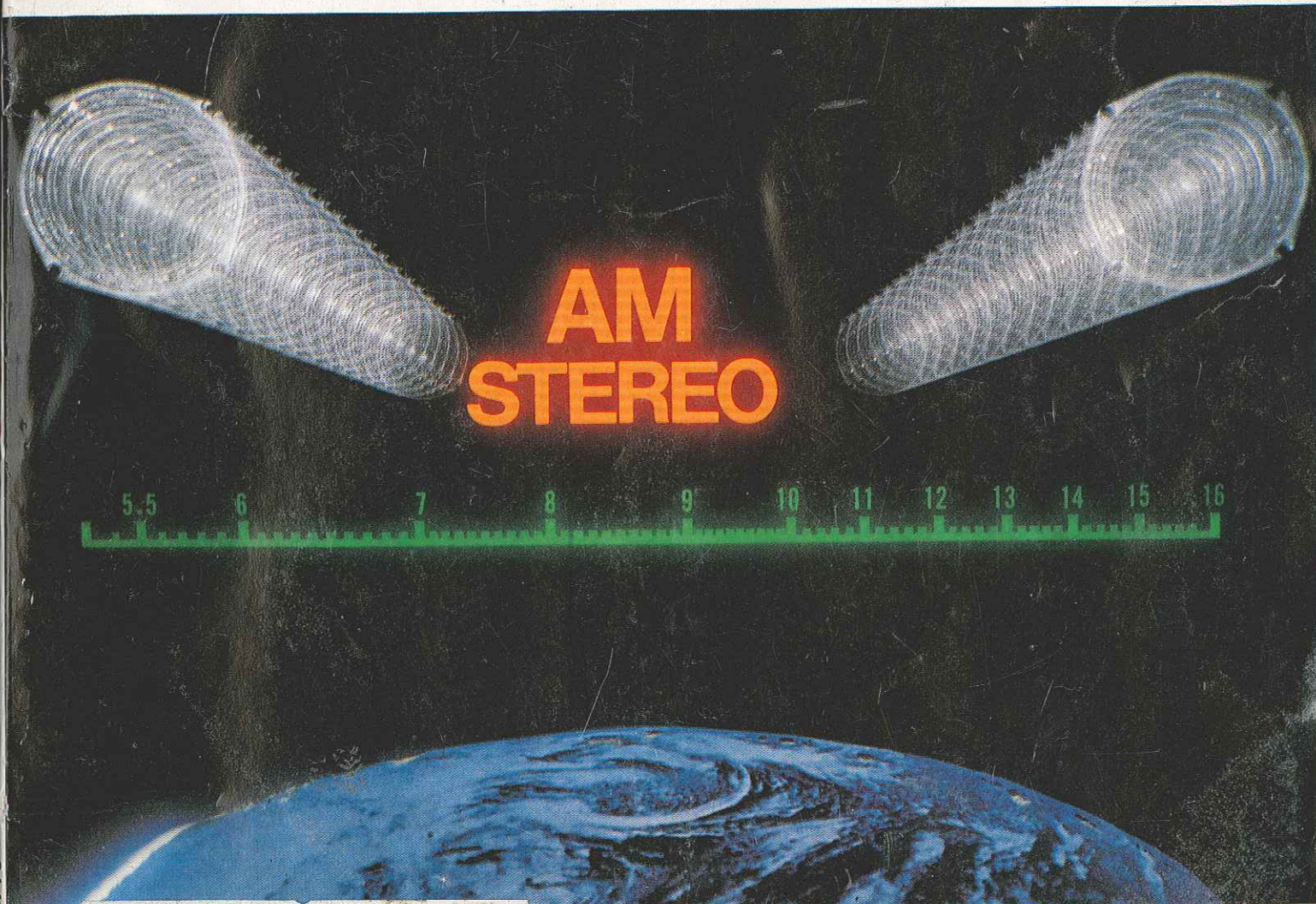
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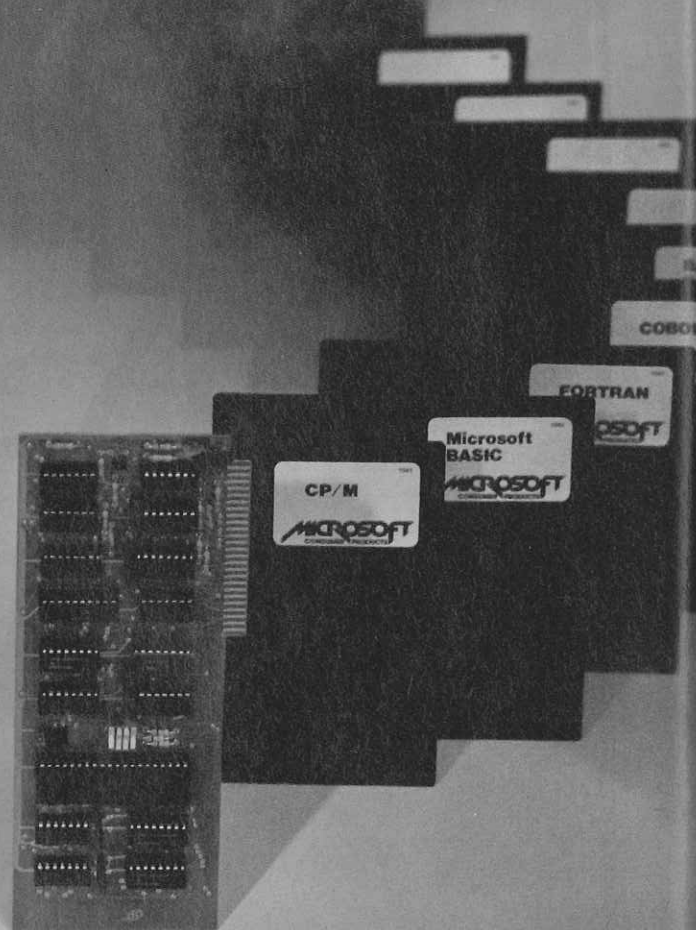
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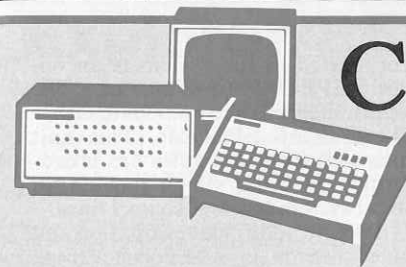
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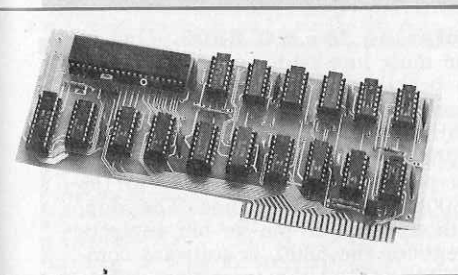
By Carl Warren

