

**GUIDE TO LIGHTWEIGHT LAPTOPS! PAGE 62**

A Publication of IDG Communications/Peterborough, Inc.

February 1990  
U.S.A. \$3.95  
Canada \$4.95  
U.K. £2.25

# PORTABLE COMPUTING

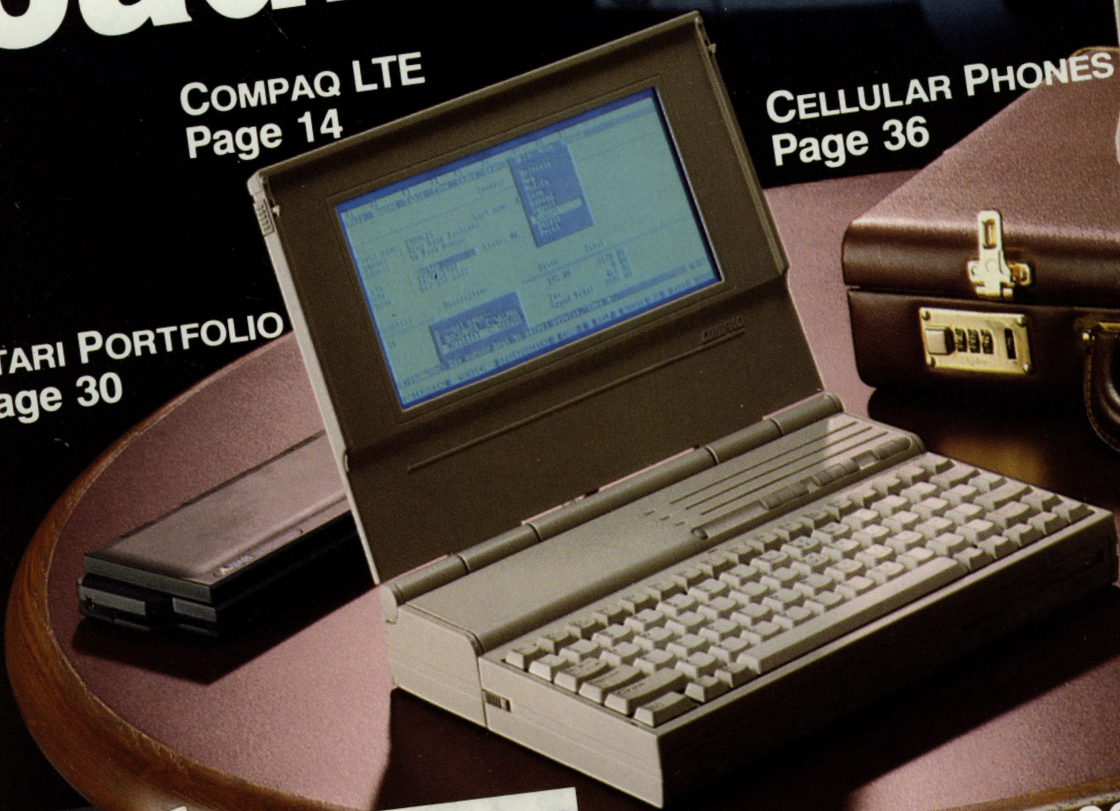
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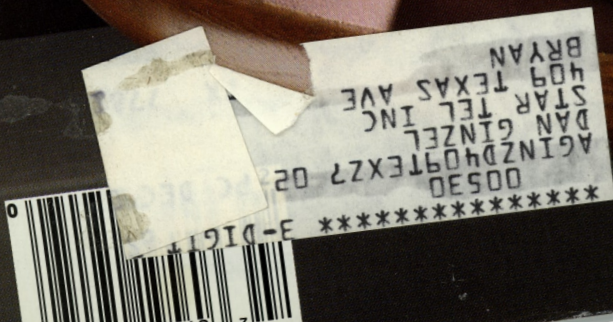
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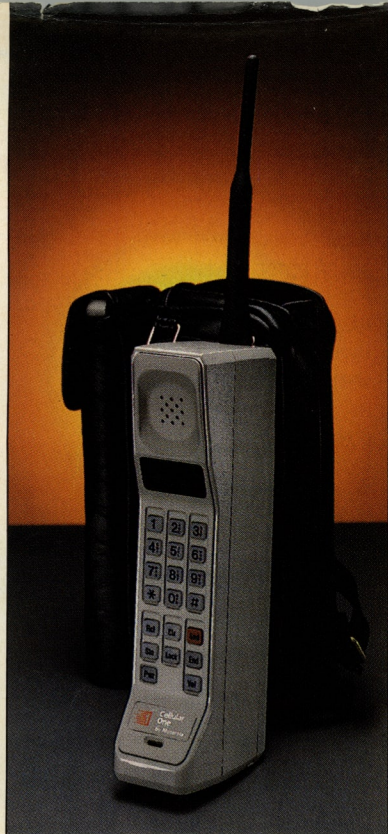
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# A NEW LOOK

**B**usiness, technology, mobility. Those three words define the new look of this magazine. With this issue, *Portable Computing* (formerly *Portable Computer Review*) undergoes a small but significant name change, increases its frequency to a regular monthly schedule, and has a new design reflecting small but significant changes as well.

Portable computers are the most personal of all personal computers. Buying decisions are made on many criteria not found in the desktop market: weight, battery life, keyboard feel, screen readability. Cost is much more of a concern. Compatibility is very important. Service is paramount. And the bottom line is often decided on a basic subjective feel on whether or not you actually like the computer you are about to buy.

I think portables are a lot like sports cars. They're advertised as being sexy, glamorous, leading-edge . . . you know, way cool. But buying a portable computer (or sports car) is a financial commitment, sometimes a very significant commitment. And once it's home, you want to take care of it, you fuss about its performance, and with the computer, your entire business may depend on it.

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very often. So, the first word in our creed—Business.

Portables are evolving more quickly than new varieties of killer bees. Whereas a 15-pound computer with a hard drive was a technological marvel three years ago, today you can buy one-pound computers more powerful than the original IBM PC. And people are increasingly hooking their computers up to modems, faxes, and cellular networks. Thus, the second leg of the three-legged stool—Technology.

But the main thing that distinguishes these systems from most personal computing technology is that they move. More precisely, they can be moved. Mobility is the primary factor driving them, if you will, into new applications and businesses. This magazine is written for the needs of the Mobile Professional. Thus, the obvious word that we never forget—Mobility.

As the magazine's frequency expands, so does its editorial coverage. First of all, we've added some new editorial features.

• Our "How-to" feature story every month will offer advice on how to deal with some of the maddening situations that continue to make personal computing tougher than the salesperson told you it would be. This month: disk drive incompatibilities and how to solve them.

• We are continuing to expand our coverage of software of interest to portable computer users. This month:

integrated software.

• The Portable Office will be a fixture in every issue. This month we look at cellular telephones and portable fax boards.

We've added a few new columnists to the mix as well.

• Masazumi Takada joins us as Asian Editor. Mas was the founder of the computer special interest group (SIG) movement in Japan. His "Info Nomad" column will appear every other month.

• Bruce Stephen, laptop computer analyst for International Data Corp., will be providing a "Marketwatch" starting next issue. Bruce's forecasts are consistently among the most conservative (and reliable) in the industry, and we welcome his contribution.

• West Coast Editor Jeff Angus will be providing observations in his "Fourth Wave" column. Jeff previously wrote this column for *InfoWorld*, and we consider ourselves fortunate to have him in our pages.

• Steve Michel, our Macintosh Editor, will be looking at portable computing "for the rest of you." The Mac Portable has competitors, including some that are not so obvious. Steve will be looking at Mac-computing options and products in "Macintosh Today" starting next issue.


More than a million people will join the portable computing revolution this year. The '90s are truly going to be the decade of portable computers. For those of you early adapters, welcome to the party.



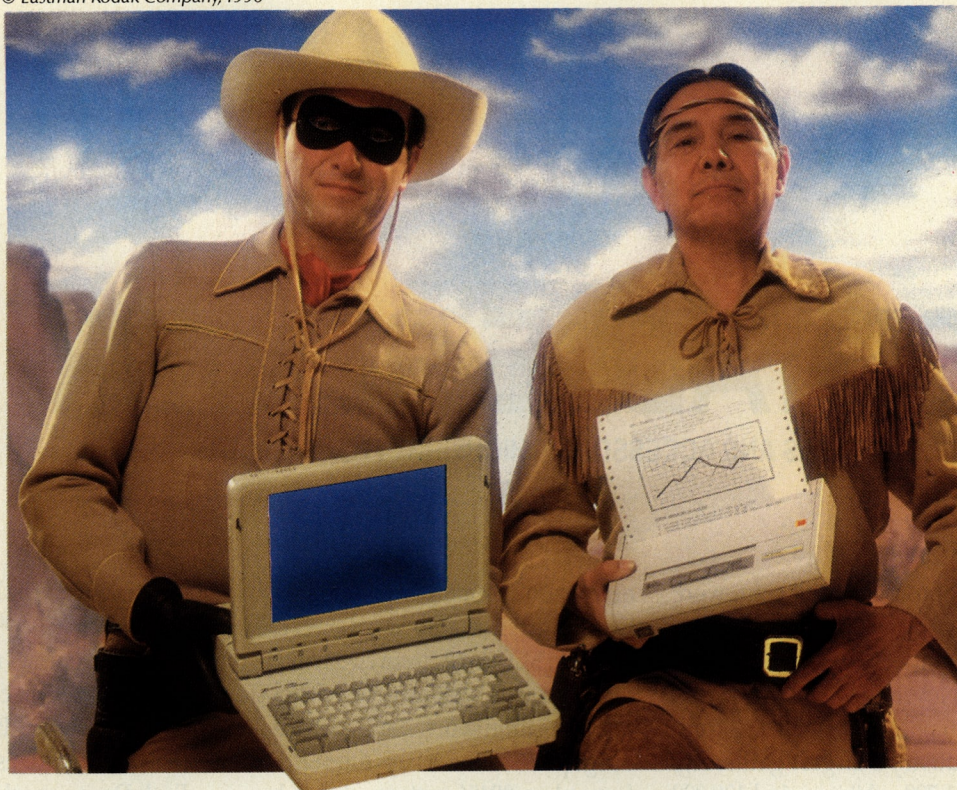
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# PORTABLE POWER

LAPTOP COMPUTERS AND ACCESSORIES HIGHLIGHT FALL COMDEX.

**P**ortable computers of all sizes were the main attractions at the 11th annual Fall Comdex convention in Las Vegas in November.

Fall Comdex is the personal computer industry's largest gathering, drawing 1,700 exhibitors and 120,000 attendees this time around. Although the EISA "gang of nine" systems and new 486 desktop computers were expected to steal the show, a fair measure of initial press coverage focused on the emerging portable computing systems.

Previously announced systems such as the Poqet PC, Atari Portfolio, Compaq LTE, NEC CSX and new systems from Toshiba drew large crowds. But newer, prototype systems from Mission Cyrus and Daewoo drew interest as well. And handheld manufacturer Psion announced its unique vision of a DOS-based briefcase computer, incorporating

new "flash" memory from Intel.

In evidence also were several Compaq SLT clones from Asian manufacturers, as well as new 80386SX machines from sources in Taiwan and Singapore. The truly demented focused on 80486 systems shown by Micronics and high-end king Dolch Computer Systems.

## NEW COMPUTERS OF NOTE

- South Korea-based Daewoo will be marketing its new laptop through Cordata, of Compton, CA, a company it recently acquired. The prototype Daewoo CPC-9000 is a 386SX-based system weighing 14 pounds that runs on batteries. It features a VGA cold-cathode "page-white" display, and choice of a 20MB or 40MB hard drive. The keyboard is a low-profile desktop computer 101-key unit, with a snap-on separate numeric keypad.

The unit clicks on to a modular desktop expansion unit that provides significant expansion capability. Daewoo gave no price, but a representative said that "you will not have to worry about the price." The system is not scheduled to ship until the third quarter of this year.

- Marching to the beat of a different drummer is Mission Cyrus, a British company with a U.S. office in Seattle, which appeared on the verge of introducing its Darius ProPortable line, high-powered portables with

bundled printers. The line will include a 386SX system (\$6,499), a 25MHz 386 with MicroChannel (\$8,999), and a 33MHz 386 ISA machine (\$17,999). The prices include MS-DOS 4.01 formatted on the hard disks.

Each Darius machine features an internal 180-character-per-second inkjet printer mounted on the left side. All systems weigh less than 20 pounds and all were scheduled for U.S. release by the end of the first quarter 1990. Displays are VGA gas plasma monitors, and storage will be phenomenal: 100MB on the two "low-end" machines and 200MB on the big box.

- Psion, another British company, with U.S. headquarters in Watertown, CT, showed its MC200 and MC400 Mobile Computers. The MC200 is a DOS-based unit weighing 4.3 pounds, and using Intel's new "flash" memory for storage on IC cards.

Flash memory features nonvolatile circuitry—it retains data without needing batteries—using erasable, programmable read-only memory (EPROM) technology in what Intel calls Etox (EPROM tunnel oxide). The Psion MC200 also features DOS stored in ROM, allowing the computer to boot directly when it is turned on. Power is supplied by eight AA batteries; Psion was making some strong claims of battery life for these systems. A product manager said a realistic assessment for the MC200 was 15 hours. Only time will tell.



Darius computer-printer combo.



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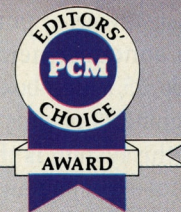
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The MC200 was scheduled for availability at the beginning of 1990, priced at an extremely aggressive \$799.

Psion's MC400 features a proprietary multi-tasking operating system and graphical interface, as well as a touchpad and voice compression and playback capability. The MC400 will be priced at \$1,499.

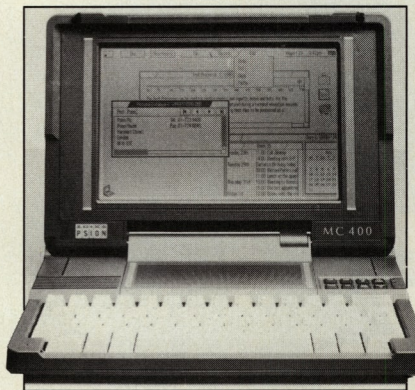
- Dolch Computer Systems, San Jose, CA, kept its reputation of making the most powerful portables intact with announcement of its Dolch-Pac 486/25, a lunchbox configuration weighing 20 pounds. Priced at \$12,995, the system is the first portable to use Intel's new 80486 CPU. It has a VGA gas plasma display, comes with 2MB RAM (expandable to 16MB), and has a standard 100MB hard drive (a 200MB disk is optional).

A number of benchmarks provided by the company show the system to be more than twice as fast as its previous top-end system, a 386 box running at 25MHz. Company president Volker Dolch said the new system is especially suitable for CAD/CAM and desktop publishing applications.

- Micronics, of Sunnyvale, CA, wants to go a step further with an 80486-based laptop system with color display, a prototype of which was at Comdex.

- Dauphin Technology was showing its LapPro 386SX, which comes standard with two megabytes of RAM and weighs 16.5 pounds with battery. The computer has an EGA LCD display. Options include an expansion chassis, 100MB hard drive, and internal modems.

- Hong Kong-based Bondwell has upgraded its lightweight laptop line. The Bondwell B310, a small 286 laptop, has received FCC approval and



was scheduled to begin shipping in January. The B310 has an 80C286 CPU running at 12MHz, weighs only 8.5 pounds, measures 13 by 12.2 by 2 inches, and comes with a high-density 3 1/2-inch floppy and 40MB hard drive. Suggested retail price is \$3,695. (Bondwell's U.S. headquarters are in Fremont, CA).

- In handheld computers, Telxon, of Akron, OH, expanded its line to include the PTC-710, an 80C88-based system with a four-line by 16-character display and plug-in pencil wand.

- Color LCDs were in evidence, but didn't attract as much attention as their previous display at Spring Comdex earlier in the year. Hitachi's active-matrix LCD was the most noticeably improved, almost quadrupling in size to about 9 inches in diameter. (Zenith will incorporate the Hitachi technology when commercialization time comes.)

Standard color LCDs were in evidence on the new NEC ProSpeed CSX and the Sharp PC-9000 (rechristened the MultiColor for the show). Sharp had to add six pounds of shielding to get FCC approval to display its computer, bringing the total weight of its demo unit to 29 pounds. The box will obviously have to go on a diet before commercial release.

## THE PORTABLE OFFICE

Portable office technology is in increasing evidence at Comdex. One company aggressively making this pitch is Ricoh, of Fairfield, NJ, which sees the "growing trend of miniaturization" and "many (more) people



working away from their traditional places of business" as twin impetuses for validation of the portable office. A review of portable office technology at Comdex includes the following:

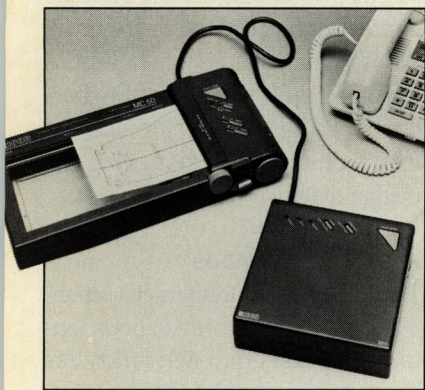
- Ricoh's MC50 portable flatbed copier/digitizer. The unit weighs less than 3 pounds (with battery) and is priced at \$540. The MC50 makes small "A6" size copies, but can enlarge images up to 200 percent and reduce to 50 percent. Resolution is 200 dots per inch (dpi). The MC50 doubles as a scanner or on-the-road fax machine when used with Ricoh's IM-A image controller (\$510) or IM-F portable fax transceiver (\$540).

- Other companies were showing downsized fax machines weighing between 10 and 12 pounds. GUIS America, of Chino, CA (Taiwan Glorious Union Information Systems is the parent company), has a 12-pound unit, the Model 14, which features an optional PC Link package facilitating direct connection to a portable com-



puter. Nissei Electric (U.S. office in Closter, NJ) showed its latest, smallest unit, the SF100, a nine-pound machine that connects through the serial port. And a plain paper fax (as opposed to thermal paper units) from the Hi-Tech Control, of Richmond, BC (U.S. office in Laguna Beach, CA) measures 8.5 by 12.5 by 2.5 inches.

Another interesting unit was the Bfax 100 from Bondwell. Weighing 11 pounds and measuring 12.5 by 12.2 by 3.3 inches, the machine is designed specifically to plug into a personal computer through the parallel port. It also acts as a computer fax terminal, thereby allowing incoming fax messages to be viewed before printed out (no more junk fax using up all your paper.)



- Pure scanners are not just for desktop publishing anymore. Of increasing interest to portable computer users are handheld scanners such as Logitech's ScanMan and a unit from the Complete PC.

The ScanMan, for example, requires 384K RAM for monochrome images or 640K for 16-color images. The unit weighs less than a pound, and will run on any graphics standard including CGA and Hercules, under DOS 2.1 or later. Resolution varies between 100 and 400 dpi (dots

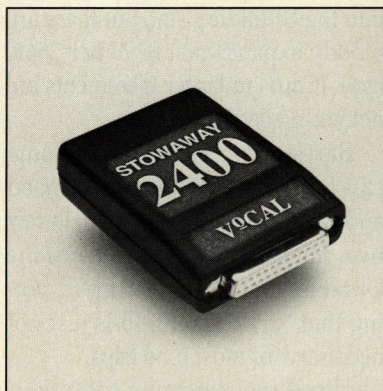
per inch). It is priced at \$339.

Scanners and a new portable fax from The Complete PC, San Jose, CA, also bring interest to this market, as does a half-pound scanner from the West German company Marstek (U.S. office in Irvine, CA) Also of interest was the MS-200 from Mitsubishi (U.S. office in Torrance, CA), a full-size yet portable scanner. Priced at \$995, it scans full pages in one pass at 200 dpi.

- Portable printers from the major companies still have not appeared in volume. The choices from major companies still boil down to the great Kodak Diconix 150 plus, Toshiba ExpressWriter 301 and Axonix LiteWrite. An interesting portable thermal printer, first seen at Portable Computing '89 in New York last fall, re-emerged under several names at Comdex, including Itoman, a Japanese company.

And a Brownsburg, IN, company, Stafford Computer Corp., was showing a small dot matrix printer that is in many ways similar to the Toshiba 301.

Okidata, of Mt. Laurel, NJ, made a tentative move, bundling its smallest desktop printer into a carrying base as a "transportable printer" that will



ered Dolch-Pac 486/25, Ricoh's MC50 flatbed copier/digitizer, the cute Stowaway 2400 modem and the ViewFrame RGB projection panel with its own lightbox.

compete with the transportable Toshiba ExpressWriter 311. Oki may be the next company to have a truly portable printer, but the rest of the major manufacturers have still not gotten on this bandwagon.

- Two modem companies had interesting products.

The Stowaway 2400 from Vocal Technologies, Santa Clara, CA is the cutest little thing at \$185. Measuring 2.2 by 3 by .8 inches, it requires no computer power, operating instead from power on the phone line. Vocal also makes a 1200-bps unit in the same size.

Xecom, of Milpitas, CA, has developed internal modems for the proprietary slots of several laptop computers, including units from Zenith, Toshiba, NEC and Compaq. Prices range from \$349 to \$449.

- Two specialty products from nView, of Newport News, VA could



Drawing attention at Fall Comdex were, from upper left: Psion's mobile MC400, the high-powered Dolch-Pac 486/25, Ricoh's MC50 flatbed copier/digitizer, the cute Stowaway 2400 modem and the ViewFrame RGB projection panel with its own lightbox.



have broad application in portable computing. The ViewFrame is a projection panel with its own lightbox and remote control. An RGB unit, it accommodates 16 colors, and works as either a front or rear projector.

A complementary product, the Toteboard, is a battery-powered unit providing remote control of personal computers, including portables. An infrared receiver plugs into the computer's keyboard port, then receives signals from the Toteboard.

- The cellular telephone companies haven't picked up on Comdex yet as a key venue. Even though many phone makers are active in the computer industry—Motorola, Toshiba, Fujitsu, NEC, etc.—these companies haven't yet identified a computer dealers' show as a prime opportunity.

In contrast, Intelligence Technology Corp. (ITC), of Dallas, is completely with the program with its line of cellular portable computers. The ITC offers three systems—286, 386SX, and 386—that feature cellular telephones attached to the units, and separate antennas on the computers themselves.

The systems also include modems and all the features expected in a high-end laptop. The 386 machine, for example, comes with 4MB of RAM, a 40MB hard drive, a VGA display, a full-size expansion slot, and separate numeric keypad. The price of this top-end system is \$8,695.

### ULTRALITE UPDATE

NEC has improved its precedent-breaking UltraLite in the year since its introduction, but continues to offer gimmicky pitches to get it into users' hands. NEC strategic planning man-

ager Jim Bartlett said at the recent Fall Comdex that the UltraLite "is still at the leading edge a full year after its introduction."

Indeed, the 4.4-pound unit remains the smallest of the briefcase computers, and probably has the best of keyboards and screens in the class. Its base price has come down to \$2,499, too. Yet NEC felt compelled to offer a "holiday season" deal at the tail-end of 1989 that included a 30-day trial period and a choice of one of four free options, including bundled software and an extended warranty.

The UltraLite has been supported by several major software developers. Applications now available on ROM card include programs from Microsoft, WordPerfect, Lotus, Xywrite and Wordstar.

The major objection to use of the UltraLite is its lack of disk storage. Programs must be available on the system's proprietary ROM card or piped in through an external drive. The UltraLite, with a maximum of 2MB of silicon-based memory, can't hold much (in today's terms) in the way of programs and files. Programs can also be sent to RAM cards that fit into the UltraLite's slot, but these are bloody expensive at \$299 per 256K card. (Cards in larger increments are not yet available.)

Bartlett contends that in some cases what people think they need and what they really need are in fact two different things. He defends the UltraLite's lack of a hard drive, noting that "20MB or 40MB is just not necessary for most road trips."

UltraLite users now have their own independent, dedicated resource: The UltraLite Connection, a bimonthly newsletter (with advertis-

ing) published by Personalized Computing, P.O. Box 869, Fairfield, IA, (515) 472-6330.

Bartlett said he sees a potential market of "a couple of hundred thousand units" for briefcase-size computers in the U.S. in 1990. Estimates of the total portable market range between 1 and 1.2 million for the year. He said there will "someday" be a second-generation machine, but wouldn't speculate on its features, price or availability.

NEC, by the way, announced a merging of two of its divisions late in 1989. NEC Technologies is the new name of the former Information Systems group based in Boxborough, MA, and the Home Electronics group based in Wood Dale, IL. The UltraLite and other laptops came from the Wood Dale group, while NEC's lunchbox units came from Boxborough. The NEC CSX color machine was a joint venture, signalling the merger that followed.

