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Our **NEW 2 Mbyte EMS** expanded memory board supports the 4.0 LIM standard and allows you to maximize the upgrade potential of most Tandy computers. It includes RAM disk and print spooler software and is compatible with memory hungry

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Multifunction Board Flexibility

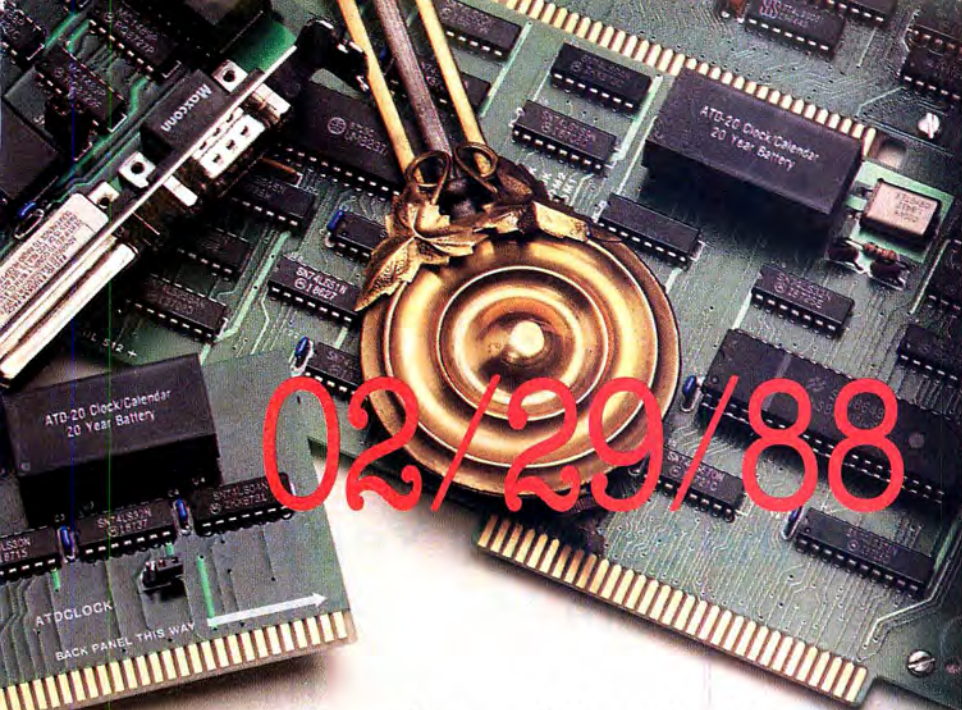
Our multifunction boards give you 1000 computers input/output and memory expansion to 640K. Features include an RS-232 serial port selectable for COM 1, 2, 3 or 4, a DMA controller chip, and clock/calendar. Plus RAM disk and print spooler software programs designed to give you more free time for your computing needs.

Hard Drive Plug-ins

Our 20 Mbyte internal hard disk drive for Tandy's 1000 and 3000 computers is preformatted with a controller card for easy installation. It eliminates the accumulation of floppy diskettes and dramatically



640K



decreases loading time on larger files. The drive is completely assembled, requires no preventative maintenance, and has low power consumption.

Two **NEW** members of our hard disk family are a 20 Mbyte drive for Tandy's new 1400 portable computer and an RLL 30 Mbyte hard card for the 1000 and 3000 computers.

Input/Output Power

Our four-option I/O board enables you to add up to two RS-232 serial ports and a clock/calendar to your Tandy 1000, 1200, or 3000 personal computer. The parallel port and optional clock/calendar comes with a 20-year lithium battery.

Our **NEW** game I/O clock board allows you to add a serial, parallel, game port and clock/calendar to your 1000, 1200, or 3000 computer.

It has a selectable serial port of COM 1, 2, 3 or 4; a selectable parallel port of LPT 1, 2 or 3; and a game port that supports dual joysticks on one connector.

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The Tandy 1400 LT's list of standard features make it a best buy for laptop shoppers.

Photography by Larry Dunn

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Lucky Number 100

■ by Michael E. Nadeau ■

Humor me while I brag.

This issue is *80 Micro*'s 100th—no big deal for magazines in general, but few computer publications have survived so long. In fact, only two consumer-oriented computer magazines, *Byte* and *Dr. Dobbs Journal of Software Tools*, are older than *80 Micro*.

Survival is tough for computer magazines. They face stiff competition, scarcity of talented writers and staff, and rapidly changing markets and audiences. Why *80 Micro* has survived is open to interpretation, but here's how I see it.

Quality Is Job One

With enough money, anyone can promote a magazine to gain a high number of readers. But what's often ignored is the quality of those readers. By quality, I mean the level of commitment to the magazine's mission. As an editor, I'd rather have 50,000 readers who are highly involved with the magazine and its market than 500,000 who merely succumbed to a high-powered subscription pitch.

Quality means loyalty. Involved readers spend more time with the magazine, renew more often, recommend the magazine to friends, and patronize the advertisers.

Staying in Tune

Over the years, *80 Micro* has had to move quickly to respond to a changing readership. Tandy has produced dozens of different computers and variations on them, and we've tried to cover nearly all of them at one time or another. Keeping up with the changes has required constant attention to the market and readership, and still does. We've done our job well in this area; we've had plenty of practice, after all.

Narrowing our focus to one operating system hasn't made our job any easier. Even now, the differences among the models in just the 1000 line are often significant. We spend a lot of time and money to remain the leading independent authority on Tandy MS-DOS computing. We survey our readers regularly, attend the major trade shows, talk to vendors about the market, and encourage interaction with you, our readers.

Third-Party Support

At one time, more software was available for Tandy proprietary systems than any other computer; this happened back when third-party vendors couldn't get the time of day from Tandy. But third-party vendors found that they could sell their wares successfully by advertising in *80 Micro*.

Not all were successful, of course. But of those who were, most became loyal to *80 Micro* and remained advertisers as they evolved with the market.

Today, Tandy flies the MS-DOS banner. Yet the Tandy market remains unique. The 1000 line, for example, sports unique graphics and sound features but has limitations such as the ability to accept only 10-inch or shorter add-on cards.

The Tandy owner is unique, too. Tandy sells more MS-DOS computers through retail outlets than any other vendor. This means that Tandy computers are bought mostly for family, home office, and small-business use.

These factors present unique marketing opportunities for savvy third-party vendors. For them, *80 Micro* is still the best way to reach Tandy users because we attract the right kinds of readers.

An Independent Voice

Tandy was the first company to market a microcomputer through retail outlets. It was also the first company to grapple with the problems of customer support at the retail level—and in the beginning, it was a mess. Like the industry as a whole, Tandy is still struggling with the problem.

As an independent publication, *80 Micro* was, and continues to be, a strong voice for the Tandy user. We took up issues such as Tandy's proprietary attitude toward third-party products, delays of promised upgrades, and the dearth of knowledgeable store personnel.

At times, the folks in Fort Worth pretended that *80 Micro* didn't exist. But I like to think that our commentary en-

couraged Tandy's customers to voice their complaints, bringing pressure for needed change. Today, Tandy is more responsive to the needs of its customers.

Credit Where Credit's Due

Without question, we picked the right line of computers to cover. The original TRS-80s were the darlings of the micro-computing pioneers—those who eagerly spent thousands of dollars for systems with little support or software available. When *80 Micro* arrived on the scene, it was able to tap a pool of experienced hackers with ideas to share, products to sell, and enthusiasm to spread.

Not surprisingly, *80 Micro* grew accordingly, and we gained momentum. The success of Tandy's 1000 line renewed that momentum a couple of years ago, and enthusiastic consumer response to the TX, HX, and 1400 LT has boosted it again. Obviously, our success is tied to Tandy's. If the Towers in Fort Worth were to suddenly vanish, *80 Micro* would soon follow.

The period of transition from TRSDOS to MS-DOS computers was an anxious time for us and, I'm sure, for Fort Worth. But now Tandy ranks second only to IBM in unit sales of MS-DOS computers. You have to give Tandy credit for bouncing back as strongly as it did after most observers were predicting doom.

Stayin' Power

We haven't forgotten what got us to this 100th issue. We'll continue to stay close to you, our readers, to speak our minds, and to produce the highest-quality magazine for users of Tandy MS-DOS computers. Care to stick with us for the next 100 issues?

Correction

We recently mailed welcome letters to some new subscribers. In a postscript, we stated that *80 Micro* is the only magazine covering Tandy computers. This was unintentional, and many of you knew better. Several publications cover Tandy computers; the postscript should have said that *80 Micro* is the one magazine covering only Tandy MS-DOS computers. We apologize for the error. ■

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Replacing a Keyboard

LOVELY TO LOOK AT, BUT NOT TO TOUCH

Q. I have one of the original Tandy 1000s (not the EX, HX, SX, or TX). I love the machine, but not the keyboard—it feels strange. I heard that Tandy offers a device that will let me use an IBM or clone keyboard on my 1000. Can I use this device to replace my keyboard with a better one, or is it only for the newer models?—*Jim Schmidt, Wheeling, IL*

A. Tandy has a Universal Keyboard Adapter (catalog no. 25-1030) available for \$99.95. It's a small box that plugs into the 1000's keyboard connector via a cable; while it accepts several keyboards, it won't accept all. Verify compatibility of the keyboard before you buy it. The adapter will accept the Tandy 1200, Tandy Enhanced (XT mode) and IBM Enhanced (XT mode) keyboards.

Because the adapter translates key codes from other keyboards to the appropriate codes for the 1000, you can use IBM-compatible software that isn't compatible with the 1000 keyboard. You'll have to switch back to your original keyboard to use software such as Tandy Basic, Deskmate, and Scripsit, which is specifically designed for the 1000 and utilizes the Tandy keyboard codes.

ITALUS INTERRUPTUS

Q. How can I get italic printing in the IBM mode of the DMP-130 printer? I'm using a 1000 SX. The manual provides codes for italics in the Tandy mode, but not for the IBM mode. There must be a way. The salesperson said that with the 1000 SX, I must use the IBM mode only. Why won't the Tandy mode work with a Tandy computer?

I'm considering buying a hard card for my 1000 SX. I've noticed several mail order offerings for such devices. But a Tandy salesperson warned me against buying any mail order hard cards, claiming that most of them would require an additional control card to work in my computer. Is this true? All the articles I've read indicate that these hard cards are mounted to the control card itself. Why would I need another one?—*Paul-Louis Enchelmayr, South Miami, FL*

A. The IBM mode doesn't have access to the italics in the DMP-130, and I don't know of a way to overcome this limitation. The Tandy mode is the TRSDOS mode.

All Tandy computers, including Models I through 16 (TRSDOS) and the 1000s, will work with the DMP-130 because of its IBM and Tandy modes.

The 1000 requires a Tandy-specific control card for a hard drive. The Tandy interrupts are slightly different from the IBM interrupts. The Tandy uses interrupt request line 2 for the hard drive controller and the IBM PC uses interrupt request line 5. Several mail-order companies that advertise in *80 Micro* include the Tandy-specific control card with their hard cards or hard drives.

INSTALLING A 3½-INCH DRIVE

Q. I have a 1000 and 1000A. I want to know if I can install a 3½-inch drive in either machine. I called all the Radio Shacks in my area but got mixed answers to my question—answers included "No," "Yes," "Maybe," and "Yes, but it will only format to 360K." What's the correct answer?

Will DOS 3.3, which I'm told will be released soon for the 1000 TX, work on my machines?

In Tandy's *Technical Reference Manual*, (catalog no. 25-1504), all the schematics are for the 1000, and none are for the 1000A. Where can I get schematics for the 1000A? Is the *Technical Reference Manual* the only reference available?

Also, is a math co-processor worthwhile? What software uses it?—*Douglas W. Lambert, Trenton, NJ*

A. Yes, you can put a 3½-inch drive in a 1000 or 1000A. You must use DOS 3.2 to format it to 760K. (See "Smaller is Bigger," April 1988, p. 28 for instructions on installing a 3½-inch drive.)

The improvements 3.3 offers over 3.2 are in hard drive management. With 3.3, you can format a hard disk larger than 32MB; it includes a Fast Open command for faster file access and has an improved Append command for finding data files in distant subdirectories. It's designed for the 3000 and 4000. Although it will boot and run on the 1000A, I don't recommend its use, because it seems to eventually cause sector read problems on the 1000A hard disk.

You can find the schematics for the 1000A in the service manual for the 1000A (catalog no. 25-1000A, \$10.20), which is available from Radio Shack National Parts Division, 900 E. Northside Drive, Fort Worth, TX 76102, 817-870-5662.

A math co-processor is a good buy if you have software that supports it, such as Lotus's 1-2-3, Quattro, Autocad, and Excel. (Check your software documentation.) All Borland and Microsoft compilers support a math co-processor. The math co-processor speeds up and provides greater accuracy for mathematical functions.

WANTS NEW SETTINGS

Q. I have a Tandy 1000 (MS-DOS 2.1) with 640K and a TRS-80 DMP 200 printer. I can't find instructions on how to set the form length to match the paper I'm using.

I can set form length with the word processor (PC-Write), but I need to set appropriate form lengths for other applications. In particular, I want to use 11½-inch A4 paper with 70 lines instead of the default (11 inches and 66 lines). How can I do this? Can I set it permanently to the new setting?—*Daniel Pangrazio, Beverly, Australia*

A. In Basic, type:

```
LPRINT CHR$(27); CHR$(52); 70
```

Press the enter key.

CHR\$(27) and 52 set the form length and 70 is the number of lines. If you have a Basic compiler, you could compile this line to an EXE file and put it in your Autoexec.BAT file to set it permanently.

REPORTS OF ITS DEMISE ARE GREATLY EXAGGERATED

Q. I want to upgrade my Tandy 1200 HD 256K RAM to 512K or 640K, add a 10- or 20MB HD, clock/calendar, and, if possible, speed it up to 6 or 8MHz. Most suppliers, including Advanced Transducer Devices (ATD), don't even bother to answer my question: Is the Tandy 1200 HD a dead machine? Radio Shack sidesteps my inquiries by repeating that Tandy discontinued this model. What is the rest of the story behind the 1200 HD?—*Walter C. Watson, Miami, FL*

A. The Tandy 1200 is an IBM/XT clone that was manufactured by Tandon and marketed by Tandy. Were you to take the covers off the 1200 and an XT, you would find little difference.

The memory upgrade, via card or chips, is available through Radio Shack. If you have the seven-slot version of the 1200, you can replace the two rows of 64K chips (18 chips) with two rows of 256K chips, bringing the system up to 640K. Available

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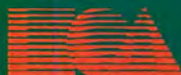
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FEEDBACK LOOP

in sets of nine as a 256K upgrade kit, they are priced at about \$80. Memory expansion cards are also available for the five-slot version of the 1200.

Tandy's Smartwatch (catalog no. 25-1033, \$39.95) is an excellent choice for clock/calendar support; it is placed in an open socket next to your ROM chip. Hard disks are also available from Tandy and others, such as ATD. Provided you have the 3.0 ROM installed (run the Version.COM program on your MS-DOS 2.11.41 disk to find out), the 1200 is compatible with the Tandy 3000. With it, you can use the 3000's peripherals and software, including its 3.20.03 DOS.

Speedup boards designed to run on the IBM/XT will run on the 1200 without difficulty.

The 1200 may be dead as a product, but as long as products are available for XT's and XT-compatibles, there will be support

THE FLIGHT SIMULATOR LITMUS TEST

Q. I recently traded my Tandy 1000 SX for a 3000 HL with a 20MB hard drive, 360K 5¼-inch floppy, 1.4MB 3½-inch floppy, and an EGA (enhanced-graphics mode) moni-

tor and board. My problem is that many games and programs I ran on the 1000 won't run. I am told that Flight Simulator is one of the true tests of compatibility. I have the program, but it won't run on the 3000 HL.

Have I made an error in acquiring the 3000 HL? I plan to use the computer as a study aid. Why isn't anything written about the 3000? Most programs in 80 Micro won't run on the 3000. Why?—*William C. Sims, Fairfax, AL*

A. The 3000 HL is technically superior to the 1000, so I don't think you made a mistake in getting it—depending on what software you want to run on it. As I've mentioned before, the 1000 has enhanced video and sound capability that the 3000 doesn't have, and the two machines differ in keyboard design. If a program is specifically designed for the 1000's sound, keyboard, or enhanced video, you can't run it on the 3000. Everything else that runs on the 1000 should run on the 3000 without difficulty.

You don't specify what kind of problems you're having with the flight simulator, so I can't help you much. We've run Micro-soft's Flight Simulator (too many times) on

the 3000 HL. Virtually all the programs in 80 Micro will work on the 3000 unless we specify otherwise.

Occasionally, a program may have difficulty running at the faster speed of the 3000. If this occurs, hold down the F4 key when you boot to decrease the CPU speed.

CAN'T GET A PRINT

Q. I have a Tandy 3000 HD with a VM-5 monochrome monitor, dual-display graphics adapter (25-3045), and Quadram Quadjet color printer. The graphics adapter DIP switches are set for the emulation mode (which emulates a color-graphics adapter [CGA]), and the jumper on the main board is set for a color monitor.

I'm having a problem getting the printer to work properly, and I'm not sure if I configured my computer properly. I'm writing this letter on Volkswriter; when I print the results, letters are missing or scrambled. I have a graphics program (ETG Plus) that uses the CGA's capabilities. When I try to print a drawing, I get only garbled letters and numbers. I have a graph/plotter program (Dakgraph) that also uses the CGA capabilities; when I try to print a graph, it comes out broken up.

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FEEDBACK LOOP

I gave the printer a self-test as instructed in the manual, and everything tests out OK. Do you have any clues or suggestions as to what might be wrong and how I can fix it?—Gary Hinds, Redmond, WA

A. 80 Micro's technical department doesn't have all the software and hardware you describe, but I suspect you may just need to run the Graphics program on your DOS disk. At your DOS prompt, type GRAPHICS PCMODE and press the enter key. You could also add the line GRAPHICS PCMODE to your Auto-exec.BAT file.

RISKY ROM BUSINESS

Q. I tried to upgrade from ROM 1.00 to 1.01. I was surprised to find that my multifunction board (PBJ's MFB-1000) will not work with this upgrade. When using this board, my computer won't boot with the ROM upgrade installed. I tried to contact the manufacturer but couldn't find a current telephone number or address. I'd like to warn other users of this potential problem and want to know the present address and telephone number of PBJ.

Since I'm unable to upgrade my computer, I'm interested in the hard disks used

on two machines that have ROM 1.00 that I read about in your January 1988 issue (see "Get the Lead Out," Feedback Loop, p. 12). I want to install a hard disk in this machine.—Jon Thompson, Oxnard, CA

A. I'm sorry to say that PBJ is no longer in business. When our January 1988 issue was published, we'd been successfully running a couple of hard drives with ROM 1.00, but as time went by, the hard drives began to have problems. I would not now recommend using a hard drive with ROM 1.00.

LINE FEED REDUCTION

Q. In your October 1987 column, you explained how to eliminate the extra line feed when using a Radio Shack Line Printer with a Tandy IBM-compatible computer by using the Mode command with LFOFF (see "Sneak Preview," p. 11). Can I do this with a non-Tandy IBM compatible using IBM DOS 3.1? If so, would you give me more detail on the exact commands to use to eliminate the extra line feed?—Robert Morris, Houston, TX

A. The commands to eliminate the extra line feed when using a Radio Shack Line Printer and a Tandy MS-DOS computer

are, at the DOS prompt:

```
LF
MODE LFOFF
```

Remember to press enter after each line. Unfortunately, these commands aren't available in the IBM DOS. The TRSDOS computers send a 0D hex to the printer to indicate a carriage return. The Radio Shack printers supply a 0A hex for a line feed. MS-DOS computers send the 0D and the 0A for a carriage return and a line feed. The Radio Shack printers still supply the 0A for a line feed, thus giving two line feeds.

Read your printer owner's manual carefully. Many printers come with a DIP switch to let you choose or reject the line feed. ■

Send your problems and solutions to Feedback Loop, 80 Micro, 80 Elm St., Peterborough, NH 03458. Where applicable, include the proper program name and version, the computer you're using (including any non-standard system configuration), the DOS version you're using, your phone number (not for publication unless you request it), and a self-addressed, stamped envelope.

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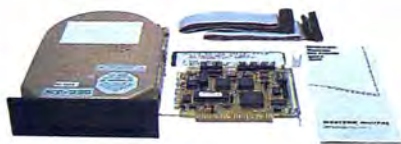


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Testing Big Blue Waters

TANDYLAND

The new frontier in personal computers this year isn't technology—it's *legality*. Clone makers now have the technology to create an IBM PS/2 clone. The question is, which upstart is willing to take on IBM and manufacture a PS/2 clone? If the demand for PS/2 hardware is really there, don't be surprised if the upstart turns out to be Tandy.

This would be a departure for Tandy, which so far in its development of MS-DOS machines has been cautious, letting others tread on IBM's heels. But while other computer makers are trembling at the idea of IBM suing the first company to clone the PS/2, officials in Fort Worth are wondering what all the concern is about.

The fuss began earlier this year when two California companies, Chips and Technologies in San Jose and Adaptec Inc. of Milpitas, unveiled kits to create PS/2 look-alikes. The microchannel kit for installing add-ons—the most distinguishing feature of the PS/2 line—received special attention.

The announcement prompted speculation about who would play the guinea pig to bait IBM's lawyers. Ronald Laurie, an attorney in San Francisco whose clients include compatible manufacturers, told Reuters news service, "The first company to introduce a PS/2 compatible is going to be a kamikaze. Nobody wants to be the target of an IBM lawsuit."

The conventional wisdom is that IBM, which lost two-thirds of the PC market to compatibles, doesn't intend to let the same thing happen to it with the PS/2. Competitors didn't feel any better when William Lowe, IBM entry system division president, told an American Electronics Association meeting, "If we feel they (PS/2s) have been copied, we will take action."

IBM's other competitors are little more than nervous nellys, to hear Ed Juge, Tandy's director of market planning, tell it. "Bill Lowe was at Microsoft recently and said IBM will license the microchannel just like anything else," Juge said. "All this worry about lawsuits is a non-issue. There's no problem."

Juge explained that blanket license agreements, which are common in the computing industry, basically say that if Company A stumbles across some technology devel-



Sierra On-Line's *Space Quest* is one of many games that use the graphics capabilities of the 1000.

oped by Company B, then Company B won't sue the pants off Company A. None of the companies in an agreement gives another its technology. Instead, the agreement is largely insurance against accidental duplication, but if Company A deliberately clones technology owned by Company B, that's covered, too.

Tandy already has a blanket agreement with IBM, and Juge said that most likely it would already cover IBM's microchannel in a Tandy PS/2 clone.

So why isn't Tandy rushing to get a PS/2 clone on the shelves? Because Tandy's customers aren't yet clamoring for PS/2 technology, Juge said. "If there's a mandate from our customers that they want PS/2 technology, we'll give it to them," he said. "But there's just no demand yet." When consumers are ready, the shelf space will be there.

Most experts are predicting that a noticeable amount of software or expansion boards taking advantage of PS/2 technology won't be available until the end of this year. IBM has been trying hard to create an illusion of success by increasing by 30-40 percent the quotas on the minimum number of PS/2s that dealers must order to keep their IBM authorizations. As a result, dealers have been slashing prices on the PS/2s by up to 35 percent and have been forced to cut back on the number of competing microcomputer brands they carry.

If Tandy starts cloning PS/2, it will probably improve upon IBM's basic design. As it has done in the past, Tandy is likely to use components developed by others, such as those by Chips and Technologies, which are supposed to create a machine that runs twice as fast as an IBM Model 50, and by Adaptec, which claims its chips will permit a clone to have up to 285 million bytes of data storage in each of two hard disk drives,

compared with the Model 50's 10MB.

Sound good? Want one? Well, you know what to do. Demand it!

One of the incompatibilities found in the Tandy MS-DOS line, the graphics of the 1000, is turning out to be an asset.

Roughly equivalent to the better graphics capability of the IBM PCjr, the 1000 gives higher resolution and up to 16 colors at a time, compared with the IBM color graphics adapter's four colors.

Where are graphics truly important? Computer-aided design? Business charts? Nawww. Games (see Photo). Anyone who's used a graphics computer for more than a month knows the machine's true *raison d'être* is zapping interstellar aliens.