Getting Started Can Be Fun and Painless

The fifth annual West Coast Computer Faire was held in San Francisco last March 14 to 16. This show, which has become a tradition among microcomputer hobbyists, demonstrated that the hobby world is well and thriving. This year's show was the largest to date with 19,630 attendees and 384 exhibits representing 276 exhibitors. According to the show's owner, Jim Warren (no relation), the show was bigger than projected and the old excitement that was so characterized of previous shows was readily evident to attendees.

Although most of the exhibits demonstrated items that you have seen advertised and written about, there was one really new device. This was the Z-80 Softcard® for Apple owners, from Microsoft Consumer Products.

What made this hardware entrant important was that, first, it is from a software house, and second, it permits users of the Apple microcomputer to have the same functions that Z-80 based machines have. The plug-in card is designed to fit in an open slot on the Apple motherboard and doesn't require any hardware or software modifications. The card's Z-80 microcomputer operates at 2 MHz and doesn't affect the operation of the main 6502 microcomputer when it is not in operation.



Microsoft's Softcard permits Apple II users to have Z-80 functions.

The Softcard comes with Microsoft BASIC and Digital Research's CP/M® operating system, all for \$349.00. According to Vern Raburn, Microsoft Consumer Products' president, the user will have all the full graphics features of the popular Apple, plus the ability to use the thousands of programs that have been written for the Z-80 microcomputer and CP/M. So if you haven't yet de-

ecided on a system, you might consider the Apple II. Then add the Softcard, to obtain the best of both worlds.

Training Aids. Since many of you who read PE are just thinking about buying a microcomputer either to play games, handle your business or just to learn, you might give some thought to obtaining an evaluation board or trainer, to become familiar with microcomputers. These dandy little units offer various features which include:

□ For the most part, the evaluation boards and trainer systems have prices as low as \$200, depending on capabilities.

□ Units that have been designed as or have been incorporated into training packages usually offer excellent documentation written in a tutorial-type style to assist you in the learning process.

□ A number of the systems have built-in cassette interfaces to permit the loading and storage of programs.

□ The units are almost always upward expandable. Thus, you can use them as a base for building a full-blown system.

Among these systems that you might want to look at is the new unit from Motorola. This evaluation board, called a D4, is built around the MC6809 microcomputer. It is a step up from the company's popular 6800-based D2 unit and has a number of useful features that make it an excellent first system.

Among these features is a 300/1200 baud cassette interface that permits punch, load and verification of data. The software features permit single stepping through a program, modify, fill or search memory; enter ASCII characters and set breakpoints. The company also offers an Editor, Assembler, and BASIC either on cassette or in a ROM package.

