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# 800 micro

the #1 magazine for Tandy users

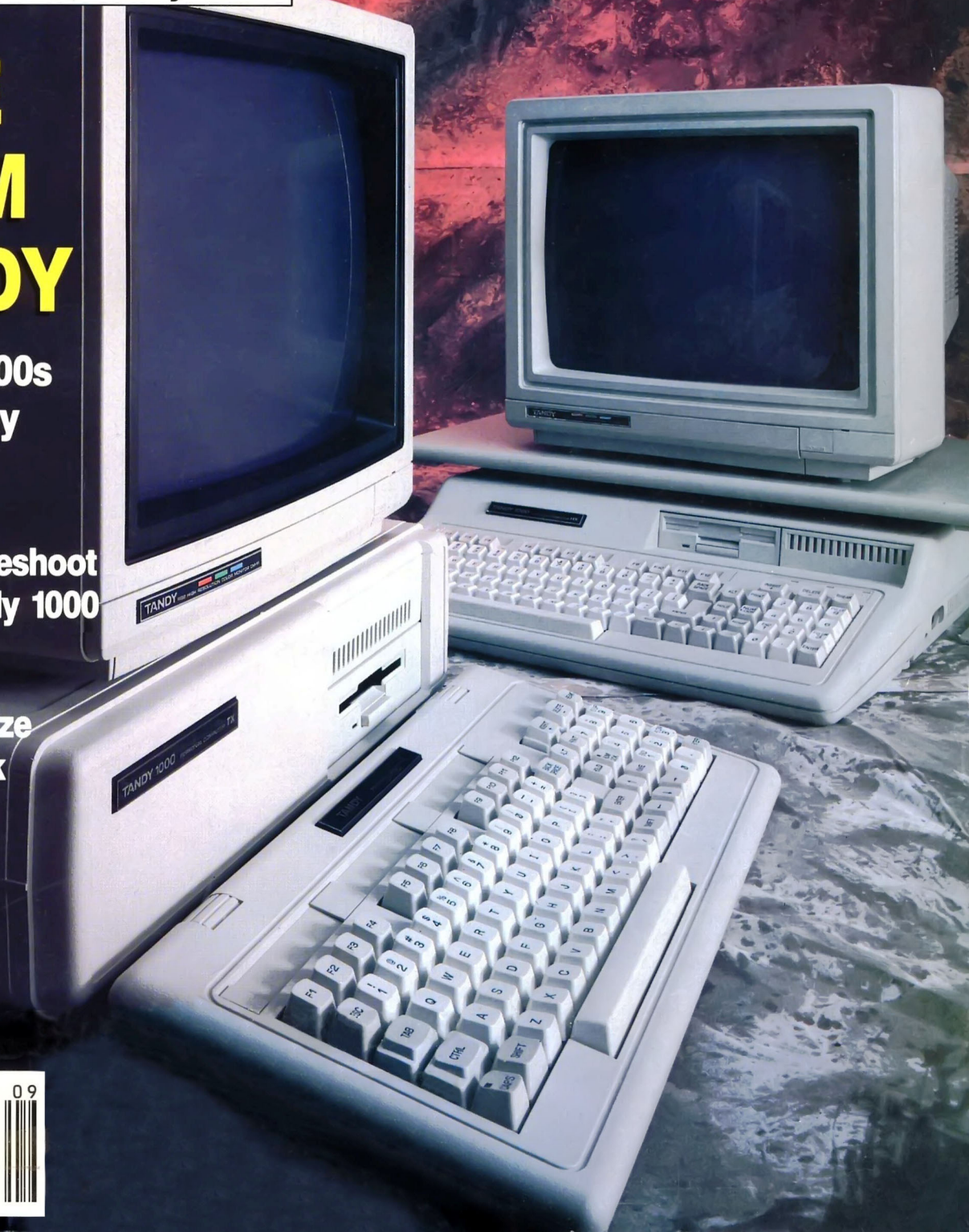
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TRSDOS, Yes  
MS-DOS, No



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# 92

A



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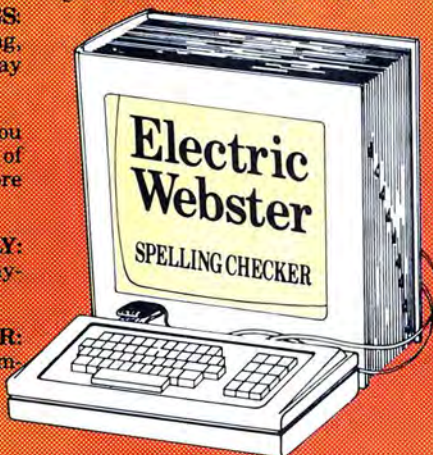
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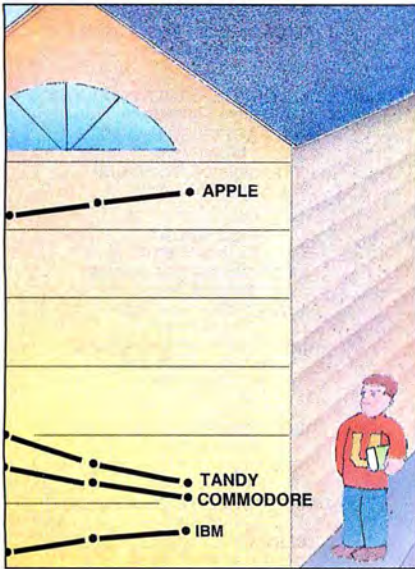
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# The 80 Micro Disk Series

(formerly Load 80)

The 80 Micro Disk Series gathers together selected programs from this issue of 80 Micro and puts them on a magnetic medium for your convenience. It is available on disk and runs on the Models I, III, and 4.

The 80 Micro Disk Series programs are ready to run, and can save you hours of time typing in and debugging listings. The Disk Series also gives you access to assembly-language programs if you don't have an editor/assembler. And it helps you build a substantial software library.

Using the Disk Series is simple. If you own a Model I or III disk system, you boot The 80 Micro Disk Series disk and transfer the files to a

TRSDOS system disk according to simple on-screen directions. If you own a Model 4, copy the Model 4 programs from the Series disk to your TRSDOS 6.x disk using the Copy command.

Not all programs will run on your system. Some Model III programs, for instance, will run on the Model 4 in the Model III mode, but not in the Model 4 mode. You should check the system requirements box that accompanies the article to find out what system configuration individual programs require.

If you have any questions about the programs, call Keith Johnson at 603-924-9471. Yearly disk subscriptions to The 80 Micro Disk Series are \$149.95. Individual loaders are available on disk for \$17.95, including postage. To place a subscription order, or to ask questions about your subscription, please call us toll free at 1-800-343-0728 between 9 a.m. and 5 p.m. Or, you can write to The 80 Micro Disk Series, 80 Elm St., Peterborough, NH 03458.

## Directory

### Convert Superscript to Scripsit Pro

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### Print Activity Calendars

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### Link Assembly Routines with Basic.

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Use "reserved" SVCs to link assembly routines with Basic.

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### Checksum

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Use our checksum program to verify the accuracy of the Basic listings you type in.  
Language: Basic.  
Filespec: CHECKSUM/BAS.

BAS = Basic; CMD = object code; SRC, ASM = source code.

See page 76 for details on the quarterly disk series for the Tandy 1000/1200/3000.

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80 MICRO Review, November 1985

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# Tandy 1000 HX: Not Your Average Clone

Writing an editorial about a new Tandy computer usually means talking about its place in the market rather than about the machine's features. The Tandy 2000's technology was interesting enough to deserve comment, but since then Tandy has stuck to the party line with computers that are enhanced compatibles at best and crippled clones at worst.

At first glance, the Tandy 1000 HX appears to present a different situation. With MS-DOS in ROM and an EEPROM (electronically erasable programmable read-only memory) that lets you permanently configure the machine through hardware, the HX is an interesting variation of your average clone.

EPROMs and EEPROMs go back to the early days of computing when the true hacker had his own EPROM burner. Outfitting a computer with an EEPROM that could be programmed by the user apparently never occurred to anyone. But what an interesting solution to the age-old dilemma of how to insulate the novice or casual user from DOS. All he has to do is turn on the machine and it'll take him wherever it's been programmed to go.

Tandy is clearly trying to design a computer for the average dummy, especially the one buying a system for home or educational use. Some experienced MS-DOS users will scoff at such spoon-feeding. Learning DOS is not, after all, such a difficult task for someone who wants to. But there are still millions—tens of millions—of computerless Americans out there who have trouble setting their alarm clocks, let alone figuring out the intricacies of DOS. The company that can give them instant computing at discount prices will command the home and education markets over the next five years.

So what about the market? Well, Tandy now has four computers—the 1000 EX, HX, SX, and TX—for the home, school, and small business. Given their similar features and prices—\$599, \$699, \$849, and \$1,199, respectively—you've got to wonder how Tandy intends to distinguish them from one another, especially considering that the targeted consumers mostly don't know an expansion card from the ace of spades. But on the other hand, why should Tandy care which computer



somebody walks out of the store with? The money's just as green.

One other thought. Tandy's Aug. 3 announcement was made possible by IBM's new line of PS/2 computers. Had IBM come out with a true low-end clone-killer, Tandy would have had to rethink its strategy. But the battle goes on, and Tandy further fortifies its position in the MS-DOS market.

## Nondisclosure Blues

Meanwhile, Tandy continues to do what it can to control the computer press. The company invited various computer magazines, including *80 Micro*, down to Fort Worth for sneak previews of the new line, but everyone had to sign a nondisclosure agreement promising not to divulge information about the computers before a specified date.

Such agreements have become standard for most computer manufacturers and the media that cover them. But they're a sore point with editors. The newsweeklies refuse to sign them, figuring they can get the information they need through regular reportorial means. The monthly system-specific magazines, however, have lead times of three months or more, and can only provide their readers with in-depth information if they see the machines early. This means often agreeing to conditions that essentially allow the company to dictate the magazine's editorial policy.

The agreement we signed to see the HX and TX had one odd stipulation that pushed our journalistic ethics to the limits. Tandy told us we could publish infor-

mation in the nearest issue following the announcement (September), but only if we agreed to feature the computers on our cover. If we felt the story was not cover material, we had to hold the information for another month.

We saw the machines and decided they were important enough to put on the cover. But what if we had a topic we thought was more suitable, or didn't believe the HX and TX were significant enough to warrant such treatment? We would have been forced to withhold information from our readers because of our agreement, a form of self-censorship that put a rancid taste in our mouths.

Our problems with the agreement didn't stop there. No sooner had we been to Fort Worth than Tandy officials were calling to ask us whether we had leaked what we knew to *Infoworld*, a newsweekly in Menlo Park owned by the same company as *80 Micro*. *Infoworld* had found out about the new portable and was printing a story in its next issue.

This was no isolated incident. The same situation occurred in 1984 when *Infoworld* published a story on the Tandy 1000 before its release. Tandy officials were convinced the information came from *80 Micro* and temporarily withdrew editorial support and advertising from all CW publications.

We can understand why Tandy's executives are so sensitive about news leaks. But Tandy must understand that a publication's first responsibility is to be an independent and credible source of information for its readers. If Tandy doesn't like news leaks, it should refuse to offer sneak previews or get rid of nondisclosure agreements. Either way, Tandy and the media will both know where they stand, and the issue of contract violations will disappear.

The other side of the coin is that if we don't like the restrictions a nondisclosure agreement imposes on us, we shouldn't sign them. So from now on we won't. We realize that this decision might hamper our ability to report quickly on new Tandy computers, but the odor of censorship has become too unpleasant. We might not get to the news first, but we'll get there on our own. And you, the reader, will know that you're getting the real story, not a tidied-up version bleached in the Texas sun. ■





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Mod 1000. \$489 Mod 3000. \$489

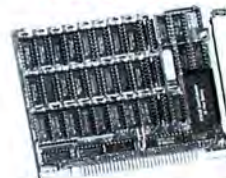
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### Not Efficient, but Effective

**Q.** I have three questions concerning differences between the Model III and Tandy 1000A. I purchased a Tandy 1000A and converted several programs with TRSCROSS. I have a philatelic inventory program that uses Data statements. It isn't the most efficient method for an inventory, but it works well and is too large to attempt to transfer. I often need to move a data line from one location to another. Using Dosplus on the Model III, I do this with the DI command. Is there a command to move data lines for the 1000A?

On the Model III, if I list a line and want to scroll additional lines, I use the down arrow and additional lines appear one by one. How can I do this on the 1000A without using the F1 key and continuously entering line numbers?

On the Model III, I had no trouble entering cents such as .09 as a value. When I enter .09 (in a Data statement) on the Tandy 1000A, I get 9.000001E-2. This only happens with .09. Why does this occur, and how can I correct it? (Eric Norton, Birmingham, AL)

**A.** To move a data line in GW-Basic (on the Tandy 1000A) type the new line number over the old line number and press the enter key. If the new line number already exists, it will be overwritten. You can remove the original line, which still exists, by entering the line number (on a blank line) and pressing enter.

On the 1000A, you can list any range of line numbers you want to see and use the hold key to see the lines slowly (one by one).

The hold key is a toggle. One press starts hold and the next press releases hold. When hold is toggled on, nothing can happen.

You are correct about the .09. It is the only number in the hundredths that displays in exponential format. In the thousandths, this happens to 12 numbers. This is an idiosyncrasy of Microsoft's binary representation. You can properly



format the display of the number with a Print Using command.

