

# Popular Electronics®

WORLD'S LARGEST-SELLING ELECTRONICS MAGAZINE

FEBRUARY 1981/95¢

**Get Multi-Trace Displays on Oscilloscopes**  
**PE Tests Hitachi's New 13" Portable Color TV**  
**Power Supplies from Discarded AC Adapters**

## Wireless TV Commercial Killer



STERLING  
7 CLEMENCE AV  
WILLIAM C CLEMENCE  
02  
306  
MA 01564

**s Broadcast**  
**wave**



# COMPUTER BITS

By Carl Warren

## Roll Your Own Computer Show

EVERYONE likes a computer show especially when it's a lot of fun. And fun is what we had a few months ago at the Heath Electronic Center located in Anaheim, CA. Bob Mathias, the president of the Anaheim Heath Users Group (ANAHUG), called and asked me if I would address that august group. After mulling it over for about 30 seconds, I told Bob I'd go him one better and put together a "mini computer show."

What I was able to do—and anyone can do it—was to get in touch with various notables in the industry and get their cooperation. Specifically, I called up Gary Kildahl, the creator of CP/M, and asked him to come and tell everyone about CP/M, MP/M and CP-Net. I also contacted the people at Remex and asked them to bring over their 8-in. intelligent floppy disk drives that are now being incorporated into the Heath/Zenith computer systems. Shugart Technology planned a special trip down to show off its ST-506 microWinchester drive and answer questions about interfacing equipment.

But that wasn't all. I contacted Diliithium Press, Reston Publishing, Sybex, and TAB books, explaining what we were doing. All the publishers responded by sending copies of their microcomputer books to be used as giveaways.

Heath came through with flying colors also. During the past year, Heath has provided me with several kits to be used for evaluation purposes in my columns. Consequently, I was able to use these kits as prizes. Intel provided an SDK-86 evaluation board for some lucky winner, and Osborne/McGraw Hill added its latest book.

Heath's Chief Design Engineer, Carl Goy, made sure that we had the 16K update for the H-89, and the 8-in. floppy disk controller for all to see. Magnolia Microsystems provided its version of the origin zero PROM via the good offices of Lifeboat Associates. Tony Gold, president of Lifeboat, went further and provided his latest software marvel, T/Maker®, for demonstration.

Although this mini exposition was put together on short notice, more than 60 people showed up to examine the wares and ask questions. Of immediate interest to the ANAHUG members were the Remex drives. These intelligent units are the heart of the H-47 floppy system that Heath began offering with its October catalog.

The Remex RFS4800 drive is a double-sided, double-density drive that ac-

commodates up to 3M bytes of online storage when used in tandem with three 5.25-in. drives and an 8-in. slave drive. What makes this unit exciting is that it incorporates a 6809 microprocessor in the controller, thus permitting the building of a bus interface with less than six chips. You can't buy the drives directly from Remex, since they sell only on an OEM basis. But you will likely want to consider products that use them.

The Shugart Technology ST-506 microWinchester drive also caused quite a stir among attendees. This unit, which I have reported on in an earlier column, offers 6.38M bytes unformatted, 5M bytes formatted, and gives the small-business user a uniquely large storage capacity in a very small box.

Supporting the 5.25-in. microWinchester effort is American Computer and Telecommunications, which has developed an interface for the drive that can be used with the H-89, S-100 bus systems, and TRS-80. The interface is called the ACT 506, priced at \$1,250. According to a company spokesman the interface supports CP/M 2.2 and HDOS. This appears to be worth looking into and will add an extra dimension to your system. My contacts at Heath say the ACT-506 interface is currently being carefully evaluated by the engineering staff and may be offered as part of the line.

Although we didn't get a chance to show T/Maker to the ANAHUG group in the manner that we wished to, all were very interested in its capabilities. Essentially, T/Maker is a powerful program, written in CBASIC, that permits development of management reports in tabular fashion. The T/Maker program is comparable to the popular Visicalc® system, but adds some other features. Among these are a full screen editor for setting up the tables. This editor permits both vertical and horizontal scrolling, arithmetic functions so totals can be generated, and the ability to create and include text material in a report. T/Maker is designed to run under the CP/M operating system either origin zero or the special implementations for a standard H-89 or TRS-80. However, since Heath/Zenith is offering a zero base and 8-in. drives, the standard distribution package fits right in. T/Maker is priced at \$275. Should you want only the manual, it costs \$25.

T/Maker requires 48K of memory. If you are planning to use it on a CP/M system that starts at 4200<sub>16</sub>, some diffi-

culties will arise. This is primarily due to the loss of 8K of memory space. You can solve this problem by adding the 16K update in the Heath system, but if you go to all that trouble, I suggest that you incorporate the zero-base PROM.

Speaking of computer shows, those of you who live in California or want an excuse for a trip there, can plan on attending the Sixth West Coast Computer Faire April 3-5 at the San Francisco Civic Auditorium. Should you have a project you are working on or have expertise in some field of microcomputing, you might consider chairing a conference.

**Let Us Go FORTH.** Just about everything you read talks about BASIC, how to program in it, and so on. There are alternative high-level languages, however, and one of these is called FORTH. This language was created by Charles H. Moore in 1969 at the National Radio Astronomy Observatory (Charlottesville, VA). Like many innovators, Moore felt he needed a language that met his special needs, particularly for observatory automation.

FORTH is what is termed a threaded language. This means that calls are inherent or threaded together. For example, if you want to jump to a subroutine, only the destination is required; the jump is implied. The language makes use of stack operations and, depending on the operation data, is either pushed or pulled on or off the stack(s). This design makes it possible to write compact code that can handle real-time operations.

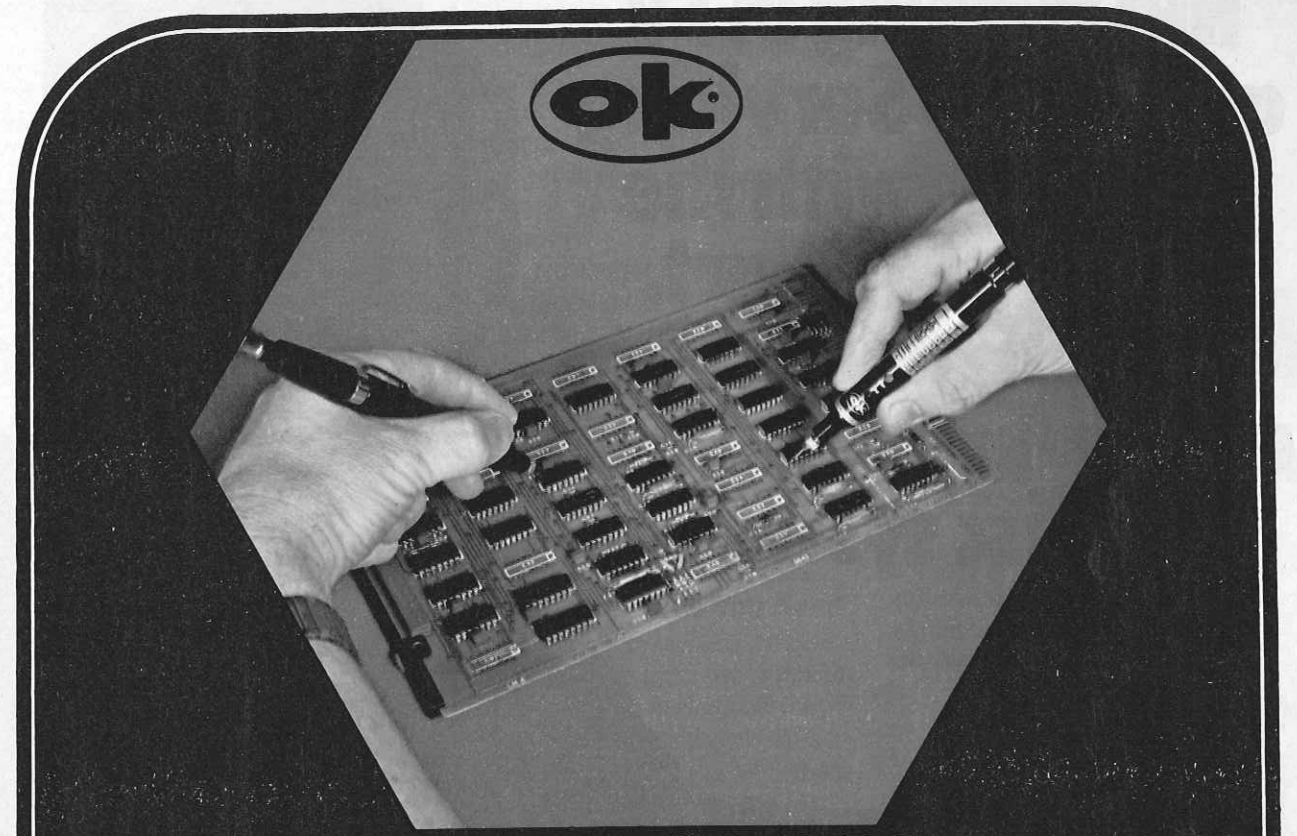
Interest in FORTH is rapidly increasing, and the language is receiving a great deal of support from the FORTH interest group. This organization, located in San Carlos, CA., publishes a magazine called "Forth Dimensions," holds seminars, provides information on how to implement a FORTH package, how to program, and assists interested parties in becoming familiar with the language.

Those of you who find FORTH attractive can get on the bandwagon by contacting the FORTH interest group and obtaining copies of the magazine. When you are ready, they can supply a copy of the language for your machine.

**Software Tidbits.** I've tried out Business Micro's Filetrans product and found it most interesting. This package works in concert with the Omikron Mapper system I discussed last month, and permits transferring of TRSDOS files to CP/M and back again. This is an important utility, especially if you plan to use a TRS-80 for anything serious—in which case, you will need CP/M.

The Filetrans package comes in four flavors. Versions 1.01 and 1.02 are priced at \$99 and permit file transfer in one direction to CP/M. Version 1.03 is for 4200 hex-based CP/M and 1.04 is for standard CP/M. Both allow file transfer in both directions.

(Continued on page 38)



## Digital IC Probe & Logic Pulser

### PRB-1 DIGITAL LOGIC PROBE

Compatible with DTL, TTL CMOS, MOS and Microprocessors using a 4 to 15V power supply. Thresholds automatically programmed. Automatic resetting memory. No adjustment required. Visual indication of logic levels, using LED's to show high, low, bad level or open circuit logic and pulses. Highly sophisticated, shirt pocket portable (protective tip cap and removable coil cord).

Automatic threshold resetting • DE to > 50 MHZ

Compatible with all logic families 4-15 VDC • 10Nsec. pulse response

Supply O.V.P. to ± 70 VDC • 120 K Ω impedance

No switches/no calibration • Automatic pulse stretching to 50 Msec.

Open circuit detection • Automatic resetting memory

Range extended to 16-26 VDC with optional PA-1 adapter

### PLS-1 LOGIC PULSER

The PLS-1 logic pulser will superimpose a dynamic pulse train (20 pps) or a single pulse onto the circuit node under test. There is no need to unsolder pins or cut printed-circuit traces even when these nodes are being clamped by digital outputs.

PLS-1 is a multi-mode, high current pulse generator packaged in a hand-held shirt pocket portable instrument. It can source or sink sufficient current to force saturated output transistors in digital circuits into the opposite logic state. Signal injection is by means of a pushbutton switch near the probe tip. When the button is depressed, a single high-going or low-going pulse of 2μ sec wide is delivered to the circuit node under test. Pulse polarity is automatic: high nodes are pulsed low and low nodes are pulsed high. Holding the button down delivers a series of pulses of 20 pps to the circuit under test.

High input impedance (off state) 1 meg ohm • Multi mode—single pulses or pulse trains

Low output impedance (active state) 2 ohms • Automatic polarity sensing

Output pulse width 2 μsec nominal • Automatic current limiting; 7 amps nominal

Input over voltage protection +50 volts • Automatically programmed output level

Finger tip push button actuated • Circuit powered

Power lead reversal protection • No adjustments required

Multi-family RTL, DTL, TTL, CMOS, MOS and Microprocessors.

PRB 1	DIGITAL LOGIC PROBE	\$36.95	PA 1	HIGH VOLTAGE ADAPTER*	\$8.50
PC 1	POWER CORD, Alligator Clips	\$4.95	PT 2	REPLACEMENT PROBE TIP(2)	\$1.50
PC 2	POWER CORD, Micro Hooks	\$9.95	PLS 1	LOGIC PULSER	\$48.95

## OK Machine & Tool Corporation

3455 Conner St., Bronx, N.Y. 10475 U.S.A.

Tel. (212) 994-6600 Telex 125091

\*Minimum billings \$25.00, add shipping charge \$2.00  
New York State residents add applicable tax



What makes this package important is that it establishes compatibility between a text editor designed to operate under TRSDOS and a CP/M text processor (such as Textwriter III from Organic Software). First you create your text under the editor package. Then transfer it to CP/M and let Textwriter process it. More important, you can take BASIC programs written under TRSDOS and transfer them to CP/M. In the case of the TRS-80, you will find that in most cases the program runs as originally written.

**Let Us All Convert.** In the past two columns, I discussed the conversion from one version of BASIC to another. As I indicated, various versions of this language exist; and with the differences between them, it can be difficult for an owner of a microcomputer to use all the software packages available.

In a discussion with Les Solomon, Senior Technical Editor of PE, the following simple idea to make all BASICs understandable was proposed. Let us use lots of REM's, even if it means one REM per BASIC line.

Obviously, on simple BASIC statements, no REM's are needed. However, in those lines that are specific to one

machine, a REM should clear things up. For example, a TRS-80 owner would immediately recognize the BASIC state-

**MORE INFORMATION**

For additional information about products or services mentioned in this column, contact the companies directly.

**American Computer and Telecommunications**  
11301 Sunset Hills Road  
Reston, VA 22090  
703-471-2688

**Business Micro Products**  
Livermore Financial Center  
1838 Catalina St.  
Livermore, CA 94550  
415-449-4412

**FORTH Interest Group**  
Box 1105  
San Carlos, CA 94070

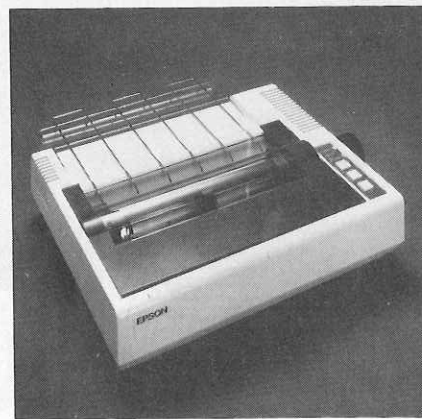
**Lifeboat Associates**  
1651 Third Ave.  
New York, NY 10028  
212-860-0300

ment CLR as the screen clear command for his machine. But, what does CHR\$(27);CHR\$(69) mean to him? This is the screen clear command used in Heath systems (quite meaningless to TRS-80 or Apple users). Therefore, we suggest:

10 CLS REM—screen clear  
10 CHR\$(27);CHR\$(69) REM—screen clear as the way out. This same approach should be used at each BASIC line that does something unique to the particular system for which the program is written. Some commands are not directly translatable—such as graphic commands. However, even these are not insurmountable since at least the person using the program will know what the author is trying to do. In many cases, the user can convert to commands his machine can perform even if it means writing small subroutines.

As an afterthought, another simple approach is for the microcomputer user to keep a notebook that contains all his BASIC statements, so that he can enter similar statements from other BASIC versions he encounters. This, of course, means a translator for a translator, which is not a very good thing, but one way to preserve sanity in the high-level language maze. ◇

The printer you  
always wanted  
but could  
never afford,

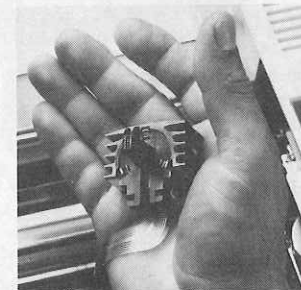


now you  
can afford.  
**Epson.**

The most revolutionary thing about the Epson MX-80 isn't the bidirectional printing or the logical seeking function. It isn't even the disposable print head—although that's pretty revolutionary. The most revolutionary thing about the MX-80 is the price. How, you may ask, could a printer that does as much as the MX-80 cost less than \$650?

Frankly, it wasn't easy. But the MX-80 could only have come from the world's largest manufacturer of print mechanisms. Epson.

*The world's first disposable print head: when it wears out, just snap it out and throw it away. A new one costs less than \$30, and you can install it yourself with one hand.*



**EPSON**  
EPSON AMERICA, INC.

23844 Hawthorne Boulevard, Torrance, California 90505 • Telephone (213) 378-2220

CIRCLE NO. 23 ON FREE INFORMATION CARD

We spent three long years designing the MX-80 from the ground up to have all the functions people wanted, to be reliable like all Epson Printers, and to be produced on a scale that would allow us to charge less for each one. The MX-80 is our proof that it can be done.

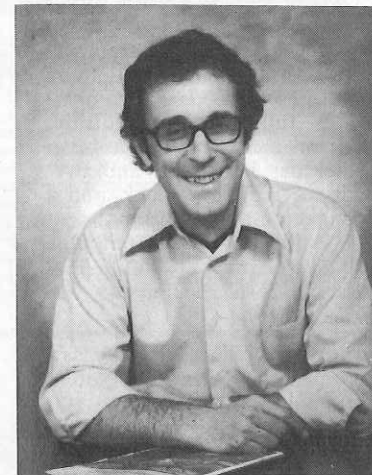
Among its features, the MX-80 prints 96 ASCII, 64 graphic and eight international characters in a tack-sharp 9x9 matrix. It prints bidirectionally at 80 CPS with a logical seeking function to maximize throughput. And it has the world's first disposable print head.

If you've ever wanted a printer that could do it all at a price you could afford, you've got to see the Epson MX-80. Because seeing is believing.

Because seeing is believing.

# creative computing

*"The beat covered by Creative Computing is one of the most important, explosive and fast-changing."—Alvin Toffler*



David Ahl, Founder and Publisher of Creative Computing

You might think the term "creative computing" is a contradiction. How can something as precise and logical as electronic computing possibly be creative? We think it can be. Consider the way computers are being used to create special effects in movies—image generation, coloring and computer-driven cameras and props. Or an electronic "sketchpad" for your home computer that adds animation, coloring and shading at your direction. How about a computer simulation of an invasion of killer bees with you trying to find a way of keeping them under control?

**Beyond Our Dreams**

Computers are not creative per se. But the way in which they are used can be highly creative and imaginative. Five years ago when *Creative Computing* magazine first billed itself as "The number 1 magazine of computer applications and software," we had no idea how far that idea would take us. Today, these applications are becoming so broad, so all-encompassing that the computer field will soon include virtually everything!

In light of this generality, we take "application" to mean whatever can be done with computers, *ought* to be done with computers or *might* be done with computers. That is the meat of *Creative Computing*.

Alvin Toffler, author of *Future Shock* and *The Third Wave* says, "I read *Creative Computing* not only for information about how to make the most of my own equipment but to keep an eye on how the whole field is emerging.

*Creative Computing*, the company as well as the magazine, is uniquely light-hearted but also seriously interested in all aspects of computing. Ours is the magazine of software, graphics, games and simulations for beginners and relaxing professionals. We try to present the new and important ideas of the field in a way that a 14-year old or a Cobol programmer can under-

stand them. Things like text editing, social simulations, control of household devices, animation and graphics, and communications networks.

**Understandable Yet Challenging**

As the premier magazine for beginners, it is our solemn responsibility to make what we publish comprehensible to the newcomer. That does not mean easy; our readers like to be challenged. It means providing the reader who has no preparation with every possible means to seize the subject matter and make it his own.

However, we don't want the experts in our audience to be bored. So we try to publish articles of interest to beginners and experts at the same time. Ideally, we would like every piece to have instructional or informative content—and some depth—even when communicated humorously or playfully. Thus, our favorite kind of piece is accessible to the beginner, theoretically non-trivial, interesting on more than one level, and perhaps even humorous.

David Gerrold of *Star Trek* fame says, "*Creative Computing* with its unpretentious, down-to-earth lucidity encourages the computer user to have fun. *Creative Computing* makes it possible for me to learn basic programming skills and use the computer better than any other source.

**Hard-hitting Evaluations**

At *Creative Computing* we obtain new computer systems, peripherals, and software as soon as they are announced. We put them through their paces in our Software Development Center and also in the environment for which they are intended—home, business, laboratory, or school.

Our evaluations are unbiased and accurate. We compared word processing printers and found two losers among highly promoted makes. Conversely, we found one computer had far more than its advertised capability. Of 16 educational packages,

only seven offered solid learning value.

When we say unbiased reviews we mean it. More than once, our honesty has cost us an advertiser—temporarily. But we feel that our first obligation is to our readers and that editorial excellence and integrity are our highest goals.

Karl Zinn at the University of Michigan feels we are meeting these goals when he writes, "*Creative Computing* consistently provides value in articles, product reviews and systems comparisons... in a magazine that is fun to read."

**Order Today**

To order your subscription to *Creative Computing*, send \$20 for one year (12 issues), \$37 for two years (24 issues) or \$53 for three years (36 issues). If you prefer, call our toll-free number, **800-631-8112** (in NJ 201-540-0445) to put your subscription on your MasterCard, Visa or American Express card. Canadian and other foreign surface subscriptions are \$29 per year, and must be prepaid. We guarantee that you will be completely satisfied or we will refund the entire amount of your subscription.

Join over 80,000 subscribers like Ann Lewin, Director of the Capital Children's Museum who says, "I am very much impressed with *Creative Computing*. It is helping to demystify the computer. Its articles are helpful, humorous and humane. The world needs *Creative Computing*."

## creative computing

Attn: Mary  
P.O. Box 789-M  
Morristown, NJ 07960  
Toll-free **800-631-8112**  
(In NJ 201-540-0445)