Software game companies are picking up on the 1000's graphics, and it's no longer unusual to see games labeled "For IBM and Tandy" from companies such as Electronic Arts and Accolade.

With the proliferation of new graphics standards such as EGA (enhanced-graphics adapter) and VGA (video-graphics array), programmers are becoming proficient at tweaking software to use different capabilities, and so it's not hard to add the 1000's display to the assortment, said a spokeswoman for Electronic Arts.

And, of course, any software from an established company that adds to the value of one of Tandy's computers is welcome in Tandy outlets, and any game with "Tandy" on its label nearly automatically earns a berth on Tandy's shelves.

In the here's-your-new-disk-drive-and-rug-shampoo department, Tandy and Amway Corp. have teamed up to offer discounts to Amway dealers on Tandy hardware and software that's specifically designed for Amway's business.

Amway dealers, who sell household cleaning products door-to-door, will be able to look over Tandy equipment at a local outlet and then order it through Amway.

Amway is providing Amware, a software program that lets distributors transmit orders via modem directly to Amway's world headquarters, keep records of customers and inventory, and prepare special reports.

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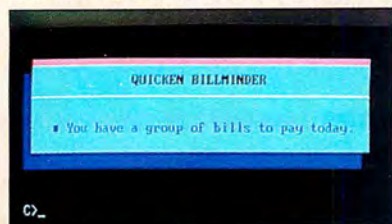
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The information in Info Line is taken from press releases. *80 Micro* has not tested the products or services described here and therefore cannot assume responsibility for any claims.

PRODUCT NEWS

BUSINESS AND PROFESSIONAL

Scheduling Help

The Critical Date System lets firms with up to 99 employees schedule and track deadlines and appointments, distinguish between critical and non-critical dates, and locate available time slots in a schedule.

Software Technology Inc., Lincoln Trade Center, 6101 S. 58th, Suite B, Lincoln, NE 68516, 402-423-1440. \$300.

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Schedule and Customer Manager

Eighty/20 helps you build a database of customers, which you can analyze according to 16 different criteria that you define (e.g., company type, sales volume, buying patterns). It is also a time and appointment manager and word processor.

Marcar Personal Computing Inc., 6101 Baker Road, Minneapolis, MN 55345, 612-931-1280. \$495.

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Specialized Business Help

Capa Software Corp. of Canada is marketing five programs for specific types of businesses. Entrepreneur (\$750 U.S.) is an accounting and management program series for small or specialized businesses. Cinema (\$540 U.S.) helps managers handle the rentals, reservations, inventory, and membership of a video-rental business. Innkeeper (\$1,150 U.S.) handles the front desk, management, and accounting chores for a small hotel or motel.

Farm (\$425 U.S.) helps farmers with their accounting and record management, and Dairyman (\$999 U.S.) is a dairy-herd man-

agement system that tracks life-cycle, production, and genealogy information.

Capa Software Corp., B2-2102 8th St. E., Saskatoon, Saskatchewan S7H 0V1, 306-322-1592.

Circle 332 on Reader Service card.

Harvard Graphics Upgrade

Harvard Graphics 2.1 features a built-in 77,000-word spelling checker, 200 new symbols, and the ability to convert chart elements into symbols so you can edit each object in a graph separately.

Software Publishing Corp., 1901 Landings Drive, P.O. Box 7210, Mountain View, CA 94039-7210, 415-962-8910. \$495.

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Data Graphs

FPgraph can transform data from popular spreadsheets, word processors, and ASCII, DIF, and SYLK file formats into 2D or 3D graphs. The program offers 976 preset graph type/viewing angle combinations. You can rotate, pan, zoom, stretch, shrink, or change the perspective of any graph.

The Small Computer Company Inc., 41 Saw Mill River Road, Hawthorne, NY 10532, 914-769-3160. \$250.

Circle 334 on Reader Service card.

The Deal that Wasn't There

In March's Info Line, we listed the wrong price for SSR Corp.'s (1600 Lyell Ave., Rochester, NY 14606, 800-521-0142) point-of-sale system, Salespoint. The package sells for \$1,995, not \$19.95.

Circle 335 on Reader Service card.

EZ Forms and EZ Forms Executive

Our announcement of a price cut for EZX Corp.'s (403 Nasa Road, One East, Webster, TX 77598, 713-338-2238 or 800-999-6999, ext. M319) EZ Forms in the April 1988 Info Line was misleading. The company has just released EZ Forms Executive 2.0 for \$89; it also sells a scaled-down version called EZ Forms C-30 for \$19.

Circle 336 on Reader Service card.

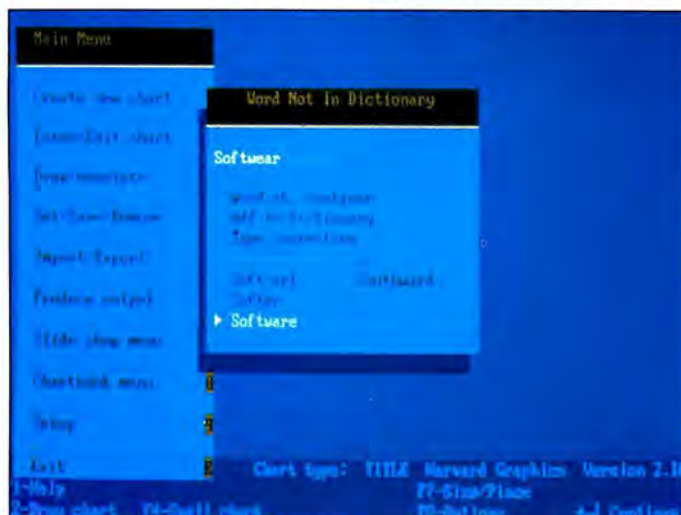
UTILITIES

Data Compression

The RAM-resident utility, Newspace, automatically compresses data an average of 50 percent on your hard disk. It also lets you use a single keystroke to retrieve any of the last five erased or overwritten files.

Isogon Corp., 330 Seventh Ave., New York, NY 10001, 212-967-2424. \$69.95.

Circle 342 on Reader Service card.



Harvard Graphics 2.1 features a 77,000-word spelling checker.

WORD PROCESSING

Celebrity in EOS

Radio Shack is carrying the Celebrity word processor in its Express Order System. The program includes a spelling checker and thesaurus, mail merge capability, a full-function calculator, a calendar/scheduler, and a file cabinet.

Good Software Corp., 13601 Preston Road, Suite 500W, Dallas, TX 75240, 214-239-6085. \$89.95.

Circle 328 on Reader Service card.

Word Processing Within 1-2-3

The memory-resident Heavy Duty Word Processor for Lotus's 1-2-3 lets you use 1-2-3's command structure to write, edit, and manipulate text, add text to your spreadsheets, or add figures and tables to your documents.

Bi-Intelligence Inc., 754 Fourth Ave., Brooklyn, NY 11232, 800-451-0303, ext. 111. \$45.

Circle 329 on Reader Service card.

FOR THE PROGRAMMER

Programmer's Calculator

The pop-up XACT-16C emulates the Hewlett-Packard HP-16C hand-held calculator and features decimal, hex, binary, octal, and floating-point modes with any word size from 2-64 bits. The programmable XACT-16C provides algebraic, logical, base-conversion, and bit-manipulation functions and includes on-line help and a built-in ASCII table.

Caltech Inc., 13629 Bellevue-Redmond Road, Suite 202, Bellevue, WA 98005, 206-643-1682. \$49.95.

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Turbo C

Turbo C 1.5 includes a graphics library of over 70 functions; a librarian that lets you build object-module libraries; text/video functions (including windows); 43- and 50-line mode support; VGA, CGA, EGA, Hercules, and IBM 8514 support; file-search utility; and more than 100 new functions.

Borland International Inc., 4585 Scotts Valley Drive, Scotts Valley, CA 95066, 800-543-7543. \$99.95.

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Fast Assembler

The OPTASM optimizing, N-pass assembler generates the smallest possible instructions, list files, and OBJ files and never inserts NOPs. It can include forward-ref-

Pirates!
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erence jumps and load effective address instructions and far calls.

SLR Systems, 1622 N. Main St., Butler, PA 16001, 800-833-3061 or 412-282-0864. \$195.

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ENTERTAINMENT

In Pursuit of the Death Angel

Police Quest, the interactive animated drama created by ex-California Highway Patrolman Jim Walls, puts you, officer Sonny Bonds, in the Lytton P.D. at the beginning of your shift. By using common sense and proper procedures, you must

work your way from uniformed policeman up to undercover narcotics agent in your search for the sinister drug dealer, the Death Angel.

Sierra On-Line Inc., P.O. Box 485, Coarsegold, CA 93614, 209-683-6858. \$49.95.

Circle 343 on Reader Service card.

Avast, Ye Swabs!

Pirates! combines historical simulation with role-playing adventure as it puts you at the helm of a sailing ship in the middle of the politics, economics, and maritime technology of the 17th-century Caribbean.

Microprose, 120 Lakefront Drive, Hunt Valley, MD 21030, 301-771-1151. \$39.95.

Circle 344 on Reader Service card.

Is this a routine call, or could this be a dangerous situation? It's all part of the job in Police Quest.



INFO LINE

Two from Mindscape

Mindscape has released two arcade-type adventure games. In *Into the Eagle's Nest* (\$34.95), you, as a WWII commando, must invade and destroy a Nazi stronghold and liberate its captives.

In *Gauntlet* (\$39.95), you become a warrior, valkyrie, magician, or elf and enter a dungeon to collect valuable prizes and destroy evil creatures.

Circle 19 on Reader Service card.

Mindscape Inc., 3444 Dundee Road, Northbrook, IL 60062, 800-221-9884 or 312-480-7667.

Circle 345 on Reader Service card.

Infocomics

Infocom and Tom Snyder Productions have joined forces to produce Infocomics, which are *not* computer games, but illustrated action and adventure stories on disk. There are no puzzles to solve or goals to achieve. It's like reading a comic book, except you can follow the story line from the viewpoint of any of the stories' characters.

The premiere Infocomics titles include *Lane Mastodon vs. the Blubbermen*, *Gamma*

Force in the Pit of a Thousand Screams, and *Zorkquest: Assault on Egreth Castle*. Each title sells for \$12.

Infocom Inc., 125 Cambridgepark Drive, Cambridge, MA 02140, 617-492-6000.

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MIDI Interface



The MIDI Starter System lets you connect a synthesizer to your Tandy machine.

The MIDI Starter System includes complete hardware and software to connect a synthesizer or other electronic instrument to your PC. The Easy-8 Sequencer program acts as an eight-track digital tape recorder with editing tools to record, correct, and play your performance.

Music Quest Inc., 1700 Alma Drive, Suite 260, Plano, TX 75075, 214-881-7408. \$199. Circle 347 on Reader Service card.

For Creative Kids

Color Me: The Computer Coloring Kit lets kids K-5 draw freehand or color, cut, and paste images from the pictures library.

Mindscape Inc., 3444 Dundee Road, Northbrook, IL 60062, 800-221-9884 or 312-480-7667. \$29.95.

Circle 348 on Reader Service card.

Baseball Handicapper

The Professional Baseball Handicapping System for baseball enthusiasts analyzes the statistics from the daily sports section of your newspaper to predict the winner, point spread, and total points in a game. You can use the stored information later for handicapping.

Software Exchange, P.O. Box 5382, West Bloomfield, MI 48033, 313-626-7208. \$49.95.

Circle 349 on Reader Service card.

LITERATURE

PC Graphics

Lee Adams' *High Performance Interactive Graphics: Modeling, Rendering, and Animating for IBM PCs and Compatibles* offers specific information about fashioning objects in two and three dimensions, creating 26 different hues from four different colors, and getting 2- and 3-D graphics to move. The book includes listings for 44 demonstration programs.

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INFO LINE

Three for Lotus's 1-2-3

Funk Software has three add-in packages for Lotus's 1-2-3.

Inword (\$99.95) is a full-featured pop-up word processor that lets you create documents from data in your worksheet. Noteworthy (\$79.95) works with 1-2-3 and Symphony spreadsheets to let you add pop-up notes to individual cells.

The Worksheet Utilities (\$99.95) adds a

The screenshot shows a spreadsheet with columns labeled A through H. A dialog box titled 'SEARCH AND REPLACE' is open, with fields for 'Search area' (set to 'All worksheets and workbooks'), 'Direction' (Forward), 'Order' (Row-by-row), and 'Case checking' (No). Below the dialog, a portion of the spreadsheet is visible, showing financial data with values like 44,652.00, 51,238.00, and 58,956.00.

Search and replace function in Funk Software's Worksheet Utilities handles text, values and formulas.

formula editor; search and replace (for text, values, and formulas); print formatting; a file manager that lets you describe, catalog,

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archive, compress, save, and retrieve worksheets; autosave; and range column width.

Funk Software Inc., 222 Third St., Cambridge, MA 02142, 617-497-6339.

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Free Dbase Backup Help

Dcheck checks your Dbase files for corrupted data before you back them up, and it's free—you can get a copy by calling Comtech Publishing Ltd. at 716-586-3365 or one of several BBSes nationwide. Dcheck is part of Dsalvage (\$99.95), a program that lets you find, diagnose, and repair damaged Dbase files.

Comtech Publishing Ltd., P.O. Box 456, Pittsford, NY 14534, 716-586-3365.

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Internal Modems by Everex—complete with a 1-year warranty and Bitcom communications software.

1200 Baud Evercom \$129
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Memory Upgrades for 1000

Zucker Memory Expansion—512K of memory with DMA. An optional clock calendar can be added. \$119

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for 1000TX/3000HL

128K RAM Kit—Upgrade your 1000TX from 640 to 768K or your 3000HL from 512K to 640K.

for 4000

1-Megabyte SIMM Kit—Upgrade your 4000 from 1 Megabyte to 2! Includes four 256 SIMMS. \$239

4-Megabyte SIMM Kit—Upgrade your 4000 with a 4-Megabyte upgrade! Includes four 1-Megabyte SIMMS. \$1049

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FOR THE HOME

Two from Capa

3 Pak (\$19.95) offers a loan amortizer, metric converter, and a program that will show what your car or truck costs per mile or payload. The Graphex program (\$39.95) makes your Tandy DMP 105, 120, 200, 400, 410, 420, 500, and 2100 work as an IBM graphics printer.

Capa Software Corp., 206-2102 8th St. E., Saskatoon, Saskatchewan, Canada S7H 0V1, 306-322-1592.

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Weather Forecaster

The Accu-Weather Forecaster uses its software and a Hayes-compatible modem to download data from Accu-Weather's database to let you display up-to-the-minute weather data in a variety of formats including graphs, charts, pictures, maps, and text. You can look at weather maps of the continental U.S. or zero in on specific states or geographic regions.



The Accu-Weather Forecaster can display live weather data in a variety of ways.

Metacomet Software, P.O. Box 31337, Hartford, CT 06103, 203-223-5911. \$89.95.

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80 Micro's BBS is open 24 hours a day. It offers programs you can download, special-interest groups, and a classified section. You can reach the board at 603-924-6985; UART settings are 300/1,200 baud, 8-bit words, 1 stop bit, no parity.

Tab Books Inc., P.O. Box 40, Blue Ridge Summit, PA 17214, 717-794-2191. \$22.60.
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HARDWARE

EMS Board

You can now order Micro Mainframe's 2MB Lotus/Intel/Microsoft expanded memory board, the EMS-5150T, through any Radio Shack Computer Center. The board features 2MB of on-board memory, a Plus connector, 256K RAM, a RAM disk, print spooler, and EMS software. It runs



Micro Mainframe's EMS-5150T EMS board.

on any 1000 except the TX.

Micro Mainframe, 322 E. Bidwell St., Folsom, CA 95630, 916-985-7501. \$229.95.
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Okidata Wide-Carriage Printer

Okidata's Microline 183 wide-carriage, 9-pin printer can produce 120 cps in utility mode, 60 cps in emphasized and enhanced modes, and 30 cps in near-letter-quality mode. The 183 offers italics, enhanced, emphasized, superscript, subscript, and underlining, and can produce double-density and bit-image graphics with up to 144-by-144



Okidata's Microline 183 features a wide carriage and several print-style options.

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Okidata, 532 Fellowship Road, Mount Laurel, NJ 08054, 609-235-2600. \$399.
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ON LINE

Wildcat!

The Wildcat! 1.10 BBS system supports most file-transfer protocols and can run other applications from outside the program code via menu selections. You can

see Wildcat! in action on Mustang Software's BBS (24 hours at 300-9600 baud) by calling 805-395-0650.

Mustang Software, 3125 19th St., Suite 162, Bakersfield, CA 93301-3118, 805-395-0223. \$129.

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Lotus On-Line Add-In

Tel-E-Mail can automatically capture and then reformat and edit data from on-line information services without leaving Lotus's 1-2-3. The package requires a Hayes-compatible modem and 1-2-3 version 2.x.

3X USA, 393 Park Ave., Leonia, NJ 07605, 201-592-6874. \$99.

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INFO LINE

ADD-INS

1-2-3 Tricks and Excel Macros

101 Tips, Tricks, & Traps for 1-2-3 (\$69.95) adds 101 pop-up shortcuts, definitions, and reminders to your version of Lotus's 1-2-3.

101 Macros for Excel-PC (\$69.95) provides macros, shortcuts, and utilities to use with Microsoft's Excel.

Macropac International, 19855 Stevens Creek Blvd., Suite 168, Cupertino, CA 95014, 800-624-0077 or 408-996-8143 (in CA).

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Freedom of Information



Photo 1. Asksam's main menu.

by Harry Bee

Where database management is concerned, Asksam demolishes expectations—among others, the expectation that for data to remain manageable, form must rule. I've used file managers that boasted convenience and flexibility. None of them delivers the freedom Asksam affords. You feel you're managing information with this system, not just organizing files.

Yet its freedom isn't anarchy. Structure is among the tools Asksam provides; it's just not an imperative. You can use forms for data entry or not. You can organize files formally or casually. You can mix management methods and vary them from record to record. You match the technique you choose to the data you have, without diminishing your ability to manage your files. The system also includes a comprehensive programming language, still without sacrificing freedom or ease of use.

Except for its lack of relational capabilities, Asksam may well serve all the database needs you have. You can use it for applications as mundane as mailing lists. In fact, it does a better job printing labels than many file managers.

In addition, its text-oriented features make it exceptional for organizing descriptive data such as bibliographic files, research notes, and inventories of collections. While Asksam is not without blemish, my most serious complaint, the inappropriate

use of the term hypertext, subtracts nothing from the way the software performs.

Quick Start

Despite its poor index, Asksam's 400-page manual—half alphabetical reference and half tutorial—is better than most. A dozen sample data files tied together with ordinary Asksam functions constitute an interactive walk-through of the program's major features and an impressive demonstration. The program itself provides context-sensitive, pop-up help.

A setup program helps you define screen attributes, default drives, and paths. It also lets you build your own printer driver, store several ways for Asksam to dial a telephone, and build a custom table for sorting.

Ever-present point-and-shoot menus make it easy to navigate Asksam's functions. Creating a new database means naming the file. Entering data is as straightforward as typing it. Searching for information requires no more than naming the terms and values you're looking for. You can print basic reports to the screen, paper, or disk with a few commands.

Data à la Carte

The size of an Asksam file is limited to the space available on a single disk, floppy or fixed. The basic unit of organization is a record consisting of 20 lines of text. You combine records into documents that fit your data. Each document can contain any number of records and be as long or short as you need it.

In document mode, the program works with whole documents at a time, or you can treat each record separately in record mode. You switch between the two modes at will.

Nothing you'd want to write a novel with, Asksam's text editor offers features, like cut and paste operations, meant to handle data as unstructured as prose. In addition to keyboard entry, you can also import information from other applications, export it as well, and swap data among Asksam files.

Because Asksam is text based, every word and symbol is significant, but the program also gives you several ways to set off the items on which you'd naturally want to organize a database, such as addresses and part numbers. Like the formal fields of flat-file managers, an explicit field has a distinct name and a definite length. You can further consider any term that consistently

begins with a particular character an implied field. For instance, you can treat all values that begin with a dollar sign (\$) as entries in a field containing a cost or price.

The concept of contextual fields lets you use almost anything in your files as if it were contained in a field. You identify the content of contextual fields by its proximity to key words. For instance, if you always type something like "Frank ordered 75" in an inventory record when someone places an order, you can use the word "ordered" to point out two fields—who and how many.

Fields can contain up to a screen of information. They can also hold lists. You can use the same field over again in the same record (or document). A field that appears in one record doesn't have to show up in others, nor do fields need to be in the same position or order from record to record.

If data entry forms make sense in an application, you can design up to 10 of them, called key templates, for each file, and use them as you need them.

Fetch

The possibly chaotic nature of Asksam files doesn't interfere with finding the data you need. The simplest search request consists of one or more terms the records you're looking for will contain. The terms may be literal or generalized with wildcard characters. You can express logical relationships among inclusive and exclusive terms. An unusual but useful feature lets you use field names themselves as search terms. You can stipulate whether your terms define an entire field, or need only be included.

Beyond fields you can look for terms that occur in the vicinity of another term—within six words after the term, for example, or within two paragraphs on either side. You can search on the basis of a range of numeric values, dates or times, but you can't search for a range of text—a startling omission.

Very strong with dates, Asksam recognizes them equally well in any standard format. It performs date and time arithmetic and date to day conversion, and you can search on the results for things like projects due before Thursday.

Searches are fast, too, because Asksam loads as much of your active file as possible into RAM. Searches get faster when you index your files. A related feature lets you select any set of records (or documents) for Asksam to remember and use the subset of remembered records as if it were a separate file.

On the Record

You can work with records in one of three modes and switch between the modes as you like. Query mode is for browsing, searching, and retrieving data. In update mode you edit, add, delete and undelete

records (and documents), remember records, and invoke major functions, such as resetting program defaults. Also, you can write and edit data entry forms, Asksam programs, and "hypertext" menu records in the update mode.

The distinguishing feature of the so-called hypertext mode is that you can move the highlight cursor into a record and select an element of it as if from a menu. By selecting specially coded entries you can change data files and execute programs. An excellent way to organize your files and procedures, it's hardly hypertext. Nor is the ability to return to the file you changed from, even to go back across several files, revolutionary enough to merit this revolutionary label.

The concept of hypertext redefines the traditional notion of database so that the ideas of files, records, and fields lose their meaning. A database is everything stored in a system, whether files, documents, tables, words, values, symbols, pictures, sounds, or whatever.

Links exist between the elements simply by virtue of their inclusion in the system, and the links are denotative and connotative, literal and conceptual, hierarchical and relational, interactive and, most of all, dynamic. No one expects to see such a thing soon.

Despite the number and variety of data links you can exploit with Asksam's hy-

The limitations aside, it's a wonderful feature, and if no one had used the label hypertext, I would have simply called it a valuable aid to tracking down exactly the information you want in large files containing mostly text, and let it go at that. Confined to browsing, and with no self-defining dynamic, it's not hypertext. (On the other hand, I wouldn't be half surprised if, by version 6, Asksam turned out to be the first system to truly merit the label.)

Reports as Ordered

If the true power of a database manager is to turn data into information and give it back in a form you can use, then Asksam's power must be measured in megawatts. The program is capable of delivering exactly the degree of detail you require.

You can sort on anything you can describe as a field, and any combination of them. Special features make it possible to sort a field correctly without inventing special ways to enter the data. For example, sorts can ignore articles (a, an, and the) in one field or use only the last word in another.

Asksam's contextual features become powerful tools for citing specific information in a report. The Show command, like a Vicinity query, lets you include words, lines, sentences, and paragraphs on the basis of their position in the record or in relation to key words.



Photo 2. An Asksam record: note the structured data and informal notes on the same screen.

perthext-like features, they're static. One set of connections doesn't affect the others.