### POCKET LAN EXPANDS

The Xircom pocket Ethernet adaptor, a great and simple way to hook laptop computers into networks, has become more flexible with introduction of an OEM driver development kit that will allow the unit to be used in more network environments.

The kit costs \$999 (the pocket adaptor configured for use with Novell networks is \$695) and includes an object code library of functional interfaces to the adaptor, documentation, and source code examples that illustrate ways to use the driver development kit interfaces. Interested developers can contact Xircom at 22231 Mulholland Highway, #114, Woodland Hills, CA 91364, (818) 884-8755. □



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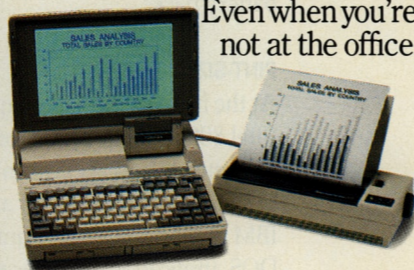
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# THIS LTE'S FOR YOU!

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**W**ell, I've finally found a laptop that's clearly the best in its class: The Compaq LTE, a notebook computer that's small enough to fit into a briefcase, sports a good keyboard, acceptable display, 3½-inch floppy drive—and a 20MB hard disk. And all for about \$3,000.

Let's start with the basics. The Compaq LTE Model 20 measures 8.5 by 11 by 1.9 inches, and weighs 6.2 pounds with battery, hard disk, and modem card. The display is a CGA-compatible blue-on-white backlit LCD, and with Compaq's power management circuitry turned on, battery life is more than 3 hours. Need more power? Pop in another nicad battery pack.

## PINT-SIZED PERFORMER

At the heart of the Compaq LTE is an Intel 80C86 microprocessor, running at a quick 9.54MHz; that's about twice the performance of an original IBM PC and is ideal for running most DOS applications, such as word processors, spreadsheets, communications, and personal-information management.

Priced at \$2,399, the base LTE Model 1 has one 1.44MB 3½-inch floppy disk drive and 640K of RAM. You can upgrade to a dual-floppy system for another \$275. Compaq also offers an LTE Model 20, which has one floppy and a fast 20MB internal hard drive for \$2,999. This makes

the LTE the only computer in this weight class which has both an internal standard 3½-inch floppy and internal hard disk.

A weak spot is internal memory expansion. Compaq's only expansion board offers 384K of expanded RAM for the LTE, priced at \$349—a hefty price to pay for a small amount of memory.

You can fit a tiny proprietary expansion slot with a 2400-bps internal modem. At present, that's the only internal board available for this computer. On the back of the LTE, however, are a full complement of ports: nine-pin serial, 25-pin parallel, external CGA monitor, and numeric keypad.

There's also a special jack for external disk drives. Compaq currently

offers both 360K and 1.2MB 5¼-inch external floppy, and a 40MB external tape backup system.

What's missing? A jack for an external 101-key keyboard, which doesn't matter to me, but might for someone planning to use this computer heavily in one location. Also conspicuous by its absence is an 8087 math coprocessor socket, which would affect heavy-duty spreadsheet users and other number crunchers.

## CLICKITY-CLICK

The Compaq LTE's 80-key keyboard is a good compromise between efficiency and extravagance. For example, the alphanumeric keys are normal sized, and spaced properly, the backspace is oversized, as are the Shift and Enter keys. On the other hand, the function keys, Ctrl and Alt, and other special keys are smaller than usual.

Some staff typists have complained that the perfectly flat keyboard, raised more than an inch off a table, is hard to type on: Compaq neglected to add any keyboard-tilt arrangement, although a roll of Life-Savers stuck under the back of the computer slants it to



The Compaq LTE Model 20

*By Alan L. Zeichick*



just about the right angle.

We've also heard complaints regarding the clickety feel of the keys. They're loud, and don't travel down as far as the keys on a regular desktop keyboard. Still, after using the computer for a few weeks, I've grown to like the LTE's keyboard good tactile feedback; I'm typing even faster on the LTE than I usually do on my desktop computer.

In these days of paper-white VGA displays, the LTE's bluish CGA screen was an initial disappointment. For non-graphics applications, though, the LCD is certainly adequate: It's bright, high contrast, shows four shades of gray, and doesn't flicker much at all.

For most portable applications, the 640-by-200 pixel CGA resolution

is good enough. I probably wouldn't want to run Windows, but the LTE was fine for running Microsoft Word in a graphics mode, and for viewing a page preview. Considering that the LCD panel, including backlighting, is less than a quarter-inch thick, I'm quite satisfied with the LTE's display.

#### SLIP SLIDING AWAY

I'm less satisfied with the computer's physical sturdiness. There's no handle, for a start, so the LTE might be prone to accidental dropping; and I'm sorry, but the fact that the computer comes with a form-fitting carrying case doesn't solve the problem. When carrying this box around in one hand, it's just too easy to drop.

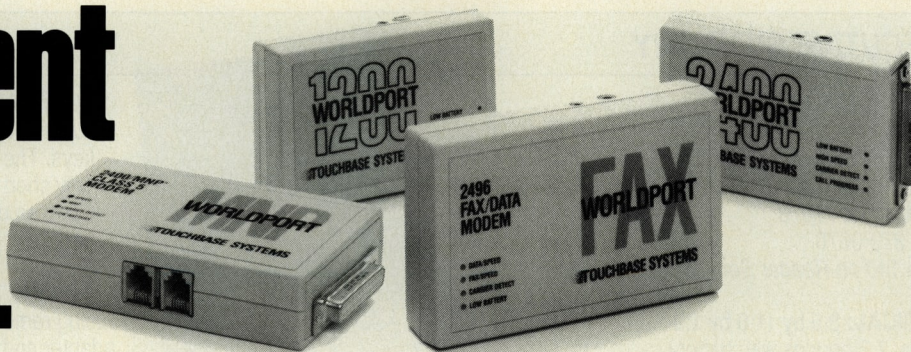
(Is this lack of a built-in handle a new trend? In the seven-pound-and-

down category, the NEC UltraLite, the Toshiba T1000SE, and the Compaq LTE all lack a handle. Zenith's MinisPort is the only computer in this class which has one.)

The flip-up display is another potential problem area. To keep the screen thin, Compaq seems to have left out a few structural supports. Rubbing your hand on the back of the screen visibly affects the LCD panel, and the screen offers little resistance to flexing and twisting.

A few detail items aren't up to standard, either. For example, the tiny latches which lock the display in the folded position are made of plastic, not metal, and seem a little frail. Also, when the cover is closed, a tongue-in-groove arrangement is supposed to lock the battery cover

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## LIGHTWEIGHT LAPTOPS

closed. It doesn't. And various other plastic fittings aren't as tight as they should be.

To summarize: For someone who is generally careful with electronics equipment, or will carry it in its padded case, the Compaq LTE should prove sturdy enough for daily use. But I'm worried about the computer's longevity in a harsher environment.

### POWER MANAGEMENT

Compaq has worked hard give the LTE long battery life, and they've done a pretty good job. They rate the removable battery for 3½ hours of life under normal use; our tests have confirmed that estimate.

When running on battery power, the LTE has user-selectable settings for conserving energy. You can set times for the hard drive to stop spin-

ning after a minute of non-use, or for the computer to "go to sleep" (have the screen dim and the system clock stop ticking) if you go for five minutes without pressing a key. Don't worry, data's not lost: Press the Stand-by key, and the computer goes right back to where you left it.

The nicad battery pack weighs 1½ pounds, with an estimated internal recharge time of eight to ten hours. Compaq also offers a \$199 external battery charger, designed to recharge the pack in less than two hours. Spare battery packs sell for \$129.

### BEST OF BOTH WORLDS

I'm a true believer in the "no sacrifices for portability" credo. That's why I argue that the Compaq LTE's use of industry-standard 3½-inch floppy disks gives it the nod over the

NEC UltraLite's RAM cards, and the Zenith MinisPort's adventurous 2-inch floppy. And the option for a second internal floppy or 20MB hard drive squeezes the LTE past Toshiba's lower-priced Dynabook, a.k.a. T1000SE, which only has a single 3½-inch floppy.

Despite its flaws, the Compaq LTE is great because of its small size (it can fit sideways in a standard briefcase), built-in drives, and extremely competitive price. The LTE is ideal for the business traveler who uses a laptop as a second computer, and doesn't mind the limited RAM, flimsy construction, and low-resolution display. That's why I'm ready to label it the best in its weight class—at least until the next slew of laptop announcements hits the newspapers. □

## EXECUTIVE SUMMARY

### COMPAQ LTE

#### Compaq Computer Corp.

20555 FM 149  
Houston, TX 77070  
(713) 370-0670  
*Circle 140 on Reader Service card.*

**PHYSICAL:** 8.5 by 11.0 by 1.9 inches; 7.2 pounds with battery pack and modem. Constructed of flimsy lightweight plastic, especially around the display.

**PERFORMANCE:** 9.54MHz 80C86 processor, 640K RAM expandable to 1MB. Norton Computing Index: 2.3. System includes hardware password protection. No math coprocessor socket.

**DISPLAY:** Blue-on-white backlit LCD with four shades of gray, and 640-by-200 pixel CGA resolution.

**STORAGE:** Configurable with one 3½-inch 1.44MB floppy drive; two 3½-inch floppies; or one floppy and 20MB hard disk. Compaq offers optional 360K and 1.2MB 5¼-inch external floppy drives.



**KEYBOARD:** 80-key keyboard with embedded numeric keypad and 12 small-sized function keys. The keyboard is flat, and keys are allowed only short travel, but it's fine for touch-typists. Compaq offers an optional external numeric keypad.

**POWER:** Rated for 3½ hours of battery life using removeable 1.5-pound nicad packs. The AC adapter and cord weigh 1.4 pounds.

**EXPANSION:** One proprietary slot for 2400-bps internal modem. The LTE includes serial and parallel ports, numeric keypad jack, and external floppy drive port.

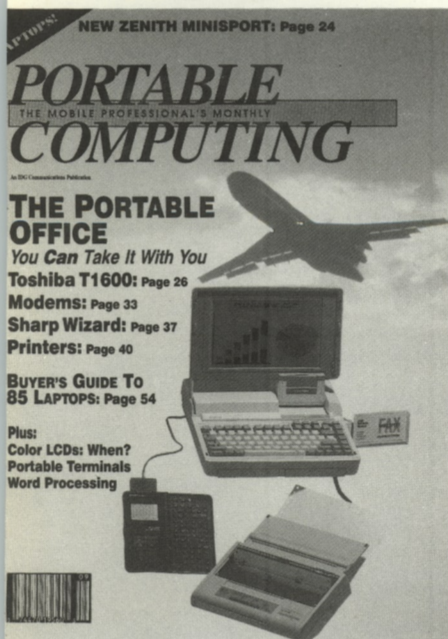
**PRICE:** Base system with 640K RAM and one floppy drive, \$2399, add \$275 for second internal floppy; 20MB version with one floppy costs \$2,999. MS-DOS is not included.

**COMES WITH:** Small carrying case, one-year warranty.

**BOTTOM LINE:** A lightweight system with industry-standard disk drives, good performance and an attractive price.



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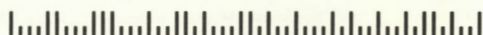
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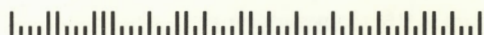
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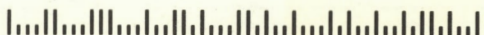
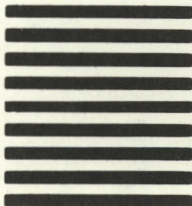
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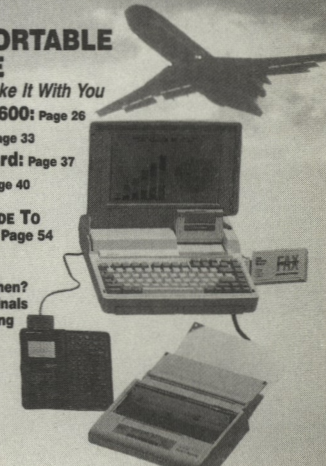
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# TWO QUESTIONS

IS A SOLID-STATE DISK AN OXYMORON?

**S**ome new laptop computers, like the NEC Ultralite, the Poqet PC, and the Toshiba T1000SE, use so-called solid-state disk drives instead of conventional floppy disks or hard disks. How do these solid-state drives work? Are they better than regular disk drives?

Solid-state disk drives are a classic oxymoron: Like "jumbo shrimp," there's actually no physical disk involved. Instead, static memory chips mounted on a removeable cards act like floppy disks, but without many of the drawbacks of physical disks.

Computers like the Poqet PC use these credit-card sized solid-state disks just like a regular computer would use 3½-inch floppies. On the Poqet PC, for example, the card on the left is accessed through DOS as drive A; the card on the right is drive B. As far as the software is concerned, there's no difference between real and solid-state disks.

The biggest drawback, of course, is lack of compatibility. The 3½-inch disk has finally eclipsed the older 5¼-inch floppy as the major PC standard. No desktop systems, and only a few portables, use the RAM-card system. Making matters worse, the RAM cards aren't all the same, and many aren't even directly interchangeable between different vendors' solid-state disk drives.

Solid-state disks are also

expensive: Few manufacturers currently make RAM cards, and there's currently little demand for the product. That keeps the price high: a typical 512K RAM card is priced at between \$25 and \$50. Compare that to a 720K 3½-inch floppy, which costs little more than a dollar. Expect to pay a premium, at least initially, for the few software titles that will be available on RAM cards.

Despite that drawback, vendors continue to use these solid-state disks. They're far smaller than regular disk drives, and because they have no motors or other moving parts, they're more rugged, and consume far less battery power. Also, since the computer is really accessing memory chips, not a rotating magnetic surface, a RAM card is hundreds of times faster than a floppy disk.

Most people agree that, all things being equal, a cheap industry-standard 3½-inch floppy disk is preferable to an expensive proprietary removable storage. The only cases where the solid-state RAM card has a clear advantage is when system weight and battery life are overwhelming concerns, such as with the Poqet PC.

**What's the difference between 9-pin and 25-pin serial ports? Is one type better than the other?**

In the portable-computer world, there's no functional difference between the two varieties of serial ports. However, the difference can be confusing, especially if you have the

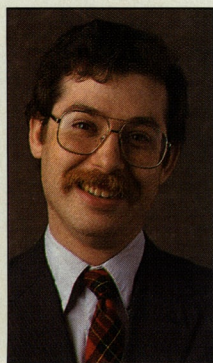
wrong type of cable.

The 25-pin serial port has been around for years; in many minicomputer and mainframe applications, most or all of the 25 pins are used. All of the pins have meanings, defined in the official RS-232C specification. But in the 25-pin serial port which appeared in the original IBM PC, only a few of the pins were ever used—generally only seven or nine.

When IBM released the IBM PC AT, it introduced the 9-pin serial port. By using the smaller port, IBM was able to stack the 9-pin serial port above a 25-pin parallel port on one board. (A standard IBM expansion board can't hold two 25-pin connectors.) A new standard was born.

Interestingly, IBM went back to the 25-pin port when it created its PS/2 series of desktop computers; that's what you'll find on the IBM PS/2 Model P70. But most laptop manufacturers use 9-pin ports, also to save room. A few sacrifice the space to build in the 25-pin variety, preferring absolute compatibility with the original IBM PC's hardware.

There's no reason to prefer one serial port over another. All PC modems will work with both; most serial mice and file-transfer software come with special cables or adapters that will work with both 9-pin and 25-pin serial ports.



*By Alan L. Zeichick*

*Alan L. Zeichick is the Senior Editor of Portable Computing.*



# Have You Been Waiting To Buy A Portable Computer Until The Time Was Right?

For years people have been waiting for just the right computer to arrive. The computer you have been waiting for needed to be as easy to carry as a book, independent of fixed power supplies, and ready to be used the very instant it is opened.

You were willing to wait for more power, greater flexibility, and the ability to operate for more than just a few hours at a time. And you wanted a computer which implemented industry standard file and data structures, ensuring compatibility with your desk bound systems.

You also wanted to make use of the latest innovative hardware and software technology. You wanted features like a graphics user interface—a 'mouse-like' touch pad right on the keyboard—a true multi-tasking operating system—removable solid-state memory discs and state-of-the-art voice processing.

What you have been waiting for is a new approach to computing, designed to meet the challenges of the 1990's—not just another 'me-too' PC squeezed into a laptop package of the 80's. In short, what you have been waiting for, is a *computer as mobile as you are*.



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**Introducing The Psion Mobile Computers**



# WHO'S TO BLAME?

WHY DON'T ALL THOSE LAPTOPS MAKE YOUR FIELD STAFF MORE PRODUCTIVE?

**G**ive your employees in the field a portable computer, and they'll become more productive. That's what you write on the purchase requisition to justify the purchase—and 85 percent of all those justifications are lies.

Take a well-researched example. A couple of years back everybody's favorite organization, the Internal Revenue Service, bought over 15,000 portables for their field auditors. The purpose: to enter and process tax numbers more quickly so each auditor could perform more audits.

The conclusion: the General Accounting Office found the thousands of laptops added nothing more to the IRS' bottom line than 15,000 cow pies would have. It's sad but true that some organizations aren't getting more out of their investment in modern office technology.

If the IRS experience failed (other IRS studies indicate the equipment provided better audits), why did it? For one thing, the field auditors' program was on 18 diskettes. Depending on the audit, one agent said, all 18 diskettes might have to be swapped into the laptop's drive at one time or another during an audit.

The IRS became dissatisfied with their software because of the disk-swapping, and because they didn't want to retain programmers who knew the program's language. They arranged to have it re-

coded in a different language and fit onto fewer disks. The re-development effort took longer than the original coding.

Many field auditors were opposed to the program from the beginning. One agent said several auditors he knew just hated computers, and while he wasn't opposed, he did feel like he "lost touch" with the numbers once entered in the system, leading to "less feel" for the data.

We can't just say the laptops were a failure. As in most technology disasters, you can't blame the technology itself, but the people who managed it. The Challenger explosion didn't happen because the "O"-rings failed; it occurred because brain-dead political appointees ignored engineers' warnings that the rings were unsafe at low temperatures.

There are some lessons to be learned from the IRS' failure to manage the laptop audit project:

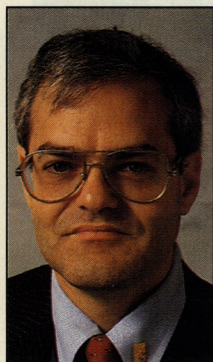
1. Never require end-users to burn more than 10 percent of total task time setting up and managing the technology. Swapping 18 disks crashes the 10 percent ceiling.
2. Start with a pilot program. On a major project, don't commit your entire budget without first trying out the innovation in a controlled experiment to judge how to make it "right the first time" for a majority of users.
3. If you make major software changes in midstream, one of two things has happened: You've either chosen the wrong development environment, or you've been politically

harangued into accepting someone else's pet program or language. A willingness to admit a mistake and change is admirable, but avoiding mistakes from the start is better.

4. Get at least mild approval from all employees using the technology. People who are opposed are likely to sabotage the implementation consciously or subconsciously. Train everybody in the benefits. Be prepared to have different approaches to training if it's a big installation. Many people just need to see an application performed once; others need multiple see-and-do sessions, or learn best from games and simulations. Be prepared to move opposed users into different jobs. Retraining is far cheaper than the more hidden costs of a dissatisfied user.

5. Remember that 85 percent of all implementations fail to deliver higher productivity, as measured by bean-counters. The true advantages of portable computer use throughout an organization may be indirect, intangible, or involved in a complex of variables.

Obviously, more efficient equipment will make your staff more productive. But before you promise—or expect—too much, consider your company's specific set of needs and problems, and make sure the money you spend will get the bang for the buck you're looking for.



*By Jeff Angus*

*Jeff Angus is the West Coast Editor of Portable Computing.*



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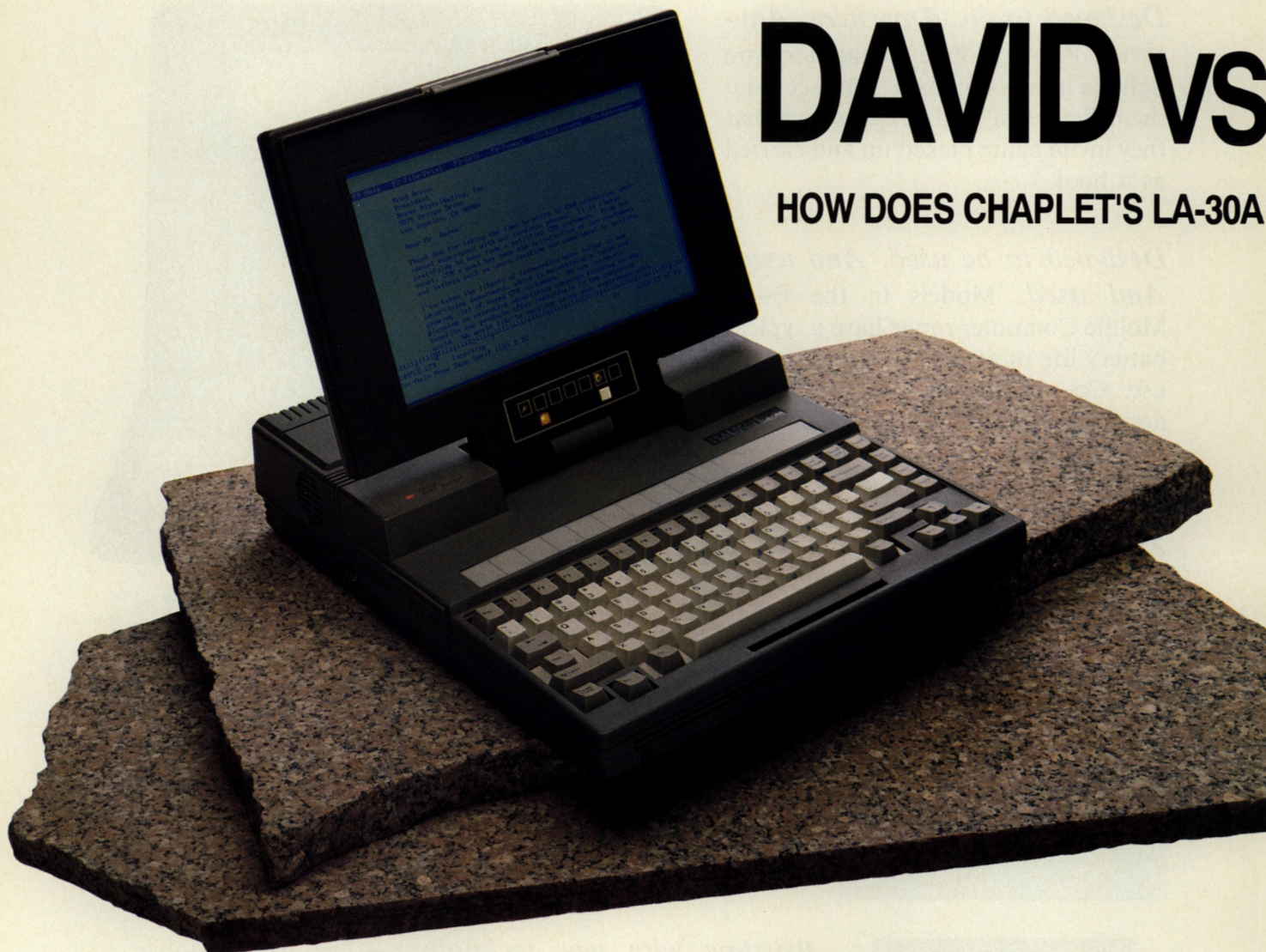
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# DAVID vs

HOW DOES CHAPLET'S LA-30A



If you're in the market for a serious laptop, you probably have a few expectations. Among them may be a fast processor and hard disk drive. A high quality screen and keyboard may also appear near the top of your list.

Portability? A fifteen pound traveling machine will do, but one that weighs a few pounds less is better.

*By John Wolfskill*

Expandability? If you've heavy road work in mind, lots of RAM to crunch spreadsheets or hammer out complex proposals may be a concern. A few PC-compatible expansion slots may come in handy, too.

Battery power? If your desk is the front seat of your car, or you prefer working to conversation in the air, a laptop with at least a two-hour battery life is crucial.