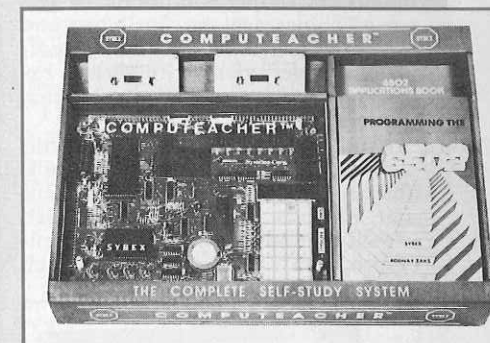
The unit which is part of the manufacturer's MOKEP (Motorola Kit Expansion Product) series is shipped with 512 bytes of user RAM (expandable to 1K), 1K of user RAM and 2K or 4K of ROM. Provisions have been made for the addition of up to 4K of user RAM and 8K of ROM.

The D4 can be used on a motherboard or stand-alone with a terminal, or can be used with the optional MEK68KPD, priced at \$250. This

module includes a 25-key keypad, eight 7-segment LED displays, and an on-board +5V power supply. Also included is a wire-wrapping area.

Currently, only the documentation that comes with the unit is available. But by the time you read this article, my book, the MC6809 handbook, should be available from TAB Books. It will assist you in understanding the 6809 microprocessor.

Another unit that is really quite exciting is based around the 6502 microprocessor. This system is called the

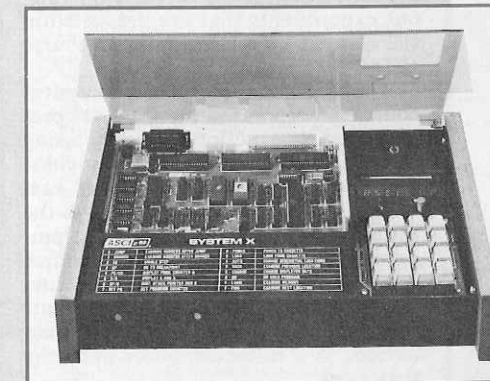


Sybex's Comuteacher has a 6502 trainer with instruction books.

Comuteacher® and is priced at \$299. What you get is a microcomputer board (Synertek VIM), that has a keyboard, LED displays and cassette I/O, and two books: *Programming the 6502* and *6502 Applications*, both of which enable you to program the unit and also become familiar with its operation.

The Comuteacher® is an educational package from Sybex and, consequently, is designed as a teaching aid, a strong feature of Sybex books.

Yet another unit that is worth considering is the ASCII μ68 System X®. This system is built around the Motorola 6800 microprocessor and is designed specifically as a training aid.



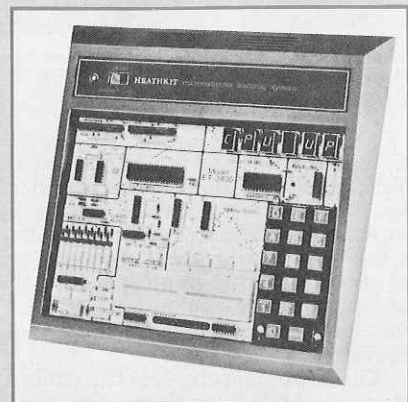
The ASCII System X, using a 6800 can be expanded to 32K of RAM.

The System X®, which is priced at \$775, is a complete self-contained microcomputer for the technician or engineer. The basic unit is equipped

with three peripheral interface adaptors (PIAs) to permit interfacing the unit to parallel devices. One asynchronous interface adapter (ACIA), for interfacing to serial devices, 1K of RAM which is expandable to 32K using the company's memory expansion boards, and a 16-key keypad and 7-segment LED display for program entry and testing.

Since the System X® is designed specifically as a teaching aid, the company supplies very complete manuals and reference cards to assist in the understanding and use of the system. To increase the flexibility and use of the system, BASIC and an editor/assembler, along with various expansion products, are available from the company.

Quite possibly the best-known microcomputer training system available is the Heathkit ET-3400. This unit, which is priced at \$199.95 (kit), is built around the Motorola 6800 microprocessor and is designed to teach



Heathkit's ET-3400 is ideal for beginners to learn about the 6800.

engineers, technicians, and hobbyists the basics of microcomputers. The ET-3400 is laid out on a plug board module, which permits you to try various experiments that are presented in the company's microcomputer course (ED-3401) for \$99.95.

The ED-3401 microcomputer course incorporates the best of programmed instruction (PI), by using visual aids in the form of a flip chart and the course notebooks, and cassette tapes that guide you through the history and functions of microcomputers. Also included in this course are number systems, the 6800 instruction set, and numerous experiments that teach you how to add different devices to a microcomputer and why they work.

The Heath unit is not something that should be thought of as a kit that you buy and use once, though. Rather, it's a tool for developing a knowledge of various functions of the microprocessor, as will as support devices such as analog-to-digital converters.