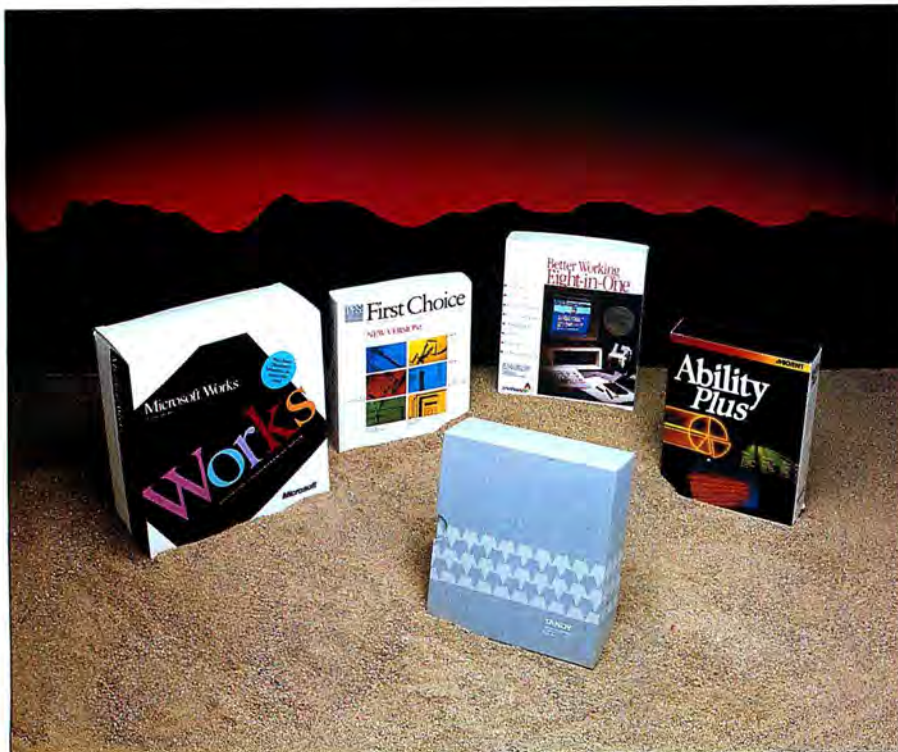
The closest Asksam comes to hypertext is that when you highlight a word or group of words not coded as a file or program name, it becomes a search term. The feature lets you travel quickly through your file; and the program remembers the way you came so you can backtrack. You have the option of stopping to edit the term, but each selection is singular. You can't combine them. And word groups are taken literally, so that their order counts.

Asksam's ability to produce highly readable reports begins with multi-line headings and flexible page definitions. Not only can you assign each field (using the term loosely) its columnar position, you can set margins for each one, making complete descriptions possible, instead of truncated notes. You can set fields to print only as the contents change and set breakpoints to trigger totals and counts. A really nice touch lets you label the breaks to distinguish one subtotal from another.

(continued on page 50)

Low-Cost Integrated Software

Five sizzling selections from one of today's hottest software categories.



by Eric Grevstad

Ordinarily, I'd begin a review like this one by saying that integrated software no longer implies the \$700 price of Framework II or Symphony. But that news is old hat to Tandy owners, who've been getting Deskmate with their 1000s since 1984.

Deskmate is more than just the equivalent of a free box of detergent in your new washing machine; it's a well-rounded set of applications that has been improved with each new edition. But a new crop of integrated programs—including Personal Deskmate 2—offers more power and features than Tandy's favorite at prices under \$300.

A few affordable packages such as Alpha Software's Electric Desk have been around as long as Deskmate, but the category's popularity took off when Software Publishing Corp. took its popular beginners' pro-

grams (PFS:File, PFS:Write, to name two) and stirred them into PFS:First Choice. Since then, First Choice has been upgraded; it has also attracted a crowd of competitors, ranging from Spinnaker's bargain-priced Eight-in-One to Microsoft's Works (named after the popular Macintosh package, not the firmware in the ill-fated Tandy 600).

This article lists the relative strengths of five contenders, but space limitations preclude discussion of their every detail; other entries, notably Timeworks' PC Quintet and Tandy's ambitious Professional Deskmate, will be reviewed in upcoming issues.

Personal Deskmate 2

What's a program with Paint and Music modules doing in this article? Two things: First, Personal Deskmate 2 (bundled with the HX and TX and sold separately for other 1000s) includes features shared by all

the programs evaluated here. All have extra features along with the "big four" of word processing, spreadsheet, database, and communications (for Hayes-compatible modems). All are integrated in both senses of the term: they have a consistent command structure for different applications and the ability to transfer data between them. None is copy-protected. All work with two 5½-inch drives or one 3½-inch drive, but they work faster with a hard disk.

Second, Personal Deskmate 2 isn't a bad program for families and beginners. The only one to squeeze into 256K, it's also the only program with a Macintosh-style graphics interface that lets you combine programs, files, and desk accessories on a customizable desktop. (The others work with monochrome PCs but require a 1000 or other system with a graphics adapter to display charts.) It can be hard seeing a yellow cursor beneath the buttons in a white dialog box, but Personal Deskmate 2 generally does a good job of providing keyboard equivalents to mouse control.

As for the Paint and Music programs, they stand with the desktop and accessories (a calculator, notepad, calendar, and phone list) as Personal Deskmate 2's best features. Filer is a skimpy, predefined, five-field database, though it does a nice job of guiding you through the searching and reporting process. The appointment scheduler and communications program are serviceable, while the spreadsheet and word processor are more elementary. The Cut, Copy, and Paste commands hark back to the Model 100 but work well within applications or when putting database text in the word processor. Copying spreadsheet rows to the word processor is a tiresome chore of choosing the ASCII printer driver and then printing and importing a disk file.

Personal Deskmate 2 is a colorful program with several friendly touches, such as a pop-up formula editing box that lists all the spreadsheet functions. Still, it's too underpowered for productive use. If you want a more powerful Deskmate, \$50 more will buy the new Professional version; if you want a family or beginners' package and

can live without Mac graphics, \$40 less will buy Eight-in-One.

Better Working Eight-in-One

Spinner Software is best known for children's educational programs, and its productivity package's \$59.95 price doesn't seem very grown-up. But Eight-in-One surprised me. It has its flaws, mainly the clumsiest integration of the five (for example, swapping between applications via disk files instead of a clipboard or buffer in RAM), but its command menus and dialog boxes are clear and easy to use, and it does many things well.

Four extra functions—a spelling checker, graphics, an outline processor, and desk accessories—are added to the usual quarter, hence Eight-in-One's name. (Microsoft, more modestly, doesn't include spelling and graphics when it advertises "four tools in one" for Works.) Eight-in-One's desk accessories include a memo pad; an address book; a "to do" list; a calendar that can remind you of appointments or birthdays; a world clock with alarm, stopwatch, and countdown timers; and a handy mailing label or envelope printer.

The main menu also offers a range of DOS functions such as copying or deleting files or viewing or sorting text files. You can control the program's pull-down menus with the escape and letter keys, or you can use the awkward hold-down-the-shift-key sequence described in the manual—which, by the way, has too many typos and not enough tutorial information (data transfer is discussed in an addendum pamphlet). When a dialog box offers options such as typestyles, you press the the space bar to cycle through choices and the F2 key to select them.

The database is Eight-in-One's weak link. You have to specify data types and field lengths, and the manual is terribly vague about searches versus reports. The spreadsheet is better. It doesn't have cell pointing for formula entry, but offers the same function-key Select/Copy/Cut commands used in the word processor and the ability to read and write DIF and Lotus's WKS files. It's also easy to copy rows or columns into the graphics module, which is nicely organized, despite being limited to three data ranges.

Students should appreciate the outliner (see Photo 1), a flexible tool that takes care of rearranging and renumbering items as you create and move them through four indentation levels (L.A.L.a.). The outliner's Write Word Processor function creates a word processing file with embedded commands to print a table of contents and numbered headings.

The word processor shows page breaks and your top and bottom margins as

shaded areas on screen (it can be helpful to know that you're a few lines away from the end of a page). Changing paragraph spacing, setting margins, justifying text, or getting word counts or print previews is easy. The spelling checker is better than nothing, though the manual's claim, "The spelling checker will leap into action," is a howler; even with a hard disk, I got tired of waiting for it to suggest corrections for *software* and *mistake*s.

Although Eight-in-One is impressive for its price, it occasionally frustrated me. The communications module proved balky at accepting new settings (such as a switch from COM1 to COM2) from its own menu (as opposed to the main menu), and I found the program's swapping of disk files between applications confusing. Besides saving Eight-in-One, Lotus, or DIF worksheets, you can save or export a worksheet range with three different commands depending on its destination—Print File, File Export, or Edit Write File. With the program set up for my Epson printer, spreadsheet rows arrived in the word processor with capital "P's" down the first column and -FH5xP at the end, thanks to escape codes and form feed commands in the print-to-disk file. Changing to a generic printer driver cured the problem.

PFS:First Choice

Where other packages might say "Integrated Software, Version 2.0," the PFS:First Choice box says "Multi-Purpose Software, New Version." Like the wonderful manual inside, that tells you plenty about First Choice. A few parts may seem awkward to power users, but for ease of use and beginner friendliness, it's top-notch.

It's almost impossible to get lost or lose data in First Choice. Function and number keys labeled on the screen guide you through pull-down menus (menu-skippers can use shortcuts such as pressing the alternate-S keys to select a block or alternate-W to erase a word or cell). The tab and enter keys control dialog boxes for choices such as printing options or graph types. Pop-up billboards ask whether you want to leave a file without saving. The escape key gets you out of anything.

Meanwhile, you can enjoy proven PFS programs with some new bells and whistles. The word processor won't show every formatting feature (justification affects an entire document and is chosen from the print menu), but its typewriter-style display shows single or double spacing and page breaks with headers and footers.

The spelling checker is fast and friendly, though it can suggest only the first six corrections it finds—given *speling*, it offered *spacing*, *spading*, *spanning*, *sparring*, *sparing*, and *spatting*, but not *spelling*. First Choice



Photo 1. An Eight-in-One outline with pull-down menu.



Photo 2. Note PFS:First Choice's pull-down menus and the row and column titles outside its spreadsheet.

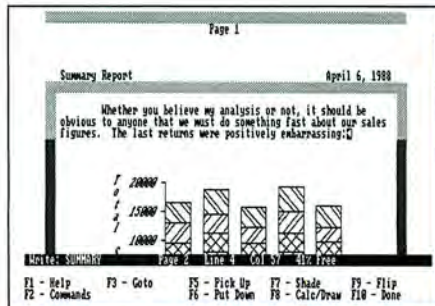


Photo 3. Ability Plus's word processor shows page breaks, headers, footers, and an imported graph.



Photo 4. Works' Macintosh-style dialog boxes make mail merge easy.

SOFTWARE

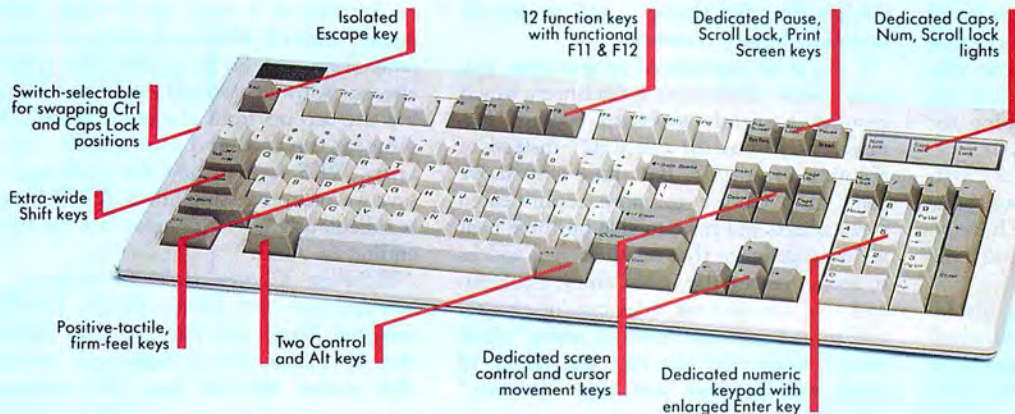
Name	Personal Deskmate 2	Eight-in-One	PFS:First Choice	Ability Plus	Works
Price	\$99.95	\$59.95	\$149	\$259	\$195
No. 5 ¼ / 3 ½ disks	0/1	3/0	3/2	5/2	8/4
RAM required	256K	384K	512K	384K	384K
Works with mouse?	Yes	No	Yes	No	Yes
DOS access?	No	Yes	No	Yes	Yes
No. files open at once	1	1	1	2	8
Bypass main menu?	Yes	No	Yes	Yes	Yes
Relational links?	No	No	No	Yes	No
Clipboard transfer?	RAM and disk	Disk	RAM	RAM	RAM
Macros?	No	Only in telcom	No	Yes	Yes
Desk accessories?	4	6	1	0	0
WP mix justification?	No	Yes	No	No	Yes
WP include graph?	No	Yes	Yes	Yes	Yes
WP outliner?	No	Yes	No	No	No
WP table of contents?	No	Yes	No	No	No
Spelling dictionary?	No	100,000 words	75,000 words	140,000 words	80,000 words
Find doubled words?	N/A	No	Yes	No	Yes
Suggest corrections?	N/A	On request	Automatically	Automatically	On request
Thesaurus?	No	No	Yes	No	No
SS rows x columns	99 x 99	30,000 x 10,000	1,024 x 768	9,999 x 702	4,096 x 256
SS cell pointing?	No	No	No	Yes	Yes
No. SS keywords	16	39	35	46	57
No. graph types	None	6	12	5	8
Graph ranges x points	N/A	3 x 150	8 x 60	7 x 18	6 x 200 +
No. DB records/file	Disk space limit	10,000	16,000	65,000	4,096
No. DB chars/field	560	254	Unlimited	76	Unlimited
Calculated DB fields?	No	No	In reports	Yes	Yes
Learn telcom log-on?	No	No	Yes	No	Yes
ASCII, x-modem transfers?	Yes	Yes	Yes	Yes	Yes
Terminal emulation?	No	Yes	No	Yes	Yes
Import/export: ASCII?	Yes	Yes	Yes	Yes	Yes
Import/export: 1-2-3?	No	Yes	Yes	Yes	Yes

Table. A summary of five integrated-software performances. "Bypass main menu?" refers to the ability to go from one file directly into another. "WP mix justification?" asks whether the word processor can combine justified with unjustified text in one file. "SS" indicates spreadsheet; "DB" stands for database.

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PC MAGAZINE BEST OF 1987
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is the only program tested that lets you select synonyms from a thesaurus (although the Works package includes a discount coupon for Microlytics' excellent Word Finder). A pop-up calculator is the desk accessory Eight-in-One forgot.

The free-form database lets you create or change fields without worrying about data types, lengths, or much of anything else except the odd 88/06/21 date format required for sorting by date. Searching for data or building sorted or subtotaled reports is easy. Mail merge works well, though you may want to jot down your database field names so you won't have to keep looking them up whenever you type a form letter (Dear *First name*).

The communications program is my favorite component. Once you're connected (the program can memorize a log-on or password sequence as you type), you're ac-

tually in the word processor, and you can scroll to the beginning or end of a session without any of that "capture on, capture off" nonsense; you can save all or part of a session to disk, or receive, edit, and send back a block of text. Like its rivals, First Choice can also answer a call or handle x-modem binary transfers.

If you're an experienced programmer, you won't likely admire the spreadsheet, which requires a slightly awkward pop-up "formula entry" box for cell R5C7 instead of pointing to cell G5. But those who move from First Choice to more sophisticated spreadsheets will have to give up these neat features: columns that set their own widths to accommodate the widest entry, a column and row reserved for titles outside the actual spreadsheet (see Photo 2), and a "quick entry" mode that can type the names of other months after you type "January."

First Choice can graph more data ranges in more different formats (bar, pie, high-low-close, for example) than any other program tested. Copying spreadsheet data into charts is child's play.

While First Choice keeps only one file in memory at a time, up to nine "bookmarks" and a RAM-based clipboard let you jump from one file to a particular spot in another without quitting the first and loading the second from the main menu. The program can load and save spreadsheets in Lotus WKS format, and the command to save a word processing file in ASCII format is ridiculously easy—just give it a file name ending in ASC.

PFS:First Choice isn't as powerful as Wordperfect and Dbase III (or PFS:Professional Write and File, for that matter). But in places, it's a beginner's package that makes veterans say, "All programs

Integrated Alternatives

by Eric Grevstad

If you like the idea of affordable integrated software but need only two or three functions instead of six or seven, you might find other productivity packages more useful. Here are three examples—a word processor for people who spend a lot of time online, and two Lotus-compatible spreadsheets with built-in word processors.

The best program for people who switch between Tandy's Model 100/102 portable and an MS-DOS desktop is Sigea Systems' **Telecommuter**. Telecommuter Connect (\$200) combines a word processor and communications program with the same function-key commands and ASCII file formats of the Tandy notebooks' Text and Telcom. Telecommuter Plus (\$400) adds fast null-modem file transfer between machines and a host mode that lets you phone home with your portable to handle files on your desktop.

Telecommuter's modules are faster and smarter than their Model 100 counterparts—the word processor, for example, offers search and replace functions and embedded dot commands for fancy print formatting. But the simplicity of on-screen function-key labels or dialing numbers from an ADRS.DO file (and the minor puzzle of communications parameters such as M8N1E) are unchanged. Also, Sigea Systems is a company with a fine record of customer support.

Against that, while I gave Telecommuter a good review for another magazine in 1985, the program hasn't changed much since then. In this age of low-priced MS-DOS laptops, Telecommuter, though still tops in ease of use, is starting to look old and overpriced against PFS:First Choice and Works.

What's the spreadsheet equivalent of Lifetree Software's economical Volkswriter word processor? Lifetree's **Words & Figures** (\$99), a worksheet compatible with Lotus's 1-2-3 Release 1A commands, macros, and files, adds extra features—a third database sort key, the ability to transpose a range from row to column or vice versa, and an "audit" mode that indicates whether cells hold values, formulas, or circular references or errors.

Words & Figures also adds a simple word processor, controlled by similar commands. Pressing the slash key brings up a Lotus-style menu just like the spreadsheet's (you type two slashes to put one into your document). The word processor isn't much more than a memo-writer with cut-and-paste editing, but instead of copying spreadsheet rows into text, Words & Figures inserts a "live" worksheet window. You can scroll within the window to see different

areas, give spreadsheet commands, or enter and recalculate values that are also changed in the attached worksheet. You can save the combined file or your spreadsheet or document separately.

The Twin, Mosaic Software's Lotus look-alike, is the heart of Words & Figures' new competitor, **Diamond** (\$195). Diamond costs more but has more features. It is compatible with Release 2 and 1A files and has fancier graphics, the ability to print graphs from within the spreadsheet instead of a separate program (as in 1-2-3 or Words & Figures), and a much better word processor, complete with an efficient spelling checker and thesaurus.

On the other hand, while Diamond's two components are more powerful than Words & Figures', their integration is less complete. Diamond's "transfer" command simply pastes a range of spreadsheet cells into a word processing file, and if you switch between the two applications, you must switch between the slash and escape keys to summon their respective menus.

Choices of price and power should mean market coexistence for Words & Figures and Diamond, but potential buyers needn't bother with **Swift & Easy**. Cosmi Corp.'s package promises "Spreadsheet, Word Processor, Instant Graphs, and Macro Key Programming," but you can scour the disk without finding any word processing functions except for specifying header and footer cells; graphics consist of complex, crummy bar charts made of number signs. Swift & Easy is a one-disk spreadsheet with an attractive screen display, incredibly slow recalculation, and a tendency to show a blank screen for 10 or 20 seconds at a time. It does have some of the other functions listed on the package, such as "save and load spreadsheets" and "exit to DOS."

Telecommuter

Sigea Systems Inc., 19 Pelham Road, Weston, MA 02193, 617-647-1098. Requires 256K. \$200 (Plus), \$400 (Connect).

Words & Figures 1.01

Lifetree Software Inc., 411 Pacific St., Monterey, CA 93940, 408-373-4718. Requires 256K and DOS 2.x. \$99.

Diamond 1.1

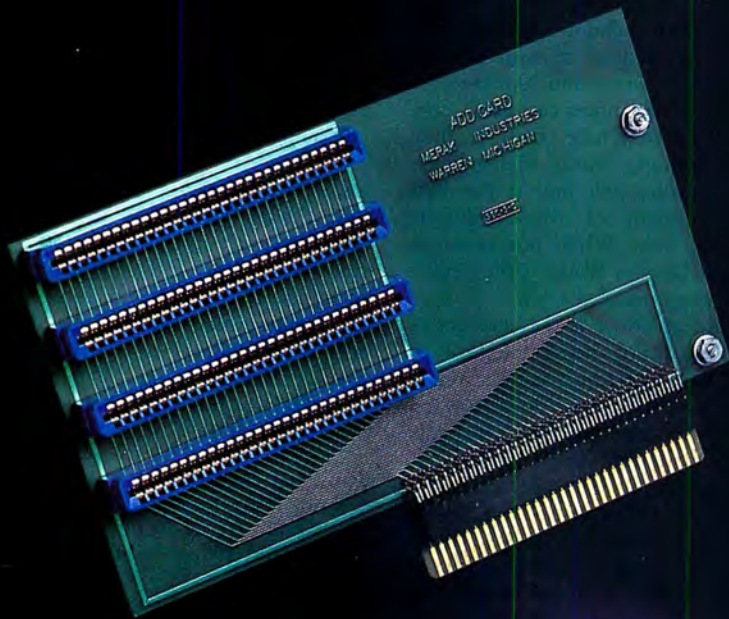
Mosaic Marketing Inc., 1972 Massachusetts Ave., Cambridge, MA 02140, 617-491-2434. Requires 320K and DOS 2.x. \$195.

Swift & Easy

Cosmi Corp., 415 N. Figueroa, Wilmington, CA 90744, 213-835-9687. Requires 256K. \$49.95.

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should work like this." Its street price is under \$100.

Ability Plus

As befits the program with the highest price (\$259, though Migent Inc. will happily recommend a discount mail-order dealer if you call), Ability Plus (see Photo 3) is the power user's product of this group. As John Allswang wrote in his review (see "Budget Integration: Ability Plus," February 1988, p. 29), Ability Plus offers several strong features and the best integration in the sense of files that make "live" links to other applications instead of copying only data. It's worth a look, though its place in this article—squeezed between the crowd-pleasing PFS:First Choice and the glamorous new Works by Microsoft—also reflects its place in the market.

Where the others have pull-down menus at the top of the screen, Ability Plus has horizontal menus along the bottom (navigated in the same way, by moving the cursor or typing a letter). Pressing the F2 key always brings up a menu of commands for a particular application; other function keys govern the Shade, Pick Up, and Put Down commands that transfer data within or between files. Pressing the F9 or "flip" key lets you move between two files or applications in memory at once, slowing Ability's already unexceptional performance.

Ability Plus isn't ideal for beginners. The manual is comprehensive, but the on-disk tutorial is sketchy and you may have to hunt through the help screens to find specifics. Those familiar with other software, while enjoying the 1-2-3 and Dbase III file import and export, will have to learn the various places Ability keeps functions.

But Ability's syntax is consistent among its modules, and the modules are all solid performers. The word processor clumsily inserts and closes up a blank line instead of having a true insert mode, but it has a nice page format display and the neatest header and footer commands I have ever seen.

The communications program divides its parameters among various menus and isn't particularly simple to use. The database is powerful but painstaking to use—where PFS and Works let you create a new database form as quickly as you can type field labels, Ability Plus makes you type a label, press F2 and D (for data field), and then enter a name and field length. But the spreadsheet, while sluggish, is above average. It has plenty of functions, cell pointing, and can print long files sideways.

Most important, Ability is so well integrated it claims a right to the word "relational." Databases can include calculated

fields and fields borrowed from other databases or spreadsheet cells. A field with spreadsheet functions can show up in a word processing file, as can spreadsheets or graphs that recalculate or redraw themselves as data changes. Ability Plus can spend a lot of time checking disk files, and it's not a program you can learn without looking at the manual. But its unique features should tempt business users who often work with related files.

Works

To high-tech types, Works is the first program to follow the new Systems Application Architecture interface used by Windows 2.0 and Windows/386 and prescribed for OS/2. For the rest of us, it's like Wordstar with pull-down menus using the alternate key instead of control: alternate-F-O for File Open and alternate-P-L for Print Layout. Beginners can use it one-handed (pressing alternate, then F, then O); experts scanning Works' dialog boxes and option buttons will find it the best keyboard equivalent of Macintosh-style mouse control ever. While not quite as simple as First Choice, Works is the newest and slickest program of the lot.