If these are your minimum require-

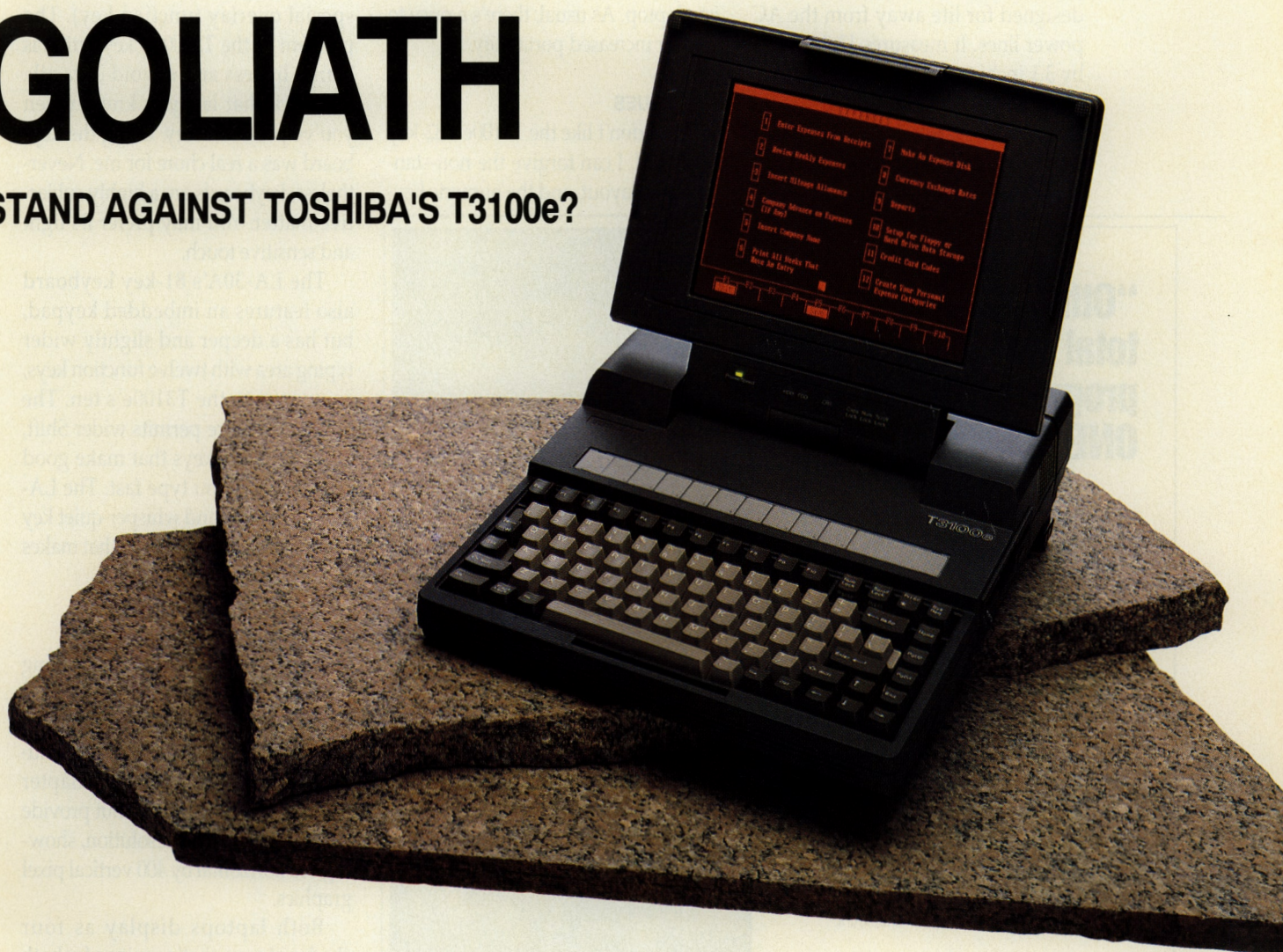
ments for a working laptop, Toshiba America's T3100e and Chaplet System's LA-30A should be on your shopping list. Both machines are rugged, dependable, and expandable. They provide the "right stuff" you'll need for maximum productivity while on the go.

Toshiba America, Inc., the undisputed Goliath of laptopdom, is a company that needs little introduction to most PC users. Also needing little



# GOLIATH

STAND AGAINST TOSHIBA'S T3100e?



introduction is the \$4,199, AC-powered T3100e. Based on Intel's 12 MHz 80286 processor, the T3100e comes standard with a 1MB RAM, a 20MB hard drive, and a gas plasma display.

Taipei, Taiwan-based Chaplet Systems, Inc. is a challenger to Toshiba's laptops, offering its Halikan series of portables. Their entry is the LA-30A, a slick battery-powered laptop with a bevy of standard features. For \$3,695, you get a 12MHz 80286 processor,

1MB RAM, and a 20MB hard drive. Sound familiar? But instead of a gas-plasma display the LA-30A uses a backlit supertwist LCD.

#### CASE AT POINT

The T3100e is compact and attractive. Measuring 12.2 by 14.2 by 3.1 inches, and weighing 13.2 pounds, it's tolerable to carry along on business trips.

At the rear you'll find a swing-out

carrying handle that serves as a prop foot. The handle also protects the port connectors when its not in use. Although it's a tight squeeze, the machine fits into a standard 5-inch briefcase with just enough room left over to close the lid.

*John Wolfskill is a Technical Editor for PC Resource magazine.*



## BUSINESS CLASS

The heavier 16.5-pound (with 1.5-pound AC adapter) LA-30A is designed for life away from the AC power lines. It measures 12.8 by 16.1 by 3.1 inches; this slightly larger size includes the rechargeable lead-acid storage battery. You'll feel every ounce of the batteries' extra bulk when you carry the LA-30A long distances.

Unfortunately, that's the price you pay for the luxury of battery power with any laptop. As usual, there's a price to pay for increased portability.

### KEY ISSUES

I just don't like the T3100e's 82-key keyboard. I can forgive the non-standard key layout, and the numeric key-

pad keys imbedded in the main keyboard area (you activate them with a special overlay function key). The problem is, the T3100e's key action is bland, lifeless and devoid of tactile feedback that lets you know when you've pressed a key. Using the keyboard was a real chore for me. Nevertheless, keyboards are a highly subjective matter. You may prefer its light and sensitive touch.

The LA-30A's 81-key keyboard also features an imbedded keypad, but has a deeper and slightly wider typing area with twelve function keys, compared to the T3100e's ten. The additional space permits wider Shift, Enter, and Tab keys that make good targets when you type fast. The LA-30A has a solid and whisper-quiet key action with good feedback; that makes typing a pleasure.

### A LOOK SEE

The T3100e features a shimmering gas plasma display with decidedly more contrast than the LA-30A's larger backlit supertwist LCD. Both emulate IBM's Color Graphics Adapter (CGA) graphics standard, but provide twice the text-based resolution, showing 640 horizontal by 400 vertical pixel graphics.

Both laptops display as four shades of gray; that's a minus for both laptops, since many other competing models display eight or 16 gray scales. In addition to the standard CGA modes, the LA-30A offers a Hercules compatible 720 by 348-pixel monochrome display mode.

Neither screen is compatible with IBM's Enhanced Graphics Adapter (EGA), or Video Graphics Array (VGA), although the 640-by-400 resolution can be custom-programmed for sharp graphics.

Overall, both displays are better than average, but the T3100e's bright and bold orange-on-black gas plasma screen is hard to beat.

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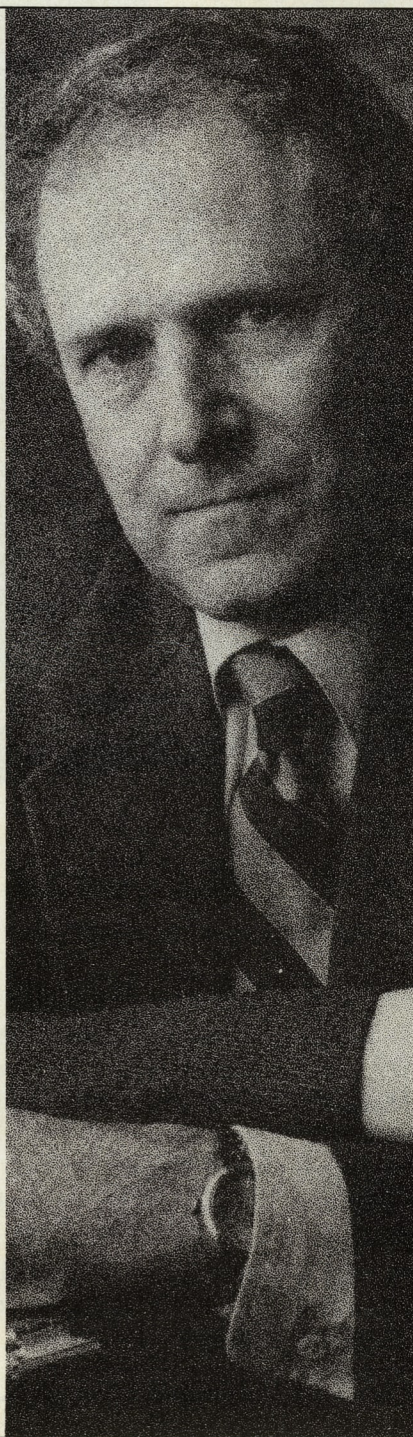


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## WELL CONNECTED

Like most laptops, this pair provides a full range of connections to the outside world, including dual 9-pin serial ports, and a parallel printer port. The T3100e also offers a switch that lets the printer port pinch hit as an external floppy disk drive connector in its spare time. Unfortunately, you can't connect or use both the printer and an external disk drive at once.

The LA-30A also includes a connector to attach an standard 101-key AT keyboard via a non-standard 7-pin connector located at the right side of the case. The connector requires a special adapter to use the LA-30A with a standard keyboard cable. I tested the external keyboard connector using the Keytronic Corp. 101-key enhanced AT-keyboard I normally use with my desktop PC and found no problems using numerous commercial applications.

## PERFORMANCE

If you're looking for ultra high performance, you won't find it here. However, both are acceptable performers, and should handle large spreadsheets, or even horsepower-hungry operating systems like Microsoft's OS/2. Both machines support the LIM (Lotus Intel Microsoft) 4.0 expanded memory specification in their onboard hardware.

The T3100e edged out the LA-30A in our Norton Computing Index with a 12.8 score, compared to the LA-30A's 11.7 rating. Both computers compare favorably with similar 12Mhz desktop AT's, and other laptops like the Ogivar Technologies 286, or Mitsubishi's MPL286L.

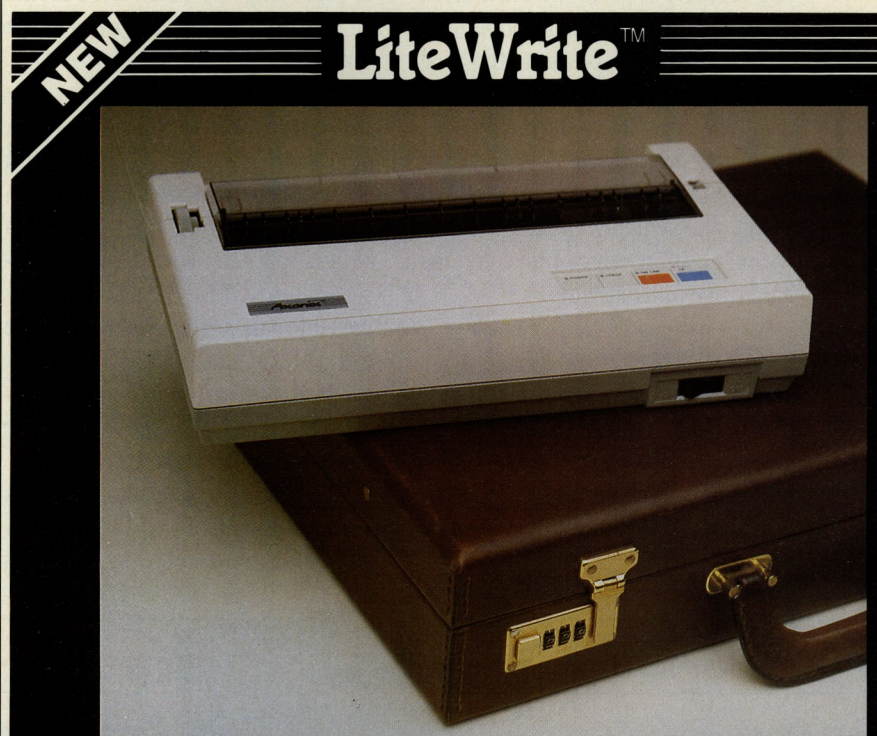
If a fast hard drive is critical to your applications, you'll find the LA-30A takes home all the marbles. Both the Toshiba and the Chaplet come standard with 20MB hard drives that boast 28 millisecond average access times, (the time required to locate a random byte on the disk's surface), but that's

where the similarities end.

According to Core International's disk test Ver 2.8, the LA-30A's hard drive transfers data to the computer at 538 KB/sec (thousand bytes per second), a respectable showing that tops the T3100's drive, (198 KB/sec) by a whopping margin. That difference will be very noticeable when loading

or saving programs and data.

The LA-30A uses a spritely Conner Peripherals CP3024 hard drive, and a 1-to-1 interleave disk controller. Toshiba's own hard drive and controller combination rank as only mediocre performers. Fortunately, Toshiba includes a copy of Multisoft's PC-Kwik, a disk-caching utility software pack-



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age that helps to narrow the performance gap between the T3100e's hard drive and 12MHz 80286 CPU. Of course, you can buy a copy of PC-Kwik or another disk cache for the Chaplet, or any laptop computer.

To conserve precious battery power the LA-30A's LED indicator panel includes a pushbutton that lets you secure power to the hard drive when you don't need it. I inadvertently forgot to restore power to the hard drive at the end of a computing session. The next time I started the LA-30A I was greeted with a stern warning that the hard disk controller had failed. The switch was merely in the wrong position, which prevented the hard drive from starting.

### SHORT CHARGE

One obvious difference between the Chaplet and Toshiba laptops: The Chaplet has an internal rechargeable battery pack, which we've found to last between two and three hours of normal use.

It's a judgement call: Not all portable computers users need batteries and their extra weight. But if you need batteries, the LA-30A has 'em.

The LA-30A may be one of only a handful of laptops that feature the low power CMOS (Complimentary Metal Oxide Semiconductor) version of Chips and Technologies, Inc.'s NEAT AT-logic chipset, which has become the rage with system designers in the past year or so.

Among its many features, the chipset provides "Shadow RAM"; a memory management scheme that remaps the RAM address lines within the first megabyte of the CPU's address space to relocate the computer's built-in ROM and video BIOS routines into fast-acting system RAM at startup. RAM shadowing the computer's built-in firmware usually provides a noticeable speed boost for most application programs.

The LA-30A's system board comes with a megabyte of RAM installed. A connector is provided to install as

much as 4MB additional RAM. However, if you don't get a charge out of tinkering with the computer's insides, installing the board may be a daunting chore. Although the manual gives you step by step procedures to complete the upgrade, you must disassemble the entire computer to install the extra RAM. A socket is also provided to plug in an Intel 80287 numeric coprocessor chip.

Like the LA-30A, the T3100e's systemboard comes standard with one megabyte of RAM, easily upgradeable to 5MB using 1MB SIMM chips. Like the Chaplet, the Toshiba has a socket for an 80287 math coprocessor.

Toshiba offers other options for the T3100e, including a five-slot expansion card chassis, a 2400-bps internal modem, and a special card called the Universal Floppy Link. This board fits into a desktop PC, and allows the T3100e and the desktop machine to transfer files without special software.

Both laptops provide a pair of expansion card slots for add-on devices.

## EXECUTIVE SUMMARY

### CHAPLET LA-30A

#### Chaplet Systems

252 N. Wolfe Rd.  
Sunnyvale, CA 94086  
(408) 732-7950

Circle 143 on Reader Service card.

**PHYSICAL:** 12.8 by 16.1 by 3.1; 16.5 pounds. It's too big for a standard briefcase.

**PERFORMANCE:** 12MHz Intel 80286 processor, 1MB of RAM expands to 16MB. Norton Computing Index: 11.7. 80287 coprocessor socket.

**DISPLAY:** Backlit, supertwist LCD, with only four shades of gray (8 or 16 is more common). Can display double-scanned CGA graphics (640 by 400 pixels), or Hercules monochrome graphics (720 by 348 pixels).

**STORAGE:** One 3 1/2-inch 1.44K floppy drive, with very fast 20MB hard drive.



**KEYBOARD:** 81-key keyboard with embedded numeric keypad and 12 function keys. Chaplet offers an optional numeric keypad.

**POWER:** Internal nicad battery pack, which should last for 2-3 hours of normal use.

**EXPANSION:** Two IBM-standard expansion slots: One half-length 8-bit slot, and one full-length 16-bit slot.

**PRICE:** \$3,695.

**COMES WITH:** MS-DOS 3.3, four-month warranty.

**BOTTOM LINE:** A good value in a battery-powered 286 portable, assuming size and weight aren't a major concern.



## EXECUTIVE SUMMARY

### TOSHIBA T3100E

**Toshiba America**  
Information Systems Division  
9470 Irvine Blvd.  
Irvine, CA 92718  
(714) 583-3000  
Circle 142 on Reader Service card.

**PHYSICAL:** 12.2 by 14.2 by 3.1; 13.2 pounds. It will fit snugly inside a standard briefcase.

**PERFORMANCE:** 12MHz Intel 80286 processor, 1MB of RAM expands to 5MB. Norton Computing Index: 12.8. 80287 coprocessor socket.

**DISPLAY:** High-contrast gas-plasma display with four shades of gray, and with 640-by-400 pixel double-scan CGA resolution.

**STORAGE:** Two configurations: one 3 1/2-inch 720K floppy drive, with either a 20MB or 40MB hard drive. Toshiba offers an optional 1.2MB 5 1/4-inch external floppy disk drive.



**KEYBOARD:** 82-key keyboard with embedded numeric keypad and 10 function keys. Toshiba offers an optional external numeric keypad.

**POWER:** AC only.

**EXPANSION:** One proprietary slot for 2400-bps internal modem; one short slot which can fit an 8-bit IBM half-card, or proprietary Toshiba expansion card.

**PRICE:** \$4,199 with 20MB hard drive; 40MB version is \$4,699.

**COMES WITH:** MS-DOS 3.3, PC-Kwik disk-caching software, one-year warranty.

**BOTTOM LINE:** A heavy-duty laptop with good performance and clear display, but limited by lack of battery power.

The T3100e reserves space to connect one standard half-size 8-bit PC expansion card, or one of Toshiba's own proprietary expansion cards. The LA-30A offers a more flexible expansion scheme that permits one 8-bit and one 16-bit half-length card.

### THE PAPER CHASE

Toshiba America is noted for its high-quality documentation. The fare it provides with the T3100e is no exception. For openers, you get *The First Time*, a small booklet that guides the new user through the maze of unpacking, setting up, and starting the computer. *The Portable Companion* is a medium-size manual you can tuck into your briefcase for roadside reference. You'll also find the full-blown *T3100e Portable Computer Reference Manual* a polished jewel of slick color illustrations and easy-to-digest writing. Documentation doesn't come any better than this.

The LA-30A comes with a single 150-page *Laptop User's Guide* that's not

as fancy or comprehensive as Toshiba's, but well-written and illustrated, easy to understand, and logically organized. Everything you need to know about the LA-30A is there. The manual also includes a tutorial that shows you how to set up the Chips and Technologies NEAT chipset for special RAM configurations.

Toshiba America provides a one-year parts-and-labor warranty for the T3100e. Under what the company calls its Exceptional Care program you can mail-in or carry your computer to an authorized dealer for repairs. While it's being repaired, Toshiba will provide you with a loaner, (sent by overnight express mail if you wish). You can either claim the loaner for keeps, or swap it for your original after repairs are completed.

The Exceptional Care program is free during the warranty period. You can extend the service two additional years by paying a flat fee to enroll in Toshiba's Extended Exceptional Care program. You can include other

T3100e peripherals in the blanket agreement for an additional charge.

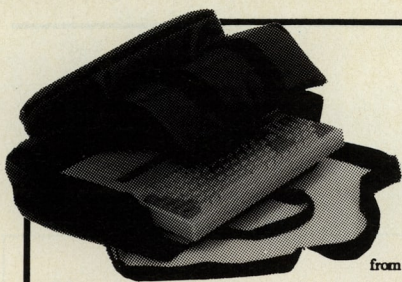
Chaplet Systems USA Inc. provides a complex and puzzling triple-tiered warranty for the LA-30A. All defective parts are covered for the first four months, provided you return them to the company at your expense. After that time the LCD, drives, battery, and power supply are covered for six months. The system board, AC adapter, and carrying case are covered for a full year.

Oddly, the warranty clock begins ticking when the system leaves the factory, rather than when you take delivery of the computer. Better to visit a high volume dealer if you want a full warranty period.

### CONCLUSION

Will David zing Goliath? I doubt it. However, if you're looking for a rugged, dependable laptop with lots of features at a reasonable price, the Chaplet LA-30A is a worthy contender in a crowded sea of laptops.





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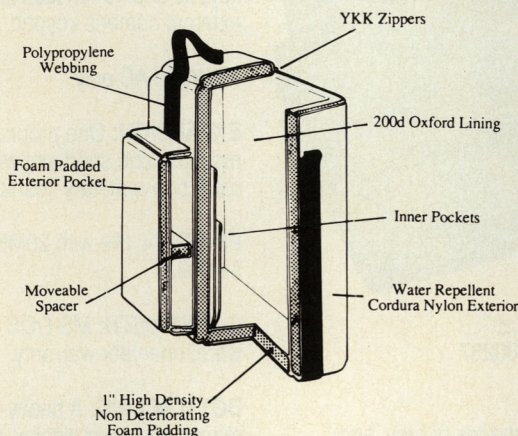
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Placed beside the T3100e's brilliant gas plasma screen (which is impractical to run on batteries), the LA-30A's big bright LCD supertwist holds its own. The laptop also has a good keyboard and, more importantly, a hard drive that can keep up with the CPU. You may find the ability to add both 8- and 16-bit expansion cards a plus, depending on your working needs.

The nicky-picky warranty doesn't promote the warm and fuzzy feeling I get from a straight-up one year service policy. Moreover, a battery life of less than two hours isn't unacceptable for most uses, but it could stand some improvement.

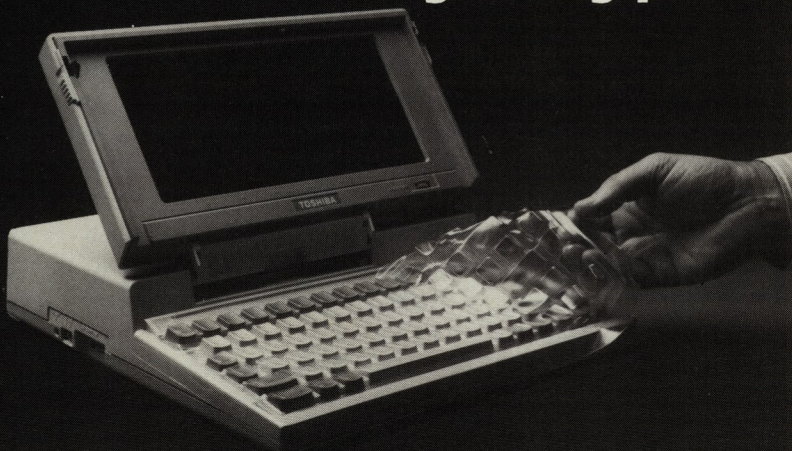
The Toshiba 3100e also has many advantages. It's lighter, smaller, and fits inside your briefcase, but doesn't run on batteries. The gas plasma display is superb, and the T3100e gives you a PC-compatible 8-bit expansion slot as an alternative to Toshiba's own proprietary expansion cards.

The T3100e's mediocre performing hard drive could use a shot in the arm. However, if your needs are limited to word processing, spreadsheet management, or similar tasks that don't demand a fast hard drive, it shouldn't present a major problem. Unfortunately, I and the T3100e's keyboard weren't sympatico.

I rate Toshiba's warranty and service policies among the best in the industry, and its documentation stands without peer. Plus, there's a certain confidence inherent in buying from a large company with a tremendous share of the market.