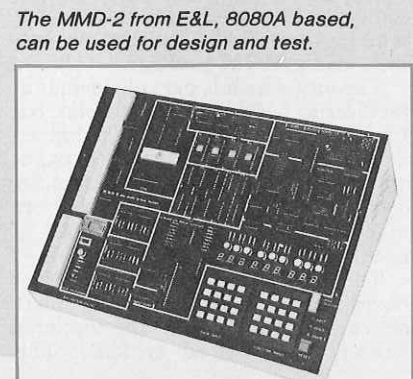
Due to the basic flexibility of design, the ET-3400 can be used for 'breadboarding' designs for later incorporation into another system. Also the unit can be used with the company's ETA-3400 trainer accessory expansion unit at \$150 (kit) and tied into a terminal to extend your knowledge of a microcomputer system.

Those of you who are seriously considering developing a strong background in microcomputer technology will not only consider the Heath system, but will be interested in two other introductory courses that can be used in conjunction with the ET-3400 or the Heath H-8 or H-89 microcomputer systems. These are the BASIC language course (EC-1100) at \$39.95, and the Assembly language course (EC-1108) at \$49.95. Both of these courses are designed with the beginner in mind and cover all the various functions of the language and how to make it function. For example, the BASIC course begins with simple statements in the language and explains how they work with demonstration programs. Then as you become more involved, you are led through the development of a game program ("Black Jack") that demonstrates just about all the features of the language. The assembly language course is designed in the same manner. This course is written to teach you how to program an 8080 microprocessor (it can be used in conjunction with any 8080 or Z-80 based machine), and starts with the very basics. The course carries you through the methods of handling I/O to developing specific system programs.

Should your interest be in learning more about the Intel 8080 microprocessor, then you might consider the MMD-2 mini-micro design trainer. This unit from E&L Instruments Inc., features: an 8080A microprocessor; fully buffered address, data, and control busses; I/O addressing that is fully Z-80 compatible; 4K bytes of RAM; one 8-bit parallel input port; three 8-bit parallel output ports; RS-232C baud-rate-selectable, serial ports, and a 300-baud audio cassette interface system.

The unit also has 9 seven-segment LED displays and a 16-key keypad to facilitate data entry and display. Also

The MMD-2 from E&L, 8080A based, can be used for design and test.



incorporated in the system is an on-board EPROM programmer. The programmer will accommodate either 2708 or 2716 EPROMs. This unit which sells for \$1250, also has breadboarding facilities which provide all critical system bus and control lines.

There are additional evaluation and trainer boards in addition to those that I have highlighted here. Among these are: The Rockwell AIM-65 based on the 6502 microprocessor, Mostek's Eval-70 built around the company's MK3850 microprocessor, RCA's Cosmac VIP that incorporates the CDP 1802 microprocessor, and Texas Instruments TM990/189M that uses the TI 9900. All of these units are useful low-cost training units, and can be obtained either directly from the companies or from most computer and electronic stores.

Disk of the Future. A new disk sub-system is available for microcomputer systems. The disk, called a, μ -Winchester, is a 5.25-inch rigid disk utilizing flying head Winchester technology. This drive was introduced in March of this year and demonstrated at NCC in Anaheim. The drive features 6.38 M bytes of storage (unformatted) in a package that fits the same form factor as a standard 5.25-inch floppy.

The μ -Winchester is from Shugart Technology, (no connection with Shugart Associates), Scotts Valley, CA. The drive is being offered by Lobo Drives Int'l and is priced at approximately 20% less than 8-in. Winchesters. Due to the newness of the drive, and fluctuations in pricing schedules, Lobo has requested that all pricing requests be directed to them. The unit, as offered from Lobo, will be compatible to various systems, including the TRS-80, Apple and Heath H-89, and will require little or no software modifications for use with them.

Notes on the MC 6809. One of the most interesting microprocessors to become available in the past 12 months has been the Motorola 6809. This chip is more than an upgraded 6800. It's designed to act as an interim processor from the 6800 to the 68000—a 16-bit machine. The chip, although not a pin-for-pin replacement for the 6800, is software compatible and, at the same time, offers some very unique features that make it a powerful CPU. Among these features are:

- The 6809 incorporates an internal 16-bit bus structure that enhances its processing power over the 6800.
- A fast interrupt request line (FIRQ) that is used when the interrupting routine will be using the registers existing contents. When the FIRQ is invoked, only the program coun-

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Explorer/85's Level "A" system features the advanced Intel 8085 cpu, an 8355 ROM with 2k deluxe monitor/operating system, and an 8155 ROM-I/O—all on a single motherboard with room for RAM/ROM/PROM/EPROM and S-100 expansion, plus generous prototyping space.

Level "A" makes a perfect OEM controller for industrial applications and is available in a special Hex Version which can be programmed using the Netronics Hex Keypad/Display.

PC Board: glass epoxy, plated through holes with solder mask

I/O: provisions for 25-pin (DB25) connector for terminal serial I/O, which can also support a paper tape reader

provision for 24-pin DIP socket for hex keypad/display...cassette tape recorder input...cassette tape recorder output...speaker output...LED output indicator on SOD (serial output) line...printer interface...total of four 8-bit plus one 6-bit I/O ports

Control Switches: reset and user (RST 7.5) interrupt...additional provisions for RST 5.5, 6.5 and TRAP interrupts onboard

Counter/Timer: programmable, 14-bit binary

System RAM: 256 bytes located at F800, ideal for smaller systems and for use as an isolated stack area in expanded systems...RAM expandable to 64k via S-100 bus or 4K on motherboard.