Works' word processor is the class act of the field, with dialog boxes identical to Microsoft's Word for the Macintosh (see Photo 4) for selecting typestyles (a scrolling list of all the fonts and point sizes for your printer) or mail-merge fields. Point-and-shoot settings also simplify the communications program, which can record log-on keystrokes as PFS can.

Works doesn't support huge spreadsheets or databases—it offers a maximum of 4,096 database records versus 16,000 for First Choice or 65,000 for Ability Plus—but its spreadsheet is the fastest, has the most built-in functions, stores up to eight graphs with each worksheet, and uses WKS files with no importing or exporting necessary (although 1-2-3's advanced string or statistical functions don't work). The database is as flexible as First Choice's.

While Works has no spreadsheet macro cells like 1-2-3's or Ability's, its memory-resident macro utility is close to Prokey or Superkey. You can design fancy spreadsheet graphs or database reports, or let the "speed charting" and "speed reporting" features create basic models for you. I don't know if there's a maximum number of data points for each of the six graph ranges; I gave up after making an 800-slice pie chart that no monitor could possibly display and no printer could print.

You can copy database items into the word processor as easily as spreadsheet rows, since the database offers a spreadsheet-style "list view" as well as one record

at a time in "form view." Works keeps up to eight files, each created by any of the four main applications, in memory at once; you can switch between them as quickly as you can press alternate-W and a number. If you get confused, you can use neatly indexed help screens, an enormous and excellent on-disk tutorial, and Microsoft's traditional 15-pound documentation.

Even the salesman I spoke to at Migent Inc. admitted that Works is a great program (though, of course, he added that it lacks Ability's relational linking). Works can't compete with the most powerful stand-alone programs, but it's remarkably seamless, sophisticated, and fun to use.

You Can't Go Wrong

Personal Deskmate 2, like Varsity Script, shows that Tandy's programmers can compete with anyone else's. Still, Professional Deskmate is going to have its work cut out for it.

Eight-in-One's outliner, desk accessories, and low price may attract students or families. Ability Plus offers good performance and top-notch integration if you need serious file-linking and can master its high potential. But overall, I'd declare one winner for beginners and another for experienced users. PFS:First Choice is perhaps the nicest and easiest program I've seen, and Works is one of the three or four best programs I've seen of any type.

Personal Deskmate 2

Tandy Corp./Radio Shack, One Tandy Center, Fort Worth, TX 76102, 817-338-2390. Requires 256K. \$99.95 (catalog no. 25-1177).

Better Working Eight-in-One 1.07

Spinnaker Software Corp., One Kendall Square, Cambridge, MA 02139, 617-494-1220. Requires 384K and DOS 2.x. \$59.95.

PFS:First Choice 2.0

Software Publishing Corp., P.O. Box 7210, 1901 Landings Drive, Mountain View, CA 94039-7210, 415-962-8910. Requires 512K and DOS 2.x. \$149.

Ability Plus 1.0

Migent Inc., P.O. Box 6062, Incline Village, NV 89450, 702-832-3700. Requires 384K and DOS 2.x. \$259.

Works 1.0

Microsoft Corp., 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717, 206-882-8088. Requires 384K and DOS 2.x. \$195.

Eric Grevstad is a free-lance journalist who's been writing about computers since 1982. He is coauthor of The Computer Guide to the Tandy 1000 (Ashton-Tate, 1985). You can contact him at 80 Micro, 80 Elm St., Peterborough, NH 03458.

The Tandy 1400 LT: MS-DOS to Go

A tad plump, but the price is right.

by **David S. Veale**
80 Micro staff

Anxious to reclaim its leading position in the briefcase computer market, Tandy recently released the 1400 LT, its first MS-DOS portable computer. A state-of-the-art, entry-level laptop, it's loaded with features and priced well below most of its competition.

The 1400 LT's NEC V20 processor, running at 7.16MHz, is fully compatible with the Tandy 1000's Intel 8088. Its enhanced clock speed makes the LT as fast as the Tandy 1000 SX and 3.4 times faster than an IBM PC/XT, according to the Norton Computing Index. While the 1400 LT doesn't quite match the speed of the NEC V30-equipped NEC Multispeed EL, it costs \$900 less—and for that kind of money, I'll wait a few seconds.

Memory

The LT comes standard with 768K of CMOS (complementary metal-oxide semiconductor) RAM. DOS accesses 640K, and the remaining 128K is available as a RAM disk. Unlike the Model 100 and the IBM PC Convertible, however, you lose the contents

of RAM when you turn off the system.

A RAM disk is an area of memory that the computer thinks is a disk drive. The LT's physical disk drives are designated A and B. The RAM drive is drive C. You can store information on drive C just as you would on any other disk drive, but information stored there will be retrieved at memory speed, not disk drive speed. Consequently, you'll find it significantly faster to retrieve information from files stored in RAM than from files on a physical disk.

A removable circuit board plugged into a proprietary expansion slot at the back of the machine holds the 128K RAM for the RAM disk. Perhaps Tandy or third-party manufacturers will develop larger-capacity memory boards for this slot; this expandability speaks well for the LT.

Front-mounted Drives

To Tandy's credit, the LT's two 3½-inch 720K disk drives are mounted on the front of the computer at the base of the display and above the keyboard. (Most laptop drives are on the side, which can be awkward.) Sometimes I pressed a key or two accidentally when inserting and removing disks, but the more I used the machine, the less frequently this occurred.



Newest Tandy laptop offers MS-DOS versatility, a comfortable keyboard, and a bright, easy-to-read display.



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Applications and utilities to help you use your computer more productively and tutorials to make learning easy. Here's a preview of what's ahead for 1988:

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The drives are quiet. Small LEDs indicate when they're active.

As with virtually all 3½-inch drives, access time is painfully slow. If you're used to 5¼-inch drives, the slow speed is annoying; if you're accustomed to a hard disk, you'll be ripping your hair out. Used correctly, however, the speed of using the 128K RAM disk will compensate for the slow drive speed.

Keyboard

Most of the laptops I've used have small, cramped keyboards. But not the LT; its keyboard is almost a clone of the IBM PC Convertible's keyboard, with a very similar layout and feel. While the Convertible has taken plenty of knocks since its release, its keyboard has been widely praised as one of the best in the industry, and Tandy did well to emulate it.

The keys click slightly as you press them. The layout is logical, and Tandy even found room for 12 function keys. Twelve keys on the right double as the numeric pad; you toggle it on and off with the num lock key. Several other keys do double duty to save space, and you access them via a special function key, as on the IBM Convertible. Once you get used to it, the system works well.

Indicator lights on the keyboard show when the caps lock, num lock, and scroll lock keys are invoked (yes, Tandy 1000 owners, the LT has a Scroll Lock key!). The LT even has small slots above the function keys for templates.

I didn't like the placement of the cursor keys at the bottom of the keyboard, however. If you like to rest your wrists or palms on the base of the keyboard, as I do, you can't help but lean on the arrow keys.

I've heard grumblings about the LT's lack

of a separate numeric pad like the NEC Multispeed EL's, but personally, I'd rather save the space, weight, and cash.

Display

The most striking feature of the LT is its display. For a computer in this class and price range, the display is nothing short of spectacular. It sports a "supertwist" backlit LCD, which represents the state of the art in mass-market LCD technology. The screen shows a full 80 columns by 25 lines of text and can display up to 640-by-200-pixel graphics. Unlike some laptops, the 1400 LT can display shades of gray by causing parts of the display to blink at varying frequencies, giving the illusion that some parts are darker than others. As you move to the lighter shades, however, the flickering action becomes obvious and somewhat distracting.

The screen contrast is excellent—as good as a CRT's—and is adjustable via a control on the side of the computer. The screen measures 4¼ by 9½ inches, with a 1:1.4 aspect ratio. Characters and graphics appear normally—not compressed, as they do on many laptops (especially IBM's).

In its normal operating position, the display opens to about a 110-degree angle to the keyboard; you can push it back even further, until it lies almost flat against the top of the unit.

The only fault I found with the display is the absence of an on/off switch or brightness control for the backlight. On a computer where battery life is crucial, you should be able to turn off the lighting when it's not required. (Tandy's is the only backlit system I've seen that doesn't include this option.) An automatic power-saver feature shuts off the display after the LT has been idle for a predetermined length of time,

however, and a small status indicator LED on the keyboard lets you know the computer is still on, so there's little chance of depleting your power accidentally.

Switches and Connectors

The LT has numerous connectors and controls—some expected, some not. In the expected category are an on/off switch, a display-contrast control, an ac power adapter connector, a DB-25 parallel printer port, and a DB-9 serial port.

In the unexpected category are an IBM standard keyboard connector for attaching a full-size keyboard, and RGB and composite video outputs for connecting an external monitor (a switch on the computer toggles between the LCD and external CRT). You could, therefore, connect a keyboard and a color monitor and have a full-featured desktop system.

Also in the unexpected category is an IBM PC/XT-type external floppy drive connector. Because the LT has only 3½-inch drives in a primarily 5¼-inch world, this connector may prove invaluable for connecting an external 5¼-inch drive to aid in transferring data. In a small stroke of apparent genius, Tandy added a switch on the computer to allow it to boot from the external drive. If you happen to have a 5¼-inch drive, this switch allows you to run your 5¼-inch software that has to boot the computer from an original 5¼-inch disk (copy-protected games, for example).

The LT has a volume control, but the speaker is so small that all you can do is change the volume from "silent" to "whisper." You won't find a reference to this control anywhere in the documentation, and it's well hidden (under the battery); I found it accidentally while dissecting the computer for this review.



The Mystery Slot

A similarly undocumented little metal cover on the back of the computer made me curious; I removed it and found, to my surprise, an unused expansion slot.

Though its connector resembles that found in a standard PC expansion slot, the size of the opening precludes the use of existing PC cards. Nothing currently on the market fits the slot!

Its presence does, however, open several possibilities such as external hard disks, communications devices, and controllers. Advanced Transducer Devices, the makers of Zuckerboards, have already announced a 20MB hard disk drive for the LT. I expect some of the third-party manufacturers who've supported the Model 100/200 over the years to do something with this slot soon, even if Tandy doesn't.

Power

The LT operates on power from a 12-volt, 2200mA battery pack composed of 10 C-size Nicad batteries bundled together in a plastic pack. Battery life is rated at four hours of continuous use. That's rather short (and probably attributable to the fact that you can't turn the display lighting off). Since the battery pack is removable, you could carry a spare (available from Radio Shack for \$79.95, catalog no. 25-3520) for backup.



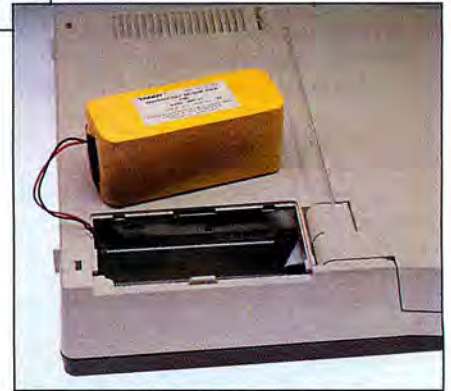
Metal cover on the back of the 1400 LT conceals an undocumented expansion slot.

A low-battery indicator LED warns you when you need to recharge or replace the batteries. Normally you'll charge through a 15-volt, 700mA AC adapter that comes with the LT. Charging the battery pack outside the computer might prove difficult, though. It has a strange connector, and I haven't seen any commercial chargers that would work with it.

The battery pack is huge—for a laptop—and adds a lot of weight to the machine. The IBM PC Convertible's battery pack is less than half the size of this monster.

Size and Weight

Weighing in at 13½ pounds and measuring 14½ by 12½ by 3½-inches, the LT is the biggest and heaviest computer in its class, largely because of the battery pack. The width is average and the length is slightly longer than average. You'd be hard-



12-volt, 2200mA rechargeable NiCad provides four hours of continuous use.

pressed to fit the machine in any normal briefcase.

While the machine is a bit of a porker, no other name-brand machine on the market today can touch its price/performance

Maximizing NiCad Life

by Joe Carr

Rechargeable nickel-cadmium batteries ("NiCads") are the power source for most portable computers. Used properly, NiCads will provide years of dependable service; used improperly, they may fail prematurely or give less than satisfactory results.

One difficulty NiCad users frequently encounter is what some experts call a "memory problem." When a NiCad battery develops a "memory," it won't allow deep discharge after too many shallow discharges.

For example, if a battery is repeatedly discharged to only 80 percent of its capacity, it will "remember" the 80-percent level as if that level were the "fully-discharged" point. It will then seem to be completely discharged even though the charge level is actually 80 percent of fully charged. When this happens, you'll be convinced your NiCads have suffered premature failure.

Sometimes it's possible to cure a NiCad memory problem by charging the battery to maximum capacity and then

immediately discharging completely. But a better approach to the problem is to avoid it entirely.

Here's an example: I have a friend who uses a NiCad-powered Transcutaneous Electronic Nerve Stimulator (TENS) to keep pain at a manageable level. When he complained that his \$90 battery pack lasted only a few weeks, I found that he routinely placed the TENS in its charger every night, even though he'd used it only intermittently. As a result, its battery was being "shallow-cycled" (charged to full capacity from a starting point well above its proper discharge level) again and again. Not surprisingly, it soon developed "memory."

I suggested he keep two battery packs on hand: one in an insulated bag in his briefcase and another in the TENS. When the battery in the TENS battery runs low, he sets it in its charger and installs the fully charged pack. With this procedure, he has increased the average useful life of his battery packs from six weeks to a year or more. One pack survived for two years.

Another problem called "polarity reversal" may result if the battery is fully discharged. This happens because not all cells have the same terminal voltage at any given time, and sometimes one cell will be charged "backwards" by the others in the series chain. For this reason, it's best to discharge multicell batteries to about 10-20 percent of capacity, rather than let them become fully discharged.

What does all this mean for laptop users? In short, *don't plug your battery pack into the charger until the "low battery" indicator light comes on.* One exception: if you're about to write data to disk and the low battery light comes on, replace or recharge your batteries, or switch to ac power; with a nearly-discharged battery, you could lose data when the disk drive comes on.

Joe Carr has prepared a brief monograph on the care of NiCad batteries for hardware-oriented readers. Contact him at P.O. Box 1099, Falls Church, VA 22041-1099. Price: \$5.00.—Eds. ■



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1400 LT

ratio. For the same price, you'll get fewer features and smaller size. For more money, you'll get similar features and smaller size. Life demands compromise—with the LT, the compromise is bigger size for lower cost.

Putting the size differential in perspective, however, the LT is the biggest computer by about 1 inch and the heaviest by about 1 pound. You have to ask yourself if that inch and pound are really significant.

Options

Tandy offers a limited number of options for the LT. An internal 1200 baud, Hayes-compatible modem (catalog no. 25-3510) installs easily in a dedicated slot at the back of the computer. The modem features dual phone jacks and an acoustic coupler hookup, should you be communicating from a phone booth or hotel room without modular hookups (nice touch!). The modem retails for \$199.95, which makes me wonder why similar modems for other brands of laptops average \$350 to \$450.

Tandy also offers a carrying case for \$39.95 (catalog no. 25-3511). It's not nec-

essary for protection—the computer's solid plastic case should suffice—and the LT's retractable handle seems rugged enough for normal use.

Software

The 1400 LT comes with Tandy's implementation of MS-DOS 3.2 and GW-Basic. You invoke a ROM-based setup routine by pressing the control-alternate-insert key combination at the DOS prompt. The setup utility allows you to set defaults for clock speed (switchable between 7.16 and 4.77MHz), an internal or external monitor, internal or external modem, and internal or external keyboard. You can also set the length of time the computer will sit without being used before the screen shuts off. The LT also has a clock/calendar feature.

Summing Up

I like this computer. It's too big and too heavy, but the convenience of the features it offers—at the price Tandy asks—far outweighs the discomfort of my slightly sore arm.

The competing machines that come closest to the 1400 LT are the IBM PC Convertible, the NEC Multispeed EL, and the Toshiba T1100+. The Convertible is only \$96 more than the LT but has only 256K and no ports, not even for a printer. A Convertible with 640K, serial and parallel ports, and a monitor hookup will set you back over \$2,400 and be bigger, heavier, and slower than the 1400 LT.

Compared with the LT, the NEC Multispeed EL has similar features as the LT and runs faster. But it costs \$2,500. Is a little more speed worth \$900? Not to me.

The same is true of the Toshiba. Its features are similar and the Toshiba weighs less, but there's no backlit display and it's priced at \$2,100.

Tandy should have a hit with the 1400 LT. If you're looking for a good, solid laptop with plenty of features at a reasonable price, I recommend the 1400 LT. ■

David S. Veale is a technical writer on the staff of 80 Micro.

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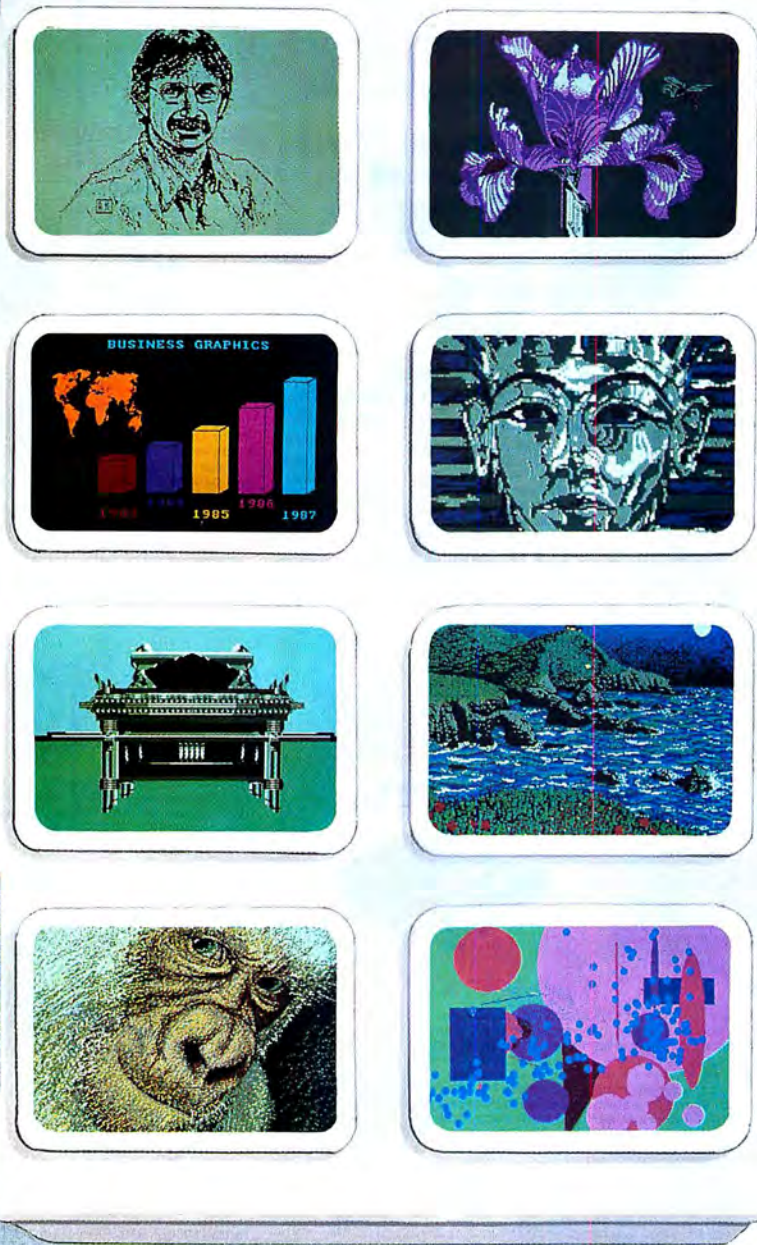
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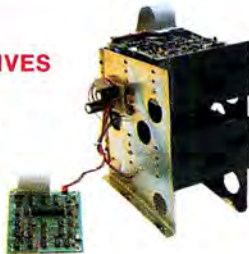
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To Graph Where None Have Graphed Before

Print simple line, bar, and pie graphs from Deskmate's worksheet.



by **Gerry Lennox**

Many spreadsheet programs include a graph function. Because Deskmate does not, I wrote Paragraph, a short Basic program that produces line, bar, or pie graphs from worksheet data or from any ASCII file containing up to 15 numbers. (If the file contains more than 15 numbers, the excess will be ignored.)

Before you can produce graphs, you need to create a data file on your Basic disk from your spreadsheet. Fortunately, Deskmate provides a way to do this. First, place the disk containing Basic.EXE and Paragraph in drive B. Next, load Deskmate and your spreadsheet from drive A. Press F7 to select the row or column of numbers you want to plot in the graph; you're limited to 15 numbers, and no alpha characters are allowed. Once the data has been selected, press F8 twice and type B:GRAPH when Deskmate prompts you for a file name. This will create an ASCII file named Graph.DOC on your Basic disk that Paragraph can read.

One word of caution: If you already have a file on your disk named Graph.DOC, Deskmate will generate an error and cancel the function. It's a good idea to purge your disk of any old files before you begin.

The key to drawing the graphs is the Basic Draw statement that draws a line on the screen in the direction you select and in the length you specify. Paragraph scales the data to fit the screen size and combines the redefined values with the Draw statement to draw the graph. Using assorted

Available on the April-June 1988 Disk Series, on sale in May.

PARAGRAPH

prefix commands with the Draw statement allows positioning lines at selected angles, setting color, drawing lines from variable strings, and moving to specific screen locations without drawing at all.

Paragraph doesn't include a print routine, but you can make paper copies with most

dot-matrix printers by pressing the shift and print keys while the graph is displayed on the screen. This function has been enhanced by shifting the screen display slightly to the left to produce properly centered copies on 8 1/2-by 11-inch paper. Remember, if you plan to dump graphs to your printer in this manner,

you'll have to run Graphics.COM from your DOS disk before loading Basic and running Paragraph.

Gerry Lennox is a free-lance programmer and writer. You can reach him at 4 Oakwood Drive, Peekskill, NY 10566.

Program Listing. Paragraph allows you to create graphs from spreadsheet programs lacking graphic functions.

(See page 63 for instructions on using checksums.)

```

2247 10 KEY OFF: CLEAR: DIM L(15), P(15), PS(15)
1562 20 SCREEN 1: COLOR 1, 5: CLS
30 * LOAD DATA FILE *
1481 40 OPEN "I", #1, "GRAPH.DOC"
2528 50 IF EOF(1) OR N=15 THEN CLOSE #1: GOTO 110 * TEST FOR END OF FILE *
443 60 N=N+1 * N IS THE NUMBER OF RECORDS READ FROM THE DISK *
70 * L(N) HOLDS ARRAY VALUE - T IS THE SUM OF ALL FILE RECORDS *
2380 80 INPUT #1, L(N): L(N)=ABS(L(N)): T=T+L(N)
583 90 GOTO 50
100 * MENU *
2315 110 CLS: PRINT " 1)PIE 2)BAR 3)LINE"
2540 120 PRINT: INPUT "WHICH TYPE OF GRAPH?"; G
1700 130 CLS: ON G GOSUB 200, 300, 300
2258 140 IS=INKEY$: IF IS=" " GOTO 10 ELSE 140
200 ***** DRAW PIE CHART HERE
977 210 FOR X= 1 TO N
1412 220 P=P+INT(360*(L(X)/T)) * CONVERTS DATA TO DEGREES OF CIRCLE *
230 * PS(X) IS 'DRAW' MOVEMENT COMMAND PLUS DATA STRING IN DEGREES *
1234 240 PS(X)="TA"+STR$(P)
502 250 NEXT
1277 260 CIRCLE(115,100),50,1
983 270 FOR X= 1 TO N
2089 280 DRAW "M115,100": DRAW "XPS(X);U47"
1076 290 NEXT : RETURN
300 * FIND HIGHEST NUMBER IN DATA STRING *
978 310 FOR X= 1 TO N
2913 320 P(X)=INT(L(X)): IF P(X)>HIGH THEN HIGH = P(X)
621 330 NEXT X
340 * ADJUST DATA STRING TO SCREEN SCALE *
764 350 F=HIGH/99
2626 360 FOR X= 1 TO N: P(X)=INT(P(X)/F): NEXT X
1070 370 IF G=3 GOTO 500 * EXECUTION BRANCHES HERE FOR LINE GRAPH *
400 ***** DRAW BAR CHART
4325 410 FOR X=1 TO N: PS(X)="U"+STR$(P(X))+": "+R4: "+D"+STR$(P(X))+": "+R5:
:NEXT
971 420 DRAW "BM50,30"
2353 430 DRAW "C2:D110;R150;U110;L150;BM58,139"
950 440 FOR X=1 TO N
1194 450 DRAW "C1:XPS(X):"
1195 460 NEXT X: RETURN
500 ***** DRAW LINE GRAPH
3877 510 FOR X=1 TO N: PS(X)="M"+STR$(55+(X*9))+": "+STR$(140-P(X))+": NEXT
972 520 DRAW "BM50,30"
2354 530 DRAW "C2:D110;R150;U110;L150;BM58,139"
951 540 FOR X=1 TO N
2317 550 DRAW "C1:XPS(X);C3;U2;D4;U2;L2;R4:"
1196 560 NEXT X: RETURN

```

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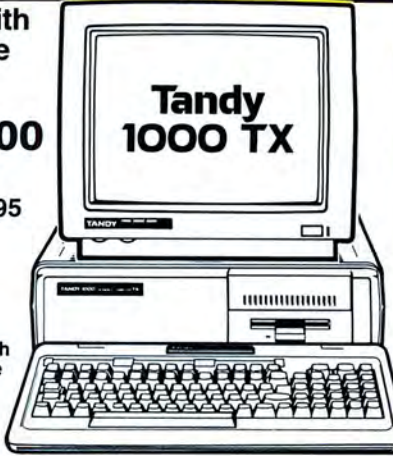
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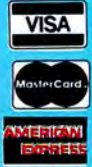
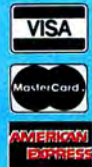
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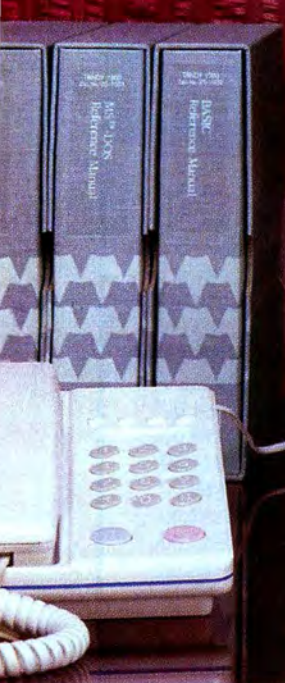
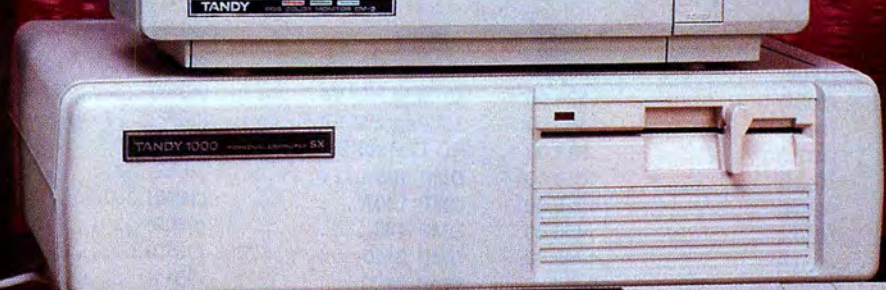
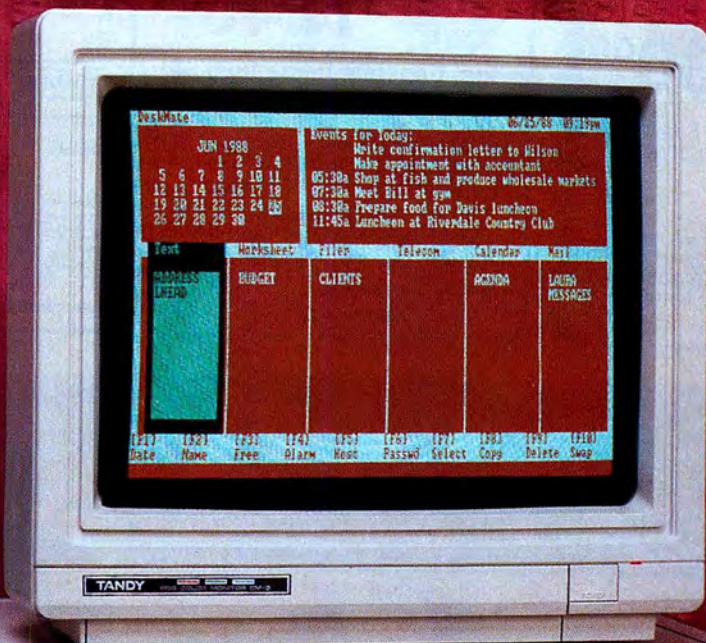
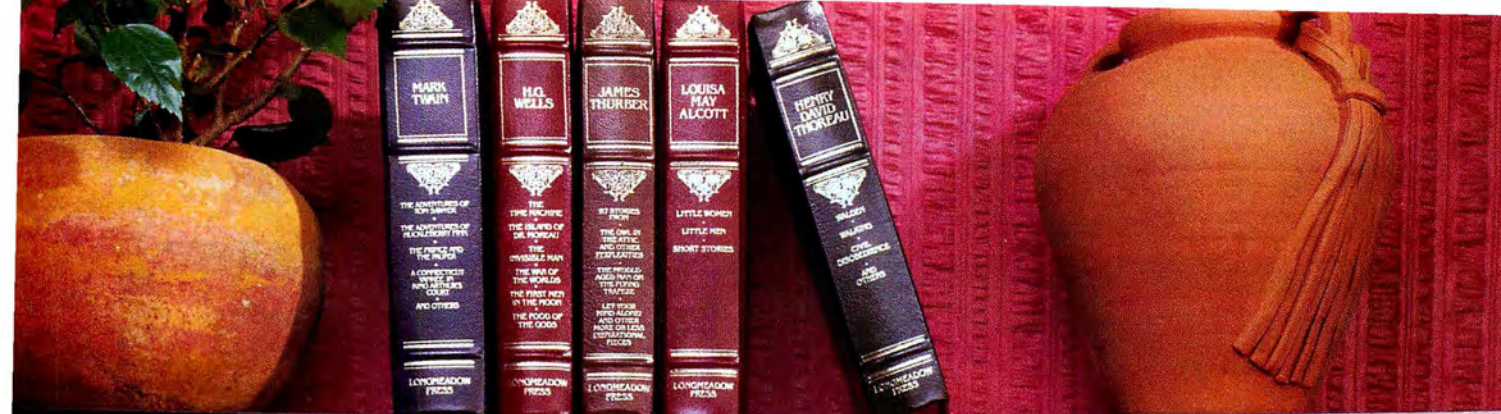
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by David A. Williams

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While you'll never mistake Notes for a word processor, you'll find that it does offer a reasonable complement of editing commands. Page up (PgUp) and page down (PgDn) display adjacent sheets. The arrow keys move the cursor on the sheet currently displayed, while the home and end keys move the cursor to the first and last lines on the sheet, respectively. The backspace key works as defined; control-D clears the current sheet. Pressing the enter key moves the cursor to the head of the next line, but it also clears the previous line from the cursor to the end of the line. The insert key opens the text to insert one space and the delete key deletes the character under the cursor. Newly entered text overtypes any already present. Control-P sends the text to your printer. To exit Notes, press the escape key.

To save the contents of a sheet to a disk file (named "Notes," with no extension, by default) type SAVE and press enter when the DOS prompt appears. The Save.COM file is

created each time you run the Notes program.

Notes uses two display routines: one displays a single character, and another displays an entire screen. Both contain the code necessary to keep your screen free of snow while you're writing notes.

The routines that save and restore the program screen are not similarly protected, so you may notice a little snow when Notes saves the program screen. I felt this was preferable to the slight delay that would occur otherwise.

Notes was originally written in assembly language for the Microsoft Macro Assembler. Because of space limitations, we've included only the Basic listing here; for a copy of the original source code and a text file that explains the code in greater detail, send a formatted disk and a self-addressed mailing label to "Notes," c/o 80 Micro's Technical Department, 80 Elm Street, Peterborough, NH 03458.—Eds.

The source listing is well documented, so you should be able to figure out what's going on well enough to change it—the editing commands, for example, or the number of sheets or rows in each sheet—if you wish. ■

David A. Williams is a staff engineer with a major aerospace firm and has 25 years of experience with computers. Write to him at 2452 Chase Circle, Clearwater, FL 34624.

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299 10 'DATA POKE FORMAT CREATED ON DATAPOKE.BAS
2648 20 CLS:PRINT"BUILDING 'NOTES.COM":RESTORE
64 30 OPEN"O",1,"NOTES.COM":L=90
542 40 CS=0:L=L+10
353 50 READ AS:IF AS="END"THEN CLOSE:END
4317 60 IF AS="S" THEN FOR K=1 TO 13995:PRINT#1,CHRS(32):NEXT K:GOTO 40
70 IF LEFT$(AS,1)="" THEN IF VAL(MID$(AS,2))<CS THEN 40 ELSE PRINT"CHC
735 80 A=VAL(AS):PRINT#1,CHRS(A):CS=CS+A
90 GOTO 50
100 '*** DATA AREA ***
1893 110 DATA 233,25,60,40,67,41,49,57,56,55,32,68,65,87,0,-935
1648 120 DATA 0,0,0,0,0,0,0,13,10,36,0,0,78,79,84,-300
300 130 DATA 69,83,0,0,0,0,0,0,0,0,0,176,-328
2813 140 DATA 186,3,0,0,0,0,208,7,80,83,65,86,69,46,67,-900
1188 150 DATA 79,77,0,180,5,205,23,176,0,180,76,205,33,80,83,-1402
185 160 DATA 81,82,87,86,30,6,14,31,156,255,30,18,1,184,64,-1125
954 170 DATA 0,142,192,38,139,62,28,0,131,239,2,129,255,30,0,-1387
1205 180 DATA 115,3,191,60,0,38,139,21,131,62,25,1,1,117,3,-907
325 190 DATA 233,31,4,129,250,1,30,116,3,233,22,4,38,137,62,-1293
1277 200 DATA 88,199,6,25,1,1,0,199,6,43,1,0,176,199,-884
1535 210 DATA 6,45,1,186,3,180,15,205,16,60,7,116,12,199,6,-1057
1720 220 DATA 43,1,0,184,199,6,45,1,218,3,161,43,1,142,192,-1239
224 230 DATA 190,0,0,191,108,45,185,208,7,38,139,4,137,5,70,-1327
2814 240 DATA 38,198,4,7,70,131,199,2,226,240,183,0,180,3,205,-1686
3985 250 DATA 16,137,22,47,1,137,14,49,1,128,229,223,180,1,205,-1390
2829 260 DATA 16,180,15,205,16,180,0,205,16,232,217,3,186,0,0,-1471
1765 270 DATA 180,2,205,16,232,241,3,180,1,205,22,117,250,180,0,-1834
373 280 DATA 205,22,61,13,28,117,108,139,30,33,1,139,195,43,6,-1140
533 290 DATA 37,1,246,54,53,1,128,252,79,116,17,198,7,32,255,-1476
3606 300 DATA 6,33,1,131,6,35,1,2,67,254,196,235,234,198,7,-1406
2164 310 DATA 32,60,24,124,48,131,62,41,1,4,117,19,131,46,33,-873
4849 320 DATA 1,79,129,46,35,1,158,0,232,162,3,232,125,3,235,-1441
330 330 DATA 172,255,6,41,1,129,6,37,1,208,7,129,6,39,1,-1038
340 340 DATA 70,129,46,35,1,160,15,255,6,33,1,131,6,35,-1058
1218 350 DATA 233,233,199,6,45,1,232,80,1,233,255,255,61,0,117,73,-2008
3128 360 DATA 139,30,39,198,7,32,75,59,30,37,1,117,246,198,-1209
1664 370 DATA 7,32,137,30,33,1,199,6,35,1,0,0,232,83,3,-799
2175 380 DATA 232,46,3,233,92,255,61,8,14,117,32,139,30,33,1,-1296
1187 390 DATA 59,30,37,1,126,16,255,14,33,1,131,46,35,1,2,-787
2598 400 DATA 198,7,255,32,232,46,3,232,9,3,233,55,255,61,0,-1685
1975 410 DATA 73,117,38,131,62,41,1,0,117,3,233,40,255,255,14,-1308
5044 420 DATA 41,1,129,46,33,1,208,7,129,46,37,1,208,7,129,-1023
1249 430 DATA 46,39,1,208,7,232,222,2,233,12,255,61,0,81,117,-1516
901 440 DATA 38,131,62,41,1,4,117,3,233,252,254,255,6,41,1,-1440
2940 450 DATA 129,6,33,1,208,7,129,6,37,1,208,7,129,6,39,-946
977 460 DATA 1,208,7,232,179,2,233,225,254,61,0,75,117,69,255,-1918
1828 470 DATA 14,33,1,131,46,35,1,2,139,30,33,1,59,30,37,-592
1321 480 DATA 1,125,44,131,62,41,1,0,117,12,255,6,33,1,131,-960
3156 490 DATA 6,35,1,2,233,182,254,255,14,41,1,129,46,37,1,-1237
2788 500 DATA 208,7,129,46,39,1,208,7,199,6,35,1,158,15,232,-1291
1709 510 DATA 108,2,232,139,2,233,151,254,61,0,77,117,69,255,6,-1706
1197 520 DATA 33,1,131,6,35,1,2,139,30,33,1,59,30,39,1,-541
2022 530 DATA 124,44,131,62,41,1,4,117,12,255,14,33,1,131,46,-1016
3279 540 DATA 35,1,2,233,108,254,255,6,41,1,129,6,37,1,208,-1317
1831 550 DATA 7,129,6,39,1,208,7,199,6,35,1,0,0,232,34,-904
1077 560 DATA 2,232,65,2,233,77,254,61,0,72,117,73,131,46,33,-1398
1977 570 DATA 1,80,129,46,35,1,160,0,139,30,33,1,59,30,37,-781
2519 580 DATA 1,125,46,131,62,41,1,0,117,14,131,6,33,1,180,-789
952 590 DATA 129,6,35,1,160,0,233,30,254,255,14,41,1,129,46,-1334
1225 600 DATA 37,1,208,7,129,46,39,1,208,7,129,6,35,1,160,-1014
16 610 DATA 15,232,212,1,232,242,1,233,255,255,61,0,80,117,73,-2008
840 620 DATA 131,6,33,1,80,129,6,35,1,160,0,139,30,33,1,-785
1599 630 DATA 59,30,39,1,124,46,131,62,41,1,4,117,14,131,46,-846
1015 640 DATA 33,1,80,129,46,35,1,160,0,233,208,253,255,6,41,-1481
2572 650 DATA 1,129,6,37,1,208,7,129,6,39,1,208,7,129,46,-954
193 660 DATA 35,1,160,15,232,134,1,232,165,1,233,177,253,61,0,-1700
2901 670 DATA 71,117,20,139,22,37,1,137,22,33,1,199,6,35,1,-841
2006 680 DATA 0,0,232,140,1,233,152,253,61,0,79,117,23,139,22,-1452
1813 690 DATA 39,1,131,234,80,137,22,33,1,199,6,35,1,0,15,-934
1783 700 DATA 232,112,1,233,124,253,61,0,82,117,38,253,183,0,180,-1869
3141 710 DATA 3,205,16,182,0,185,79,0,43,202,30,7,139,249,3,-1343
1762 720 DATA 62,33,1,139,247,78,243,164,198,68,1,32,252,232,35,-1785
791 730 DATA 1,233,81,253,61,0,83,117,36,183,0,180,3,205,16,-1452
172 740 DATA 182,0,185,79,0,43,202,30,7,139,62,33,1,139,54,-1156
604 750 DATA 33,1,70,243,164,198,68,255,32,232,250,0,233,40,253,-2072
3521 760 DATA 60,124,91,60,127,127,87,139,30,33,1,136,7,255,-1309
1822 770 DATA 6,33,1,131,6,35,1,2,139,30,33,1,59,30,37,-546
1942 780 DATA 1,117,53,131,62,41,1,4,117,11,255,14,33,1,131,-976
1091 790 DATA 46,35,1,2,232,160,0,233,241,252,255,6,41,1,129,-1634
1705 800 DATA 6,37,1,208,7,129,6,39,1,208,7,199,6,35,1,-890
3681 810 DATA 0,0,232,167,0,232,198,0,233,210,252,232,123,0,232,-2111
665 820 DATA 189,0,233,201,252,61,16,25,117,58,186,0,0,191,92,-1621
2576 830 DATA 6,185,125,0,187,0,0,81,185,80,0,138,5,180,0,-1172
1865 840 DATA 205,23,71,226,247,176,13,180,0,205,23,176,10,180,0,-1735
1972 850 DATA 205,23,67,131,251,54,117,9,176,12,180,0,205,23,187,-1640
5229 860 DATA 0,0,89,226,213,233,138,252,61,27,1,117,248,199,6,-1810
1413 870 DATA 25,1,0,0,161,43,1,142,192,190,108,45,191,0,0,-1099
37 880 DATA 185,208,7,243,165,183,0,180,2,139,22,47,1,205,16,-1603
1975 890 DATA 1,139,14,49,1,205,16,7,31,94,95,90,89,91,-1102
3067 900 DATA 88,207,161,43,1,142,192,139,54,33,1,139,62,35,1,-1298
5338 910 DATA 138,100,255,139,22,45,1,236,168,1,117,25,236,168,1,-1878
2230 920 DATA 116,251,38,136,101,254,195,161,43,1,142,192,139,54,37,-1860
4398 930 DATA 1,191,0,0,185,208,7,139,22,45,1,236,168,1,117,-1321
1645 940 DATA 251,236,168,1,116,251,164,71,226,242,195,248,161,33,1,-2364
2841 950 DATA 141,22,92,6,43,194,51,210,247,54,51,1,139,194,246,-1691
1207 960 DATA 54,53,1,138,212,138,240,180,2,183,0,205,16,195,6,-1623
2642 970 DATA 30,85,80,83,81,14,31,128,252,5,116,11,89,91,88,-1184
1491 980 DATA 93,31,7,46,255,46,14,1,251,180,60,141,22,27,1,-1175
3236 990 DATA 185,0,0,205,33,185,125,0,139,216,141,22,92,6,180,-1529
2646 1000 DATA 64,81,185,80,0,205,33,82,141,22,22,1,185,2,0,-1103
2477 1010 DATA 180,64,205,33,90,131,194,80,59,226,229,180,62,205,33,-2001
782 1020 DATA 89,91,88,93,31,7,207,32,32,32,32,32,32,-862
466 1030 DATA "S"
2052 1040 DATA 32,32,32,32,32,32,32,32,32,32,32,32,141,22,-579
283 1050 DATA 92,6,137,22,37,1,137,22,33,1,137,22,39,1,129,-816
2827 1060 DATA 6,39,1,208,7,184,9,53,205,33,137,30,18,1,140,-1071
1296 1070 DATA 6,20,1,184,9,37,186,73,1,205,33,184,23,53,205,-1220
856 1080 DATA 33,137,30,14,1,140,6,16,1,184,23,37,186,9,6,-823
2434 1090 DATA 205,33,186,27,1,176,0,180,61,205,33,114,28,185,125,-1559
1975 1100 DATA 0,186,92,6,139,216,81,185,82,0,180,63,205,33,114,-1582
2201 1110 DATA 0,131,194,80,89,226,70,180,62,205,33,180,60,141,22,-1853
1521 1120 DATA 54,1,185,0,0,205,33,69,216,141,22,63,1,150,64,-1304
1253 1130 DATA 185,10,0,205,33,180,62,205,33,186,28,61,177,4,211,-1580
1598 1140 DATA 234,176,0,180,49,205,33,-877
425 1150 DATA END

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179-058

REVIEWS

(continued from page 25)

Asksam's calculation features are rich enough to seem like overcompensation for its orientation toward text. Among the finer ones is the ability to treat lists as arrays. You can calculate new fields, include them, and remove them on the run.

Simple reports are easy to get with immediate commands. A little practice gains you a facility for writing programs for ordinary columnar reports and file updates. Mastering Asksam's programming language, with its conditional expressions, loops, and tests, takes study—not that this language is more difficult than others, but programming in any language is an acquired skill. While most of your applications may not require the power the

language affords, having it available means you can reach for the level of sophistication you need and never come up short.

Evolutionary

Text-based database managers have been the rage lately, and a slew of them have appeared on the market, most of them searchable notebooks. Asksam needs to be carefully separated from the followers of fashion. Though it's based on the idea of organizing textual information, it transcends it. It joins traditional database techniques with methods for managing text to make something new. Rather than a best of both worlds, Asksam is a new world unfolding, now in its fourth carefully executed version, with an obvious commitment to pursuing the evolution. ■

Asksam 4.0 requires 256K and two disk drives. Asksam Systems, 119 S. Washington, P.O. Box 1428, Perry, FL 32347, 904-584-6590. \$295.

menus make choosing commands easy (select one with the arrow keys or type its first letter) and are so friendly that the same menu might pop up in different places at different times to avoid hiding your cursor. There's no need to memorize which commands go with F6, shift-F6, and control-F6, because the on-screen row of function-key labels changes whenever you touch the shift, alternate, or control key.

Many commands on Varsity's startup menu are also available while editing a document—changing the current directory; printing a file; "document maintenance" utilities such as deleting or renaming a file or moving it to another directory (but no access to DOS to format a data disk); and a full range of layout or formatting options, whether customizing an open file or changing default settings from the main menu.

I found one bug: Varsity refused to change its default of single spacing for new documents, though I could change other defaults from the main menu and all the settings, including spacing, within individual files. I reported the glitch, and a Tandy representative promised a cure.

Besides its text and formatting information, you can include a 38-character description or memo when you save a Varsity file—a great memory jogger when you browse through Varsity's directory. (The directory also lists each file's size and the date and time it was saved, though Tandy forgot to include the space remaining on your disk.) Varsity can also save pure ASCII files, with no extra carriage returns except those at the ends of paragraphs.

All the Modern Conveniences

While I miss luxuries such as DOS access or disk-space indicators, my biggest complaint involves the program's slow performance. Although my fastest typing rarely made Varsity drop characters, the cursor lagged jerkily behind and a blinking "Working..." message sometimes appeared during simple word wrap, let alone during block moves or reformatting.

Varsity's scrolling and reformatting speed proved bearable, but its time in my search-and-replace test was abysmal (20 times slower than Wordstar 4, 160 times slower than Xywrite III Plus). Moving from my old 1000 to a speedy 1000 TX made the typing lag much less noticeable, but I still have an odd desire to try this low-end word processor on a high-end 80386 machine.

Despite its budget price and easy menus, Varsity might be good enough to tempt a Tandy 4000 owner or other power user. In selecting text to move, cut, or copy, it tops Word—you can instantly highlight a word, sentence, paragraph, page, document, or text up to the next occurrence of whatever character you type. Splitting the screen to shuffle text between two files is a cinch. A "delete previous word" command (control-backspace) is something every writer needs, but few word processors have.

Varsity Scripsit: Not Fast, But Not Bad



Varsity Scripsit offers split-screen editing, visible page breaks, and pop-up command menus.

by Eric Grevstad

If you're the fastest typist in town, Varsity Scripsit's sluggish performance might distract you from its other fine features. But if you're a leisurely typist or have a fast 80286 computer, Varsity is one of the best low-priced word processors yet.

Varsity Scripsit, while heir to the venerable name of Radio Shack's first TRS-80 word processor, is very different from its ancestors. It's the first Tandy program to be sold outside and inside Radio Shack stores, through a deal with distributor Ingram Software.

Its installation menu actually supports

printers other than Tandy's. Most of all, it's a surprisingly friendly, powerful program at one-third the price of 1985's original, unusable MS-DOS Scripsit—a program that asked you to toggle insert and overtype modes by pressing control-F3, then F10-control-F3. Varsity lets you tap the insert key like real word processors do.

While the Varsity manual offers a fair introduction and an excellent reference section, you can master the program by glancing at the manual and using the help screens (which offer detailed help when you type a command's keystrokes or a word such as "copy" or "tabs" from an on-screen list of topics).