After using both machines heavily for five weeks under a variety of conditions, I'm hard pressed to choose one over the other. But if I were required to do so, the edge would go to the Chaplet LA-30A for its portability, 16-bit expansion slot, better overall computing performance, and lower retail price. □

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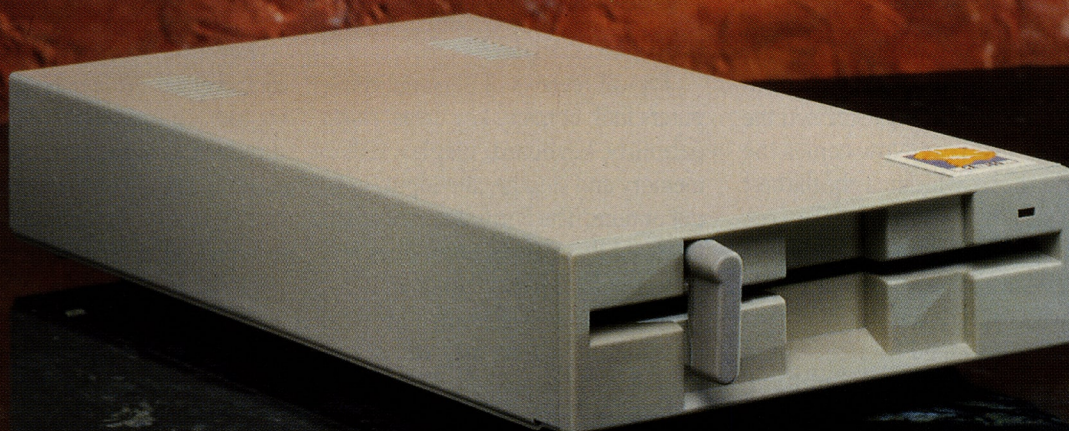
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The Portfolio has a small but usable standard keyboard. It runs a clone of MS-DOS, the risibly-named DIP OS (developed by Distributed Information Processing, Guildford, England). An expansion slot accepts integrated circuit (IC) cards containing memory today and perhaps software programs tomorrow. A connector provides access to memory and the outside world (by adding the proper cables, of course). And at \$400, it has an attractive price point.

## FEATURES

**Typical reviews of personal computers look at many key areas: compatibility, keyboard, display, CPU, memory and storage, and input/output options. The Portfolio is not great in any of these areas, but it does not have any fatal flaws, either. Battery life is an extra consideration for portables, and this is an area where the Portfolio is a blessing.**

**Compatibility:** Although the Portfolio's tiny size precludes its ability to run today's power-user programs like Lotus Development Corp.'s 1-2-3 Release 3.0 or Ashton-Tate's dBASE IV, it nevertheless tries to be an industry-standard MS-DOS system. Its Intel 80C88 processor defines vanilla, and the DIP OS presents the familiar DOS prompt, and many DOS commands. (But not all — rarely used, but sometimes necessary DOS external commands like CTTY are missing.)

A bonus for many Europeans, Quebecois or people brushing up on language skills: easily accessible French and German commands and software-driven keyboard reconfigurations.

**Keyboard:** Keyboards are always controversial. At *Portable Computing*, we like a good tactile feel. We like standard key positioning. We like enough room to type comfortably. The Portfolio's keyboard has a nice feel, including tactile noise generation that can be turned off. Its key placement is quite reasonable. The keys are of the "chiclets" variety, but that is an obvious point not worth dwelling on. I found I could type at a rate of 20-25 words per minute on it when in overdrive. If you want to go faster than that, don't buy the Portfolio.

**Display:** A standard, non-backlit LCD with good readability. Atari will be criticized for settling on an 8 columns by 40 rows format, rather than the standard 80 by 25 chosen by the Poqet PC's developers.

Another obvious point, with the bottom line being you won't be writing books on this thing, so the trade-off of good readability at the expense of a sea of characters on the screen will work for simple tasks.

**Chips:** The Portfolio can be accused of being a toy in the areas of CPU, storage and memory. However, its 80C88 running at 4.92 MHz does provide 30 percent more raw processing power than the original IBM PC, according to a Norton SI we ran on the Portfolio. It has 128K standard RAM, a quarter of which defaults to a RAM disk for storage. (The RAM disk can be made larger or smaller by using the OS FDISK command.)



Atari's Portfolio with  
Parallel Interface and Cable

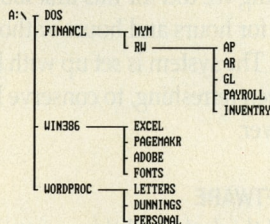
*By Roger Strukhoff*



## Transfer files between PC's and Lap-top's

# DIREC-LINK

**Point-and-shoot.** Direc-Link displays a tree diagram of directories on each computer. Simply tag files you want to transfer, highlight destination directory, and Direc-Link does the rest. You can even send text files to the printer of the second computer.



F1...Use Script File	F2...Create Directory	C...Change Drive
F3...Rename files	F4...Delete Directory	S...Status Screen
F5...Delete files	F6...Mult-Directory copy	D...Dos E...Execute DOS
F7...Global File Copy	F8...Customize	Q...Quit Direc-Link
F9...Copy Files	F10...Rescan Drive	/...Remove Menu
Press Alt for more	Scroll...Rnt/Lcl=LOCAL	

**Parallel or Serial operation.** If the serial port on one of your computers is being used for something else, you can transfer files through the parallel port 30 to 50% faster than the serial. You can also send files to a printer on another lap-top or PC.

**Remote control.** You can run Direc-Link commands and display both computers from either keyboard.

**Copy entire directory structures.** Highlight a directory, point and shoot. The entire directory (or disk) is transferred... with subdirectories being created as needed. You can also create or rename directories manually.

**Automatic file transfer.** "Script" commands let you optionally transferring files automatically, even with both systems completely unattended.

**Lightning fast.** Transfer files at over 200,000 baud in serial mode - and 30-50% faster in parallel.

**File Viewing.** You can instantly view a files contents to help decide whether or not to transfer it.

**Context-sensitive help.** Available at every step.

**Options galore.** You can tag files using DOS "wild cards," transmit a file only if it has changed, track down a lost file, and much, much more.

**Autoclone.** Copies Direc-Link from one computer to another. Eliminates the need for having Direc-Link installed on both PC's and the problem of not having the proper disk drive size.

**Incredibly economical.** Even with the cost of cables, Direc-Link costs less than most other transfer programs, including those that are only serial or parallel. *In terms of features, Direc-Link is absolutely the best buy around.* Call (213) 652-3598 and order you copy today.

## Direc-Link . . . . . only \$59.50\*

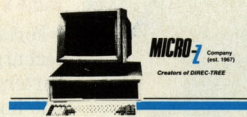
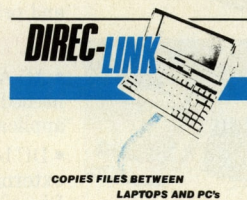
30-day money back guarantee.

Direc-Link comes with 3.5" and 5.25" disks, plus a clear, consise user manual. Manual includes do-it-yourself cable diagrams, or you can purchase a Micro-Z Cable and Adapter Set (5 ft. serial cable with two 25-pin to 9-pin adapters, plus an adapter that allows you to use a standard parallel cable and computer parallel ports on both computers). **Cable and Adapter Set: \$45.00\***

\*Add \$5.75 shipping and handling per order (not per product). California residents also add appropriate sales tax.

*"A powerful program, Direc-Link works well and gives you lots of control. . . The flexibility offered by the different control options makes it accessible to beginners but attractive to advanced users as well."*

- PC Magazine, January 12, 1988



**Electronicmedia Marketing Company**  
987 Hancock Avenue, Los Angeles, CA 90069 (213) 652-3598

System Requirements: IBM PC, XT, AT or compatible, Serial/Parallel port, DOS 2.X or later, 80 column display and less than 64k RAM.



Dealer Inquiries Invited



Additional storage comes on IC cards available in modest increments of 32K, 64K, and 128K, priced between \$79.95 and \$199.95. This is an appalling price to pay for RAM, but reflects the state of IC technology rather than strict opportunism by Atari. Our unit came with a 64K card.

The bottom line here is don't expect to run your favorite programs on the Portfolio. You'll have to be happy with the system's bundled applications. In the future, perhaps some popular software packages will be available on IC card, and IC memory cards should go up in capacity and come down in price.

**I/O:** Atari realized the Portfolio would have to cooperate to some extent with the outside MS-DOS world to succeed. Atari sells cute little serial (\$79.95) and parallel (\$49.95)

interfaces that click right onto the Portfolio's right side to accomplish this mission. (Atari will also offer connectivity to its ST computers.)

Once we scared up the proper cable, we were able to use the parallel interface in combination with file transfer software provided by Atari with it to send files back and forth between the Portfolio and a range of desktop and laptop computers. Text files, data files, even program files moved through at a snail-slow but steady pace—it took a couple of minutes to send a 30K program file, for example. The big news was that our Lotus worksheet made it intact. The screen won't run graphics, though.

We managed to lock up the computer when facetiously sending a huge Microsoft Word file just to see what would happen. The Portfolio

didn't indicate an error message, but merely stopped receiving when full, then required us to stick a pin in its reset hole on the back of the unit.

**Batteries:** The Portfolio runs on three "AA" lead-acid batteries, easily found and inexpensive. No battery life rating is given, but in the limited testing we did for this first look, ours ran for hours and hours without fading. The system is set up with limited screen refreshing, to conserve battery power.

### SOFTWARE

I think that all things considered, the Portfolio's bundled applications will be the key to its success or failure. Deliberately kept simple and bundled into the system's ROM, they are meant to do simple date keeping, note jotting, blue-sky "what-iffing"

## PERFORMANCE PRODUCTS FOR LAPTOP COMPUTERS



### INTERNAL FAX AND MODEM CARDS FOR TOSHIBA PERSONAL COMPUTERS

First and most complete line of internal 2400 bps modem cards for Toshiba's three proprietary modem slots. CCITT/Bell compatible for world-wide applications. International approvals, FCC/DOC certified. Supports MNP/5 software for data correction and compression at 4800 bps. Two year limited warranty.

- **MODEM FEATURES:** Hayes AT compatible, COMMS port, acoustic coupler port, highest performance, lowest power use.
- **FAX FEATURES:** Send and receive at up to 9600 bps, Group 3 to any fax machine or other PC/fax. Proprietary R&D-FAX™ software included to create, display (zoom), edit (paint), store, and print faxes.



### BATTERY POWER ADAPTERS

- AC Adapta™ POWER units convert 12 Volt pack or vehicle battery power to the high voltages needed by AC powered, portable computers. Three 80W models for 120 or 230 VAC International applications. Patented technology.
- DC battery adapters provide 2.5 Amps of regulated voltage for DC laptop computers using external battery packs or vehicle power. Adapters for Toshiba, Sharp, and others (including Diconix 150+ printer). 5 ounces small.



### BATTERY PACKS

- Portable battery packs have 12V/6.5AH sealed, rechargeable battery and 120 VAC plug-in recharger in stylish nylon zippered bag with shoulder strap. Internal compartment to store battery power adapter. Just seven pounds achieved through high-efficiency battery. Typically one hour running time with AC adapters, three to twenty hours with DC adapters. One year limited warranty.

## Product R&D Corporation

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Phone: (805) 546-9713 or (800) 234-5584  
FAX: (805) 546-9716, Telex (ITT): 4932116

PRODUCT R&D Corp.  
Patents pending  
Specifications  
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AD8940



page down to go  
e. A "line" mode  
to be displayed.  
is the system's  
touch-tone num-  
speaker from its  
am. Just point to  
e return key and  
ap to the phone.

feature to work,  
enter your names  
strict and slightly  
So forget quick  
conversion in this

also easily accomplished. No prob-  
lems here.

**Text editor:** Some of the PR material  
for the text editor is a bit misleading. I  
was amazed to see touting of "cut-  
and-paste" functions for the system's  
"word processor," then mildly disap-  
pointed but not totally surprised  
when the system offered a rudimenta-  
ry text editor with limited search,  
replace and merge capabilities.

But the system's designers can't  
be faulted for that. The text editor  
does at least offer word wrap, a run-  
ning count of row and column num-  
bers, and insert and overstrike  
modes. A series of control-key com-  
mands provide text deletion and cur-  
sor movement.

**Worksheet:** A little more misdirec-  
tion here in touting the worksheet as  
a Lotus 1-2-3-compatible "spread-  
sheet". The worksheet has 255 rows  
and 92 columns and accepts standard  
spreadsheet formulas. There are no  
graphics capabilities and no Lotus  
command line. The key to this appli-  
cation will be the ability to import  
portions of existing spreadsheets  
smoothly. This won't be used for seri-  
ous planning, but provides easy  
opportunity for refinement of sec-  
tions of business plans.

**Address:** The address book is easy  
to use. Simply bang in the names and

module.

**Calc:** The calculator is a good one.  
Besides the basic four arithmetic  
applications and ciphering percent-  
ages, it does factorials (to nine places  
plus the exponential agree to two  
places), roots (to 12 places), has five

memories for long or repeated calcu-  
lations, and you can choose among  
general, fixed, scientific and engi-  
neering notation. Go ahead and make  
fun of the 80C88; it's a heck of a lot  
faster than your dedicated calculator.

**Diary:** The diary is a little crude,  
but quite functional as a day-timer.  
Alarms can be set on appointments,  
and a pleasing chime will remind you  
of them. When looking at an entire  
month, dates with appointments  
have asterisks, and individual dates  
can be accessed directly by entering  
that date.

**Extras:** When equipped with  
Atari's serial interface, the Portfolio is  
supposed to be able to easily transmit  
files to and fro. Better watch it with  
the imports, though, because the lim-  
ited memory can quickly be over-  
whelmed if you're used to using big

## Add number-crunching power to your portable computer...

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22-key calculator-style layout and  
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**TOUCHSTONE  
TECHNOLOGY INC.**  
955 Buffalo Road  
Rochester, NY 14624



## COATPOCKET COMPUTING

programs, text documents and spreadsheets.

The Portfolio has two nice ease-of-use features: any key will turn the system on, and a special red Atari function key leads directly to the applications.

But the opening screens of the diary, calculator and address book are desultory and confusing if you haven't read the documentation. And many features of the applications are, in today's parlance, "counter-intuitive."

Example: I was entering data into the address book, then decided to look over a few of my entries. But then I couldn't get back to entering new names. Solution: hit the tab key. But of course!

One more example: the delete key deletes single characters, while you hit Ctrl-L to delete a line...except when you're in line mode in the address book, in which case hit the delete key to delete a line. Yikes! (Don't worry, F4 undeletes your damage.)

Time and time again I had to refer

to the manual to figure out what the heck was going on. But the portable-sized manual itself was well organized, leading from a hardware description to a summary of DIP OS, then on to clear, cogent explanations of the individual applications.

Another small beef: a dangerous escape key function. I have an instinctive desire to hit escape when in any sort of trouble. In the Portfolio's applications, this often results in a terse "Save—yes or no" message. If you say yes, your file is saved but you're quickly bounced back to DOS, and you have to start the application again. If you say no, you lose all your changes (everything if it's a brand new file) and you get bounced back to DOS. There needs to be a little more idiot-proofing in this area.

### TOUGH ENOUGH?

A big question about a computer this small: Does it feel flimsy? The answer in this case is a big "no". The computer feels very solid. The screen is attached securely to the main unit

then snaps shut reassuringly when not in use, the IC card slips in securely (although without a reassuring click when in place), and the connector port is solid. I can't predict how long the computer will stand up to day-to-day abuse, but on first look, it appears to be tough enough.

In an age when systems 20 times faster than the original IBM PC—and with 50 to 100 times the memory—are a routine item in portable computing, it's difficult to scale back. But the main point about the Portfolio—its \$400 price tag—makes it a system to be taken seriously.

If you've been lugging your 15-pound laptop beast around—or worse, your 25-pound transportable monster—but don't always go nuclear with your applications on the road, the Portfolio will take a heavy burden off your shoulder. Even if your business requires the kind of computing power you can only get from a more sophisticated laptop, the Portfolio can still replace your date book, and double as a calculator and conversation starter. □

## EXECUTIVE SUMMARY

### ATARI PORTFOLIO

#### Atari Computer

1196 Borregas Ave.  
Sunnyvale, CA 94088  
(408) 745-2000

Circle 141 on Reader Service card.



**PHYSICAL:** 8.0 by 4.0 by 1.2 inches; 1.2 pounds with batteries. Fits into a sportcoat pocket.

**PERFORMANCE:** 4.92MHz 80C88 processor, 128K RAM expandable 640K. Norton Computing Index: 1.3. System has DOS and various productivity applications in ROM, including a telephone dialer.

**DISPLAY:** 40-by-8 non-backlit LCD, which acts as a window onto a standard 80-by-25 screen. Supports only a proprietary 240-by-64 pixel graphics mode.

**STORAGE:** Removable RAM cards, currently available in sizes ranging from 32K to 128K, which act like disk drive A.

**KEYBOARD:** 63-key keyboard with embedded numeric keypad and function keys. The keyboard conforms to QWERTY standards, but has calculator-like keys with very close spacing.

**POWER:** Uses three AA-cells which should last for dozens of hours.

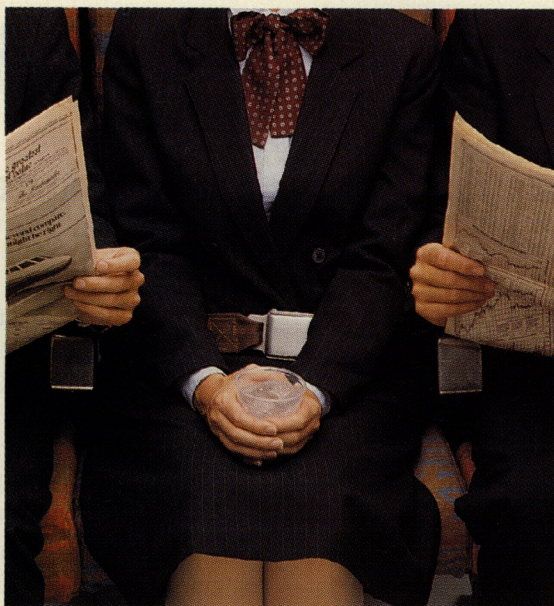
**EXPANSION:** One proprietary bus connector, for which Atari offers a serial interface and parallel interface with communications software.

**PRICE:** Base system, with 64K RAM card, \$399.95.

**BOTTOM LINE:** A useful computer that's small enough and cheap enough to carry everywhere.



# Don't just sit there.



# Do something.

## Get the most from your laptop with Traveling Software.

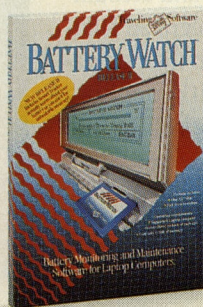
Laptop computers are great. They let you get work done when you might otherwise just be sitting around. But these powerful little machines are different from their desktop cousins. For one thing they often have different size floppy disk drives from the computer on your desk, making program and file transfers to your laptop very difficult.

That's why hundreds of thousands of laptop owners have come to rely on **LapLink III**. LapLink is the most popular laptop to desktop and desktop to desktop file transfer program available. LapLink communicates between your computers' serial or parallel ports (includes cables), so it doesn't matter what disk drive sizes you have. And it's fast too. LapLink transfers files at speeds of up to 500,000 baud - that's almost 3 megabytes a minute!

One of the frustrations of using a battery-operated laptop is that it can run out of battery power and die at the worst time. **Battery Watch II** eliminates this frustration by providing you with a pop-up "fuel gauge" letting you know how much longer, in hours and minutes, you can operate your computer before it dies. You can even define three alarm settings so that the Battery Watch fuel gauge will pop-up at these set times. Battery Watch II also supports most of today's popular laptop brands.

Here at Traveling Software, we're laptop specialists. In fact, no other software company knows more about these unique computers than we do.

So, to get the most from your laptop, ask your dealer about LapLink and Battery Watch. Or, call our customer service department at 800-662-2652 for more information.



M.S.R.P. \$49.95



M.S.R.P. \$149.95



Traveling Software, Inc.  
18702 North Creek Parkway, Bothell, WA 98011



# REACH OUT ON THE ROAD

**CELLULAR TECHNOLOGY HAS REDEFINED TELEPHONE USAGE NATIONWIDE.  
NOW YOU CAN REACH OUT AND COMPUTE WITH SOMEONE NO MATTER WHERE YOU ARE.**

A few years ago, car telephones were regarded as little more than yuppie status symbols. Following the initial wave of curly-cue antennas on seemingly every BMW and Mercedes, fake car-phone antennas were soon appearing on beat-up old VWs and pickup trucks as a spoof of the latest in self-centered achievement flaunting.

But as cellular communications have become entrenched throughout the U.S., the resulting lower equipment and communications costs have made a car telephone an attractive buy to many travelling businesspeople. Mobile professionals as diverse as landscape architects and accounting consultants have integrated cellular communications into their operations. Combined with ongoing evolutions in portable computing technology—as machines get simultaneously smaller and more powerful—the car phone today seems a logical and integral component of a portable office.

## TO THE POINT

A cellular phone works through a series of radio transmitters, each defining a certain cell area, which receive and transmit messages to a central station that in turn hooks into regular telephone networks.

Some areas, such as the Hollywood Freeway in Los Angeles, have become so choked with cellular phone traffic that not enough cells can be built to accommodate the traffic while still respecting tough devel-

opment ordinances. Other areas, such as the Monadnock Region of New Hampshire (where this magazine's offices are located) don't have any cells at all.

There are typically two major cellular networks in any given area: the local Bell-operating company and a competitor. In New England, for example, Nynex and Cellular One (a subsidiary of Southwestern Bell) do battle with separate networks, stores, and service people.

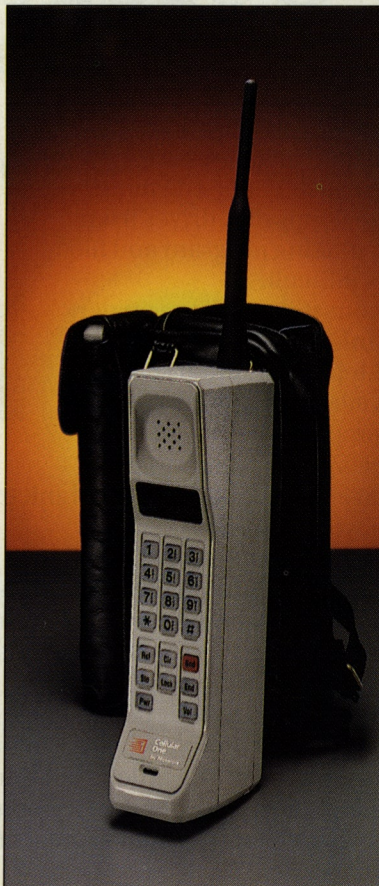
It costs between \$25 and \$50 to gain

access to a cellular network, then an additional 40 cents to \$1 per minute for communicating on it, whether you're receiving the call or sending it. The network companies program phone numbers into the individual phone after you purchase it.

A key characteristic of cellular communications is the "handoff," as a message coming from a moving vehicle is transferred from cell to cell. The handoff is a minor annoyance with a voice conversation, just a blip of silence. But data can be lost if one occurs with a modem transmission that's accessed a cellular network. With a fax transmission, the handoff will simply produce a blank spot on the page, analogous to the silence you hear (or don't hear) when talking during a handoff.

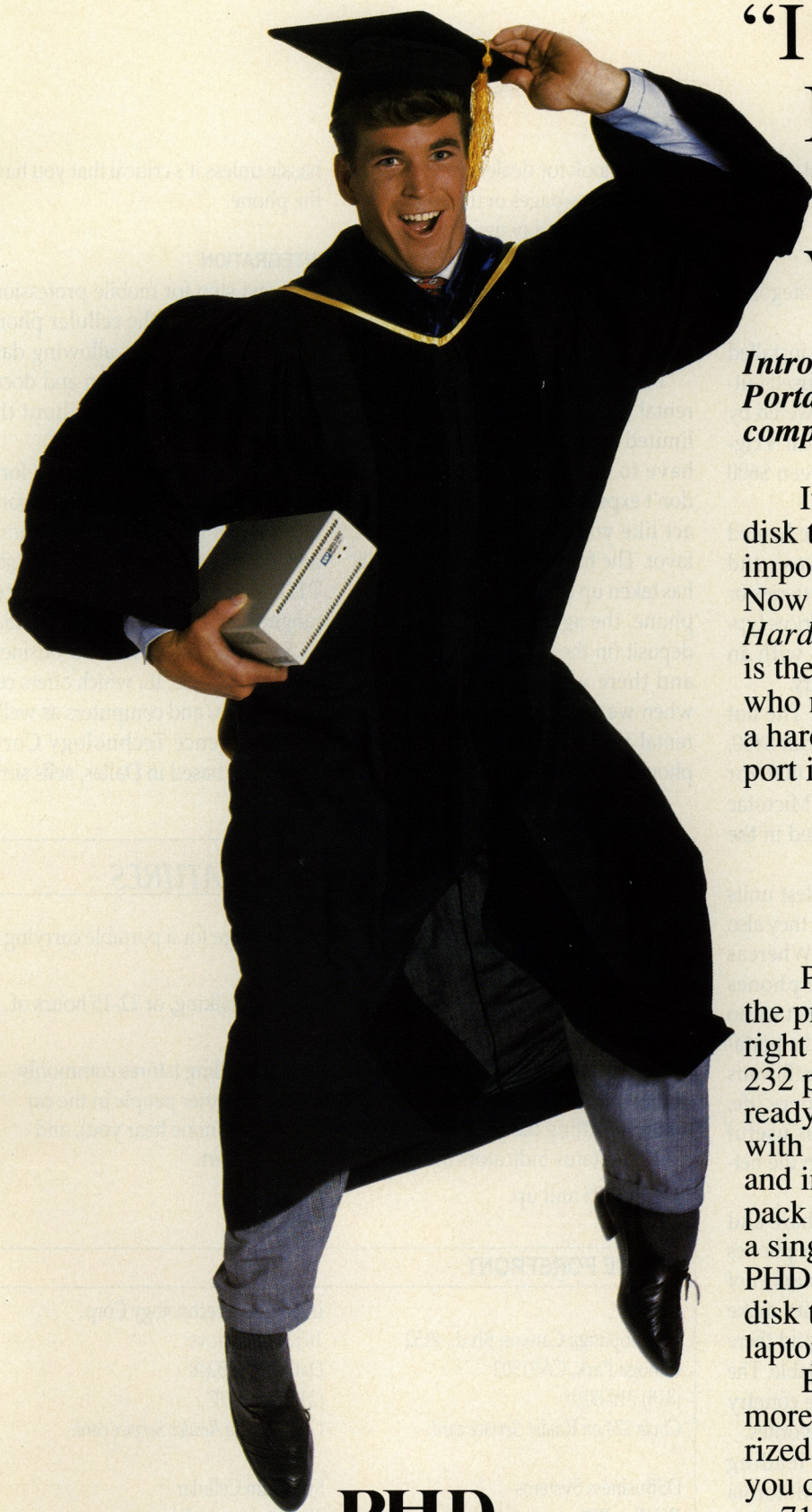
A Dallas-based company, Spectrum Cellular, has patented technology designed to eliminate these problems through a sophisticated scheme of data checking, error detection and correction. Spectrum bundles its technology with portable computers and cellular phones.