System Monitor (Terminal Version): 2k bytes of deluxe system monitor ROM located at F000 leaving 0000 free for user RAM/ROM. Features include tape load with labeling...tape dump with labeling...examine/change contents of memory...insert data...warm start...examine and change all registers...single step with register display at each break point, a debugging/training feature...go to execution address...move blocks of memory from one location to another...fill blocks of memory with a constant...display blocks of memory...automatic baud rate selection...variable display line length control (1-255 characters/line)...channelized I/O monitor routine with 8-bit parallel output for high speed printer...serial console in and console out channel so that monitor can communicate with I/O ports.

System Monitor (Hex Version): Tape load with labeling...tape dump with labeling...examine/change contents of memory...insert data...warm start...examine and change all

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- 8k Microsoft BASIC in ROM Kit (requires Levels "B," "D," and "E"), \$99.95 plus \$2 p&h.
- Level "B" (S-100) Kit, \$49.95 plus \$2 p&h.
- Level "C" (S-100 6-card expander) Kit, \$39.95 plus \$2 p&h.
- Level "D" (4k RAM) Kit, \$69.95 plus \$2 p&h.
- Level "E" (EPROM/ROM) Kit, \$5.95 plus 50¢ p&h.
- Deluxe Steel Cabinet for Explorer/85, \$49.95 plus \$3 p&h.
- ASCII Keyboard/Computer Terminal Kit (features a full 128 character set, upper & lower case, full cursor control, 75 ohm video output convertible to baudot output, selectable baud rate, RS232-C or 20 ma. I/O, 32 or 64 character by 16 line formats, and can be used with either a CRT monitor or a TV set (if you have an RF modulator), \$149.95 plus \$2.50 p&h.
- Hex Keypad/Display Kit, \$69.95 plus \$2 p&h.
- Deluxe Steel Cabinet for ASCII Keyboard/Terminal, \$19.95 plus \$2.50 p&h.
- Power Supply Kit ($\pm 8V @ 5$ amps) in deluxe steel cabinet, \$39.95 plus \$2 p&h.
- Gold Plated S-100 Bus Connectors, \$4.85 each, postpaid.
- RF Modulator Kit (allows you to use your TV set as a monitor), \$8.95 postpaid.
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- 48k RAM Kit, \$459.95 plus \$2 p&h.
- 64k RAM Kit, \$589.95 plus \$2 p&h.
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- North Star Double Density Floppy Disk Kit (One Drive) for Explorer/85 (includes 3 drive S-100 controller, DOS, and extended BASIC with personalized disk operating system—just plug it in and you're up and running!), \$699.95 plus \$5 p&h.
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registers...single step with register display at each break point...go to execution address. Level "A" in the Hex Version makes a perfect controller for industrial applications and can be programmed using the Netronics Hex Keypad/Display.

Hex Keypad/Display Specifications Calculator type keypad with 24 system defined and 16 user defined keys. 6 digit calculator type display which displays full address plus data as well as register and status information.

Level "B" Specifications Level "B" provides the S-100 signals plus buffers/drivers to support up to six S-100 bus boards and includes: address decoding for onboard 4k RAM expansion select-able in 4k blocks...address decoding for onboard 8k EPROM expansion select-able in 8k blocks...address and data bus drivers for onboard expansion...wait state generator (jumper selectable), to allow the use of slower memories...two separate 5 volt regulators.

Level "C" Specifications Level "C" expands Explorer's motherboard with a card cage, allowing you to plug up to six S-100 cards directly into the motherboard. Both cage and cards are neatly contained inside Explorer's deluxe steel cabinet.

Level "D" Specifications Level "D" provides 4k or RAM, power supply regulation, filtering decoupling components and sockets to expand your Explorer/85 memory to 4k (plus the original 256 bytes located in the 8155A). The static RAM can be located anywhere from 0000 to EFFF in 4k blocks.

Level "E" Specifications Level "E" adds sockets for 8k of EPROM to use the popular Intel 2716 or the TI 2516. It includes all sockets, power supply regulator, heat sink, filtering and decoupling components. Sockets may also be used for soon to be available RAM IC's (allowing for up to 12k of onboard RAM).

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The keyboard follows the standard typewriter configuration and generates the entire 128 character ASCII upper/lower case set with 96 printable characters. Features include onboard regulators, selectable parity, shift lock key, alpha lock jumper, a drive capability of one TTY load, and the ability to mate directly with almost any computer, including the new Explorer/85 and ELF products by Netronics.