The program's pop-up menus and sub-



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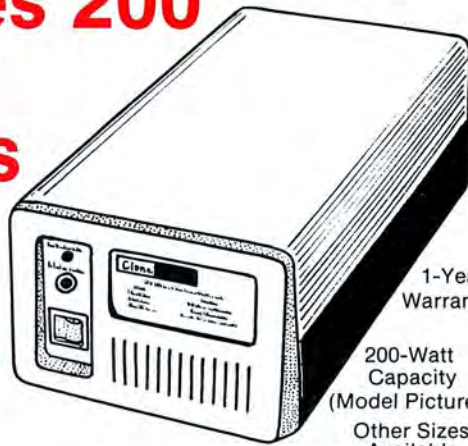


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AD 37

REVIEWS

Varsity lets you type foreign-language accents, fractions, or trademark, copyright, or line and box drawing symbols onto your screen. If you often use the same boilerplate text or series of commands, a pop-up menu offers up to 10 "user key" macros with names or descriptions.

You can jump to any of 27 places or markers in your text, then leap back to where you were by pressing the home key

twice. You can insert a reference to a marker to print a page number in a phrase such as "See page 6," but there's a fatal flaw—markers are left behind when you cut and paste their context, so don't allude to a quotation if you might move it to a different page before printing. Varsity's footnotes, by contrast, are as smart as any I've seen, offering every conceivable formatting option and renumbering themselves as fast as you can rearrange them.

There are a few formatting quirks—bold-facing begins with alternate-B and ends with control-B, instead of the more common technique of using the same command as a toggle. It takes practice at changing margins and add-

ing blank lines to arrange space between text and headers or footers. Headers, footers, and footnotes appear in their own full-screen displays; Varsity can print to a disk file but offers no print preview on screen.

The program does show page breaks on screen, suppress widow lines at the top and bottom of pages, and offer vertical centering for title pages. Other formatting options are plentiful, from decimal tabs to different typesyles for different paragraphs—a neat pop-up menu of the fonts and point sizes available from your installed printer, such as "Standard 10" versus "Correspondence 16.5." Varsity can generate a table of contents of headings and page numbers, as well as an alphabetical ASCII list of selected words or phrases (not an index, but the start of one).

Varsity's mail merge and spelling checker are less impressive. While other word processors' merge routines involve two files, the base document and the merge data, Varsity requires you to create three—the base document, another Varsity document listing variable names, and an ASCII file of variable data such as names and addresses.

The speller can't catch doubled words (Paris in the the spring) but offers the usual choices of skipping one or ignoring all occurrences of an unknown word, adding it to a personal dictionary, or letting you type a replacement. Asked to suggest a correction, it slowly shows one alternative at a time, making you select "next" or "previous" instead of choosing from a list.

It noted the common error "alright," but couldn't suggest a way to make it all right. The speller does work with another Varsity command to hyphenate one or more paragraphs or an entire document.

Summing Up

Even with Varsity's shortcomings, getting a spelling checker, mail merge, split screens, footnoting, and terrific ease of use for under \$100 is something to cheer about. I could wish for extra features and problem fixes; I could wish Varsity hadn't inherited MS-DOS Scripsit's sluggish response along with its friendly function-key labels.

But the newest Scripsit is a tremendous improvement over its predecessor and a serious contender in the crowd of budget word processors. Varsity Scripsit could be a winner. ■

Eric Grevstad is a free-lance journalist who's been writing about computers since 1982. He is coauthor of The Computer Guide to the Tandy 1000 (Ashton-Tate, 1985). You can contact him at 80 Micro, 80 Elm St., Peterborough, NH 03458.

Varsity Scripsit (catalog no. 25-1174) requires 256K (384K recommended; 384K required for Tandy 2000 or 1000 using DOS 3.x). Tandy Corp., Fort Worth, TX 76102. \$99.95.

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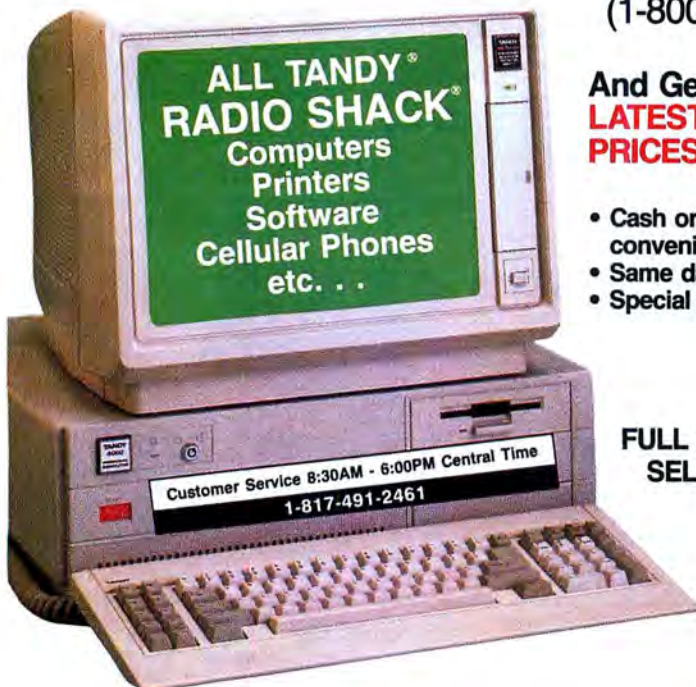
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Invoice # : 2134		Discount Available : 8.00		
Acct. #	Account Name	Description	Debit	Credit
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52071	Lodging	Visa Bill	93.65	
5211	Office Supplies	Visa Bill	44.34	
5302	Interest	Visa Bill	12.22	
52073	Meals	Visa Bill	55.70	
52075	Other Travel Expense	Visa Bill	20.56	
Total Debits :			234.55	Total Credits : 234.55

F1-Help F6-Delete F9-Auto Entry F10-Process ALT D-Delete Line

Dac Easy Accounting's accounts payable transaction entry form.

by Harry Green

Dac's Easy Accounting 1.0 wasn't easy to use or adapt to a cash basis of accounting. And though Easy Accounting 2.0 includes enhancements that make it easier to use, setting up an accounting system from scratch is still not a trivial job.

Dac has added Easy Payroll to this new package. Together, the two programs make a complete accounting package for the small to medium-sized business. A report generator, Dac Easy Report, and a shell program, Dac Easy Mate, round out the collection.

Easy Accounting

This program's name would lead you to believe that just about anyone could use it to establish and run an accounting system. If your existing procedures match Dac's, getting on line shouldn't be too difficult. If they don't, be prepared to spend time learning Dac's system, because the program is not flexible.

Easy Accounting comes with a 382-page paperback manual that explains the fundamentals of accounting clearly and documents the program effectively. An optional tutorial explains more of the basics and shows how the program's modules fit together. The tutorial, however, is nothing more than a programmed instruction book

on a disk; it doesn't contain sample books of a hypothetical company to give you practice in using its seven modules.

If you learn best by doing instead of reading, you can skip the tutorial, set up a fictitious entity using Dac's built-in chart of accounts and report structure, and get the feel of the system—but be prepared for some frustrations.

The overall structure of Dac Easy Accounting is a general ledger with subsidiary accounts receivable and payable, and billing, purchase order, inventory, and forecasting modules. The program supports up to five levels of accounts. Only the lowest accepts transactions; the rest are summarizing accounts.

One possible structure might be: level 1, Assets; level 2, Current Assets; level 3, Cash; level 4, Cash in Checking; level 5, Cash in Bank Account No. 1. The chart of accounts that comes with the program contains 255 accounts, far more than most businesses need. You can delete unneeded accounts, but only within limits imposed by the program, by making separate entries for each account deleted.

The program requires receivable and payable accounts, making it cumbersome for companies that use cash rather than an accrual basis of accounting. The manual offers no suggestions about operating with a cash system, but it appears that users

have two choices: clear all cash through receivables and payables accounts or enter cash receipts and payments in the general journal. The latter approach requires that you post both sides of a cash transaction, while in the former, the system automatically produces one side of the transaction.

If you use accounts receivable and payable modules, all you have to do is enter the customer or supplier code and the amount of the transaction. There's plenty of room for posting the transaction against multiple accounts.

One function key calculates the amount required to put the whole transaction in balance, and another key automatically posts the entire or remaining amount to the account you enter. For example, pressing the automatic entry key produced the last entry in Photo 1.

If the rest of the program was as easy to use as these journals, Dac Easy would live up to its name. But some of the other functions aren't as simple. The inventory module requires assigning a number to every product in your line. It provides costing on one of three bases: average cost, standard cost, or last purchase price. The manual states that it isn't necessary to use the inventory module, but if you don't, the purchase-order module won't work.

If you attempt to enter an item that isn't in inventory, the machine rejects the transaction. It does provide a process for entering infrequent purchases such as furniture and office equipment, but since the item description is automatically keyed to the inventory code, the purchase order won't necessarily be descriptive. The system would be more flexible and useful if it let you enter the item description directly from the keyboard for some types of purchases.

While I was preparing purchase orders, the program asked for a file rehash. The manual tells you simply to enter the name of the file to rehash but gives no clue as to how or where to enter it. Furthermore, after I had set up an inventory file to test the purchase order function, the system rejected an entry stating that a required department number did not exist. A check of the general ledger showed, however, that it did exist.

Unlike some of its other functions, Dac Easy's report structure is very flexible. You can create reports in nearly any format you choose, but to do so, you must learn how to give the proper commands, and they aren't so easy. Fortunately, most of the common reports such as balance sheet, profit and loss statements, and trial balance are provided with the program. If you use the chart of accounts supplied, you can modify the report without a great deal of difficulty. Another alternative is the optional Report program.

Dac Easy Payroll

Dac Easy Payroll integrates with Accounting or operates in a stand-alone

mode. Although it also belies its name, it is not lacking in features and is easier to set up than Dac Easy Accounting. You install the program by entering a company control file that establishes common information such as company name and address, employer tax ID number, number of work days for different classes of employees, and percentages and limits of social security and unemployment taxes. You also use this file to link Dac Easy Payroll to Dac Easy Accounting.

Next you must create a departmental file, even if you have only one department, which contains account numbers for payroll expenses.

Dac Easy's payroll records can handle several types of information, including deductions, vacation and sick leave accruals, and payroll taxes. Tax tables are included for each of the 50 states.

Like its accounting sister, Dac Easy Payroll is not an easy program to set up and administer. A clerical employee can operate it, but you should have someone who knows what results to expect compose and test it.

Dac Easy Mate

Dac Easy Mate is a shell program that surrounds the accounting or payroll programs to provide several useful enhancements. Mate can call Payroll or Accounting and remain in the background until you summon it. Mate has five menu selections: Backup/Restore, Files, Reports, Macros, and Utilities.

Backup/Restore is a fast and easy way to back up data files. It uses a file compression technique that makes the file impossible to restore without Dac Easy Mate.

Files makes Dac Easy Mate worth the price. It lets you view the current contents of any payroll or accounting file

The third feature, Reports, permits you to see reports before they are printed. The Macro function lets you create keyboard macros, and the Utility menu provides an on-screen calculator and note pad.

Dac Easy Report

Dac Easy Report enables you to create reports from one of the applications and send it to the screen, printer, or file. Report also provides a facility for exporting ASCII files to other programs such as a spreadsheet, with fields delimited by spaces, commas, or both.

Dac Easy Report and Dac Easy Mate are worthwhile additions to Accounting and Payroll. If you purchase either or both Dac Easy Accounting and Payroll, get Mate and Report too.

The Bottom Line

Dac Easy Accounting and Payroll are powerful, complex, and don't earn the name "easy." However, both programs have definite applications. Accounting is more suited to a product-oriented than a service-

oriented company, and it's too rigid for cash basis accounting. Both programs offer much processing power for the money, but they are not for the uninitiated.

Together these six programs give you a complete accounting system for less than \$240, but you'll pay a professional more than that to set up the system for you, unless you've got the expertise yourself. ■

Dac Easy Accounting 2.0 (\$69.95), Payroll (\$49.95), and Report (\$39.95) require 256K. Dac Easy Mate (\$39.95) requires 384K. All require MS-DOS 2.x, two floppy drives or one floppy and a hard disk. A bonus pack priced at \$149.95 includes Easy Accounting, Payroll,

Deskset Plus, as well as Accounting Tutor (\$19.95) and Payroll Tutor (\$19.95). Dac Software Inc., 4801 Spring Valley Road, Building 110B, Dallas, TX 75244, 800-992-7779 or 214-458-0038.

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Help Is on the Way

by Harry Bee

Although DOS Help! and Tech Help! won't replace your DOS manual or system-programming references entirely, they are comprehensive enough to render most of the trips you make to the bookshelf unnecessary. In addition, each database has several indexes, and each is thoroughly cross-referenced, making it swift and painless to find specific information.

DOS Help! covers the DOS commands from Assign to Xcopy as well as DOS's filters, drivers, and configuration commands. Each reference page, typically several screens long, details its topic in much the same manner and depth as Tandy's *MS-DOS Reference Manual*—though DOS Help! usually gives you more examples along with practical notes and usage tips.

More general references explain subjects like files and directories, batch files, and environments. Others summarize special purpose utilities, such as Debug, Edlin, and Link. The four indexes range from a broad subject index to an alphabetical list of com-

mands, including descriptions.

Tech Help!'s five indexes list material you'd have to pore over several programmer's manuals to gather. You find details of DOS and BIOS interrupts, functions, and services, including EGA services. Maps plot everything from memory allocation to control blocks, device drivers, and program headers. Charts organize such information as escape sequences, control codes, and number-base conversions. Special topics include the AT's CMOS memory and the 8088/86/286 instruction set.

Both DOS Help! and Tech Help! cover PC- and MS-DOS through version 3.3. However, the orientation is toward the pure versions. Tandy-specific items, such as LF.COM and the line-feed options of the Mode command, are absent.

Each package comes with the Help driver program, its own data file, and a configuration program. The configuration program is the best I've used for setting up the combination of a CGA graphics card and a composite monitor common with Tandy computers.

You can run Help as a stand-alone program from the DOS prompt. It is identical for both DOS Help! and Tech Help!. If you have both, you can direct the program to either one with another command line parameter. You can also run Help as a memory-resident program. The data file you name when you install the program in memory must be available when you pop it up. Since the files are large—Tech Help! is over 300K—the resident option is easier to manage from a hard-disk system.

The indexes are point-and-shoot menus. You move the highlight bar to the item you want and press enter to select it. The text of the reference pages emphasizes direct and indirect references to other topics. You can highlight and select these interconnections to follow a thread of information about the subject you're after.

The backspace or escape key lets you backtrack to your starting point. Although the data is disk based, browsing from page to page is comfortably quick even from floppy disks—quick enough to save you a lot of time getting much of the information you'd normally reach for a book to look up.

DOS Help! (\$34.95) and Tech Help! (\$89.95) require two disk drives. Flambeaux Software, 1147 East Broadway, Suite 56, Glendale, CA 91250. 818-500-0044.

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Word for Word Exchanges Documents—Intact

by David A. Williams

Exchanging between word processors has always been a problem. You can convert to ASCII format, but you'll lose underlining, boldfacing, and other formatting. Word for Word solves this problem handily.

Version 3.0 supports the current versions of Wordstar, Microsoft's Word, Multimate Advantage, Word Perfect, Xywrite III, Display Write (DCA/RFT), Office Writer, and several PFS products.

It can convert files from any of these products to ASCII, EBCDIC, smart ASCII, and a special COM format. Smart ASCII retains some formatting features.

A menu-driven installation program makes setup a snap. Word for Word itself is also menu-driven, but you can enter file names on the command line and skip the menus. Using wildcards, you can convert several files with one command.

I converted Word for Word's sample Wordstar file to Microsoft's Word, to Multimate, and then to the COM format, which I then converted to Word. In each case the document was faithfully reproduced.

I then converted a Word document containing a running head, page numbers,

tabs, subscripts, superscripts, bold, underlining, a forced page break, and line-draw characters to Multimate. Everything worked except the page numbers. Had I put the page numbers in a running footer, that would have worked too.

When I converted the same document to the COM format and then back to Word, I picked up stray characters along the way. A second Word document I tried caused the conversion program to lock up. Send any problem file to Mastersoft; they'll send you an updated version of the program.

Word for Word keeps track of the instances where it can't perform a conversion. You can get a list of these occurrences, or better yet, the program will embed failure codes in the text. This makes it easy to find and correct the errors.

Word for Word isn't perfect, but considering the diversity in word processing programs, it's surprising that it works as well as it does. If you have a conversion problem, it's worth a try.

Word for Word 3.0, Mastersoft Inc., 4621 N. 16th St., Phoenix, AZ 85016, 800-624-6107. \$149.

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How to Use 80 Micro Program Listings

Most lines in 80 Micro's Basic program listings begin with a checksum value, a number representing the sum of the ASCII values of all characters and spaces in the line. (Lines that begin with apostrophes don't have checksum values. Remarks at the end of a line of code are not included in the checksum values.)

Like the previous Checksum program, the new Checksum program (see Program Listing) lets you confirm the accuracy of your typing line by line. But unlike the earlier program, it uses weighted checksum values to identify transpositions. Example: With the old program, typing 168 would yield the same checksum value for that line as 186, and no error would be evident. With the new program, the error will be obvious.

All programs published in previous issues of 80 Micro use the old Checksum program; all programs published in this and forthcoming issues will appear with weighted values calculated to work with the new Checksum program.

To enter a program, load and run Checksum. Enter the program exactly as listed, omitting the checksum number and bar at the beginning of the line. Omit the indentations when program lines continue to a second or third magazine line. Do not type in comments at the end of a line. When you press enter, the line will be redisplayed with a checksum.

Compare this number with the one found in 80 Micro. If they are not the same, you made a typing error. Use the arrow keys to move the cursor to the first space of the line just typed. Press the delete key seven times to delete the checksum. Move the cursor to the error, and correct it by typing over the error or use the insert and delete keys to add or delete information. Press enter and recheck the checksum number.

After you enter the entire program, save it to disk with the Save command.

Checksum simulates Save, List, LList, Load, Files, and New commands and adds three new commands: Basic, Check, and LCheck. The Basic command exits the Checksum program back to Basic, leaving Checksum in memory. Check and LCheck work like List and LList, except they show the checksums along with the listing.

Checksum saves the new program as an ASCII file. By saving the program again with Basic, you shorten it on disk and make it load faster, but you can no longer edit it with Checksum unless you convert it back to an ASCII file by using the SAVE"file name", A command in Basic. ■

