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Johnson 4330 has remote control mike with speaker and channel indicator in separate box.



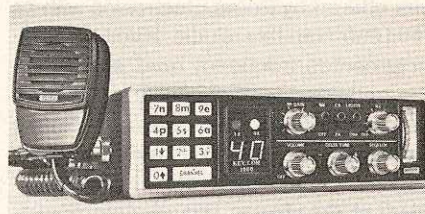
Cobra 45XLR combines 40-channel CB with AM/FM/stereo FM.

Texas Instruments' Model SM-172 has remote computer control.

Hy-Gain, Pace, Panasonic, SBE, Sharp, and Superscope "Aircommand." To jump directly to any other station, calculator-type keyboards are used to punch in the number on many rigs: SBE's Key-Com (again), Pace's 8117 base station and the TI units, for example. The latter also have a unique, keyboard-operated selective-call system. Select a 5-digit number and a channel, tell you friends with TI units what your number is, and your receiver section will be silent until they "dial" you. Unlike most selective-call systems that use tones, the TI sets can access up to 100,000 CB "phone numbers" for each AM or SSB channel and store the five most frequently called numbers in a memory, to be recalled at the touch of a key.

Interestingly, there's a move afoot at the Electronic Industries Association to standardize selective calling signals for CB radio use. The purpose is to head off incompatibility among products of different manufacturers.

Rigs That Remember. Memory—another digital feature—is found on many of the latest transceivers. Sharp's IMC and Hy-Gain's 2716 remote models are examples of CB transceivers that remember which channel you last used so you don't have to re-tune to it when you turn the unit on again. The 2716 also remembers other settings when it's in



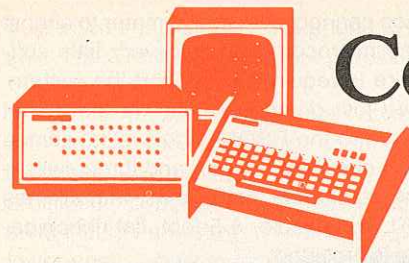
SBE Key-Com 1000 has built-in microprocessor and a calculator type keyboard channel selector.



"stand-by" mode. SparkOmatic has a model with a 5-channel memory. You can use its scanning feature or manual tuning to search through all 40 channels or just through the 5 channels you use most in search of activity. Pace's 8047 can scan channel 9, 19 and any other channel you choose and its 8117 base station has a 10-channel memory that can be scanned as does SBE's Key-Com mobile. Both Sharp and Superscope Aircommand have models that monitor channel 9 as well as the channel you're using.

These weren't the only CB products at CES of course; just some of the ones with the most exotic features. Furthermore, not all CB manufacturers exhibited at CES. And at least one who did—Motorola—held off introducing new CB models so that it could show them for the first time a few weeks later at a distributor's convention. Here it introduced a 40-channel base station with an automatic "on-setting" digital clock function (Model 4025) and an under-dash "public safety" monitor mobile (Model 4009) with dual receivers that features a channel 9 crystal that can be replaced by another channel's crystal.

About the only other possible trend observed was the growing number of CB in-dash "entertainment centers" available. That is, CB transceivers combined with AM, stereo FM and a choice of cassette or 8-track tape units. ◇



Computer Bits

By Leslie Solomon

MORE GOOD NEWS FOR THE COMPUTER GROUP

THE NUMBER and variety of hardware and software items available to computer hobbyists continue to increase—with no end in sight at present. Let's take a look, then, at a few of the "goodies" that have come across our desk in the last several weeks. First, the hardware items.

Radio Shack Too! The latest entry into the hobby computer scene is from Radio Shack. Packaged in an attractive and functional plastic case only 16½" by 8" by 3½" are a 53-key ASCII keyboard, a Z80 microprocessor and support logic, a video display unit, 4k of ROM and 4k of RAM (internally expandable to 12k ROM and 16k RAM), and a cassette interface. Soon to be available at most Radio Shack outlets, the wired and tested TRS-80 Microcomputer can be purchased for \$399.95. An associated 12" video monitor and cassette recorder package is also available to create a complete personal computing system for \$599.95.



Radio Shack's TRS-80 microcomputer system.

The video display is memory mapped with graphics and alphanumerics (upper case) controlled by BASIC commands. Cursor control and automatic scrolling are also featured. Connections to the cassette recorder and the video monitor are made via rear-apron connectors. Also on the rear apron is a small door that, when opened, exposes a bus connector that is used for system expansion. Although the computer can physically hold only 16k of RAM, it has a total memory capacity of 62k by using its bus connector.

The video display is 16 lines of 64 characters but can be software controlled for 32 characters per line. The video graphics are formed on a 128 (horizontal) by 48 (vertical) matrix and both graphics and text can be interspersed in any manner by software.

The BASIC software comes in ROM and features floating point arithmetic; numeric, array, and string variables; video graphic commands; and cassette save and load commands. The software

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Hobby Computers are HERE Green Simplified introductions to various aspects of hobby computing. \$4.95

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level is between "tiny" BASIC and "regular" BASIC and includes the special commands used for graphics.

Along with the computer, the customer will be supplied with a free cassette that "plays" blackjack (with graphics) and backgammon. Other available cassettes provide a 15-person payroll program (\$19.95), a Math-1 package that teaches multiplication, addition, and subtraction, and includes a teacher's guide (\$19.95 for a three cassette portfolio); a kitchen program that covers menus, conversion tables, a computer directory, and a message center (\$4.95); and a personal finance program for \$14.95 which includes a seven-cassette portfolio.

Radio Shack intends to support its new baby and plans to introduce Extended BASIC (more memory is required), a disc and DOS system, a hard-copy printer, an expansion unit for additional circuit boards (connecting the expansion bus), and a modem.

A number of interesting software packages have also been promised for the near future with the hope of making the TRS-80 a useful hobby and personal computer.

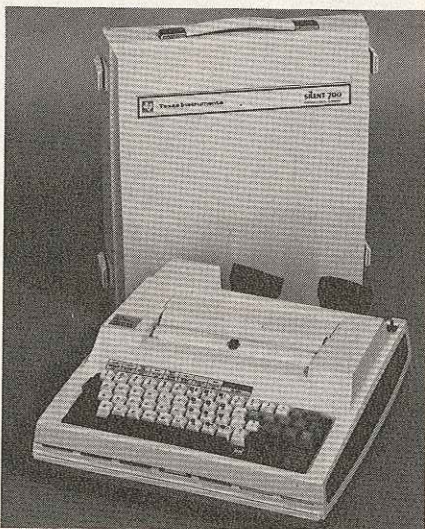
For Fans of the Z80. If you are interested in the Z80 processor, you should be aware of the Martin Research (3336 Commercial Ave., Northbrook, IL 60062; tel: 312-498-5060) MIKE-8 Model 882. It sells assembled for \$895. The 882 has 4k of RAM, a 1k monitor program in PROM, and a "console" board with a calculator-type of keypad and six 7-segment LED displays. Besides the usual functions, the monitor offers advanced debug features, RAM test, signal-step, and trap setting. The system also includes a 2708 PROM programmer and a UV erase lamp. The Model 882 is mounted on a base and has its own switching regulator power supply. The firm's Microcomputer Design book fills out the package.

PROM Programming. Oliver Audio Engineering (7330 Laurel Canyon Blvd., North Hollywood, CA 91605; tel: 213-765-8080), which introduced the low-cost optical tape reader some time ago, has now introduced a new PROM programmer, the OAE PP-2708/16. (As a kit, it is \$249; wired and tested, it's \$299.) Containing address counters, timing and control logic, switching voltage regulator, and a zero-insertion-force socket, this new programmer can handle either the 1k 2708 or the new 2k 2716 PROM's. A simple parallel inter-

face connects the programmer to almost any microcomputer and very little software is required to support the system. You just dump the data via the output port into the PROM. The system comes with one 8-bit I/O port and three switch-programmable status lines, with all lines TTL compatible. A 5-foot, flat ribbon cable is provided.

Cassette Interface. Compatible with the Altair/S-100 bus, the Universal Cassette Recorder Interface (UCRI) is now available from Dajen Electronics (7214 Springleaf Ct., Citrus Heights, CA 95610; tel: 916-723-1050) for \$135 in kit form, \$175 assembled and tested. Using bi-phase recording and having no adjustments, the UCRI can operate from 520 to 41,000 baud—switch selectable. There is also a switch-selectable board address, and independent selection of transmit and receive data inversion for use with different recorders. A level-indicator light comes on at correct levels, and a sync indicator light shows reception of the sync byte. User selectable sync character, under software control allows Tarbell, KC or other sync character format. Relay options for control of two recorders are available. An independent latched input port can be used for a keyboard. Output connectors for recorder and parallel port, recorder cable, IC sockets, pre-recorded cassette with sync, and a full manual are included.

Super Hobby Terminal. If your dreams include a super hard-copy terminal, take a look at the new Texas Instruments Silent-700 Model 765 Portable Memory Terminal or the Model 763 Memory Send-Receive Terminal. About the size of an office typewriter, the 765 is designed for portable use and includes a



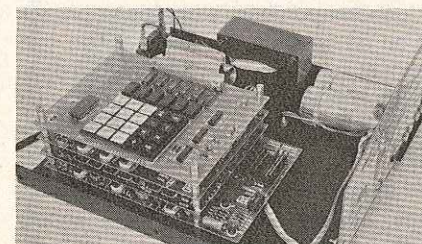
TI's Silent 700 Terminal.

built-in carrying case and a phone coupler. The 763 is for use where portability is not required.

Each of these new terminals comes with 20k characters of nonvolatile bubble memory expandable to 80k. A 9900 processor controls the system. Both units include a keyboard with upper and lower case, a built-in calculator-type numeric keypad cluster, and a quiet 30-character/second nonimpact printer. Both models have file management systems, and an operator command mode to allow the user to select the communications mode, configure memory, and enter or edit text. The Model 765 is \$2995 and the 763 is \$2695.

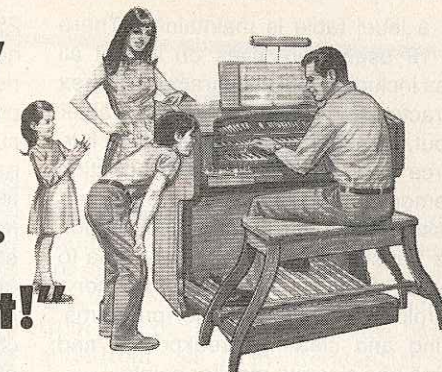
Economical Terminal. If you have a computer, the next thing you need is a CRT-type terminal so you can "talk" to your machine. Southwest Technical Products (219 W. Rhapsody, San Antonio, TX 78216), the producer of the CT-1024 terminal, has announced its CT-64 CRT Terminal (\$325 in kit form, with assembled CT-VM Video Monitor \$175). This new terminal features 16 lines of 32 or 64 characters per line, scrolling or page operation, upper and lower case, reversed character printing, full cursor control, and complete character decoding. The kit includes power supply, keyboard, serial I/O, beeper, chassis, and cover.

6800 Software. Impro Micro Systems (Box 7776, Van Nuys, CA 91409) recently announced its MIKADOS+D (mini instant keyboard assembler, debug, operating system + disassembler) package. The \$17.95 software package occupies only 3k of RAM and with 4k bytes, 1k is still left for user programs and the label table. The assembler generates object code for the 72 basic variable-length 6800 instructions with all addressing mode variations—a total of 197 different instructions. The assembler generates object code for user-entered mnemonics, enters them into memory, and outputs formatted object code and address on the same line as user input. Relative addressing for branch instructions with symbolic labels are resolved,



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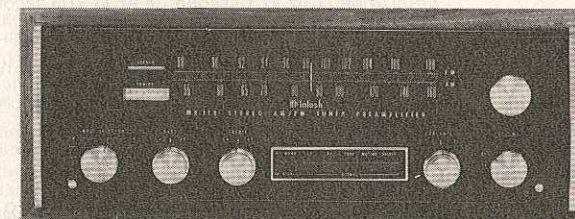
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and a label table is maintained. There are 18 useful directives on line at all times including ASCII character I/O, hex character input formatted hex character output, disassembly of object code into source code with complete instruction mnemonics and absolute branch addresses, label table formatted output, data transfer from one memory area to another, clearing all or part of memory, controlling execution of user programs, setting and clearing breakpoints, and setting and clearing monitor points.

Another 6800 software producer, TSC (Technical Systems Consultants, Box

2574, W. Lafayette, IN 47906) has announced its Text Editing System (stock number SL68-24 at \$23.50) which supports many of the standard commands such as PRINT, INSERT, DELETE, FIND, REPLACE, and VERIFY. It also provides file TOP and BOTTOM, an APPEND command allowing any string to be added to any or all lines starting in a specified column, text block COPY and MOVE, and an extensive CHANGE command that allows changing any or all specified occurrence of one string into a second string. Other features include TAB, SET, NUMBERS, EXPAND, NEXT, RENUMBER, STOP, LOG,

and OVERLAY that allows line changing by typing over an existing line. There is a HEADER command, a ZONE feature and, for tape users, READ, WRITE, and SAVE.

6502 Software. If you are more concerned with the 6502, you should know that Microcomputer Associates Inc. (2368-C Walsh Ave., Santa Clara, CA 95050; tel: 408-247-8940) has a new 6502 RAP (resident assembler program) and Tiny BASIC on ROM. The two 2k ROM's house the 1.75k resident assembler and the 2.2k Tiny BASIC. RAP is a single-pass resident assembler. Statements are entered either from paper tape or from a terminal keyboard, and RAP generates a listing and places object code into RAM for immediate execution. A minimum of 4k RAM is needed in the user's computer. Tiny BASIC statements include LET, IF, THEN, INPUT, GOTO, GOSUB, RETURN, END, REM, CLEAR, LIST, RUN, RND, andUSR (user subroutine). The ROM software has been designed so that most I/O devices can be used. The RAP/Tiny BASIC package (SW101) is \$200 with full documentation. Tiny BASIC is available in paper tape format (SW300) for \$25, or in nine 1702A PROM's (SW202) for \$275.

Altair 680 Doings. If you have an Altair 680b, you should be aware that MITS has introduced the 680b-KCACR Audio Cassette Interface for this machine. Using the KC Standard, the device features a digital demodulator, CMOS logic, motor control for starting and stopping tape motion, test points at all key circuits, and sockets for all IC's. BASIC Version 1.2 is available on cassette and includes all standard functions, plus the capability of storing and loading software through the KCACR.

Three-Dimensional Graphics. Sublogic Co. (Box 3442, Culver City, CA 90230) has a new software package that will provide 3-dimensional graphics for microcomputers. With it, you can view two-dimensional perspective projections of three-dimensional scenes from any location in space. A minimal subset BASIC version of the package, for \$22 is for general-purpose, slow-speed graphics on any system. Another version, the 6800, at a slightly higher price, has optimized assembly language with dynamic graphic capabilities for advanced simulation and complex graphics. Driving and flying simulations, artistic projections, design projections, engineering analysis, and advanced games are possible uses. ◇

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- **Tone By-Pass**—Scanning is not interrupted by mobile telephone tone signal.
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- **3-Inch Speaker**—Front mounted speaker for more sound with less distortion.
- **Squelch**—Allows user to effectively block out unwanted noise.
- **AC/DC**—Operates at home or in the car.

Bearcat® 210 Specifications

Frequency Reception Range	
Low Band	32—50 MHz
"Ham" Band	146—148 MHz
High Band	148—174 MHz
UHF Band	450—470 MHz
"T" Band	470—512 MHz

*Also receives UHF from 416—450 MHz

Size
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Weight
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Power Requirements
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Audio Output
2W rms

Antenna
Telescoping (supplied)

Sensitivity
0.6µv for 12 dB SINAD on L & H bands
U bands slightly less

Selectivity
Better than -60 dB @ ± 25 KHz

Scan Rate
20 channels per second

Connectors
External antenna and speaker; AC & DC power

Accessories
Mounting bracket and hardware
DC cord

**COMMUNICATIONS
ELECTRONICS**

Box 1002 Dept. 733
Ann Arbor, Michigan 48106 USA