The Computer Terminal requires no I/O mapping and includes 1k of memory, character generator, 2 key rollover, processor controlled cursor control, parallel ASCII/BAUDOT to serial conversion and serial to video processing—fully crystal controlled for superb accuracy. PC boards are the highest quality glass epoxy for the ultimate in reliability and long life.

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The heart of the Netronics Computer Terminal is the microprocessor-controlled Netronics Video Display Board (VID) which allows the terminal to utilize either a parallel ASCII or BAUDOT signal source. The VID converts the parallel data to serial data which is then formatted to either RS232-C or 20 ma. current loop output, which can be connected to the serial I/O on your computer or other interface, i.e., Modem.

When connected to a computer, the computer must echo the character received. This data is received by the VID which processes the information, converting to data to video suitable to be displayed on a TV set (using an RF modulator) or on a video monitor. The VID generates the cursor, horizontal and vertical sync pulses and performs the housekeeping relative to which character and where it is to be displayed on the screen.

Video Output: 1.5 P/P into 75 ohm (EIA RS-170) • Baud Rate: 110 and 300 ASCII • Outputs: RS232-C or 20 ma. current loop • ASCII Character Set: 128 printable characters—

abcdefghijklmnopqrstuvwxyz0123456789:;<=?
!@#\$%^&*()_+,-./:;~`{|}~<=>?
^_`abcdefghijklmnopqrstuvwxyz{|}~<=>?
^_`abcdefghijklmnopqrstuvwxyz{|}~<=>?

BAUDOT Character Set: ABCDEFGHIJKLMNOPQRSTUVWXYZUVWXYZ? : * \$ % () , . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?

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ter (PC) and condition-code register is saved on the stack, with control being passed to the interrupt routine via a vector address.

□ A fast memory ready pin (MR) that stretches the duration of phase 2 of the clock up to 10 ms.

□ Two 16-bit index registers (X and Y), a 16-bit D accumulator, and two stack pointers (U and S).

The 6809 microprocessor is a CPU that is designed with software development in mind. Consequently, it permits efficient handling of high-level languages, including PASCAL. This microprocessor is as easy to use, in most cases easier, to program than the 6800.

Because the 6809 is upward compatible with 6800 software, the device can be put in operation immediately using existing software with minor modifications. The important point to remember is that, whatever the routine is (in most cases) that uses the 6800 instruction set, it can be rewritten to be more efficient in the 6809 instructions.

Programming the 6809 and instructions on how to use it on the Heath ET-3400 trainer will be the subject of a future column. ◇

MORE INFORMATION

For additional information about products mentioned contact the companies directly.

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Like our TX-80. Of the first 3,000 sold in Europe, the failure rate was about 1%. Now that's a phenomenal record. But it doesn't surprise us. Because that's how we built it.

The TX-80 prints a full 96 ASCII and 64 graphic characters in 80-columns at the rate of 125 CPS. It

utilizes a unique 5x7 dot matrix that allows the printing of descenders. It's controlled by an internal microprocessor, is available with friction or tractor-type paper feed, and comes packaged in a sturdy, all-metal cabinet. And you can get it with custom interfaces to fit your Apple II, TRS-80 or just about any other small computer.

The incredible reliability of our TX-80 is one reason nobody makes more printers than Epson. Here's the other: you can get one for about \$710. Write to us. We'll tell you where.

EPSON
EPSON AMERICA, INC.

23844 Hawthorne Boulevard, Torrance, California 90505 • Telephone: (213) 378-2220
CIRCLE NO. 20 ON FREE INFORMATION CARD

Five new Scanners! New 800 MHz!

Communications Electronics™, the world's largest distributor of radio scanners, welcomes the addition of Fanon to our product line. Fanon introduces two new high performance hand-held scanners. More importantly, Fanon has a complete selection of useful accessories to compliment their *Slimline* models.

Electra Company, manufacturers of *Bearcat* brand scanners introduces three new scanners including a model that can monitor the exciting 800 MHz. band. The new *Bearcat* models will be available Fall, 1980, so reserve your scanner now!

A new product made by Electra, the *Freedom Phone*® is now available from CE. This is the ultimate cordless extension phone that can make and take your calls.

Bearcat® 300

The Ultimate Synthesized Scanner!
Allow 90-120 days for delivery after receipt of order due to the high demand for this product.
List price \$519.95/CE price \$339.00
4-Band, 50 Channel • Service Search • No-crystal scanner • AM Aircraft and Public Service bands. • Priority Channel • AC/DC Bands: 32-50, 118-136 AM, 144-174, 421-512 MHz.
The new *Bearcat* 300 is the most advanced automatic scanning radio that has ever been offered to the public. The *Bearcat* 300 uses a bright green fluorescent digital display, so it's ideal for mobile applications. The *Bearcat* 300 now has these added features: Service Search, Display Intensity Control, Hold Search and Resume Search keys, Separate Band keys to permit lock-in/lock-out of any band for more efficient service search.