High rises, hills, and even wide open spaces can hamper cellular communications. The first two categories mentioned simply present obstacles to the radio waves trying to get your message through. Wide open spaces—relatively unpopulated



*By Roger Strukhoff*

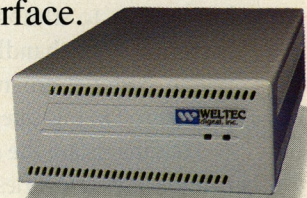




# "I Got My PHD™ From WELTEC!"

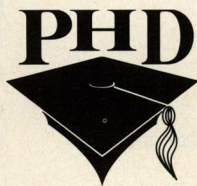
*Introducing PHD, the very first  
Portable Hard Disk for laptop  
computers.*

It used to be that adding a hard disk to your laptop was next to impossible—but not anymore. Now there's PHD, the *Portable Hard Disk* from WELTEC. PHD is the solution for laptop users who need the increased storage of a hard disk with the ease of serial port interface.



PHD was designed with all the proprietary hardware built right in; just plug it into the RS-232 port on any laptop and it's ready to go. Plus, PHD comes with 20MB of storage capacity and includes an internal battery pack that runs up to two hours on a single charge. Simply stated, PHD is the highest degree in hard disk technology available for your laptop.

Be smart—get a PHD. For more information or the authorized WELTEC reseller nearest you call us today at 800-333-5155 or 714-669-1955.



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digital, inc.

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areas—are typically not well-stocked with cells.

### REACHING OUT

Today there are three basic categories of cellular phone for sale:

**Mobile.** The kind that's installed in a car. Not designed to be used outside of the car. Typically powered by the car battery or from the car's cigarette lighter. Cost is between \$600 and \$800.

**Transportable.** These are hauled around in a little carrying case, and are powered by separate batteries or by a car's cigarette lighter. Prices typically start at about \$550, with an additional \$100 for the battery.

**Portable or Handheld.** The hot new area. Prices start at about \$800, but go up to almost \$3,000 for Motorola's new handheld Microtac phone. Batteries are included in the phone itself in this category.

Handhelds are the smallest units in these three categories, but they also have the smallest power. Whereas mobile and transportable phones emit the governmentally-set radio frequency limit of 3 watts, the portables are typically set at 600 milliwatts or less. This maximizes battery life, but makes the phones less useful when far away from cells on the network.

Motorola is a market-share and technology leader in cellular phones in many areas. However, a number of personal computer companies make cellular telephones as well, and there are many other options available. The networks in each area of the country will have settled on a few favorites.

Among the dozens of leading companies in addition to Motorola are GTE, OKI, Fujitsu, NEC, Uniden, Mitsubishi, Panasonic, Nokia-Mobira and brands produced under various Bell names. Radio Shack also offers a range of cellular phones. The best

places to look for dealers in your area are the yellow pages or the sports section of your Sunday newspaper.

Cellular phones, like most business products and services, can be leased as well, with entry prices typically starting at about \$30 per month.

Phones are also available from rental car agencies on an extremely limited basis. Reservations usually have to be made in advance, and don't expect the counter personnel to act like you've done them a great favor. The few times we've tried it, it has taken up to half an hour to get the phone, the agency required a large deposit (in the \$750 to \$1,000 range), and there was an additional wait when we returned the car. Until the rental agencies enthusiastically rent phones in all major airports, avoid the

hassle unless it's critical that you have the phone.

### INTEGRATION

The next step for mobile professionals is integrating the cellular phone into a portable office, allowing data files to be sent by modem and documents to be faxed throughout the country.

Spectrum Cellular is on the forefront of this business. The company bundles its LapPak cellular phone and modem with the popular Toshiba T1200 laptop computer, at prices ranging between \$4,950 and \$7,025.

Spectrum now owns DS Business Systems, Moline, IL, which offers cellular phones and computers as well.

Intelligence Technology Corp. (ITC), also based in Dallas, sells simi-

## CELLULAR PHONE FACTS AND FEATURES

**Weight:** Usually about 1.5 pounds. Add a few more for a portable carrying case or car mount.

**Operating time:** Typically only about an hour of talking, or 12-15 hours of standby time.

**Typical features:** Single-keystroke redial, speed calling (stores commonly called numbers in memory), mute lets you talk to other people in the car without letting the person on the other end of the phone hear you), and various status indicators including a low-power alert.

**Price:** \$495 and up.

### ON THE FOREFRONT

Cellabs  
6433 Topanga Canyon Blvd., #152  
Canoga Park, CA91303  
(818) 710-0010  
*Circle 174 on Reader Service card.*

DSBusiness Systems  
P.O. Box 870  
Moline, IL 61265  
(309) 797-3873  
*Circle 175 on Reader Service card.*

Intelligence Technology Corp.  
16526 Westgrove  
Dallas, TX 75248  
(214) 250-4277  
*Circle 176 on Reader Service card.*

Spectrum Cellular  
2710 Stemmons Freeway  
Dallas, TX 75207  
(214) 630-9825  
*Circle 177 on Reader Service card.*





# Before McKesson picked GRiD computers, they looked this close.

GRiD opened some very critical eyes when McKesson, the world's largest drug distributor, began to scrutinize laptop computers.

"We interviewed a number of auditors from major companies," says Department Manager Dave Stout. "About 35% of the companies were using GRiD."

*Unlike other manufacturers, GRiD focuses on field information systems.*

"When we let our auditors get their hands on them, GRiD came out on top for ease-of-use and performance."

*The GRiDLITE XL is expandable, and weighs a mere nine-and-a-half pounds.*

"And the service we've received from the people at GRiD far exceeds any other service I've been associated with," says Dave.

*Besides local sales and service, GRiD Systems Centers offer training and seminars.*

"The system is simple, so our auditors can do what they do best—audit," concludes Dave.

*As the leader in field information systems, GRiD knows how to help professionals do what they do best.*

To help your field professionals do what they do better, call 1-800-222-GRiD, or visit your nearby GRiD Systems Center. And get a closer look.



**GRiD**<sup>®</sup>  
*First in Field Systems*

In the United Kingdom call 44-0-372-60266, in Germany 49-211-498-2971/2/3, and in Canada 416-446-1555. © Copyright GRiD Systems Corporation 1989.

**CIRCLE 17 ON READER SERVICE CARD**



lar configurations for prices in the \$7,000 to \$8,500 range. ITC has added high-end 386 systems to its line (see the "Update" section in this issue).

These systems let you transfer data through the modem and phone, including faxed material if you have a portable scanner or fax machine.

In the accessories arena, Cellabs of Canoga Park, Calif. produces the Datajack, an adapter that hooks up laptops with cellular phones.

Communications remain the most frustrating part of using personal (and portable) computers. Factors such as modem protocols, "handshakes," bad lines, software memory requirements, and incompatibilities all make electronic data transmission a real challenge. Adding the extra complexity of cellular networks, with

their handshakes and sometimes sporadic cells, forces the person on the leading edge to have a little extra determination to get the job done.

## BOTTOM LINE

Cellular phone users today fall into two basic classes that cut across professions and regions: frequent flyers and constant commuters. A word or two about both:

**Frequent flyers:** If you ignore our advice and get a rental phone, your access charges will typically be three to five times as much as the daily rental. That's been our experience. Is it really worth almost 100 bucks over three days to stay that closely in touch? Couldn't you have stopped at a couple of those 7-11s instead, and gotten a Coke or Pepsi in the deal?

More to the point, if staying that closely in touch is such a priority, leasing or buying a transportable phone is the answer. Just make sure the battery is charged before you go on the road.

**Constant commuters:** Legions of sales people, managers, emergency personnel, contractors, and consultants who spend much of their business life in their car or truck are willing to pay the cellular access cost in order to maintain that important link between clients and the home office.

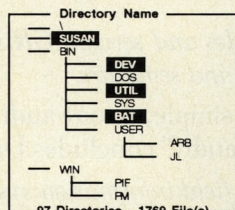
As an employer of many frequent flyers, the company that publishes this magazine found that buying a limited number of phones for the company, then doling them out when people went on the road, keeps everyone happy. □

## ULTRA HIGH SPEED FILE TRANSFER

For PC's, PS/2™, LAPTOPS & NETWORKS

Name	Ext	Size	Date	Time
<DIR>			01-12-88	10:04a
<DIR>			01-12-88	10:05a
<DIR>			01-12-88	10:06a
GLINFO				
AR	CFG	198	02-01-88	10:30a
FEB88	DAT	32496	02-28-88	2:29p
MAR88	DAT	30546	03-31-88	4:22p
APR88	DAT	32468	04-30-88	3:22p
MAY88	DAT	33329	05-31-88	3:15p
JUN88	DAT	41296	06-30-88	4:10p
JUL88	DAT	44824	07-31-88	2:56p
AUG88	DAT	48324	08-31-88	3:19p
SEP88	DAT	54796	09-30-88	1:58p
OCT88	DAT	86496	10-31-88	2:57p
NOV88	DAT	142296	11-30-88	3:20p
13 File(s)		956798	Bytes	

Select files, directories or complete hard drives.



Tag files or directories individually or press a key to mark them all. In the directory tree window one key marks the entire drive then the directory structure is automatically created on the destination drive.

**Transfer Options** include selecting files by hidden, wildcard, modified or date range settings.

**Backup** hard disks by selecting modified files.

**Macros** may be used for repeated tasks and fully automated hands free operation.

**Network compatible**, connect your PC or laptop to a network station.

GetC Software Inc.  
Box 8110 - 182  
264 H Street  
Blaine, WA  
98230-8110

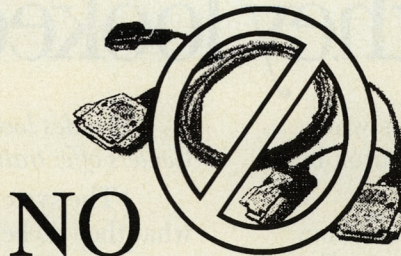
**GetC**  
SOFTWARE

REPRINTED FROM

PC Magazine, April 25, 1989

File Shuttle is quick to install, easy to use and the fastest program we tested...

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## CLUMSY CUSTOM CABLES

Custom cables are not only bulky and difficult to connect to desktops, they are too short (6 to 8 feet).

## File Shuttle goes the distance.

The Rocket Socket allows you to use a standard parallel printer cable as long as 75 feet with most laptops and desktops. You can even use an A B Switch Box with the Rocket Socket. If you need to go farther simply use File Shuttle's built in serial mode.

File Shuttle is ready to run! Just plug it in and go. No master/slave situation and no device drivers to install. Works with and between different versions of DOS including 2.x, 3.x & 4.x with complete error checking for error free transfer.

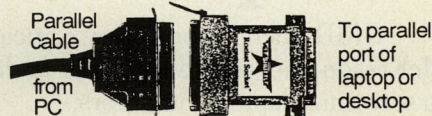
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**FILE SHUTTLE**

\$119.95

includes the amazing Rocket Socket™



No special cables required, just plug the printer end of the parallel cable into the Rocket Socket then plug it into the parallel port of a laptop or desktop. How simple can it get, you don't even have to remove or attach any cables behind the desktop.

## Tri-lingual user interface

Just right for the traveller! English, French and German, instantly change screens, all with context sensitive help. European Edition includes foreign language documentation.

Transfer files up to 2 megabytes per min. between AT's and 3+ megabytes per min. between 80386's. With File Shuttle it's only a matter of time...

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be held at the Sheraton Centre, New York, NY, September 26 & 27, 1990.

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Title \_\_\_\_\_

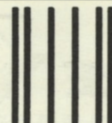
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with you.**

# PORTABLE COMPUTING & COMMUNICATIONS

MAY 9 & 10, 1990  
Anaheim Marriott, Anaheim, CA

SEPTEMBER 26 & 27, 1990  
Sheraton Centre, New York, NY

Technology continues to change the way we do business. Busy professionals from all industries spend more and more time away from the office and working on the road. This new portable office has created a demand for computing and communications products and services that will help you work more efficiently and keep you competitive. Portable computers, laptops, hand-held computers, fax machines, paging units and cellular phones are at work today, making mobile executives more productive, helping sales and marketing increase sales, and revolutionizing distribution systems.

## Join the portable movement

Portable Computing & Communications '90 is a two-day conference and exposition that will give you the information you need to forge ahead into the exciting world of portable computing. It is the only event that brings together today's mobile work force buyers of portable computing equipment with vendors of those products, business applications and services vital to them.

**Attendees** — You'll discover which systems and applications best suit your company's needs, boost your team's strategic advantage and increase personal productivity.

### Benefits, if you attend:

- how companies are already increasing their productivity by up to 30% and more
- who the market leaders will be in the 1990's and beyond
- which innovative technologies will cause the laptop computer to replace the desktop in the not-too-distant future
- what features you should be looking for now and what will be available in the future
- how your colleagues and competitors are using portable computing to increase their competitive edge
- the latest products and services as they are introduced at the conference and exhibition
- what to expect from vendors of hardware, software, peripherals, and communications products

**Exhibitors** — You'll reach the users and volume buyers of portable computers and peripherals who will be spending millions of dollars as this market takes off. Buyers who are equipping their sales force with hundreds of portable systems costing up to \$10,000 per rep.

Last year's conference and exhibition was attended by over 2,400 prospective buyers representing sales of 200,000 portable and laptop computers, according to data gathered and analyzed by IDG Conference Management Group, the show's producer.

### Who should attend:

If you currently are or will be making portable computing purchases for business, sales, education, engineering, or any other applications, you'll get the knowledge you need to make better buying decisions at Portable Computing & Communications '90.

### Who should exhibit:

If you manufacture or resell products to the portable computer market, Portable Computing & Communications '90 is the only conference and exhibition that brings you face to face with your prospects in this explosive market.

### Portable Computing & Communications '90

**Spring** — May 9 & 10, 1990, Anaheim Marriott, Anaheim, CA

**Fall** — September 26 & 27, 1990, Sheraton Centre, New York, NY

Portable Computing & Communications '90 is sponsored by *Portable Computing Magazine* and is presented by the conference and expo specialists at IDG Conference Management Group (producers of Communication Networks, CD-ROM Expo, and Network Management Solutions), and Hajar Associates.

### Exhibitors (as of 12/7/89)

Altima Systems Inc. • Chicony America Inc. • Computer Products Plus • Contact Software International • DS Business Systems • Eastman Kodak, Personal Printer Products • GENIE's Laptops RoundTable • Hugh Carver Group Inc. • J.W. Systems Ltd. • Kiss Computers • Megahertz Corp. • NEC • *Portable Computing Magazine* • Portable Technology • Quay Computer Corp. • Scully Inc. • Sharp Electronics • S.L.S. Technology Inc. • TEC • Touchbase Systems Inc. • Traveling Software Inc.

## Act now for more information

For details on how you can join the portable movement at Portable Computing & Communications '90, complete and return the postage paid card today, or use the coupon. Or call us directly at 800-225-4698—ask for Conference Sales for conference information; Robin Poulin for exhibitor information. Or FAX your request to us at 1-508-872-8237.



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# GET YOUR FAX STRAIGHT

AS LONG AS YOU'VE GOT YOUR LAPTOP, BEING AWAY FROM

No doubt about it, the fax machine is now as much a part of the business office as the typewriter used to be. Those shiny sheets of rolled thermal paper bearing information that your colleague five states away said not five minutes ago he'd fax to you are just another aspect of a normal business day.

And if you're among the growing ranks of mobile professionals carrying on the kind of serious business from a hotel room or convention floor that used to be possible only from a well equipped office, you may be finding it important to include fax capability along with the other high-tech business electronics you take on the road. As the cutting edge of this

business technology slices deeper into the portable market, more and more options emerge to get you sending and receiving faxes from just about anywhere you might be.

Fax machines are getting smaller and easier to take with you. Nissei Electric (3 Reuten Dr., Closter, NJ 07624, 201-768-0085) is now offering an 8-pound portable (as in battery-powered) fax machine that should provide a nice alternative to those who prefer a standalone machine over installing a fax board in their laptops.

Or one of the internal fax boards in our buyer's guide can turn your laptop into a fax machine at nearly no extra weight or bulk. (Most fax

boards weigh from six to 10 ounces; however, Intel's two-pound, full-length Connection Co-processor card won't fare well for portability). Can't spare an internal slot?—Touch-

base's pocket-size external fax/modem plugs into a serial port. The prices are getting right, too. Fremont Communications has just introduced an 8-bit, half-size fax board that sells for \$195, well within most business budgets.

## FAX CONSIDERATIONS

No matter what your faxing needs, there's probably a product out there that can handle the job. Before you run out and buy one, though, make sure you've considered your needs carefully. Remember, life on the road puts its own restraints on fax communication. You won't be able to send a fax anytime you want (since you won't always be near a phone), and your equipment certainly won't be set up to receive a transmission whenever someone wants to send one. You'll have to add an extra step in planning your trip to make sure you're connected to a phone line at the right times if you intend to fax while you're travelling.

Obviously, if you want a fax board, you're going to have to pick one that fits your laptop. Only a few of the larger portables—the Toshiba T3200, for example—can accommodate a full-size card.

The amount of electricity an internal board consumes is a critical factor if you're planning to operate your computer under battery power. How much consumption is too much depends on several factors, such as the type of batteries you have, the other battery-draining activities (e.g., hard-disk use, screen backlighting) you're doing, and how many documents you intend to fax at any one sit-



Brooktrout Technology's Fax Mail 96

*By Mark E. Reynolds*



# —WHEREVER YOU ARE

THE OFFICE DOESN'T MEAN BEING AWAY FROM YOUR FAX MACHINE

ting, but if your going the battery-powered route, limit your fax-board choices to those with the lightest power requirements or those that draw from their own batteries.

The more file formats a board supports, the more options you have. Most can send and receive ASCII files; the better choices should handle one or more popular graphics for-

mats, such as PC Paintbrush (PCX) or Dr. Halo (CUT). If you're faxing graphics files, your laptop will need a graphics card and a few megabytes of hard disk space. Most boards can

COMPANY	PRODUCT	PRICE	FAX SPEED	MODEM SPEED	BUS/SIZE	POWER	FEATURES
American Data Technology Inc. 44 W. Bellevue Drive, Suite 6 Pasadena, CA 91105 (818) 578-1339	Smartfax 48	\$299	4800	n/a	8-bit, ¼ IBM	2.5W	Hot-key sending, screen capture utility, and print capture built into the graphics editor.
	Smartfax	\$499	9600	n/a	8-bit, ¼ IBM	2.5W	Hot-key sending, screen capture utility, and print capture built into the graphics editor.
	Smartfax Plus	\$799	9600	1200/2400	8-bit, full IBM	5W	Network compatible. Screen and print capture utilities, hot-key sending, graphics editor.
Brooktrout Technology Inc. 110 Cedar St. Wellesley Hills, MA 02181 (617) 235-3026	Fax-Mail 96	\$499	9600	n/a	8-bit, full IBM		Background operation; auto file conversion, selectable fonts; display with zoom, flip, reverse video; auto log, auto signature and logo, auto transmission/retry.
Brother International Corp. 8 Corporate Place Piscataway, NJ 08854 (201) 981-0300	IntelliFax	\$995	9600	1200	8-bit, ¼ IBM	10W	Background operation, auto signature and logo, broadcasting, auto transmission/retry, directory.
The Complete PC Inc. 1983 Concourse Drive San Jose, CA 95131 (408) 434-0145	The Complete Fax	\$399	4800	n/a	8-bit, ¼ IBM		Background operation, pop-up hot-key faxing, named distribution groups, on-screen viewing, DOS file transfer, and polling.
	The Complete Fax/9600	\$699	9600	2400	8-bit, ¼ IBM		Background operation, hot-key faxing, named distribution groups, on-screen viewing, DOS file transfer, polling.
	The Complete Communicator	\$899	9600	2400	8-bit, ¼ IBM		Background operation, pop-up hot-key faxing, named distribution groups, on-screen viewing, DOS file transfer, polling, voice mail with fax.
	The Complete Fax/Portable	\$499	9600	n/a	8-bit, ½ IBM	9V battery	Background operation, pop-up hot-key faxing, named distribution groups, on-screen viewing, and polling.
Fremont Communications Co. 46309 Warm Springs Blvd. Fremont, CA 94539 (415) 438-5000	Fax 96	195	9600	n/a	8-bit, ½ IBM	1.9W	On-screen display, auto log of faxes sent, and graphic user interface.



## BUYER'S GUIDE

accommodate a wide range of dot matrix or laser printers.

If you need fax capability on the road, there's no reason why you can't

have it, and, as the laptop market continues to mature, your portable fax options should get even better. After you've decided what you need, check

out the offerings in Portable Computing's Buyer's Guide to Fax Boards to see who's selling the best equipment for you. □

COMPANY	PRODUCT	PRICE	FAX SPEED	MODEM SPEED	BUS/SIZE	POWER	FEATURES
Gammalink 2452 Embarcadero Way Palo Alto, CA 94303 (415) 856-7421	Gammafax NA	\$495	9600	n/a	8-bit, 1/2 IBM	5W	Background operation, polling and turnaround polling, and high-speed file transfer. Micro-channel version available.
	Gammafax CP	\$1,095	9600	2400 opt.	8-bit, full IBM	5W	Network compatible. Background operation, polling and turnaround polling. Micro-Channel version available.
Hayes Microcomputer Products Inc. P.O. Box 105203 Atlanta, GA 30348 (404) 449-8791	JT Fax 4800B	\$295	4800	n/a	8-bit, 1/2 IBM	1W	One-step convert and send, applications print capture, auto print on receive.
	JT Fax 4800P	\$595	4800	n/a	MCA card	1W	Broadcasting, security/control, high-resolution mode, compressed print, scheduling.
	JT Fax 9600B	\$695	9600	2400	8-bit, 3/4 IBM	1.5W	Background operation, digital signal processing, auto adaptive equalization, call progress monitoring and enhanced diagnostics.
	JT Fax 4800 Portable	\$595	4800	n/a	8-bit, 1/2 IBM	.7W	Phone directory, scheduling.
Intel Personal Computer Enhancement Operation CO 3-7 5200 Elam Young Parkway Hillsboro, OR 97124-6497 (800) 538-3373	MCA Connection Coprocessor	\$995	9600	2400	MCA card	9.3W	Network compatible. Background operation, timed transmission, single-step transmission to distribution lists.
	Intel Connection Coprocessor	\$995	9600	2400 opt.	8-bit, full IBM	9.3W	Network compatible. Background operation, timed transmission, single-step transmission to distribution lists.
OAZ Communications Inc. 1362 Bordeaux Drive Sunnyvale, CA 94089 (408) 746-1750	OAZ FW1	\$695	9600	2400 opt.	8-bit, full IBM	10W	Background operation, 2400-bps modem available as option for \$149.
	Fax Manager	\$1,195	9600	1200	8-bit, full IBM	20W	Background operation, real-time multitasking operating system, auto file conversion, scheduled transmission, polling, broadcasting.
Panasonic Communications & Systems Co. Two Panasonic Way Secaucus, NJ 07094 (201) 348-7000	Fax Partner/FX-BM89 Plus	\$599	9600	n/a	8-bit, 3/4 IBM	10W	Background operation, view faxes on screen, unattended printing.
Touchbase Systems Inc. 160 Laurel Ave. Northport, NY 11768 (516) 261-0423	WorldPort 2496	\$699	9600	2400	4.5 x 2.75 x 1-in. external box	9V battery	Background operation, view faxes, phone directory, auto log. Plugs into RS-232 port.
	WorldPort 2496i-T	\$699	9600	2400	Toshiba slot	.65W	Background operation, view faxes, phone directory, auto log.
Xerox Imaging Systems 535 Oakmead Parkway Sunnyvale, CA 94086 (408) 245-7900	Microfax	\$695	9600	1200	8-bit, full IBM or MCA card	4W	Text editor, direct printing, file transfer.



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- Included software: MS DOS 3.3 & GW BASIC.
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- Socket for 80287 co-processor on motherboard.
- Zero wait state.
- One Year Warranty!
- Factory New! Factory Perfect!

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## TURBOSPORT 386 PORTABLE LAPTOP COMPUTER

- 80386 32-bit processor, 12/6 MHz (switchable).
- 40 MB (28ms) hard drive.
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- 2 MB RAM.
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- Activity reports confirm successful transmission of each page.
- Dim.: 6.5" x 19.3" x 16.1".
- Model #: 295.
- 90 Day Warranty!



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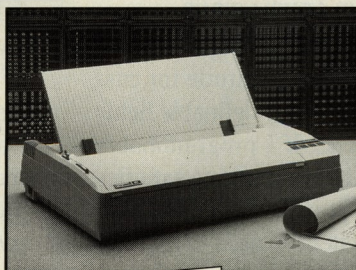
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- Weight: 26.5 lbs.
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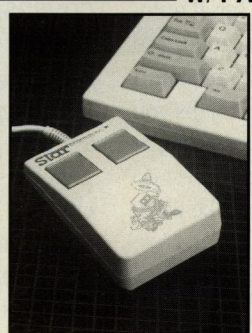
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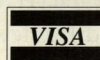
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# CUSTOM SOFTWARE

**IF THAT OFF-THE-RACK PACKAGE DOESN'T QUITE FIT, MAYBE YOU SHOULD TRY SOMETHING TAILOR MADE.**

In the last issue, I listed five advantages to off-the-shelf software: it's less expensive than custom-made programs, it's available immediately, it's usually bug-free, it usually comes with hotline support, and its documentation is usually adequate to make the program easy to learn and use.

But obviously, off-the-shelf packages are seldom exactly what you need to solve your unique business problems. Software packages such as word processors, spreadsheets, and time managers are usually fine right out of the box, but you're more likely to bring your special needs to accounting, database management, or inventory and tracking programs.

The field lengths allotted to such things as inventory parts, serial numbers and model numbers can exceed the space offered in off-the-shelf accounting packages. Or perhaps you require concurrent access to your accounting or database modules; do off-the-shelf programs you like work on a network?

## THE CASE FOR CUSTOM

There are two major advantages to investing in custom software:

1. It provides a solution tailored to a specific problem. Custom software meets a company's particular application requirement exactly the way

the company wishes to have it done. For example, Chrysler Corp. has pronounced itself "perfectly satisfied" with an investment of almost \$5 million in 500 Grid laptop computers and custom software developed internally.

And new program-generating software that helps custom programmers write application code enhances solutions to many individual projects.

2. It can provide a competitive advantage. That edge may be greater speed, accuracy, and efficiency when dealing with a customer, or the ability to use a laptop at a customer's office to demonstrate special features and benefits you can offer.

## COMBOS AND CONCLUSIONS

Some off-the-shelf packages permit a certain amount of latitude for customizing, with user-definable fields and categories. If a programmable generic software package satisfies enough of your requirements, so much the better. No need to reinvent the wheel.

And there are other programs—notably databases—that feature their own built-in programming languages. In the right hands, it's like customizing a pre-fab house on-site. You get a software foundation and framework that's close to what you want, and you can customize it to suit your needs. This is often a good alternative to non-programmable software that leaves you wishing for too much more.

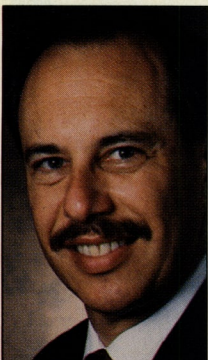
One caveat here: If you use a customizable package, you're responsible for programming it the way you

want. Fortunately, developers of such packages are generally quite capable of giving you the technical support you need over the phone.

But you shouldn't give up too much ground in the areas at which off-the-shelf software excels. Make sure the custom package you're considering meets the following requirements:

1. It should be well-written and fully-documented.
2. It should be thoroughly tested and debugged.
3. It should completely address the need for which it was written.
4. The programmer should support, maintain, and update his product (sometimes at additional cost).
5. Its should be useful enough to justify the cost of having it written.
6. There should be no better alternative available.

**Conclusion:** A laptop computer with effective application software is an invaluable tool. However, custom software is expensive and usually requires a bit of technical support before it's up and running smoothly. If possible, consider it only after you evaluated and rejected the available off-the-shelf offerings.



*By Ronald S. Kauffman*

*Ronald S. Kauffman is a sales and marketing consultant specializing in high-technology business. He's also author of the new book, FutureSell: Automating Your Sales Force.*



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# ALL-IN-ONE ANSWERS

PORTABLES MAY MARK THE COMEBACK FOR MULTI-PURPOSE PACKAGES

If you own a portable computer and don't use integrated software, you're making things hard for yourself.

True, you may feel it's not cool to use a multipurpose program instead of separate applications, that it's more macho to bounce from 1-2-3 to Word-Perfect to Paradox and back. But by that logic, you shouldn't carry a Swiss Army knife, either, instead stuffing your pockets with a screwdriver, a scissors, a corkscrew, a can opener, a file, an awl, and a penknife. You could hurt yourself when you sit down.

Unless you need specific, advanced functions that a specialized program can do—a programmable, relational database, or a word processor that can generate an index—there are real advantages to using an integrated package.

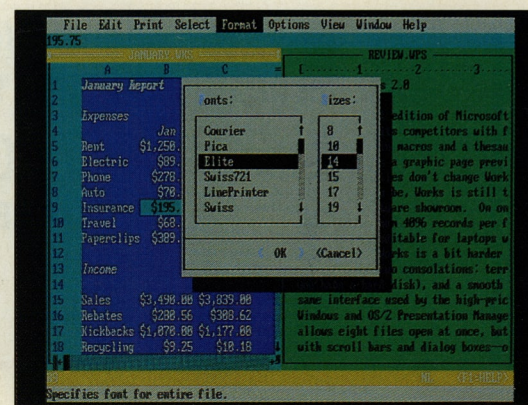
*Integrated software has taken a beating recently. Sales plummeted in 1989, according to the Software Publishers' Association. Long considered jacks-of-all trades but masters of none and typified by Lotus Symphony, a colossal spreadsheet that does little else well, integrated software may make a comeback in this decade on the strength of increasing portable computer sales. Portable computer buyers, accustomed to relative ease of use with their hardware, typically have little time or inclination to suffer multiple steep learning curves with their software. This issue, we take a look at four multipurpose applications, each potentially useful to a different group of portable computer users. -ed.*

For one thing, it's more efficient to work with one program than to shut it down, return to DOS, and load another every few minutes. For another, integrated software is easier to use than a fleet of applications: you can give the same "save" or "copy" command in your database as in your spreadsheet, instead of having to learn different syntax or carry stacks of program manuals with your portable.

But there's another advantage to integrated packages. In addition to working alike, integrated applications work together—making mail merge simple, or copying spreadsheet rows, database records, or graphs into word processing documents as easily as they copy paragraphs within a document. For these sophisticated reports or combination jobs, an integrated package is a business tool that does things standalone programs either can't do, or can do only with difficulty, such as in the worksheet or graphics importing of today's high-end



PFS First Choice



Microsoft Works

word processors.

Some integrated packages are more businesslike than others. I'll examine four here.

PFS:First Choice, Microsoft Works, and AlphaWorks represent the hot-

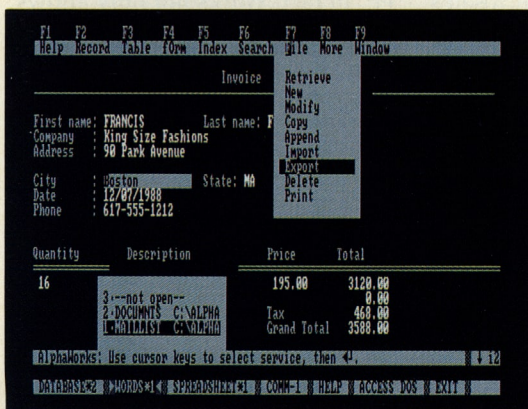
*By Eric Grevstad*



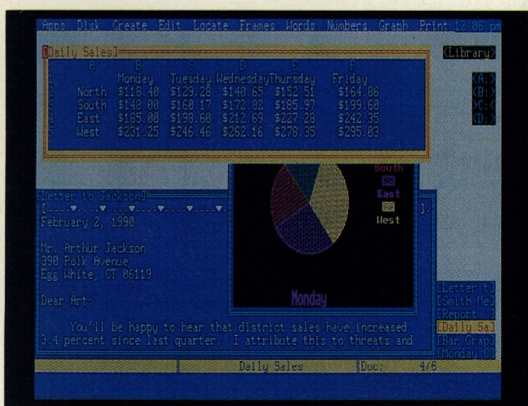
ter, low-end market segment in multifunction software. All are priced under \$200. Framework III is our pick among more ambitious, full-featured all-in-one products.

Each combines a word processor with spelling checker, a spreadsheet with graphics, a database that toggles

PFS:First Choice, Microsoft Works, AlphaWorks, and Framework III—roughly corresponds to their suitability for business environments, moving upward from the mom-and-pop shop to the corporate suite.



Alpha Works



Framework III

between a single-record "form" view and spreadsheet-style "list" view, and a communications program supporting text and Xmodem transfers for Hayes-compatible modems. Except for a good disk utility package, one of these four might be the only software you'll ever need.

Their order of appearance here—

label a spreadsheet with the months of the year? Type *January* in one cell, and the program can type *February*, *March*, and so on in the next.

Besides ease of use, First Choice highlights include first-class, flexible graphics and great integration of communications and word processing—once the communications mod-

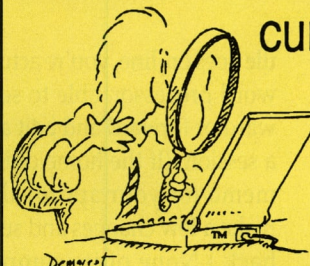
#### A CHOICE PROSPECT

PFS:First Choice 3.0 (\$159); Software Publishing Corp., P.O. Box 2710, 1901 Landings Drive, Mountain View, CA 94039-7210; (415) 962-0191; Requires 512K RAM.

I can't describe PFS:First Choice properly, because the Computer Writers' Cliche Guild outlawed the phrase "user-friendly." Software Publishing Corp.'s package not only has easy pull-down menus and dialog boxes galore, but conveniences which more costly programs should copy.

Want to install a printer or change other defaults? Push a few keys within First Choice, instead of running a separate installation program as with the other packages here. Want to

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ule goes on-line, you're actually in the word processor, able to scroll backward or forward and edit any part of a session. (If the home office sends a memo for your approval, you can make a few changes and send it right back.) None of its components is ultra-powerful, but all are capable performers.

On the other hand, its status as the beginner's or student's best friend slows PFS:First Choice somewhat for business settings. While there are Alt-key shortcuts for many commands, the nested menus may frustrate power users. While it offers "bookmarks" to switch between files without going through the main menu, First Choice is the only program here that keeps only one file in memory at a time.

Worse, while it can read and write Lotus .WK1 and .WKS formats, the spreadsheet will seem awkward or

bizarre to 1-2-3 veterans. Instead of the arrow keys, you use Tab and Shift-Tab to move the cursor between cells. Instead of typing a formula into cell B7, you press Alt-F to pop up a "formula box" and type a formula for cell R7C2. Unless your office uses SPC's Professional Plan, the spreadsheet is a possible stumbling block.

### IN THE WORKS

Microsoft Works 2.0 (\$149); Microsoft Corp., 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080; Requires 512K RAM.

The newest edition of Microsoft's all-in-one package catches up to its competitors with formerly missing features such as built-in macros and a thesaurus; it even adds a few gadgets such as a graphic page preview and alarm clock. But the bells and whistles don't change Works' character. While bulkier than it used to be,

Works is still the sporty compact in the integrated software showroom. On one hand, it has the smallest database (maximum 4096 records per file); on the other hand, it's the most suitable for laptops without hard disks.

Learning Works is a bit harder than learning First Choice, but there are two consolations: terrific on-line tutorials (if you have a hard disk), and a smooth Alt-key menu interface—the same interface used by the high-priced spread of Microsoft Windows and OS/2 Presentation Manager. In fact, Works not only allows eight files open at once, but can show them in windows with scroll bars and dialog boxes—on character-based displays, yet.

The word processor is a simple, efficient miniature of Microsoft Word, with pop-up, point-and-click lists of printer fonts and mail-merge fields

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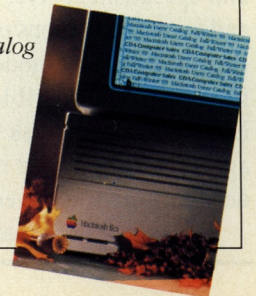


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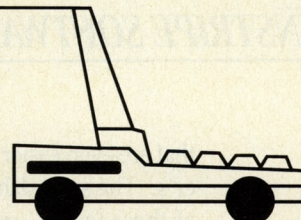




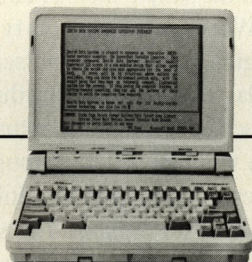


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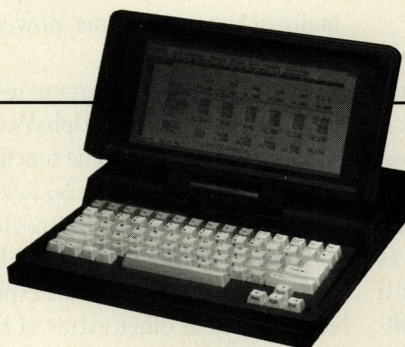
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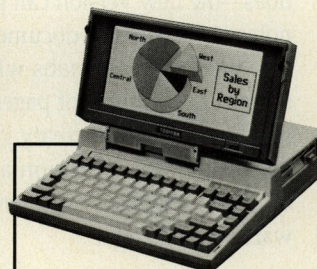
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that are even easier than its big brother's. The spreadsheet—the quickest of those tested—uses the .WKS format but resembles Excel, including the Fill Right and Fill Down commands that I always stumble over in search of 1-2-3's Copy command.

Works doesn't offer all the luxury features that grownup software does—the new version can put footnotes at the ends of documents, but that won't satisfy snobs who want them at the bottoms of pages. But it handles most productivity jobs in as neat and clean a fashion as you'll find, and it looks like grownup software while doing it.

### ALPHA TEST

AlphaWorks 1.0 (\$195); Alpha Software Corp., 1 North Avenue, Burlington, MA 01803; (617) 229-2924; Requires 512K RAM (640K recommended).

The most grownup, pinstriped program in the under-\$200 class is AlphaWorks. Alpha Software's integrated package sticks to office standards, using the file formats of Lotus 1-2-3 and dBase III Plus and copying many of those programs' powerful capabilities.

While none of the programs tested supports Lotus macros, AlphaWorks' spreadsheet uses the same functions and .WK1 file format as 1-2-3 Release 2.01. It offers ho-hum Lotus-clone graphs (six data ranges and five graph types, with none of the exploded pie slices or other extras of First Choice, Works, or Framework). You can even summon AlphaWorks' menus, normally linked to function keys as in First Choice, with the slash key as in 1-2-3 (you press the key twice to type a slash in the word processor).

The worksheet doesn't, alas, share

1-2-3's speed. While you can keep working during background recalculation, a 1000-cell crunch which took Lotus 3.5 seconds took AlphaWorks 10 times as long. (Microsoft Works whizzed through the job in under two seconds.)

The dBase-compatible database is harder to set up and search through than the simple filers of First Choice or Works, making you type field lengths, data types, and search formulas instead of breezing through an on-screen form. But in return, it lets you view your data through up to seven indexes, with versatile layout and reporting options. The word processor and communications services go beyond the basics, too.

On the minus side, AlphaWorks' integration of its own modules is weaker than its integration with 1-2-3 and dBase files. Works and First Choice have smooth cut-and-paste

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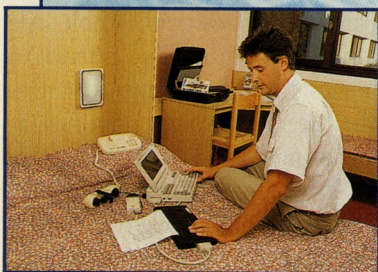
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clipboards to transfer data between applications, but AlphaWorks makes do with clumsier "Copy-to-Doc" and disk import/export routines to put spreadsheet or database rows into word processing documents, and can't put graphs into documents at all. While users with expanded memory can theoretically work on 29 files at once (nine each for the three modules plus communications on two serial ports), they'll get 29 nuisance prompts to "Open New Service (Y/N)?"

### THE BIG PICTURE

Framework III 1.1 (\$695); Ashton-Tate, 20101 Hamilton Avenue, Torrance, CA 90502-1319; (213) 329-9989; Requires 640K RAM.

Framework III is the latest edition of an integrated heavyweight that dates back to 1984. Unlike its archrival,

Lotus Symphony, Framework has evolved into a well-rounded, well-connected set of applications.

Two big differences separate Ashton-Tate's flagship from the under-\$200 packages. One is its FRED programming language, which many users will only know as a complete set of spreadsheet functions such as @SUM and @PMT, but others can use to write sophisticated applications that manipulate, consolidate, and generate reports from several files or roll Framework in and out of memory to launch other programs.

The other difference is Framework III's desktop of 3-D "frames"—movable, resizable windows that hold documents, databases, graphs, or other nested frames. Not only does Framework III include a first-rate outliner that lets you zoom in or out of sections of a document, but the

whole program works like an outliner: You can combine word processing, spreadsheet, and graphics frames to build a document, or link spreadsheet cells or database records from different frames for relational lookups.

Once you learn the ropes—you'll need to memorize a few function keys in addition to using the pull-down menus, and the keypad plus and minus keys that navigate frame levels are awkward on some laptops—it's easy to get hooked on Framework's powerful, flexible style, quickly zooming and shrinking frames, graphing spreadsheet ranges, and breezing through print formatting menus.

The applications aren't bad, either. The spreadsheet, while still sluggish compared to 1-2-3, is much faster than old Framework's (or AlphaWorks'). The word processor offers everything from a thesaurus to footnotes; the outliner can even create a table of contents. If you're not faithful to Framework III, the program can import and export ASCII, dBase, 1-2-3, SYLK, WordStar, WordPerfect, MultiMate, and DisplayWrite files.

### FOUR FAVORITES

Each of these packages is appealing; any one of them can make you a convert to the benefits of integrated software.

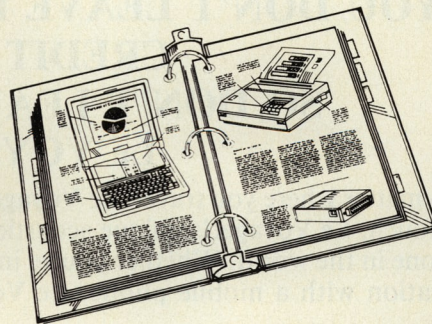
When it comes to picking personal favorites, I'm a sucker for a smooth interface. First Choice is the friendliest and AlphaWorks is a good solution for folks on a budget who work alongside 1-2-3 and dBase users, but Microsoft Works is the neatest and fastest integrated program. As for Framework III, it's big and expensive, but one of the richest, most innovative PC programs ever designed. □

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*Eric Grevstad is a newspaper columnist and frequent contributor to several computer-related magazines.*

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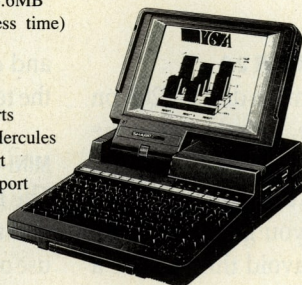
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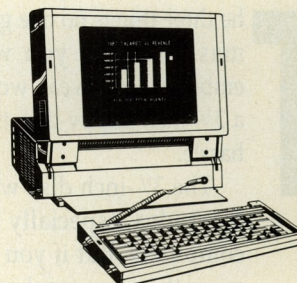
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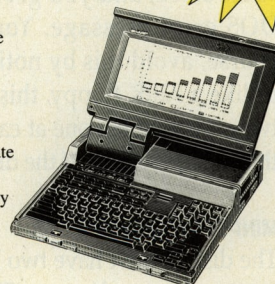
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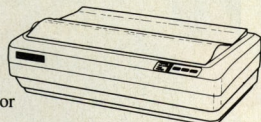
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# THE LONGEST .0972 YARD

THE 720K VS. THE 1.44MB STANDARD

**T**he three things no one got for Christmas are: a tie you wouldn't be embarrassed to wear, world peace, or a 3½-inch floppy disk that's never a hassle.

The 3½-inch disk was (and is) a great idea, especially for portable computers. But if you use them in more than one machine, sooner or later you're going to bang your head against the classic problem: the 720K versus the 1.44MB standard. Look at all the things that can go wrong.

## MINI-CRISIS NUMBER 1.0

You try to put a 1.44MB floppy in a 720K drive, and you get to read a DOS error message. You can, of course, avoid this by noticing that unlike a 720K floppy, this disk has two square holes; one at each end of the outside surface of the disk.

## MINI-CRISIS NUMBER 1.5

The disk doesn't have two holes, but yet it can't be read by your 720K drive, and it can by a 1.44MB one. This source of fun usually happens when some clever dude with the economic tendencies of a Scot intentionally formats a disk designed for 720K use on a 1.44MB drive to the 1.44MB standard. (This situation is not helped by the many floppy-drive manufacturers who fail to include hardware that only allows 1.44MB formatting if both holes are present and accounted for.)

## MINI-CRISIS NUMBER 2.0

You attempt format a disk to 720K on a 1.44MB drive, forget to give the proper counter-intuitive "/" switch, and end up with the same sweet DOS error message you got before. The easiest way to avoid this is write a one-line batch file—call it something like EZFORMAT.BAT—that calls the format program with all the proper switches and arguments. That statement, by the way, should be

`FORMAT A: /N:9 /T:80`

meaning 80 tracks on the disk, and nine sectors per track. (I told you it was counter-intuitive.)

## MINI-CRISIS NUMBER 3.0

You've learned your lesson. You remember the arcane "/" switch and format the disk to 720K on the 1.44MB drive and . . . the 720K drive still won't read it. This is a real wasp in your nose, and one that brings back memories of 5¼-inch drives. As with old friends the 1.2MB and 360K floppies, just because the DOS manual says you can format to the lower-density standard on the higher-density drive doesn't mean the lower-density drive can read it. That's because the 1.44MB drive's heads are thinner than those on a 720K drive,

and can't always completely cover the territory. Funny, no?

## MINI-CRISIS NUMBER 4.0

The final upgrade. You properly format a diskette designed for 1.44MB use on a 1.44MB drive to 1.44MB. You put files on it. You take the disk to another 1.44MB drive. The other



By Jeff Angus



drive won't read the disk.

You probably haven't had all five scenarios banged out on your skull, but you've probably had at least one of them happen. And Angus's Third Law of Disk-namics says it will invariably happen when you can least afford to spend time figuring out what went wrong.

Vendors aren't making things any easier by picking out one density to standardize on. Of the twenty leading portables using 3½-inch media from the five leading vendors, ten use 1.44MB drives, ten are using 720K drives. And you can't even count on buying all your machines from one vendor as a fix. Of 15 leading manufacturers surveyed, six use both density formats on portables bearing their labels.

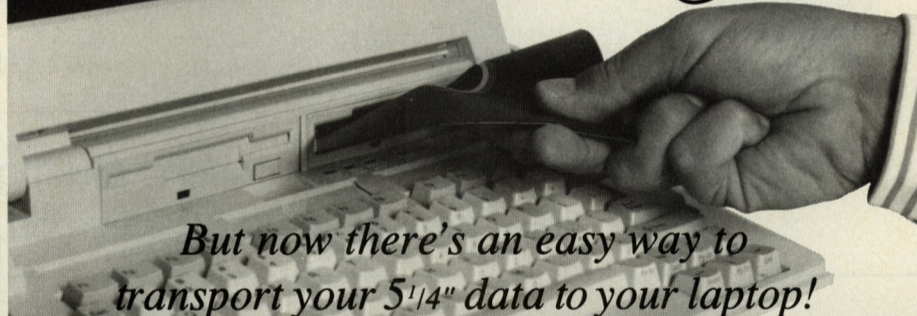
#### CRISES SOLVED

Media Technologies of Bothell, Wash. has become expert on disks: these people handle tens of thousands of floppies at once. The company duplicates product disks for software vendors, and one of their primary goals is zero-defect deliveries, so they've made an intensive study of the media and what makes it tick.

Media Technologies disk technician Brian Patow says the inability to read 1.44MB disks from another 1.44MB system is usually the drive's fault. Patow said about 9 in 10 of these cases are head-alignment differences, where one machine's heads are mis-aligned in one direction, and the other machine's in the other direction. (The other 10 percent are the result of rotation speed.)

"If they're both mis-aligned in the same direction," Patow added, "it's not ideal, but you're probably okay. Until you take one of those disks to a machine mis-aligned the other direction." If you do have a drive with mis-

# Some Things Never Change



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WELTEC introduces their new 525 external floppy drive subsystem - the easy way to use 5.25" data with your 3.5" format laptop computer. The 525 subsystem is simple to setup, easy to use, and supports a wide variety of laptop and desktop systems.

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## HOW-TO



## Vendors aren't picking one density to standardize on.

aligned heads, you should plan on getting the alignment corrected. Most urban areas have a small shop dedicated to disk drive repair, competent to correct disk head alignment problems.

Patow says the problem reading low-density disks properly formatted for that density on a high-density drive isn't as common in the 3½-inch world as in the 5¼-inch world, but it still exists. The 1.44MB drives' stepper motor has to do some fancy dancing to lay out or read tracks that were

laid out exactly half as densely as they were designed to.

There are other differences between the way a 720K drive writes data and the way a 1.44MB one does. For one thing, the level of electric current used to write to the disk is different.

### THREE WAYS OUT

I chatted with three consultants who focus on portable systems—actually, I chatted with two, and had to “dialogue” with the Californian—to dis-

cuss their strategies to help their clients deal with the problem.

One said he does nothing to prevent it. The occasional blow-up the client experiences from these little portable land-mines ensures a constant stream of work, which is good for the consultant's income. But he believes it works out for the client as well, because when he comes to the client to fix the little problem, he can look over how they're handling their computers and possibly deflect a big blunder.

A second says she has her clients use Mace Utilities to format floppies because the utility program automatically recognizes the default format for the disk, avoiding accidental 1.44MB formatting on a 720K floppy. She's also standardized all clients on



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*“I'm in a drug information program in school, and have gotten a lot of information on CompuServe. I start with the online encyclopedia for specific information, and branch out from there.”*

—Jaime Lewis, High School Student  
Steve Lewis, Computer Consultant

## CompuServe®



the less-sensitive, and very-slightly more common 720K drives. While that makes all in-house disk swaps less problematic (all disks have been formatted to 720K), it doesn't solve density identification hassles when disks come from outside.

The third is the most aggressive in managing floppy drives with multiple formats. He insists clients buy more expensive 3½-inch disks in fancy colors: All 720K floppies are bright yellow, and 1.44MB floppies are red. Every disk drive gets a label specifying it as either "720" or "1.44". Every incoming disk from another company or a shrink-wrapped package goes through a company information center specialist who checks it for virus contamination and density.

The disks that come shrink-

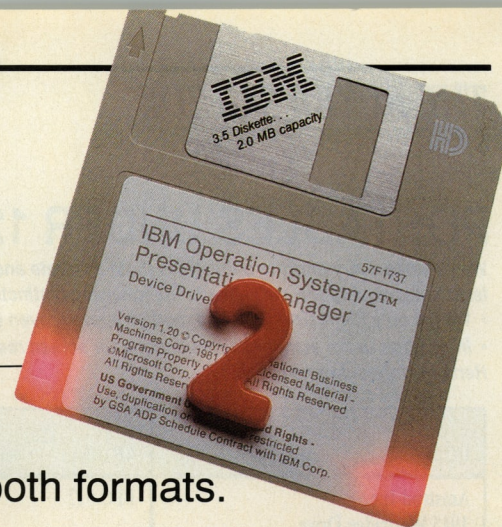
## Of 15 leading laptop manufacturers, six use both formats.

wrapped are given sticky labels that identify their health check-up and density. Other disks are transferred to an appropriately colored disk. The info center specialists also keep their eyes peeled for any telltale beige or blue disks floating around the building, hints that users are bringing in unchecked media. If they find any, they educate the offender on the importance of their color-coding and disinfecting program.

You got all those solutions? Good,

because two major drive OEMs have been working for a while to get system builders to move to a 2.88MB floppy standard. You'll get a lot more stuff on your disks. You'll get higher densities, more sensitive formats, and less tolerance for head mis-alignment and disk rotation speed variances. I can't wait. □

*Jeff Angus is a manager at Farallon Computing in Berkeley, CA, and a systems analyst.*



## Everyday People on CompuServe

### Take a Trip.

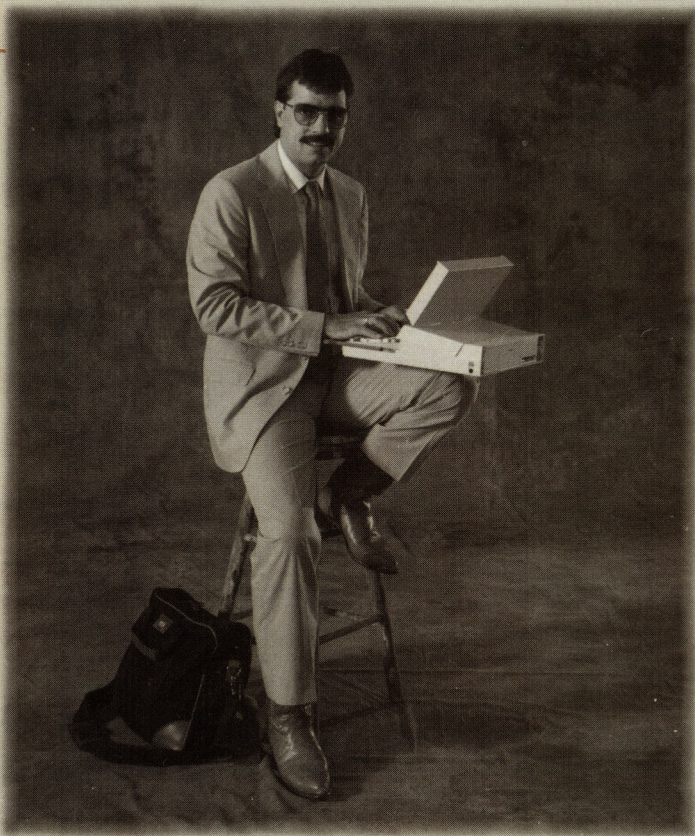
Whether you travel for business or pleasure, CompuServe can help you get a better handle on it. You'll have access to information from virtually every major domestic and international airline, right at your fingertips. So, you can compare fares, select your route and the most convenient travel times—even book your reservations, right down to the car rental and hotel.

Before you travel abroad, verify passport and visa requirements in advance. And, if you're going to a new resort, try the Travel Forum for firsthand tips from people who have been there before. Call 800 848-8199, or see your computer dealer. You'll find CompuServe is just the ticket, when it comes to traveling anywhere.

*"I often fly from New York to Tampa, and if I plan my flight online, I can save \$150 to \$200 on that trip alone. In the last year, I've saved enough money to buy a round-trip ticket to Paris."*

*— Don Sanderson, Systems Consultant*

**CompuServe®**





## PORTABLES UNDER 12 POUNDS

We've made every effort to publish the most accurate and complete portable computer buyer's guide you can find. To give you the most information in the least amount of space, we've made the following distinctions:

- We list only the fastest CPU and modem speeds, even though both may run at slower speeds. For example, 2400-bps modems work fine at 1200 and 300 bps.
- In addition to the standard abbreviations for screen resolution (CGA, EGA, VGA), we use DCGA to mean double-scan CGA (640 by 400) and HGA to indicate Hercules monochrome graphics.

COMPANY	MODEL	PRICE	SIZE/ WEIGHT	CPU/ CLOCK	RAM STD/MAX	DISPLAY	INTERNAL BATTERY
<b>Amstrad Inc.</b> 1915 Westridge Drive Irving, TX 75038 (214) 518-0668	PPC 512	\$949	17.8 × 9 × 4 in. 11 lbs.	8086 8MHz	512K/640K	LCD (CGA)	C-cells
<b>Bondwell International</b> 50485 Seabridge Drive Fremont, CA 94538 (415) 490-4300	B200	\$1,295	13 × 12.2 × 2.2 in. 8 lbs.	80C88 8MHz	256K/640K	LCD (CGA)	nicad
<b>Colby Systems Corp.</b> 2991 Alexis Dr. Palo Alto, CA 94304 (415) 941-9090	Walkmac SE	\$5,499	12 × 15 × 3.5 in. 12.5 lbs.	68000 16MHz	1MB/8MB	backlit LCD (Macintosh)	nicad
<b>Compaq Computer Corp.</b> 20555 FM 149 Houston, TX 77070 (713) 370-0670	Compaq LTE	\$2,399	11 × 8.5 × 2 in. 6 lbs.	80C86 9.54MHz	640K/1MB	backlit LCD (CGA)	nicad
	Compaq LTE/286	\$3,899	11 × 8.5 × 2 in. 6 lbs.	80C286 12MHz	640K/2.6MB	backlit LCD (CGA)	nicad
<b>Data General Corp.</b> 3400 Computer Drive Westboro, MA 01580 (800) 328-2436, (617) 898-4074	DG One/Model 2T	\$1,995	14.5 × 11.8 × 3.1 in. 10.5 lbs.	80C88 7.16MHz	512K/2.5MB	backlit LCD (CGA)	nicad
<b>Datavue</b> One Meca Way Norcross, GA 30093 (404) 564-5555	Snap 1 + 1	\$2,295	13 × 13 × 3.2 in. 10 lbs.	V20 9.54MHz	640K	LCD (CGA)	nicad
	Spark	\$995	13.2 × 13 × 2.5 in. 9 lbs.	V20 9.54MHz	384K/640K	LCD (CGA)	nicad
<b>Dynabook Technologies Corp.</b> 6150 Stoneridge Mall Rd., Suite 225 Pleasanton, CA 94556 (415) 850-0660	Dynabook 286	\$4,695	13.6 × 11 × 2 in. 8.7 lbs.	80C286 16MHz	1MB/4MB	backlit LCD (VGA)	lead acid
<b>Epson America</b> 2780 Lomita Blvd. Torrance, CA 90505 (800) 922-8911	Equity LT	\$1,899	13.6 × 12.2 × 3.1 in. 12 lbs.	V30 10MHz	640K	LCD (CGA)	nicad
<b>Grid Systems Corp.</b> 50211 Lakeview Blvd. Fremont, CA 94537-5003 (415) 656-4700, (800) 222-4743	GridLite XL	\$1,950	13 × 11 × 3 in. 9.5 lbs.	80C86 8MHz	128K/1MB	LCD (CGA)	nicad
	GridCase 1520	\$3,495	15 × 11.5 × 2.3 in. 12 lbs.	80C286 10MHz	1MB/4MB	backlit LCD (DCGA)	nicad
	GridCase 1530	\$4,695	15 × 11.5 × 2.5 in. 12 lbs.	80386 12.5MHz	1MB/8MB	backlit LCD (DCGA)	nicad
	140 XT	\$2,750	14.3 × 12.5 × 3.5 in. 11 lbs.	V20 8MHz	768K	backlit LCD (CGA)	nicad
<b>Hewlett-Packard Co.</b> 19310 Pruneridge Ave. Cupertino, CA 95014 (408) 973-1919, (800) 752-0900	Vectra LS/12	\$4,999	12.2 × 12.2 × 3.5 in. 10.5 lbs.	80286 12MHz	1MB/2MB	backlit LCD (DCGA)	nicad



- "Opt" means that the feature is available from the manufacturer as an extra-cost option.
- Nicad (nickel-cadmium) and lead-acid batteries are rechargeable; all other types are not.
- Units feature a serial and a parallel port unless otherwise listed.
- Prices shown are the manufacturers' suggested list prices, which include standard RAM but no options.

We've designed our buyer's guide to help you shop for the portable that best suits your needs. All information is provided by the manufacturers and may be subject to change. Limit your choices to one or two machines, then contact the manufacturer directly for expanded information.

FLOPPY DISKS	HARD DISKS	BUNDLED SOFTWARE	INTERNAL MODEM	IBM SLOTS	PROP SLOTS	MATH	NOTES & OPTIONS
3.5/720K, 2nd opt		MS-DOS 3.3	2400			opt	Features carrying case, cigarette-lighter adapter. Options include PPC512 expansion box.
Two 3.5/720K		MS-DOS 3.3					Options include carrying case.
3.5/1.44MB	40MB or 100MB opt	Colby hard drive formatter	2400 opt		1	opt	Features extended keyboard. Options include accelerator board, Colby keyport (50-pin lock & peripheral connector, 68020 or 68030 CPU.
3.5/1.44MB	20MB opt	Utilities, EMS manager, disk caching	2400 opt				Options include 5.25 external drive or 40MB external tape drive, cigarette-lighter adapter.
3.5/1.44MB	20MB or 40MB opt	Power-conservation utilities, EMS manager, disk caching	2400 opt			opt	Options include 5.25 external drive or 40MB external tape drive, cigarette-lighter adapter.
Two 3.5/720K	20MB opt	MS-DOS 3.2	2400 opt		4	opt	Options include portable printer, backlit LCD, numeric keypad, bar-code reader.
Two 3.5/720K	20MB opt	MS-DOS 2.11	1200 opt	1	1	opt	Keyboard has full numeric keypad. Options include 5.25 external drive, expansion unit, gaslit or EL backlit LCD, carrying case.
3.5/720K, 2nd opt	20MB opt	MS-DOS 2.11	1200 opt		1	opt	Options include 5.25 external drive, expansion chassis, backlit supertwist EL display, carrying case.
3.5/1.44MB	20MB or 40MB opt	MS-DOS 4.01	2400 opt			opt	Features telephone link jack, telephone set jack, expansion bus. Options include docking module, carrying case, LCD extender, remote-charge adapter.
Two 3.5/720K	20MB opt	MS-DOS 3.2, Lap-Link	1200 opt		2		Features hard-drive power switch and full numeric keypad. Options include backlit LCD, 5.25 external drive, carrying case, cigarette-lighter adapter.
3.5/1.44MB	20MB opt		2400 opt			opt	Options include carrying case, cigarette-lighter adapter, external 3.5 or 5.25 drive, external 40MB tape drive.
Two 3.5/1.44MB	20MB (40MB or 100MB opt)		2400 opt		2	opt	Options include 3.5 or 5.25 external drive, gas-plasma display, expansion cartridge, VGA.
Two 3.5/1.44MB	20MB (40MB or 100MB opt)		2400 opt		2	opt	Options include 3.5 or 5.25 external drive, VGA, gas-plasma display, expansion cartridge.
3.5/720K	20MB	MS-DOS 3.3	2400 opt			opt	Options include 5.25 external drive, external keyboard.
3.5/1.44MB	20MB (40MB opt)	Battery Watch (MS-DOS 3.3 opt)	2400 opt		2	opt	The battery pack snaps on the back. Features port for numeric keypad. Options include 5.25 external drive, carrying case.



## THE BUYER'S GUIDE

COMPANY	MODEL	PRICE	SIZE/ WEIGHT	CPU/ CLOCK	RAM STD/MAX	DISPLAY	INTERNAL BATTERY
<b>Hyundai Electronics America</b> 166 Baypointe Parkway San Jose, CA 95134 (408) 503-9200	Super-LT3	\$2,995	13 × 12.8 × 2.8 in. 12.5 lbs.	80C286 10MHz	1MB/2MB	backlit LCD (CGA)	nicad
<b>NEC Home Electronics</b> 1255 Michael Drive Wood Dale, IL 60191 (312) 860-9500, (800) 632-7638	MultiSpeed	\$2,499	13.6 × 12.4 × 3.1 in. 11.2 lbs.	V30 9.54MHz	640K	LCD (CGA)	nicad
<b>Poqet Computer Corp.</b> 650 North Mary Ave. Sunnyvale, CA 94086 (408) 737-8100	Poqet PC	\$1,995	8.8 × 4.3 × .9 in. 1 lb.	80C88 7MHz	512K	LCD (CGA)	AA-cells
<b>Sanyo Business Systems</b> 51 Joseph St. Moonachie, NJ 07074 (201) 440-9300	MBC-16LT	\$1,399	12.6 × 11.4 × 2.4 in. 7.9 lbs.	80C88 8MHz	640K	LCD (CGA)	nicad
<b>Sharp Electronics Corp.</b> Sharp Plaza Mahwah, NJ 07430 (201) 529-9500	PC-4602	\$2,195	12.1 × 13.7 × 3 in. 10.8 lbs.	V40 10MHz	640K/1.6MB	backlit LCD (DCGA)	lead acid
<b>Tandy Corp.</b> 1800 One Tandy Center Fort Worth, TX 76102 (817) 390-3011	1100 FD	\$999	12.1 × 9.8 × 2.4 in. 6.5 lbs.	NEC V20 8MHz	640K	LCD (CGA)	lead acid
	1400 FD	\$1,499	14.5 × 12.5 × 3.5 in. 11.5 lbs.	NEC V20 8MHz	768K	backlit LCD (CGA)	nicad
<b>Texas Instruments Inc.</b> P.O. Box 202230 Austin, TX 78720-2230 (800) 527-3500	TravelMate LT286 Mod. 12	\$4,199	11.7 × 8.2 × 3.2 in. 6.7 lbs.	80C286 12MHz	1MB/4MB	backlit LCD (CGA)	nicad
<b>Toshiba America Information Systems</b> 9740 Irvine Blvd. Irvine, CA 92718 (800) 334-3445	T1000SE	\$1,699	12.4 × 10.2 × 1.8 in. 5.9 lbs.	80C86 9.54MHz	1MB/3MB	backlit LCD (CGA)	nicad
	T1000	\$999	12.2 × 11 × 2.05 in. 6.4 lbs.	80C88 4.77MHz	512K/1.2MB	LCD (CGA)	nicad
	T1200	\$2,099	12.2 × 12 × 2.6 in. 9.9 lbs.	80C86 9.54MHz	1MB/2MB	LCD (CGA)	nicad
	T1600	\$4,999	12.2 × 12.5 × 3.2 in. 11.6 lbs.	80C286 12MHz	1MB/5MB	backlit LCD (EGA)	nicad
<b>Zenith Data Systems</b> 1000 Milwaukee Ave. Glenview, IL 60025 (312) 699-4800, (800) 553-0331	MinisPort	\$1,999	12.4 × 9.8 × 1.3 in. 5.9 lbs.	80C88 8MHz	1MB/2MB	backlit LCD (CGA)	nicad
	SupersPort	\$2,399	12.2 × 12.2 × 3.1 in. 9.7 lbs.	80C88 8MHz	640K/1.6M	backlit LCD (DCGA)	nicad
	SupersPort 286	\$4,999	12.2 × 12.2 × 3.1 in. 10.5 lbs.	80286 12MHz	1MB/2MB	backlit LCD (DCGA)	nicad



FLOPPY DISKS	HARD DISKS	BUNDLED SOFTWARE	INTERNAL MODEM	IBM SLOTS	PROP SLOTS	MATH	NOTES & OPTIONS
3.5/1.44MB	20MB	MS-DOS 3.3	1200 opt		2	opt	Features external 50-pin bus. Options include carrying case, 5.25 external drive.
Two 3.5/720K	20MB opt	MS-DOS 3.2	2400 opt		1		Keyboard has separate numeric keypad. Optional backlit screen models available.
		MS-DOS 3.3, PoqetTools, PoqetLink in ROM					Features two slots for RAM or ROM cards, I/O bus. Options include 3.5/1.44MB external drive, parallel cable, serial modem cable.
Two 3.5/720K		MS-DOS 3.2	2400 opt		1		Features detachable display. Options include numeric keypad, external hard drive.
Two 3.5/720K	40MB opt	MS-DOS 3.3	2400 opt			opt	Options include 5.25 external drive, EPROM card, second serial port.
3.5/720K		MS-DOS 3.3, DeskMate in ROM.	2400 opt				Options include carrying case.
Two 3.5/720K	20MB opt	MS-DOS 3.3	2400 opt		1		Options include 5.25 external drive, carrying case, cigarette-lighter adapter.
	20MB	MS-DOS 3.3, Lap Link in ROM	2400 opt			opt	Features IC memory card. Options include numeric keypad, carrying case, express battery charger, 3.5 external drive.
3.5/1.44MB		MS-DOS 3.3 in ROM, PC-Kwik	2400 opt		1		Features expansion-bus connector. Options include 5.25 external drive, external recharger, cigarette-lighter adapter, carrying case.
3.5/720K		PC-Kwik (MS-DOS 3.3 opt)	2400 opt		1		Options include AC adapter/battery charger, 5.25 external drive, numeric keypad, cigarette-lighter adapter, Floppy Link.
Two 3.5/720K	20MB opt	MS-DOS 3.3, PC-Kwik	2400 opt		1		Options include 5.25 external drive, expansion unit, backlit LCD, numeric keypad, carrying case, Floppy Link, cigarette-lighter adapter, ToshibaLAN card.
3.5/1.44MB	20MB	MS-DOS 3.3, PC-Kwik (disk-cache software, MS OS/2 opt)	2400 opt		1	opt	Options include 5.25 floppy drive, expansion chassis, cigarette-lighter adapter, numeric keypad, Floppy Link, ToshibaLan card.
2.0/720K		MS-DOS 3.3 and FastLynx in ROM	1200 opt				Options include removable battery pack and charger; external 2, 3.5, and 5.25 external drives; carrying case.
Two 3.5/720K	20MB or 40MB opt	MS-DOS 3.3 Plus	2400 opt		3	opt	Options include cigarette-lighter adapter, expansion chassis, external numeric keypad, 5.25 external drive.
3.5/1.44MB	20MB (40MB opt)	MS-DOS 3.3 Plus	2400 opt		3	opt	Options include carrying case, cigarette-lighter adapter, numeric keypad, 5.25 external drive, expansion chassis.



# INTRODUCING . . . THE

## TWO COMPAQ LTES

**C**ompaq's new LTE and LTE/286 are six-pound, 11 by 8.5 by 2-inch portables featuring a hard drive and a 3½-inch, 1.44MB floppy drive. Both machines come with EL supertwist backlit LCD screens with CGA resolution, an 80-key keyboard with embedded numeric keypad, an AC adapter, clock/calendar, ports for an external monitor and keypad/keyboard, and a protective slipcase.

The Compaq LTE has a 9.54MHz, 80C86 CPU and 640K RAM (expandable to 1MB). The LTE/286 features a 12MHz, 80C286 CPU and 640K RAM (expandable to 2.6MB). The LTE and LTE/286 with 20MB hard drive sell for \$2,999 and \$4,499, respectively. The 286 model with 40MB drive costs \$4,999.



Options for both machines include a 2400-bps internal modem, external 5¼-inch 1.2MB or 360K drive, external 40MB tape drive, Fast Charger/AC adapter, cigarette-lighter

adapter, and carrying case.

Compaq Computer Corp., P.O. Box 692000, Houston, TX 77269-2000, (713) 370-0670.

*Circle 160 on Reader Service card.*

## TWO FROM TEXAS

**T**exas Instruments' two new 80C286 portables include the TravelMate LT286 Model 12 (\$4,199) and the TravelMate LT286 Model 25 (\$4,999). The six-pound, 11.7 by 8.2 by 3.2-inch Model 12 comes with 1MB of RAM (expandable to 4MB), a backlit CGA screen, a 20MB hard drive, nicad batteries, and MS-DOS 3.3 and LapLink Plus in ROM. The machine features an external monitor port, AT expansion bus, memory-card slot, and a port for the optional 3½-inch, 1.44MB floppy drive module.

To conserve battery life, the Model 12's processor will automatically cycle down to 6MHz from its usual



12MHz when idle. The Models 12 and 25 let you switch off the screen's backlighting to save energy, and both can put the hard drive to sleep when it's not in use.