Program Listing. Checksum.

```

10 'Checksum by Randall D. Hamilton, enhanced by Donald Williams
3681 20 DIM L$(500),LNUM(500):KEY OFF:CLS:MAX=0:LNUM(0)=65536:CLS
3238 25 DEF FN$P(A$)=-LEFT$(A$,1)="" :DEF FN$M(A$)=MID$(A$,2)
1671 30 DEF SEG=&H40:W=PEEK(&H4A)
3210 40 PRINT:PRINT"Checksum Program Ready."
3389 50 LINE INPUT L$:Y=CSRLIN-INT(LEN(L$)/W)-1:LOCATE Y,1
7499 60 DEF SEG=0:POKE 1050,30:POKE 1052,34:POKE 1054,0:POKE 1055,79:POKE 105
6,13:POKE 1057,28:LINE INPUT L$:DEF SEG:IF L$="" THEN 50

1373 70 DS=L$:GOSUB 800:L$=DS
2204 80 IF ASC(L$)>57 OR ASC(L$)<48 THEN 210
4235 90 BL=INSTR(L$," "):IF BL=0 THEN BL=L$:GOTO 100 ELSE BL=LEFT$(L$,BL-1)
3089 100 LNUM=VAL(BL$):TEXT$=MID$(L$,LEN(STR$(LNUM))+1)
4974 110 IF LNUM>65529 THEN PRINT"Line number greater than 65529":GOTO 30
4770 120 IF TEXT$="" THEN GOSUB 540:IF LNUM=LNUM(P) THEN GOSUB 550:GOTO 50 EL
SE 50

961 130 WORK$=TEXT$
1913 140 DS=WORK$:GOSUB 800:WORK$=DS
3482 150 IF LEFT$(WORK$,1)="" THEN A$="" :LOCATE Y,1:GOTO 180
1464 160 GOSUB 900:LOCATE Y,1
2202 170 A$=".....":RSET A$=STR$(CKSUM)+" "
870 180 PRINT A$+L$
3408 190 GOSUB 540:IF LNUM(P)=LNUM THEN L$(P)=TEXT$:GOTO 50 'replace line
1253 200 GOSUB 560:GOTO 50 'insert the line
5579 210 TEXT$="":FOR I=1 TO LEN(L$):A=ASC(MID$(L$,I)):TEXT$=TEXT$+CHR$(A+32*
(A>96 AND A<123)):NEXT

3366 220 DELIMITER=INSTR(TEXT$," "):COMMAND$=TEXT$:ARG$=""
13137 225 IF DELIMITER THEN COMMAND$=LEFT$(TEXT$,DELIMITER-1):ARG$=MID$(TEXT$,
DELIMITER+1) ELSE DELIMITER=INSTR(TEXT$,CHR$(34)):IF DELIMITER THEN
COMMAND$=LEFT$(TEXT$,DELIMITER-1):ARG$=MID$(TEXT$,DELIMITER)

2210 230 IF COMMAND$="LIST" THEN GOTO 330
4283 240 IF COMMAND$="LLIST" THEN OPEN "lpt1:" FOR OUTPUT AS #1:GOTO 340
4910 250 IF COMMAND$="LCHECK" THEN CKFLAG=1:OPEN "lpt1:" FOR OUTPUT AS #1:GOT
O 340

2839 260 IF COMMAND$="CHECK" THEN CKFLAG=1:GOTO 330
5011 270 IF COMMAND$="SAVE" THEN GOSUB 570:OPEN ARG$ FOR OUTPUT AS #1:ARG$=""
:GOTO 340

2194 280 IF COMMAND$="LOAD" THEN GOTO 490
9685 290 IF COMMAND$="NEW" THEN INPUT "Errase program - Are you sure":L$:IF L
EFT$(L$,1)="y" OR LEFT$(L$,1)="Y" THEN MAX=0:LNUM(0)=65536:GOTO 30:
ELSE 30

4028 300 IF COMMAND$="BASIC" THEN COLOR 7,0,0:ON ERROR GOTO 0:CLS:END
2265 310 IF COMMAND$="FILES" THEN GOTO 520
2381 320 PRINT"Syntax error":GOTO 30
2172 330 OPEN "scrn:" FOR OUTPUT AS #1
2690 340 IF ARG$="" THEN FIRST=0:P=MAX-1:GOTO 380
5903 350 DELIMITER=INSTR(ARG$,"-"):IF DELIMITER=0 THEN LNUM=VAL(ARG$):GOSUB 5
40:FIRST=P:GOTO 380

4462 360 FIRST=VAL(LEFT$(ARG$,DELIMITER)):LAST=VAL(MID$(ARG$,DELIMITER+1))
4797 370 LNUM=FIRST:GOSUB 540:FIRST=P:LNUM=LAST:GOSUB 540:IF P=0 THEN P=MAX-1
2954 380 FOR X=FIRST TO P:NS=MID$(STR$(LNUM(X)),2)+" "
2049 390 IF CKFLAG=0 THEN A$="":GOTO 450
881 400 WORK$=L$(X)
1913 410 DS=WORK$:GOSUB 800:WORK$=DS
2770 420 IF LEFT$(WORK$,1)="" THEN A$="" :GOTO 450
1410 430 A$=NS+L$(X):GOSUB 900

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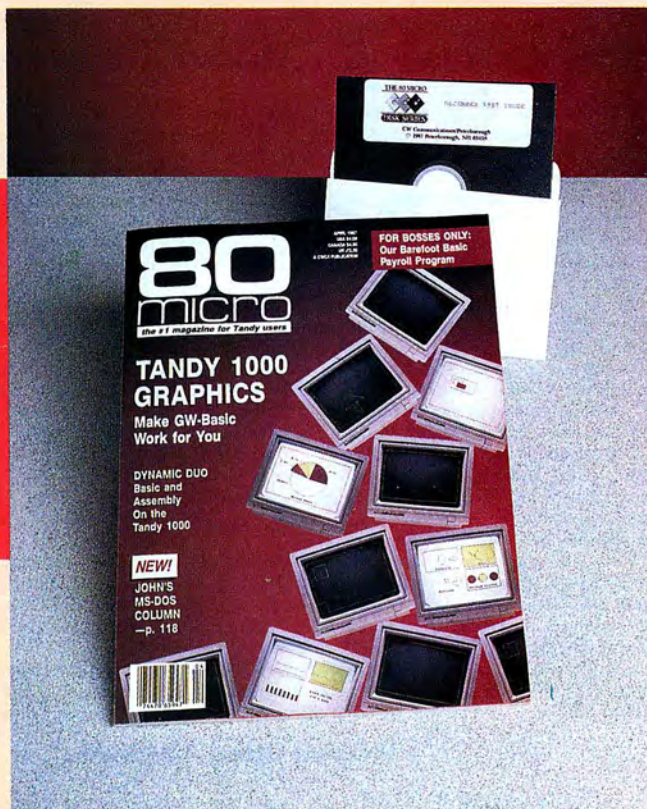
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Random Thoughts

■ by Harry Bee ■

Before software publishers unleash a new application on you and me, the smart ones turn the product over to a group of folks known as beta testers. A beta version is a complete but unproven edition of a product, and beta testing puts the product to work under real-world conditions to certify that it's ready for ordinary citizens of the republic.

Small companies may call on a few friends and relatives, who may or may not have a clue about the software's value and practical application. But, any impartial testing is better than none at all. Larger publishers keep beta testers on the payroll, one way or another. Many of them are longtime customers who will probably use the finished product.

Much of the contribution made by beta testers involves determining how well the product does the job it's intended to do. Often, their work reveals minor inaccuracies and encourages subtle adjustments. The beta stage is a period of fine tuning. But occasionally, testing will uncover a fatal bug or a glaring omission and save serious embarrassment and money.

When a bug, large or small, shows up in a reasonably complete program, something from outside the program (input from the keyboard or data imported from another application, for example) often triggers it. A programmer—you, I, or somebody else—can take care of internal factors well enough, but under the best of circumstances, we can only guess what the program may suffer once it's released to the outside world. Somebody else may have an army of beta testers at his or her disposal, but you and I, writing applications for ourselves and our work groups, clubs, and clients, usually have to wing it.

Bug Busters and Mules

To flush out gross bugs, the best beta tester in the world is a 12-year-old. To get at the inconsistencies that are guaranteed to crash your best work at the worst moment, however, takes either mulish persistence on your part or a method by which the program can test itself. Since persistence, mulish or otherwise, is roughly the equivalent of hard work, I prefer the latter.

Individual input routines usually don't require anything special. You decide which values you'll accept and write the routine to filter out the rest. Then you try values at the limits of the range you want and a couple more in the middle, and that does it.

But what happens when your program multiplies Input A by Input B, adds Input C, and raises it all to the Input D? Will the subscript you've calculated still be in range? Will the line you're plotting still be on the screen?

The way to find out absolutely is to supply every possible value for each input in every possible combination or something close to that. You can get away with less if you give the program a random sample of the possibilities. The mulish way to generate random input is to do it yourself—but even if you don't quit before you've done enough of it, you won't produce a random sample. Your biases get in the way.

The easy way turns out to be the best way. You replace the input routines in the part of the program you want to test with functions that will generate random values. You can include out-of-range values to test the program's filters and traps at the same time. If you isolate the routines under test in a loop, the job can go quickly. A few hundred iterations (more or less, depending on the number of inputs you're testing) usually give results as good as any gang of beta testers'.

Order From Chaos

To build a function that will generate test values in a range you specify, it's important to appreciate a few things about Basic's random function (RND). In the first place, the series of numbers the function returns isn't truly a random series. It's fake random, but the fakery is good enough to make the effect indistinguishable from that of real randomness. A fortunate quality of pseudo-randoms lets you play a series of them over again. This means that if a sequence of random values should unlock a secret of the universe, you'd be able to reproduce the key.

Obviously, it's important to be able to replay the sequence of values that crashed your program. One way to do this is to give the RND function an argument, as in RND(X). When X is positive or missing, RND gives you the next phony random value in the sequence. A zero argument gets you the last value over again. If you print RND(0) right after your program crashes, you'll see the last random number the program saw—maybe the one that blew it up. A negative argument causes the current sequence to start again from the beginning. You can use the negative argument to feed the same sequence of values to several routines.

Replaying a random sequence when you run a program again depends on the Randomize function. If you leave out Randomize, Basic supplies the same sequence of numbers to the RND function every time you run any program. To get a different sequence, use Randomize with any integer argument. The argument is called a seed value. Every different seed value produces a unique random-looking sequence.

Using Randomize and various arguments, you can make any number of test runs of a program you're developing. The useful feature of the function lets you re-create fatal conditions by repeating the same seed after the program died on a particular run. You can slam the program into the same mountain again and again until you find the cause of the crash.

A Self-test Function

As I said, I like a program to test itself—preferably while I go have another cup of coffee. Self-testing requires a function that will produce test values within any particular range. To my mind, the basis of any good random routine is a function that returns a random sequence of integers. I suppose I got used to using random integers because the built-in function in TRS-80 Basics worked that way. However, GW-Basic's RND function uses a more common approach and gives you numbers between zero and 1.

The function in line 10 of Program Listing 1 returns an integer by multiplying the next random-looking ratio that the RND

function supplies by the value you give it. The Fix function lops off any remaining decimal portion. The function itself, FNRNDI#, is double-precision, so it can handle integers outside of Basic's integer range. The value it returns will range from zero to one less than the value you supply in its argument.

The function in line 20, FNTESTVAL, is one I often use to replace input routines or to generate sample files. You supply the lower limit and the upper limit of the range of values you want and the maximum number of decimal places they may have. The function calculates the breadth of the range you name, uses FNRNDI# to generate a random displacement from none to the full breadth, maintains the correct number of decimal places by shifting the decimal point right, then left, and subtracts the displacement from the top of the range.

The routine beginning at line 100 demonstrates that FNTESTVAL works. The program asks you for a seed value so that you can play with the Randomize function. It generates its own definitions to establish the range of values within a limited scope and formats its output to look pretty.

Random Signs

A closer look at Listing 1, however, reveals that I've left out a crucial bit of it. To determine the lower limit of the demonstration range (in line 120), the program relies on FNSign to make the low value either positive or negative. I've left the definition of FNSign for you to complete in line 30. It's worth an 80 Micro T-shirt if you can define FNSign so that it returns either one (1) or minus one (-1), exclusively. It can never return zero, because that would cause the low value to be zero, more often than not.

Tipping the Balance

FNTESTVAL works in most instances where you need to simulate numeric input. By introducing minor variations, you can make it fit unusual circumstances, too. You can even use it to generate characters, strings, and text. One variation, the usefulness of which goes beyond generating test values, involves weighting the output so that more of the values fall near a special point within the range you define.

An uncomplicated but fair way to weight a routine is to use a natural factor of accumulated randomness that shows up in any dice game. Dice make great random number generators. Assuming you've got a perfectly manufactured die and you roll it on an ideal surface, every face on the die has an equal chance of turning up.

But the simple variation of rolling two dice and adding the numbers skews the chances so that most of the numbers rolled will be near the middle of the range. In fact, the number most likely to turn up on any roll of two six-sided dice is seven. The least likely is two.

Program Listing 2 lets you see, graphically, what happens when you generate several random values and add them. You can stipulate from one to five "dice" and from two to 20 "faces" on each one. The program then rolls the dice a thousand times and records each number rolled on a color-coded bar chart. A thousand rolls isn't enough to produce the smooth curve that 10,000 would, but it's good enough.

Regardless of how many faces it has, one die will give you fairly flat results. Rolling two dice, each with the same number of faces, renders a curve with most of the "weight" in the middle third. To make the curve steeper and the weighted range narrower, use more dice and keep the number of faces equal. To flatten the curve, vary the number of faces on each die. The more variation, the flatter.

Farewell—not Goodbye

I didn't realize it until someone pointed it out to me, but the way I use a computer has changed dramatically in the past decade. In the beginning, if I wanted to do anything productive on a computer, I'd either write the application myself or dream on.

So, I spent most of my time in front of my computer writing programs or modifying programs I got from other folks who spent most of their time in front of *their* computers writing programs. We spent a lot of time, in other words, preparing to be productive, instead of actually being productive.

Times certainly have changed. These days, most of my computing time involves writing, researching, calculating, communicating—and entertaining myself. Except for the last, it's all good, productive stuff.

Not that there's nothing preparatory to productivity anymore or that it isn't as vital as making up for programs that didn't exist. But my preparation these days—and yours, probably—consists of sorting through all the software and hardware options available to find the ones that best suit my needs. I read all the reviews I can find,

and when possible, I get someone to demonstrate a product for me. When all else fails, I buy something and test it on my machine. Lately, most of my "programming" consists of writing batch files and using utilities to get my ever-growing cache of computer goodies to peacefully coexist.

Next month, Fine Lines won't be here. In its place, I'll be writing a new column that has more to do with the way I use my computers today. In it, I'll look at software, hardware, firmware, freeware, shareware, and maybe some Tupperware, and tell you about how they work and how they don't. For the most part, the products I'll ferret out for you will be those that tend not to get full-blown reviews. Utilities, games, inexpensive applications, and special purpose applications will be areas of particular interest. At the same time, I'll also relate each product to an issue that will help improve the way you use your computer, whether it's getting software to work or peripherals to talk to your Tandy 1000; getting your applications to work together better; making DOS work more efficiently for you; or helping you get along better with manufacturers and vendors.

I'm looking forward to writing the new column, but I've enjoyed writing Fine Lines over the past couple of years, and I'll miss it. Fortunately, I won't have to miss it completely, since I've reserved a corner of the new forum for Fine Line-ish things like the random sign function I proposed above. There won't be a set deadline for your solution submissions. I'll still choose the most interesting from among the solutions you send and print them. And I'll still see that you get an 80 Micro T-shirt for any I like. So keep the cards and letters coming. Most of all, I'd miss the mail. ■

Harry Bee is a free-lance writer, programmer, puzzle creator, and dreamer. You can contact him at P.O. Box 567, Comish, ME 04020, or on CompuServe (74076,3461).

Program Listing 1. A random value generator. See page 63 for instructions on using checksums.

```

1008 | 10 DEF FNRNDI#(D)=FIX(RND*D)
2503 | 20 DEF FNTESTVAL(L,H,D)=H-FNRNDI#(1+(H*10^D-L*10^D))/10^D
1076 | 30 DEF FNSIGN(F)=
    | 99
332 | 100 CLS:LINE INPUT "Enter seed value: ";SEEDS:SEED#=VAL(SEEDS)
1657 | 110 RANDOMIZE SEEDS:PRINT:PLACES=FNRNDI#(6)
2942 | 120 LOW=FNSIGN(FNRNDI#(2))*FNRNDI#(10):HIGH=LOW+FNRNDI#(10)
1834 | 130 FORMATS="###"+STRING$(ABS(PLACES*8),"")+STRING$(PLACES,"##")
1261 | 140 PRINT "LOW =";USING FORMATS;LOW:PRINT
348 | 150 FOR NR=1 TO 16
2995 | 160 PRINT USING FORMATS;FNTESTVAL(LOW,HIGH,PLACES)
214 | 170 NEXT NR:PRINT
3969 | 180 PRINT "HIGH =";USING FORMATS;HIGH:PRINT

```

Program Listing 2. The dice are cast.

```

2832 | 10 DEFINT A-Z:DEF FNRNDI(D)=FIX(RND*D)+1:RANDOMIZE TIMER
3458 | 20 CLS:INPUT "Number of dice (1 to 5)";ND:IF ND<1 OR ND>5 THEN 30
1082 | 30 FOR L=1 TO ND:CLS
6996 | 40 PRINT "Number of faces on die no. ";L;" (2 to 20)";:INPUT D(L)
6390 | 50 IF D(L)<2 OR D(L)>20 THEN PRINT "Again?":GOTO 50 ELSE MX=MX+D(L)
575 | 60 NEXT L
3964 | 70 TOP=1000/(MX/ND-1):CHNG=TOP/6+1:DIM COUNT(MX-ND),CLR(MX-ND)
880 | 80 KEY OFF:SCREEN 3:WINDOW (ND-1,1)-(MX+1,TOP):COLOR 8:PRINT ND TAB(36)
    | MX
    | 99
18 | 200 FOR N=1 TO 1000:ROLL=0
982 | 210 FOR M=1 TO ND:ROLL=ROLL+FNRNDI(D(M)):NEXT M
940 | 220 COUNT(ROLL-ND)=COUNT(ROLL-ND)+1
163 | 230 CLR(ROLL-ND)=INT(COUNT(ROLL-ND)/CHNG)+1
370 | 240 PSET(ROLL,COUNT(ROLL-ND)),CLR(ROLL-ND)
1098 | 250 IF POINT(ROLL,COUNT(ROLL-ND)-1)<>CLR(ROLL-ND) THEN GOSUB 1000
614 | 260 NEXT N
4305 | 999 IS=INKEYS:IF IS="" THEN 999 ELSE SCREEN 0,0,0:WIDTH 80:KEY ON:LIST
2608 | 1000 FOR L=1 TO COUNT(ROLL-ND):PSET(ROLL,L),CLR(ROLL-ND):NEXT L:RETURN

```

READER FORUM

edited by Mare-Anne Jarvela

SMOOTHER SEQUENCE

■ I received many positive letters regarding my Help File Generator (see "Help Yourself," February 1988, p. 41), but for those who don't have long or dexterous fingers, I developed a simpler keyboard activation sequence.

I wrote two changes to the alternate-left shift-H sequence. The first change, for those who prefer to use keys on the keyboard's left side, lets you press the control-left shift-H keys in sequence. If you prefer to use keys on the right side, the second change lets you use alternate-right shift-H.

To add either change, modify the last two values in line 460 (p.42) from 0E and -1633 to 0F and -1634. To use the control-left shift-H sequence, change the second value in line 470 from 0A to 06 and the final value in that line from -1030 to -1026. To use the second sequence, change the second value in line 470 from 0A to 09 and the final value in that line from -1030 to -1029. This will make the original help-file activation sequence smoother.

David Goben
Mansfield Center, CT

CHANGING SX DRIVES

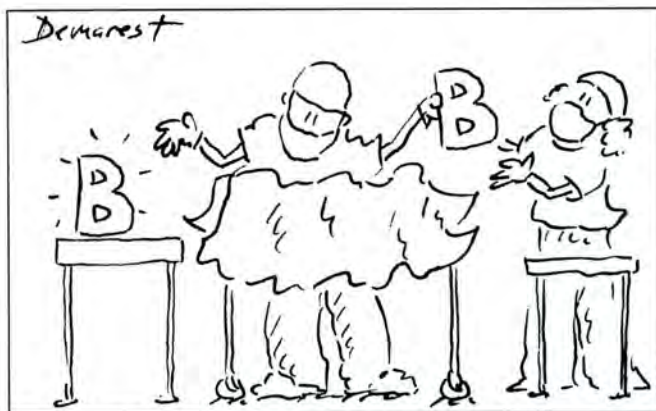
■ To increase compatibility with my clients' computers, I decided to replace my 1000 SX's 5¼-inch drive B with a 720K, 3½-inch drive.

I bought a Toshiba drive and installation kit, which includes gray and black face plates, 5¼-inch conversion rails with an edge card connector, and a power cord adapter.

The vendor told me to place `DEVICE = DRIVER.SYS/D:1` in my `Config.SYS` file to get 720K of read and write space on drive B, and cautioned that I'd have to enter `FORMAT D:` to format the drive with 80 tracks properly. But I discovered that you don't have to add anything to your `Config.SYS` file, and no special machinations are required.

To change the drive, unplug the power cord, remove the SX's cover, unplug the power and data cables at the back of drive B, and remove the three Phillips screws holding it in place. Unsnap the 3½-inch face plate, snap the appropriate face plate onto the new drive, attach the power connector adapter, and mount the drive into its rails.

Make sure you set the 3½-



inch drive's jumpers as DS1 (your vendor can do this for you). The drives slide in and out like a drawer; just remove the existing drive and insert the new one. I needed a slightly longer drive cable because the existing one in my SX didn't provide sufficient length for reversing the data cable. The Toshiba drive's number 1 contact on the edge card connector was opposite to that on the drive it was replacing (a split near one end of the drive's edge connectors makes it easy to see the difference).

I removed the cable's connectors and reset them onto a slightly longer piece of cable.

The connectors and cable are available at Radio Shack, or you can buy an already assembled cable.

Plug the power and data connectors back where they belong, and, after checking your work and tightening the mounting screws, replace the cover and boot your computer. My SX with DOS 3.2 immediately recognized the new 720K drive, and I didn't need additional software. To verify this, I read existing 3½-inch disks and formatted a couple of new ones. It was amazing to watch DOS format 80 tracks automatically.

Henry C. Gemhardt Jr.,
Huntington, WV

MORE FUNCTION KEY FUN

■ I've incorporated E.E. Dorsey's Demo.BAS program (see "Screen Input—Basically Speaking," February 1988, p. 84) with a similar program of my own. It uses lines 22-25 on your screen for a menu to

describe each of the function keys instead of the short six-character description on line 25 in Mr. Dorsey's program. My program also uses the Color Statement (see the Program Listing).

I own a Tandy 1000 SX with

a 20MB hard disk; floppy disk users should change the F9 and F10 function keys as you wish. Instead of C:, you should use A: or B:.

If you don't like the border, you can change line 420:
420 LOCATE,,,0,7:COLOR 14,0,0

When you test the program, be aware of line 430. The program removes itself after the run, so you should take the New command out until the last good test; then put it back before saving the program. If you save the program as Baskeys.BAS, you can create a batch file like the one I use, called B.BAT:

```
ECHO OFF
BASIC BASKEYS
CLS
```

By typing B from DOS, this batch file switches you to Basic, runs the Baskeys program, removes it, and when you go back to DOS (by pressing F12), the menu will be removed.

Hector Saviotti,
Waterbury, CT

Program Listing. Saviotti's Basic function keys program.

```

10 'Basic function keys menu
20 'by Hector Saviotti
916 30 KEY OFF
1377 40 DEFSTR A-Z
68 50 C=CHR$(12)
139 60 R=CHR$(13)
421 70 B=CHR$(7)
85 80 N=CHR$(10)
72 90 H=CHR$(11)
209 100 Q=CHR$(34)
167 110 D=CHR$(25)
237 120 U=CHR$(24)
1433 130 VIEW PRINT 1 TO 25
2425 140 SCREEN 0,1,0:COLOR 7,4:CLS
1331 150 KEY 1, C
988 160 KEY 2, C + "LIST" + R
2816 170 KEY 3, H + U
1369 180 KEY 4, D
2614 190 KEY 5, C + "RUN" + R
2182 200 KEY 6, C + "EDIT" + R
1910 210 KEY 7, C + "LIST" + R
3034 220 KEY 8, C + "SAVE" + Q
3764 230 KEY 9, C + "FILES" + Q + "C:*.BAS" + R
5449 240 KEY 10, C + "FILES" + Q + "C:" + R
4009 250 KEY 11, N + "KILL" + Q
1083 260 KEY 12, C + B + B + "SYSTEM" + R
398 270 LOCATE 22,1
746 280 PRINT STRINGS(80,CHR$(205))
2490 290 PRINT "F1 - Clear screen"
6887 300 PRINT "F5 - Run the program"
2124 310 PRINT "F9 - List all files .BAS"
4428 320 PRINT "F2 - List the program"
2527 330 PRINT "F6 - Edit on one line"
3845 340 PRINT "F10 - List all files"
2115 350 PRINT "F3 - Scroll program up"
1263 360 PRINT "F7 - List one line"
316 370 PRINT "F11 - Kill file"
1805 380 PRINT "F4 - Scroll program down"
1348 390 PRINT "F8 - Save program"
1562 400 PRINT "F12 - Return to DOS"
1535 410 VIEW PRINT 1 TO 19
545 420 LOCATE,,,0,7:COLOR 14,0,8
1060 430 CLS:NEW:END

```


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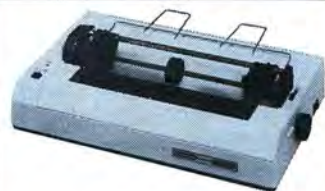
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Video Flexibility

■ by Hardin Brothers ■

Even though I normally use an EGA (enhanced-graphics adapter) on my Tandy 1000, the Tandy video system has unique features that can add dramatic impact to some programs. For the next few months, I'll be exploring some of those features, especially those on the early 1000s (including the 1000A and 1000 HD) and suggesting ways you can take advantage of them in your own programs. Unless (or until) I get a newer 1000 with its special high-resolution graphics, I won't be writing about the newer features. However, much of the information in these columns will apply to all versions of the 1000.

Machine Language in Basic

To my knowledge, no high-level language can provide access to all, or even most, of the advanced features of the Tandy video system. The special version of Basic that Tandy supplies has a greater knowledge of the video system than most languages, but it ignores many of the 1000's capabilities. The easiest way to access some of these features is with machine-language subroutines from your favorite programming language.

The demonstration programs this month are written in interpreted Basic, augmented with machine-language routines. This month, I've chosen one of the simpler methods of combining machine-language and Basic: placing routines in strings within each Basic program. You don't need Microsoft's Macro Assembler (MASM) to run this month's programs; you can write the subroutines with Debug or type in the Basic programs, which include the necessary Data values for the machine-language subroutines.

One common method of calling machine-language subroutines is inappropriate for this month's programs. Some books suggest linking machine-language routines with Link's high switch. But, besides producing routines that can be used only on computers with identical memory configurations, this technique will place the routines in a memory location that, as we'll see, the video screen can overwrite.

Video Memory

The 1000's video system is compatible with the CGAs (color-graphics adapters) found on many MS-DOS machines. Most CGAs use a special 16K block of memory addressed at 0B800:0 hex to hold video information. This memory is completely separate from the main, or MS-DOS memory, which normally extends (on a 640K computer) from 0:0 to 9000:FFFF hex.

The 1000 was designed to be compatible with the IBM PCjr and consequently has a different method of allocating video memory. Instead of using a special block of RAM, the 1000 shares a section of main memory with the video system.

During bootup, the top 16K of memory is normally set aside as video memory. Therefore, if you have 640K of memory installed in your 1000, 624K will be available to your programs, and 16K will be reserved for the video system.

With the 16K reserved, the 1000's video system is almost completely compatible with other computers' CGA cards. However, the 1000 offers one great advantage: it can use any or all of the top 128K of main memory for the video display, giving it a flexibility that few MS-DOS computers possess.

A danger in using that flexibility, however, is that neither MS-DOS, programming languages, nor application programs are generally aware of how much video memory is being used; the video system has no way of knowing whether any program or data exists in the top 128K of memory. The simple way to avoid conflicts would be to reserve the top 128K of memory (or any lesser amount desired) for video use.

Unfortunately, there isn't a documented method for reserving a block of high memory. Because MS-DOS generally reserves and uses memory from the bottom of physical memory and slowly works its way to-

ward the top, you have to resort to trickery to circumvent MS-DOS. Program Listing 1 modifies its own undocumented memory control header to release the top 128K from MS-DOS's control. Program Listing 2 is a Basic program that will create the same COM program as Listing 1.

Once you've assembled Listing 1 or run Listing 2, you can run Save128.COM. There will be 128K less memory for programs to use. However, Command.COM, the program that interprets the commands you type from the A> prompt, will still use a portion of the reserved high memory. This shouldn't cause any problems, but it could prevent you from passing data in the video memory area from one program to another.

Using Video Memory

You are probably familiar with Basic's Screen command and its ability to select, in 80-column text mode, any one of four display pages. In text mode, each display position on the screen requires 2 bytes: one contains the ASCII code of the character being displayed, and the other holds color attribute information for that character. An 80-by-25 screen, therefore, requires 4,000 bytes of memory (80 x 25 x 2). In a standard 16K CGA system, there are 16,384 bytes—enough for four video screens and a few miscellaneous bytes.

The 1000's video system can access up to 128K, which means it has room for 32 screen pages. However, you can't just tell Basic to call up page 27 or page 19. To remain consistent with the normal organization of video screens, the 1000 maps any 16K block of its top 128K of memory as a page. That page can then be broken down, by the normal Screen command, into four video screens.

The 1000 accomplishes this organization by a form of address aliasing. From 0:0 to 9000:FFFF, all of the main memory remains

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THE NEXT STEP

addressed as it would be in a 640K computer. Electronic circuitry makes a single 16K block also addressable at B800:0, the normal video buffer address. (In some graphics modes, the block is 32K long.)

There's one additional wrinkle here. Just as Basic's Screen command can let you display one video screen while your program updates a second screen, the video circuitry can make one 16K block visible to the CPU at B800:0 and a different block visible to the CRT (cathode ray tube), or video, controller. Therefore, any one of the possible 32 screen pages can be accessible to the CPU while any other page is displayed. During all of this, the entire block of memory is still accessible at its normal, main-memory address. The Table shows the relationship between video blocks and main-memory addresses.

Unfortunately, a problem of terminology is associated with screen paging. Basic and the basic input/output system (BIOS) programming documentation call the individual 4,000-byte screen displays "pages." The BIOS documentation and Tandy's technical literature also call the 16K blocks of memory "pages." Because the conflicting terminology makes all the documentation seem less clear than it really is, I'll try to distinguish between screen pages and CPU/CRT (or memory) pages in the following discussion.

It is possible to set the screen page with the Basic Screen command or with a BIOS call (in assembly and other languages). Several things happen when the screen page is changed: registers in the CRT controller (CRTC) chip are reprogrammed to set a new starting address in memory for the video display; a page register in low memory is changed to record the currently active page; and the cursor is set to its previous position on the new page. One last, and undocumented, effect of changing the memory page is that the screen page is reset to the highest page in memory, page 7.

While Basic doesn't have a command to change the memory page, certain BIOS services can do this. The BIOS service resets a hardware port that modifies the block of memory that's accessible at B800:0 for either the CPU, the CRTC, or both. You can write a program to manipulate the hardware register directly, but doing so means that the BIOS routines will no longer know which memory pages are currently active.

Program Listing 3 is a short assembly-language routine that receives a request to change the CPU and CRT memory pages from Basic and makes the appropriate calls to BIOS services to fulfill the request. If the requested pages are outside the per-

Program Listing 1. By using an undocumented feature of MS-DOS—a memory-control header—to release the top 128K of memory from MS-DOS's control, you can reserve the memory for the 1000's video system.

```

; This program uses an undocumented feature in MS-DOS to
; reserve the top 128K bytes of memory for the Tandy 1000
; video system.
;
; Save as: SAVE128.ASM
; Compile: MASM SAVE128;
;          LINK SAVE128; (ignore stack warning message)
;          EXE2BIN SAVE128 SAVE128.COM

code segment
assume cs:code, ds:nothing

start: org 100h
       mov ax,40h ;Segment of BIOS area
       mov ds,ax ;DS ==> BIOS RAM
       mov bx,15h ;Offset of physical RAM size
       mov dx,[bx] ;RAM size in DX
       mov cl,6 ;Bytes to rotate
       rol dx,cl ;Convert from K to paragraphs
       sub dx,2000h ;Subtract 128K (as paragraphs)
       mov ax,es ;Get segment of our PSP
       sub dx,ax ;Paragraphs we will have left
       dec ax ;Point to memory header
       mov ds,ax ;DS ==> memory header
       mov bx,[3] ;Offset of paragraphs available
       mov [bx],dx ;Save new top
       mov ax,4c00h ;Return to MS-DOS
       int 21h
code ends
end start

```

End

Program Listing 2. A Basic program that creates Save128.COM. (See page 63 for instructions on using checksums.)

```

1 ' This program will create SAVE128.COM for you
2 '
1370 10 DEFINIT A-Z
1219 20 OPEN "R",1,"SAVE128.COM",1
532 30 FIELD 1, 1 AS BYTES
17 40 READ LENGTH
390 50 FOR LP = 1 TO LENGTH
415 60 READ XS
936 70 LSET BYTES = CHR$(VAL("&h"+XS))
751 80 PUT 1
222 90 NEXT LP
358 100 CLOSE
320 110 END
370 1000 DATA 35
2500 1001 DATA 88, 40, 00, 8E, 08, 8B, 15, 00
3818 1002 DATA 8B, 17, B1, 06, 03, C2, 81, EA
2230 1003 DATA 00, 20, 8C, C0, 2B, D0, 48, 8E
2652 1004 DATA 08, BB, 03, 00, 89, 17, B8, 00
364 1005 DATA 4C, CD, 21

```

End

Program Listing 3. When this assembly-language routine receives a request to change the CPU and CRT pages from Basic, it makes the appropriate calls to BIOS services to fulfill the request.

```

; Read or set the CPU page and CRT page of the video system
; [Note -- Set memory top to avoid colisions with code]
;
; Call from BASIC:
; CALL addr%(cpu.page%, crt.page%)
; Pages will be set if both numbers are in range of 0 .. 7
; otherwise current page numbers will be returned

code segment
assume cs:code

start: org 100h
       push bp ;Save caller's frame
       mov bp,sp ;Get a copy of SP
       mov bx,8[bp] ;Get cpu.page
       mov cl,[bx] ; in CL
       mov bx,6[bp] ;Get crt.page
       mov ch,[bx] ; in CH
       mov al,cl ;Get numbers for testing
       or al,ch ;Merge both numbers together
       cmp al,7 ;Both in range?
       ja getpage ;No -- go read pages
       mov bx,cx ;Move pages into BL, BH
       mov ax,0583h ;Service 5 - 83: set both pages
       int 10h ;Call BIOS service
       jmp exit ;Then go

getpage:
       mov ax,0580h ;Service 5 - 80: read both pages
       int 10h ;Call BIOS service
       mov cx,bx ;Save pages in CH, CL
       mov bx,6[bp] ;Get addr of crt.page%
       mov al,ch ;Move page # to al
       cbw ;Make into a full integer
       mov [bx],ax ;and store current page
       mov bx,8[bp] ;Get addr of cpu.page%
       mov al,cl ;Move page # to al
       cbw ;Make into a full integer
       mov [bx],ax ;and store current page
       pop bp ;Recover caller's BP
       retf 4 ;Clear stack and return

code ends
end start

```

End

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THE NEXT STEP

missible range of zero to 7, the routine returns the current page numbers.

Program Listing 4 is a Basic program that includes the Listing 3 routine. Because the program uses all 32 possible video pages, you should run Save128.COM first to reserve the top 128K of memory before entering Basic.

Listing 4 calls up each of the 32 video pages, writes to each, and then moves back through the pages each time you press a key. Listing 4 is merely a demonstration of how the pages can be manipulated; it doesn't suggest how you might use such power.

The customary uses for extra pages include in-memory help screens and separate display screens for each module within a program. Once you've set up the alternate pages, you can use BSave and BLoad to save and reload them.

The only possible difficulty is that Basic keeps track of the cursor position for each screen page and doesn't know when you've changed memory pages. Therefore, cursor positioning may require extra thought when you start manipulating memory pages.

Colors and Palettes

The last two programs this month demonstrate another special feature of the 1000's video system, one that's easier to describe and use than memory pages.

All CGA systems send four color signals to the monitor: red, green, blue, and intensity. The monitors used are called RGBI monitors for the four signals they can receive. Because only 16 combinations of four on-or-off signals are possible, both the CGA boards and monitors are limited to displaying 16 colors.

In text modes, 4 bits are used for the foreground color and 4 bits are used for the background color of each position on the screen. Together, these 8 bits make up the attribute byte that is stored next to each ASCII character (including spaces) in video memory.

Any character on the screen should be displayable as one of 16 foreground colors on top of one of 16 background colors. But that's usually impossible, because the computer interprets the background intensity bit as a blink signal and instead of generating one of the bright or intense colors for background, makes the character blink.

If you prefer, you can have 16 background colors instead of blinking characters. All you have to do is send a single byte out a port. In Basic, the command for this is OUT &H3D8,9 (a similar com-

mand will work in any other language).

To re-enable blinking, use the command OUT &H3D8,&H29. These values are valid for the 80-column text mode only. In the 40-column mode, use the commands OUT &H3D8,8 and OUT &H3D8,&H28. This command will work on almost all CGA systems, including the 1000's.

On most computers, the color bits stored in the attribute byte are used directly to create the signals sent to the monitor. But on the 1000, an intermediate step can provide unique capabilities. Instead of translating the color bits into output signals directly, the 1000 uses each of the 16 possible attributes as an index to a set of

palette registers. The bits in the register determine the color that's produced.

In other words, if the 1000's video system finds an attribute of 0101 binary (5 or magenta), it doesn't automatically turn on the blue and red signals and leave the green and intensity signals off, as most computers would. Instead, it looks at the contents of palette 5 and uses the bits there to determine which signals should be on and which should be off.

Normally, each palette contains the binary equivalent of its own number; palette 5 contains 0101, so an attribute of 5 produces magenta. The palettes are reset to their default values whenever the screen

Standard Handle Assignments		
Handle Number	Handle Name	Normal Physical Device
0	stdin (Standard Input)	keyboard
1	stdout (Standard Output)	screen
2	stderr (Standard Error)	screen
3	stdaux (Standard Auxiliary)	COM1
4	stdprn (Standard Printer)	LPT1

Table. All programs inherit five standard handles when invoked from Command.COM or when invoked as a "child" of another program.

Program Listing 4. Demonstration of video paging on the 1000. Memory must be reduced to physical-size 128K before you run this program.

```

1 ' Demonstrate video paging on the Tandy 1000
2 ' Memory must be reduced to physical-size 128K
3 ' before running this program.
227 10 SCREEN 0,,0 'Set for normal text, screen 0
573 20 GOSUB 52010 'Initialize the page routine
630 30 FOR PAGE% = 7 TO 0 STEP -1 'Step through all memory pages
1754 40 CPU.PAGE% = PAGE% 'Write to the page
1725 50 CRT.PAGE% = PAGE% ' that we see
652 60 FOR SCRNM% = 0 TO 3 'Step through all 4 screens
718 70 SCREEN 0,,SCRNM% 'Select the screen first
1072 80 GOSUB 52100 ' and then the memory page
793 90 CLS
213 100 FOR LINES% = 1 TO 24 'Print 24 lines
5769 110 PRINT "CPU page:" CPU.PAGE%;" CRT page:"; CRT.PAGE%;
1734 120 PRINT " Screen:"; SCRNM% 'Let us see where we are
705 130 NEXT LINES%
562 140 NEXT SCRNM%
391 150 NEXT PAGE%
328 160 FOR PAGE% = 0 TO 7 'Step through memory pages again
1723 170 CPU.PAGE% = PAGE% 'Let us see the active page
1697 180 CRT.PAGE% = PAGE%
627 190 FOR SCRNM% = 0 TO 3 'Step through all 4 screens
27 200 WHILE INKEYS = "" : WEND 'Wait for a keystroke
677 210 SCREEN 0,,SCRNM% 'Then select the screen
1034 220 GOSUB 52100 ' and the memory page
565 230 NEXT SCRNM%
388 240 NEXT PAGE%
205 250 WHILE INKEYS = "" : WEND 'Wait for one more keystroke
286 260 SCREEN 0,,0 'Make sure we're back to normal
53 270 END
52000 ' CRT & CPU page swapping routine
464 52001 DATA 58
147 52002 DATA 55, 0B, EC, 0B, 5E, 0B, 8A, 0F
827 52003 DATA 0B, 5E, 06, 0A, 2F, 8A, C1, 0A
2215 52004 DATA C5, 3C, 07, 77, 0A, 8B, D9, B8
3068 52005 DATA 83, 05, CD, 10, EB, 06, 90, B8
1195 52006 DATA 00, 05, CD, 10, 8B, CB, 8B, 5E
1263 52007 DATA 06, 8A, C5, 98, 89, 07, 8B, 5E
1858 52008 DATA 0B, 8A, C1, 98, 89, 07, 5D, CA
424 52009 DATA 04, 00
52010 ' Initialize the page routine
1086 52020 RESTORE 52001
608 52030 READ LENGTH%
1171 52040 PAGE.RTNS = SPACES(LENGTH%)
973 52050 FOR PG.LP% = 1 TO LENGTH%
409 52060 READ PGS
2114 52070 MIDS(PAGE.RTNS, PG.LP%, 1) = CHR$( VAL( "&h" + PGS))
27 52080 NEXT PG.LP%
189 52090 RETURN
52100 ' Call the page routine
602 52110 PAGE.PTR% = VARPTR( PAGE.RTNS)
986 52120 PAGE.ADDR% = CVT( CHR$( PEEK(PAGE.PTR%+1)) + CHR$( PEEK(PAGE.PTR%+2)))
1144 52130 CALL PAGE.ADDR%( CPU.PAGE%, CRT.PAGE%)
166 52140 RETURN

```

End

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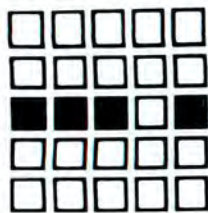
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THE NEXT STEP

mode is changed. Therefore, it's usually impossible to switch palettes to change the colors displayed by an application program, since most programs begin by resetting the screen mode.

To change a palette definition, add 10 hex (16) to the number of the palette you want to change. Send the resulting value out port 3DA hex to address the palette. Then send a new color value between zero and 15 out port 3DE hex. Finally, send a value of zero to port 3DA hex to clear the address register.

The palettes could be set with Basic's Out instruction except for two problems. First, the screen will display hash lines from the time the address port receives a palette number to the time the port is reset. The way to avoid this is to make the change while the display moves from the bottom of the screen back to the top for the next frame. Unfortunately, Basic can't execute three Out statements in such a short period of time.

Second, during every interrupt the address register is apparently changed. If an interrupt occurs between the first Out instruction and the second, the palette won't be changed. Basic is slow enough that an interrupt will almost surely occur, and it has no method of temporarily disabling interrupts.

You need a machine-language subroutine to change a palette. Program Listing 5 shows how such a routine can be written. It reads the requested palette number and new color sent from Basic. Then it turns off interrupts and reads port 3DA until it finds that a vertical retrace is occurring. Finally, it sends the required values out ports 3DA hex and 3DE hex, re-enables interrupts, and returns to Basic.

Program Listing 6 is a demonstration of how fast the palette changes occur. Without the pause loop in the middle of the program, the palettes change too rapidly to see.

You might want to change the length of the pause to suit your own tastes. You could find many uses for palette changes in your own programs. Perhaps the most interesting modification would be to set all the palettes to one value such as black, then write text or graphics data to the screen, and finally change one palette at a time to reveal parts of your screen. By using such a technique, you should be able to make various parts of the screen appear to flash into view. Just remember that your program will not work correctly on any other MS-DOS computer except, perhaps, a PCjr.

Work in Progress

In the coming months, I'll explore other aspects of the 1000's video system, including how languages that know nothing about it, such as the new Basics, can gain access to the special graphics modes.

I'll also discuss how to implement in the 1000's 16-color medium resolution mode John Conway's "The Game of Life," which

is a popular simulation of a small universe with rigorous rules about birth, life, and death. ■

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Program Listing 5. A routine to set a color palette for the 1000 from Basic.

```

; Routine to set a Tandy 1000 color palette from Basic
; CALL addr% (pal%,col%) [pal% and col% are 0..15]

code segment
assume cs:code

start:
org 100h

push bp ;Save register
mov bp,sp ;Copy stack register
mov bx,[bp+6] ;Get address of col%
mov ch,byte ptr [bx] ;Get color value
mov bx,[bp+8] ;Get address of pal%
mov cl,byte ptr [bx] ;Get palette number
add cl,10h ;Add offset to palettes
mov dx,3dah ;Address & status register
mov bx,3deh ;Palette data register

lp: cli ;Interrupts off
in al,dx ;Get status register
and al,8 ;Look for bit 3
jz lp ;Wait until vertical retrace
mov al,cl ;Palette number in AL
out dx,al ;Select palette
mov al,ch ;AL = color number
xchg dx,bx ;Data register in DX
out dx,al ;Set palette color
xchg dx,bx ;Address register in DX
sub al,al ;AL = 0 to reset address register
out dx,al ;Register reset
sti ;Interrupts back on
pop bp ;Recover caller's frame pointer
retf 4 ;Restore stack & return
code ends
end start

```

Program Listing 6. A demonstration of speedy palette changes.

```

1 ' Palette demonstration for the Tandy 1000
2
401 10 SCREEN 0 ; Set text mode
73 20 WIDTH 80 ; with 80 columns
594 30 GOSUB 50010 ; Initialize palette routine
334 40 CLS
915 50 FOR FRGND% = 0 TO 15 ; Pick all foreground colors
511 60 FOR BCKGND% = 0 TO 7 ; and all background colors
54 70 COLOR FRGND%, BCKGND%, 0 ; Set the color
390 80 PRINT " AA "; ; Print a block
2043 90 COLOR FRGND%+16,BCKGND%,0 ; Set "blink" mode
432 100 PRINT " BB "; ; And print that
530 110 NEXT BCKGND%
140 120 NEXT FRGND%
163 130 COLOR 15,0,0 ; Rest of the screen is normal
775 140 OUT &H3D8, 9 ; Turn off blink mode
355 150 FOR PAL% = 0 TO 15 ; Take one palette at a time
2601 160 FOR NEWCOLOR% = 0 TO 15 ; Cycle it through all colors
1199 170 GOSUB 50100 ; Change the palette color
146 180 FOR I% = 1 TO 200: NEXT ; Short pause so we can see it
685 190 NEXT NEWCOLOR%
1589 200 NEWCOLOR% = PAL% ; Put it back to normal
964 210 GOSUB 50100 ; Change the palette color
342 220 NEXT PAL%
939 230 OUT &H3D8, &H29 ; Turn blink mode back on
315 240 END
50000 '
50001 DATA 46 ; Palette routine: initialize 50010, call 50100
289 50002 DATA 55, 8B, EC, 8B, 5E, 06, 8A, 2F
2023 50003 DATA 8B, 5E, 08, 8A, 0F, 80, C1, 10
2550 50004 DATA BA, DA, 03, 8B, DE, 03, FA, EC
2402 50005 DATA 24, 08, 74, FB, 8A, C1, EE, 8A
3772 50006 DATA C5, 87, D3, EE, 87, D3, 2A, C0
86 50007 DATA EE, FB, 5D, CA, 04, 00
50010 ' Initialize palette routine
1122 50020 RESTORE 50001
604 50030 READ LENGTH%
999 50040 PALETTE.ROUTINES = SPACES(LENGTH%)
979 50050 FOR P.LP = 1 TO LENGTH%
480 50060 READ X$
1870 50070 MIDS(PALETTE.ROUTINES,P.LP,1) = CHR$(VAL("&h"+X$))
3 50080 NEXT P.LP
185 50090 RETURN
50100 ' Call palette routine with palette number in pal%,
50105 ' color in newcolor%
1198 50110 DEF SEG
3142 50120 PAL.PTR% = VARPTR(PALETTE.ROUTINES)
4276 50130 P.ADDR% = CVI(CHR$(PEEK(PAL.PTR%+1))) + CHR$(PEEK(PAL.PTR%+2)))
1085 50140 CALL P.ADDR% (PAL%, NEWCOLOR%)
166 50150 RETURN

```

End

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Advice and Dissension

Advice

■ I upgraded my Tandy 1000 with Hard Drive Specialist's Tanpac card. The card worked well until I tried to install an interface card for the Cipher Data Tape System and Microspeed's Fast 88, a PC accelerator card. Neither device worked on the 1000.

Compusystems (Columbia, SC), which makes an adapter/interface card for the Cipher Data tape drive, suggested that I check the DMA (direct memory address) chip on the Tanpac card; if it was an 8237A made by AMD, they recommended replacing it with an 8237A chip made by Intel. I couldn't find an Intel chip with that part number, so I bought one made by NEC. After I made the change, the accelerator card worked—but not the Compusystems card. I resolved this problem by using a card made by Cipher Data instead.

I don't know why NEC's DMA chip works better than the one by AMD, but it does. The new chip costs only \$4.00.—*Bill Ellis, San Diego, CA*

Dissension

■ Harry Bee, at the least, might have asked us for a recent version of T/Master before writing his review (see "Far Out," February 1988, p. 82); the street number and company name are 20 months out of date. To be honest, though, I doubt a new disk would have changed his opinion of our "odd" and "unconventional" product.

T/Master is unconventional. Our spreadsheet is just text, so you can type one in the middle of the document. Convention would have it that text is a cell in a spreadsheet. You don't have to do but one annotated invoice the conventional way to realize, quite frankly, that the concept is dumb.

Our new publishing mode is also unconventional. Pictures can be stored in a library independent of the document that uses them. You call a picture into play by including a special line. If you've ever tried to produce a nifty 30-page newsletter, I am sure you've come to loathe the tedium of conventional desktop publishing.

T/Master, like its predecessor, T/Maker, is really designed to get work done for the productive individual. Looking or feeling like other products was never our concern. In a survey of our users, 51 percent re-

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ported that they were "very satisfied," but better still, 28 percent described themselves as "fanatics of the product." That probably is also an unconventional result.

I think a reviewer needs to look at another idea with at least one eye open for what's better, not just with a concern for what's different or what's worse (those are always easy to find). The fault, though, is not entirely Mr. Bee's; an operating environment such as 80 Micro's that gives someone a few hours of time and 10 square inches of paper to review nine years of thought and effort is not likely to yield observations of quality. You would have made a better contribution by asking three users to list the best and worst things about T/Master. Unfortunately, it seems, you guys are just too conventional.—*Peter Roizen, President, T/Maker Research Co., 812 Pollard Road, Suite 8, Los Gatos, CA 95030*

Out of date by 20 months? A slight exaggeration, perhaps. Or else, when I called in September 1987 to verify such things as address, phone number, and current version, the woman I talked to forgot where she'd gone to work that morning. That's some lapse of consciousness.

My complaint against T/Master is not its departure from convention. That's a quality I'm inclined to appreciate. But something unconventional isn't necessarily—or automatically—good. T/Master is different. It's also slow and extremely difficult, a lumbering behemoth that was never redesigned to take advantage of the possibilities of a new operating system. As I said in the review, "it all feels nailed together," as if it were still running under CP/M. All the added features in the universe won't make up for clumsy, plodding, and disjointed operation.

If it's unconventional to expect software, unconventional or otherwise, to come with decent

documentation, to have an understandable user interface, to be easy to use, and to function smoothly—and yes, quickly—then I'm conventional, indeed. Maybe that's not so bad.—*Harry Bee*

Too Much Character

■ I use Robert Gipson's Basic program (see "The Amazing Shrinking Program," February 1988, p. 47) in one of my own programs that analyzes my mutual funds. My program, written in Basic, uses 23.6K in its original form. I thought I'd compressed it as much as possible, but after running it through Gipson's program, mine shrank by another 2.7K.

However, I wrote my program with some of its Gosubs to a REM (Remark) statement, which caused problems when I compressed it. You have to ensure the original program doesn't Gosub to any REM or "" statements. Makeover.BAS will delete the destination line numbers of the Gosubs if they are REMs when you request the deletion of the REMs. I also had to edit line 4240 (p. 52) to shorten the number of characters permitted from 240 to 230. When I left it at 240, the program crashed at a line in my original program that had 255 characters. Finally, I had to set my dimension statement to 'DIM LIN\$(1500),...' to handle my 23.6K program.—*Steve McKee, Cincinnati, OH*

Though I haven't been able to duplicate McKee's problem, there is a problem when Makeover.BAS reads in a 255-character line. The next line read from the disk will be a null string that must be discarded before continuing. To discard it, insert the following lines in Makeover:

```
3315 IF VAL(A$)=0 THEN 3300
3934 IF VAL(A$)=0 THEN 3920
```

As written, the array allows 500 lines of code. In longer programs, this number will be too small. You can change line 970 from "DIM LIN\$(500)" to "DIM LIN (1500)" to solve this problem. It would also be a good idea to edit line 1670 so that the loop that inputs the lines of text agrees with the size of the dimensioned array. Change FOR I=1 TO 5000 to FOR I=1 TO nnnn, where nnnn is the value you entered in line 970. Makeover does a minimal amount of error-checking. Choosing the "Remove Remarks" option will eliminate all Remark statements in the program you're compressing. Makeover doesn't check first to see if the line number is referenced elsewhere in the program.—Robert W. Gipson

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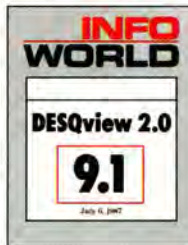
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