Bearcat® 250

List price \$419.95/CE price \$279.00
50 Channels • Crystalless • Searches Stores • Recalls • Digital clock • AC/DC Priority Channel • 3-Band • Count Feature.
Frequency range 32-50, 146-174, 420-512 MHz.
The *Bearcat* 250 performs any scanning function you could possibly want. With push button ease you can program up to 50 channels for automatic monitoring.

Bearcat® 220

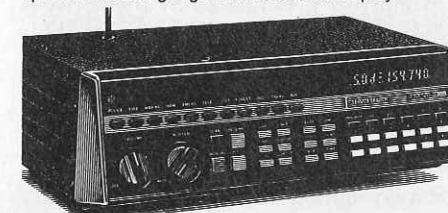
List price \$419.95/CE price \$279.00
Aircraft and public service monitor. Frequency range 32-50, 118-136 AM, 144-174, 420-512 MHz.
The *Bearcat* 220 is one scanner which can monitor all public service bands plus the exciting AM aircraft band channels. Up to twenty frequencies may be scanned at the same time.

Bearcat® 211

List price \$349.95/CE price \$229.00
Frequency range: 32-50, 146-174, 420-512 MHz.
The *Bearcat* 211. It's an evolutionary explosion of features and function. 18-channel monitoring. With no-crystal three-band coverage. Dual scan speeds. Color-coded keyboard. Even a digital clock. All at a modest price. More scanning excitement than you bargained for.

NEW! Bearcat® 210XL

This is a new model. Shipments will begin in Fall, 1980.
List price \$319.95/CE price \$219.00
18 Channels • 3 Bands • Crystalless
Frequency range: 32-50, 144-174, 421-512 MHz.
The *Bearcat* 210XL scanning radio is the second generation of the world's best selling crystalless programmable scanner—the *Bearcat* 210. It has almost twice the scanning capacity with 18 channels plus dual scanning speeds and a bright green fluorescent display.



NEW! 50-Channel Bearcat 300

Bearcat® 210

List price \$319.95/CE price \$209.00
10 Channels • 3 Bands • Crystalless
Frequency range: 32-50, 146-174, 420-512 MHz.
Use the simple keyboard to select the 10 channels to be scanned. Automatic search finds new frequencies. The 210 features patented selectable scan delay, push button lockout, single antenna, patented track tuning, AC/DC operation. With no crystals to buy. Ever!

NEW! Bearcat® 160

This is a new model. Shipments will begin in Fall, 1980.
List price \$279.95/CE price \$199.00
16 Channels • 3 Bands • AC only • Priority Dual Scan Speeds • Direct Channel Access
Frequency range: 32-40, 144-174, 440-512 MHz.
The *Bearcat* 160 presents a new dimension in scanning form and function. The keyboard is smooth. No buttons to punch. No knobs to turn. Instead, finger-tip pads provide control of all scanning operations, including On/Off, Volume and Squelch. Green easy to read fluorescent display. Requires (2) 9 Volt batteries to retain memory when disconnected from AC Power.

Bearcat® 12

List price \$179.95/CE price \$119.00
10 Crystal Channels • 3 Bands • AC or DC
Frequency range: 33-48, 146-174, 450-512 MHz.
More features, more channels, more action. The *Bearcat* 12 has automatic squelch, individual lockout and more.

NEW! Bearcat® 5/800 MHz

The world's first 800 MHz. scanner!
This is a new model. Shipments will begin in Fall, 1980.
List price \$179.95/CE price \$129.00
8 Crystal Channels • 4 Bands • AC only
Frequency range: 33-50, 144-174, 440-512, 806-870 MHz.
The *Bearcat* 5/800 MHz is the only scanner on the market today that offers coverage of the 800 MHz. public service band and the other public service bands. Individual channel lockout. Scan Delay. Manual Scan.

Bearcat® 5

List price \$129.95/CE price \$94.00
8 Crystal Channels • 3 Bands • AC only
Frequency range: 33-50, 146-174, 450-508 MHz.
The *Bearcat* 5 is a value-packed crystal scanner built for the scanning professional — at a price the first-time buyer can afford. Individual lockout switches.

Bearcat® Four-Six ThinScan™

List price \$179.95/CE price \$119.00
Frequency range: 33-47, 152-164, 450-508 MHz.
The incredible, new *Bearcat* Four-Six Thin Scan™ is like having an information center in your pocket. This three band, 6 channel crystal controlled scanner has patented Track Tuning on UHF. Scan Delay and Channel Lockout. Measures 2 1/4 x 6 1/2 x 1 1/2". Includes rubber ducky antenna.

NEW! Fanon Slimline 6-HLU

List price \$169.95/CE price \$109.00
World's smallest 6-channel, 3-band scanner!
The new *Fanon* Slimline 6-HLU gives you six channels of crystal controlled excitement. Unique Automatic Peak Tuning Circuit adjusts the receiver front end for maximum sensitivity across the entire UHF band. Individual channel lockout switches. Frequency range 30-50, 146-175 and 450-512 MHz. Size 2 1/4 x 6 1/4 x 1 1/2". Includes rubber ducky antenna.

NEW! Fanon Slimline 6-HL

List price \$149.95/CE price \$99.00
6-Channel performance at 4-channel cost!
Frequency range: 30-50, 146-175 MHz.
If you don't need the UHF band, get this model and save money. Same high performance and features as the model HLU without the UHF band. Order crystal certificates for each channel.

FANON SCANNER ACCESSORIES

CHB-6 AC Adapter/Battery Charger \$15.00
CAT-6 Carrying case for Fanon w/Belt Clip \$15.00
AUC-3 Auto lighter adaptor/Battery Charger \$15.00

OTHER SCANNER ACCESSORIES

SP50 AC Adapter \$12.00
SP51 Battery Charger \$12.00
SP58 Carrying Case for Bearcat 4-6 ThinScan™ \$15.00
FB-E Frequency Directory for Eastern U.S.A. \$15.00
FB-W Frequency Directory for Western U.S.A. \$15.00
FFD Federal Frequency Directory for U.S.A. \$18.00
SM220 Service manual for Bearcat 220 \$15.00
B-4 1.2 V AAA Ni-Cad's for ThinScan™ and Fanon \$15.00
B-5 Replacement memory battery for Bearcat 210..... \$6.00
B-7 1.5 V AAA Alkaline battery (Pack of 4)..... \$4.00
B-9 9 V Alkaline battery \$3.00
A-135cc Crystal certificate \$4.00
Add \$3.00 shipping for all accessories ordered at the same time.

INCREASED PERFORMANCE ANTENNAS

If you want the utmost in performance from your scanner, it is essential that you use an external antenna. We have six base and mobile antennas specifically designed for receiving all bands. Order #A60 is a magnet mount mobile antenna. Order #A61 is a gutter clip mobile antenna. Order #A62 is a trunk-clip mobile antenna. Order #A63 is a 3/4 inch hole mount. Order #A64 is a 3/8 inch snap-in mount, and #A70 is an all band base station antenna. All antennas are \$30.00 and \$3.00 for UPS shipping in the continental United States.

TEST ANY SCANNER FREE

Test any scanner purchased from Communications Electronics™ for 31 days before you decide to keep it. If for any reason you are not completely satisfied, return it in original condition with all parts in 31 days, for a prompt refund (less shipping/handling charges and rebate credits).

CIRCLE NO. 1 ON FREE INFORMATION CARD

Regency® K500

List price \$419.00/CE price \$279.00
40 Channel • Synthesized • Service Search Digital count • Weather with tone alert Search/Store • Priority Channel • AC/DC
Frequency range: 30-50, 144-174, 440-512 MHz.
The new *Regency* Touch K500 is an advanced synthesized scanner with many new features.

OTHER REGENCY® SCANNERS

Aircraft Touch 720-A \$239.00
Touch K100 \$199.00
Touch M100 \$199.00

NEW! Telephone Products

Electra's cordless *Freedom Phone* does everything an ordinary phone does and more. Because it is cordless, you can take it anywhere, inside or outside — on the patio, by the pool, in the garage, in the workshop...even next door at the neighbor's.

Model FF-500 has pushbutton dialing. Rechargeable ni-cad batteries included. Battery low light. Secure feature. Telescopic antenna. Your cost is \$179.00. Model FF-1500 has the same features as the FF-500 but also includes a charger/cradle that allows the phone's handset to be recharged away from the base station. Your cost for this cordless phone is \$199.00. The model FF-3000 has all the standard features (except charger/cradle) plus interchangeable telescopic and rubber ducky antenna. Redial feature. Belt clip. Carrying case. Greater range. Your cost is \$229.00.

World Scanner Association™

The WORLD SCANNER ASSOCIATION is sponsored as a public service by Communications Electronics™. When you join, you'll receive a quarterly newsletter with scanner news and features. You'll also get a wallet I.D. card, an Official WSA Membership Certificate, and more. FREE classified ads for members so you can contact other scanner owners when you want to sell or buy a scanner. FREE membership in the WSA Buyer's Co-op. Your Co-op membership will allow you to get special discounts on scanners and scanner related products. Since the WSA Buyer's Co-op gives you group purchasing power, you can easily pay for your membership dues the first time you make a Co-op purchase. To join, send \$12.00 (\$17.00 outside U.S.A.) for your membership materials.

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Mail orders to: Communications Electronics™, Box 1002, Ann Arbor, Michigan 48106 U.S.A. Add \$5.00 per scanner or phone product for U.P.S. ground shipping, or \$9.00 for faster U.P.S. air shipping to some locations. If you have a Master Charge or Visa card, you may call anytime and place a credit card order. Order toll free in the U.S.A. 800-521-4414. If you are outside the U.S. or in Michigan, dial 313-994-4444. Dealer inquiries invited. All order lines at Communications Electronics™ are staffed 24 hours.

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