The 14-pound, 14.3 by 12.1 by 3.3-inch Model 25 comes with 640K of RAM (expandable to 3.6MB), a 3½-inch, 1.44MB floppy drive, a 20MB hard drive (or optional 40MB drive), nicad batteries, and a backlit VGA screen. The Model 25 features analog and digital monitor ports, a reverse video switch, a CRT/LCD switch, and a 101-key keyboard connector.



# LATEST IN LAPTOPS

## TWO MITAC PORTABLES

American Mitac Corp. enters the laptop market with two machines, the 16MHz LT386SX (\$4,495), and the 12MHz LT286 (\$3,295). Beside their different processors, the machines are similar in many respects. Each runs on nicad batteries, measures 14.5 by 12 by 3.5 inches, and includes 1MB of RAM (expandable to 5MB). Each has a 1.44MB, 3½-inch floppy drive, an AC adapter, and a VGA screen that supports 640 by 480 resolution with 16 gray scales.

Both machines have ports for an external monitor and have power-management systems and an auto-resume feature that lets you hot-key into a previous application. You can get an optional 20MB or 40MB hard drive for either laptop.

American Mitac Corp., 410 E. Plumeria Drive, San Jose, CA 95134, (800) 648-2287, (408) 432-1160.

Circle 164 on Reader Service card.



Circle 163 on Reader Service card.

## THREE FROM ZENITH

Zenith's 16MHz SupersPort SX (\$6,799) is the company's first battery-powered, 80386SX-based laptop. The 12.1-pound, 12.2 by 12.2 by 3.4-inch unit comes with 1MB of RAM (expandable to 8MB), a backlit, supertwist VGA screen, a 3½-inch, 1.44MB floppy drive, and a 40MB or 100MB hard drive.

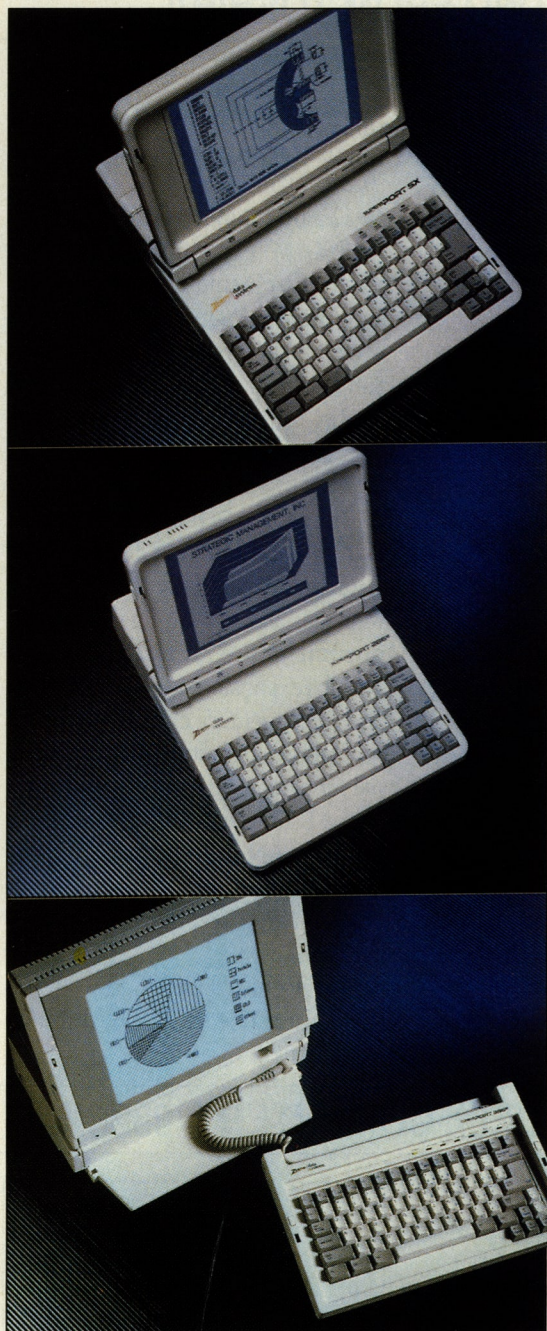
The new SupersPort can operate up to four hours on its nicad battery pack, according to Zenith. Standard features include ports for an external monitor and disk drive, an expansion bus connector, a coprocessor socket, and a modem slot.

The 12MHz SupersPort 286e (\$5,499) measures 12.2 by 12.2 by 3.35 inches and weighs 15.6 pounds. It features a supertwist black-on-white VGA screen 1MB of RAM (expandable to 3MB), a 3½-inch, 1.44MB floppy drive, rechargeable battery pack, 20MB or 40MB hard drive, and an Intelligent Power Management system that lets you allocate power among the disk drives, screen backlighting, and peripheral ports.

The 286e includes ports for an external monitor and 5¼-inch floppy drive, a 110/120 VAC adapter/charger, and MS-DOS 3.3 Plus.

Zenith's Turbosport 386e (\$7,499) is a 20MHz, 80386 portable with a detachable keyboard. It weighs 14.7 pounds, measures 14.8 by 13.3 by 4.8 inches, and comes with 2MB of RAM (expandable to 3MB), a 3½-inch

Texas Instruments Inc., Information Technology Group, P.O. Box 202230, Austin, TX 78720-2230, (800) 527-3500.





## WHAT'S NEW

1.44MB floppy drive, a 40MB hard drive, a 2400-bps modem, and a nicad battery. The 386e also includes the Intelligent Power Management sys-

tem to conserve battery life, an expansion bus connector, an external monitor port, a 110/120 VAC adapter/charger, and MS-DOS 3.3 Plus.

Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025, (800) 553-0331.

*Circle 165 on Reader Service card.*

## TWO FROM TOSHIBA

**T**oshiba's T3100SX (\$5,999) is the company's first battery-powered portable offering a 16MHz, 80386SX CPU. This 14.9-pound, 14.2 by 12.2 by 3.2-inch machine features 1MB RAM (expandable to 7MB), a VGA gas-plasma display, a 40MB hard drive, a 3½-inch, 1.44MB floppy drive, 86-key keyboard, and ports for an external monitor and an external keyboard or numeric keypad. The T3100SX can drive its own and an external monitor simultaneously.

The laptop is bundled with MS-DOS 4.01, PC-Kwik Power Pak, Quarterdeck Expanded Memory Manager-386, and on-line Hypertext documentation. It also includes a Toshiba expansion slot, a modem slot, and three memory expansion slots.

Options include a 2400-bps internal modem, a carrying case, numeric keypad, 101-key keyboard adapter, a ToshibaLAN Ethernet card, expansion chassis and interface card, external 5¼-inch drive, and Toshiba Lap Link Plus.

The Toshiba T1000SE (\$1,699) is a 5.9-pound, 12.4 by 10.2 by 1.8-inch

portable with a 9.54MHz, 80C86 CPU, 1MB of RAM (expandable to 3MB) and a battery-backed RAM disk (which can use memory above 640K). The unit comes with a 3½-inch, 1.44MB disk drive, double-scan CGA resolution on a backlit LCD, a 100-pin expansion bus, modem slot, and MS-DOS 3.3 in ROM. Power-management techniques such as shutting down the display after a period of keyboard inactivity help extend battery life.

The T1000SE comes with an AC adapter and Multisoft's PC-Kwik Power Pak performance utilities with disk cache, print spooler, screen and keyboard accelerators, and hypertext on line (pop-up reference and MS-DOS documentation).

Options include 1MB or 2MB memory cards, recharger and extra battery packs, 2400-bps modem, cigarette-lighter adapter, external 5¼-inch external disk drive, fabric carrying case, and the LapLink Plus file-transfer package.

Toshiba America Information Systems Inc., Computer Systems Divi-



sion, 9740 Irvine Blvd., Irvine, CA 92718, (800) 334-3445.

*Circle 161 on Reader Service card.*

## DELL COMPUTER'S 386SX



**D**ell Computer Corp. jumped into the laptop market with the 15-pound Dell 316LT (\$3,499), a 16MHz, 80386SX machine featuring VGA graphics, a 3½-inch, 1.44MB floppy and 20MB hard drive, 1MB of RAM (expandable to 8MB), and a Continuous Power Battery System that lets you change batteries in the middle of an application without turning the computer off.

The 14.3 by 12.7 by 3.4-inch 316LT

offers ports for an external keyboard and monitor and an eight-bit half-size expansion slot. Options include a 40MB hard drive and a 5¼-inch external disk drive. Dell's next-day, on-site service policy means there's ready support for your computer wherever you're travelling with it in the U.S.

Dell Computer Corp., 9505 Arboretum Blvd., Austin, TX 78759-7299, (800) 426-5150, (512) 338-4400.

*Circle 162 on Reader Service card.*



## 5<sup>1</sup>/<sub>4</sub>-INCH LAPTOP DRIVES

**T**he MultiDrive II auto-sensing, 1.2MB external 5<sup>1</sup>/<sub>4</sub>-inch floppy drives (\$299.99) read and write to both high- and low-density disks. The 4.4-pound, 9.8 by 5.8 by 1.8 inch drives work with 286 and 386-based Toshiba laptops, the Zenith Super-sPort 286, and the Compaq SLT/286. A molded-cable interface plugs into the laptop's floppy drive port; the units do not require driver software.

The MultiDrive II functions in either the U.S. 110-volt environment or the European 220/240-volt, depending on the power supply you order.

CNF Inc., 17705 Hale Ave., Building 1, Suite 2, Morgan Hill, CA 95037, (408) 778-1160.

*Circle 170 on Reader Service card.*

## THE NEWEST BROOKLYN BRIDGE

**V**ersion 3.0 of The Brooklyn Bridge (\$139.95) is the first new release of the file transfer program since Fifth Generation Systems purchased it from White Crane Systems in August 1989. Version 3.0 gives the host computer the ability to clone the program onto the remote machine, so you can transfer files even when you don't have the Brooklyn Bridge on a disk format that the remote computer can accept.

The Bridge can now automatically

configure itself to a parallel or serial port and use either computer as master or slave. You can also record keystroke macros to automate file transfer procedures that you perform regularly. The package features enhanced EGA/VGA graphics support and comes with parallel and serial cables.

Fifth Generation Systems Inc., 10049 N. Reiger Road, Baton Rouge, LA 70809-4562, (800) 873-4384, (504) 291-7221.

*Circle 167 on Reader Service card.*

## 100MB DRIVE FOR THE TURBOSPORT

**T**he LiteDrive II-100 (\$2,345) replaces the Zenith TurbosPort 386's 40MB hard drive. The 1.8-pound LiteDrive has a fast 25-millisecond access time, a 1.25MB per second data-transfer rate, and re-

quires 4 watts while seeking and 5.7 watts while reading and writing.

CMS Enhancements Inc., 1372 Valencia Ave., Tustin, CA 92680, (714) 259-4004.

*Circle 166 on Reader Service card.*

## Chaplet Laptop

*Pound for pound,  
The most powerful  
PC's in the world*

Although the Chaplet LA-30A mounts standard 80286-12 microprocessor, running at 12/6 MHz, it can plug into an 80287 for processing power. In addition, the laptop has 2 expansion slots. The memory is 1 MB, optional 2/5 MB, extendable to 16 MB. LA-30A also comes with a Conner's 20 MB HDD with 28 MS access time and 1.44MB 3.5" FDD.

The backlit supertwist LCD with 640 × 400 pixels. LA-30A can be used with internal Ni-Cd battery, and AC power adaptor.



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# DREAM MACHINE

HAS THE ULTIMATE IN VERY PORTABLE COMPUTERS ARRIVED?

**T**he passing days and months are eternal travellers in time. So are the years that come and go. Life itself is a journey, and among the poets of old there were those who died while travelling."

So begins a travel sketch by Matsuo Basho, the celebrated 17th-century Japanese pilgrim poet and travelogue writer. He is considered the greatest of the Haiku poets, and helped perfect the art of this 17-syllable form of Japanese poetry.

Matsuo Basho is important for networkers and an info nomad like me, in that he stressed the significance of being compact in form and constantly on the road.

Today, three hundred years later, I am on the go with a laptop, spanning a bridge of information over the Pacific Ocean. Wherever I go, I carry a Toshiba book-size laptop computer instead of Basho's traditional calligraphy brush. Weighing less than 6 pounds, the 16-bit backlit Toshiba machine supports Japanese Kanji characters.

With this computer, I can dispatch news reports, essays, and columns on-line for my newspaper in Japan and my SIG, "Global Village", on NEC's PC-VAN, which is Japan's largest nationwide

network with more than 100,000 subscribers.

My goal in life, as you may be aware by now, is to devote myself to help realize a true global village.

## MORE DREAMS

In the ever-changing world of laptop computers, can I say that my book-size computer is the ultimate dream machine?

My answer is no, because I have information from well-informed sources in the PC manufacturing industry in Tokyo that a machine more compact and smaller than either the Compaq LTE or Toshiba T1000SE is likely to come out soon. Weighing less than 4 pounds, but including a 20MB or 40MB hard drive, such a machine will use nickel hydride batteries, which have 50 percent greater power density than nicads.

Toshiba, which triggered the laptop boom in the U.S., could be among the first manufacturers to produce such a "minissimo" portable. However, Compaq and NEC are also certainly in the running for this new generation of book-size systems.

Whoever is first, this new generation of laptops should make quite an impact on the portable computer market.

## WORTH WATCHING

Japan is a country worthy of attention and observation for new,

state-of-the-art laptops and for future trends in portable computing, because the Japanese have a sharp penchant for producing things mini and compact as is shown by the poet-monk Basho's writing style in ancient times.

I would like to tell you a little more about myself in this first in a series of Tokyo-dateline columns, which I hope will generate responses, suggestions, ideas, etc.

As special correspondent for Business Computer News—a Japanese-language weekly trade paper in Tokyo—I have the opportunity to travel to the U.S. nearly every other month to cover major trade shows and conferences. I also work as a telecommunications specialist and consultant for telecom and computer-related corporations in Japan.

Books published under my name in Japan include *An Introduction to Global Networking*, *The Digital Information Man*, *How I Built an Online Community Called Global Village*, and *An Introduction to Laptops*.

If you wish to offer comments concerning this column, please feel free to contact me through my CompuServe ID: 70007,2767.

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*"Mas" Takada is Asian Editor of Portable Computing. Author of more than 20 books, he is also founder of the special-interest-group movement in Japan.*



*By Masazumi Takada*



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## RX LAPTOPS

**C**iba-Geigy has purchased 1,300 copies of PFS:First Choice so its salespeople, each of whom calls on more than 500 physicians, can use the program on their laptop computers. PFS: First Choice was developed by Software Publishing Corp., Mountain View, Calif.

Peter Hutchinson, who commands CG's Headquarters Help desk, says he was originally looking for a word processing package, but realized that with an integrated package "we could (also) have four other applications that would otherwise be too costly to purchase separately."

Hutchinson says support is a critical issue in determining his company's software needs. "The majority of our sales force had never used a computer before, and (we) didn't have the resources to support a package that required a lot of attention," he says. "With PFS:First Choice, each



member of the sales force gets about three hours of training and a manual, and they're ready to go."

Even though the multiple applications are nice, Hutchinson says word processing is the most widely used module. Typically, salespeople write up personal notes about each visit to a physician, then compile reports that are sent on to corporate headquarters.

They also use the word processor in combination with the graphics module to create invitations or flyers

about seminars they are sponsoring. "Before, many of them would use an office or an outside secretarial service, which takes a couple of days to turn around," according to Hutchinson. "Now they can do it immediately."

The spreadsheet module is used to record expenses and sample inventories, the database module for creating mailing lists, and the "screenshot" part of the graphics module for creating presentations to Ciba-Geigy management.

## HANDHELDS AT HOJO'S

**R**estaurant Management Co. (Remanco), Danvers, Mass., has developed a handheld computer that is used by waitresses at a Howard Johnson's restaurant in New

England. Waitresses punch in "food-specific" codes into the units, and orders are then automatically dispatched to stations at the bar or kitchen.

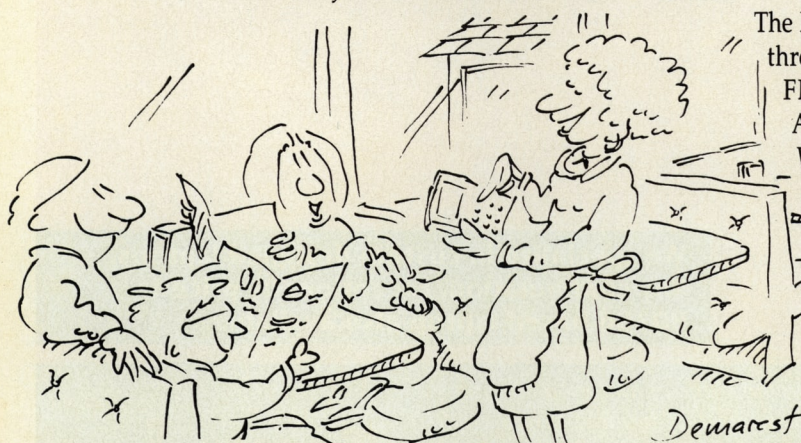
The Remanco units operate through a low-frequency FM receiver network. According to Richard Wright at the Howard Johnson's in White River Junction, Vt., "the system has smoothed a lot of edges in relations between cooks and waitresses. Cooks no longer have to learn

to interpret (various) shorthand scrawls, and waitresses are assured that each order is right the first time."

Management can track quantities of food sold, as well as the timing of service, and even when each waitress punches in and out for the day.

The 3 by 7-inch Remanco units fit into a pocket; waitresses also have a 3 by 7 card to refer to the less familiar of the 250 or so food codes.

Oh, yes . . . payment. When customers are done eating, they let the waitress know the method of payment, and one of six cash register stations print up a receipt from the information originally entered into the handheld unit.





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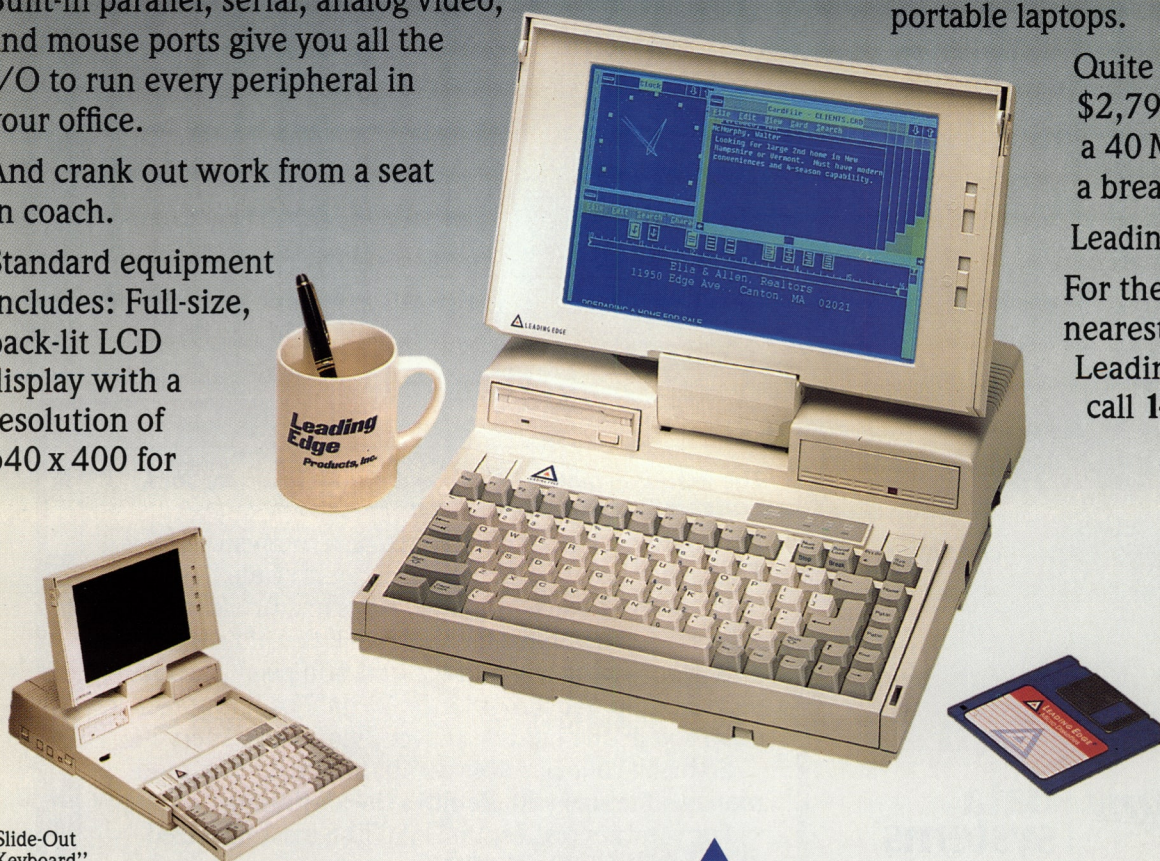
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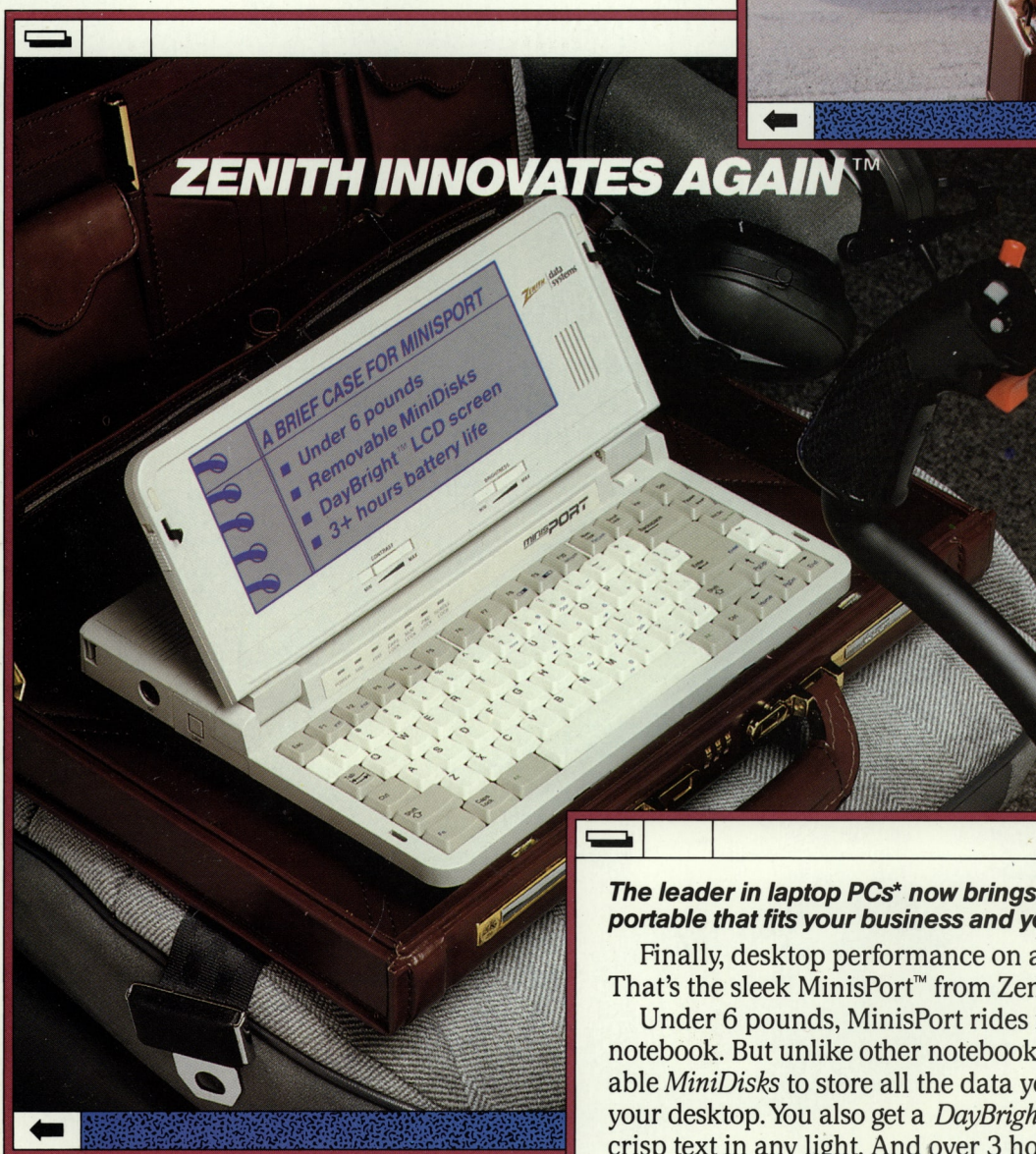
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