### Turn the Page

**Q.** When I use Superscript 1.02 on my Model III, I sometimes have documents longer than a single page. Often, I revise a page other than the first one and then only need the printer (a DMP 200) to retype that one page. I can't begin printing on any page other than the first and a call to my local Radio Shack Computer Center has been no help. Any suggestions? (Larry Shaw, Gustine, CA)

**A.** Use the block markers to block off the desired page(s) and use the block mode's Print subcommand. If you use headers or footers, first go to the Open Document page and verify that the header- and footer-start pages are set to 1 so that they can also print.

### Way Out of Line

**Q.** I had the same problem with Superscript's right justification as Gideon Oren (see "Out of Line," Feedback Loop, May 1987, p. 14). I use Superscript on a Model III with a Daisy Wheel II printer and proportional spacing. I discovered that all versions since 1.2.8 print any line with a tab in it ragged, while justifying all other lines. Version 1.2.8 handles tabs and right justification properly. I talked to Tandy service people about this. They duplicated the problem, but they don't have a fix. My Open Document options and Print Text options agree on selecting proportional spacing and justification. I currently use version 1.3.2 for all documents not requiring right justification but continue to use version 1.2.8 for documents requiring justification. Do you know of a fix for this problem? (Andrew J. Wheeler, Butner, NC)

**A.** I do not think that you have the same problem as Mr. Oren because he did not mention tabs and I duplicated his problem as he described it. But your problem is valid for version 1.3.x and Model 4's version 1.1.x. This problem is in a tricky portion of coding and I do not have a patch. The best advice I can give is to use hard spaces (shift-spacebar) to manually get to the desired tab location and then type your data.

### Connect the Dots

**Q.** I recently inherited a Model 4. I realize that desktop publishing is currently geared for use with other systems, but I wonder if there is a program for the Model 4 that composes newsletters using a dot-matrix Epson printer. (Richard Rowand, Norfolk, VA)

**A.** You could use Allwrite with Dotwriter, both available from Prosoft (P.O. Box 560, North Hollywood, CA 91603, 818-764-3131). If you use CP/M, you can use Wordstar, available from Montezuma Micro (P.O. Box 224767, Dallas, TX 75222-4767, 214-631-7900), with Magicprint, from Computer Editype Systems (509 Cathedral Parkway, Suite 10A, New York, NY 10025, 212-222-8148).

### Backup About-Face

**Q.** I own a Model 4 with 128K RAM, two disk drives, and TRSDOS 6.2. I had DOS installed in Memdisk according to Don Coffin's article (see "Set Drive Zero Free," January 1987, p. 69). Now I can do disk backups between drive 1 and what is now drive 2, regardless of whether the disk has DOS on it, without inserting a system disk for the data-disk backups. I formatted a blank disk in drive 1 and left it there. I inserted the program disk in drive 2 and typed the command BACKUP :2 :1. The backup utility reported that "datadisk," the name of the destination disk, was different and asked me if I still wanted to backup to it. This was normal, and since the last time this tragedy occurred (I assumed I had typed the command incorrectly), I used that as a final check that I was copying correctly. I answered "yes", and after a few seconds the message "Copying track 20" appeared.

I knew it had just trashed my program disk. I checked the contents of the screen without finding an entry error. When I checked the destination disk in drive 1, I found that it was given the name of the program disk and contained only the



boot and directory files. Checking the source disk in drive 2 showed that it was identical to the destination disk in drive 1. It still had the proper name, but it contained only the boot and directory files. It appears that the backup started out fine—it transferred the name of the source disk to the destination disk—but it then reversed itself and copied the directory track from the destination disk to the source disk. How can the computer possibly pull a stunt like this? Is it a glitch from using DOS in Memdisk or is it a disk-controller problem?

Lately, the only problem with my computer is that occasionally it won't access a drive at all or reports that no disk is in the drive when it actually is. My dealer thinks it's a controller problem, but the problem occurs so seldomly that I doubt he'd find it on the bench without spending much time (at my expense) in tracking down such an intermittent problem. The problem usually occurs in drive 1, but lately it's been happening in drive zero. The only cure is to power down, wait a few seconds, then power up. That works every time.

Now I have two irreplaceable program disks of Basic. I borrowed a Model III version of Super Utility Plus (because I couldn't borrow a Model 4) and looked at the first blown disk. It would read it, and I could page through each sector and see my Basic programs, which seemed to be all there, but nothing in SU Plus picked up an individual program without the proper directory file in place. Until I get help, I won't use DOS in Memdisk for backups or copies, and I will write-protect my source disks during backup. (R. Kendall, