

Epson's HX-20 and Texas Instruments' CC-40

Portable notebook computers hold more promise than performance

by David Ramsey

The microcomputer revolution caught everyone by surprise. When the first Altairs became available, no one had any inkling that personal computing would be more than an expensive hobby for eccentrics. Things didn't work out that way, of course. And now we're on the verge of a submovement: the portable computer revolution.

In this article we'll take a look at two of the many portables available today: the Epson HX-20 and the Texas Instruments Compact Computer 40.

The Epson HX-20

The Epson HX-20 is the Japanese computer that was going to set America on its ear. It didn't, although its brisk early sales were encouraging. After an initial spurt of interest, people began to note that no accessories or software were available for the machine. In an unusual case of Japanese marketing failure, Epson had the lap computer market to itself for almost a year and did nothing with it.

Fortunately, it looks as if a truckload of new software and peripherals for the HX-20 is just around the corner. Epson has recently upgraded the standard \$795 machine, which now includes the formerly optional (at \$160) microcassette drive and a simple word processor called Skiwriter. Disk drives for the machine are due out before the end of the year, and a telecommunications ROM (read-only memory) should be available by September.

The basic machine contains two 6301 processors, CMOS (complementary metal-oxide semiconductor) implementations of the 6800 architecture that run at 614 kHz. One processor handles computing chores while the other handles I/O (input/output). Included in the stan-

dard machine are 16K bytes of RAM that can be expanded to 32K with the addition of the \$150 expansion unit. The standard 40K-byte ROM includes BASIC, the routines to drive the printer and microcassette drive, and the small word processor. BASIC and the word processor share the same addresses—the application not in use at the time is bank-switched out. (See the "At a Glance" box.)

Epson's goal with the HX-20 was to provide a complete portable computer system that includes a printer and mass storage. The HX-20 has a 60-key, full typewriter keyboard, a 4-line by 20-character LCD (liquid-crystal display), and a 20-column impact dot-matrix printer (which is, incidentally, the smallest impact dot-matrix printer in the world). It is also equipped with RS-232C (albeit through a DIN connector) and serial ports and a computer-controlled microcassette mechanism for program and data storage.

The display has an important capability not found in competing machines: the ability to act as a window on a "virtual screen" of arbitrary size. Theoretically, a screen of up to 255 rows of 255 columns can be supplied; realistically, however, the 64K bytes of memory that would require don't exist in the machine. Still, allocating an 80 by 24 screen is as simple as typing WIDTH 80,24 in BASIC. You can use the cursor keys to move around the virtual screen with scrolling in all directions, and various control keys provide larger (more than a single character) jumps in any direction. The display is also dot-addressable as a 120 by 32 array, and commands to plot points and draw lines are included in the BASIC.

Along with the standard typewriter keyboard, the HX-20 has three dedicated keys (Break, Pause, and

are complete and well written. *The Guide to Operations* is a profusely illustrated work that gently guides the neophyte. Topics such as the virtual screen and the concepts of "programs" and "data" are handled very well. Overall, I'd have to rate the documentation high.

Summary

The HX-20 has a lot of potential. The introduction of the Radio Shack Model 100 has given the HX-20 very stiff competition, and compared to Radio Shack's 40 by 8 display, the HX-20 looks primitive. But Epson's new wave of peripherals and software, if introduced in a timely manner, will probably save the machine. Currently, its big selling points are the integrated microcassette and printer, features no other portable offers yet.

The Texas Instruments Compact Computer 40

I tried to be unbiased and objective about this machine, I really did. I kept reminding myself what a notebook-sized BASIC computer would have meant to me just a few years ago. And the price of the TI CC 40 is only \$250.

But there's no clock. No file system. Only one BASIC program at a time can reside in memory, and the user can work with only about 5200 bytes of that. And the keyboard is vile.

There's also no cassette interface. If you want to store programs or data, you have to buy the TI wafertape drive. The CC 40 offers neither built-in storage nor a standard audiocassette interface. It could be argued, however, that you can buy a CC 40, the optional wafertape for mass storage, and another 16K bytes of memory, and still have an inexpensive computer. Unfortunately, none of these accessories was available at the time this review was written.

The CC 40 has a 31-character display, a sort-of-type-

writer keyboard, and a separate numeric/cursor keypad. The keyboard spacing is so small that it's essentially impossible to touch-type on it. The Shift and Control keys lock for one keystroke—to type an uppercase character, you press *and release* the Shift key, then press the character key. There's only one Shift key; the space normally occupied by the right-hand Shift key is taken up by the Return key.

The CC 40 does make a dandy scientific calculator, and perhaps that's the market it should be aimed at. Good scientific programmable calculators cost about as much and are not nearly as powerful as the CC 40. Up to 10 user-definable key sequences can be entered, and the Playback feature recalls the line last entered on the display for editing and resubmission. All BASIC keywords can be entered with a two-keystroke sequence (FUNC followed by another key), which is handy considering how difficult it is to type on this machine. There is a slot for ROM or RAM cartridges in the upper-left corner of the machine. None were available at the time of this writing.

Built-in Software

The TI BASIC included is a good extended BASIC with several interesting features, among them a subprogram capability (with local variables); an ACCEPT statement that combines the functions of the normal INPUT statement with automatic positioning of input and length and type checking; a PRINT USING and IMAGE capability that allows some elaborate output formatting; and some real oddities such as SETLANG, which sets the output language for system messages. The standard computer includes English and German, so you can set your error messages to be displayed in German if you wish. Some ROM cartridges presumably offer the option of other languages.

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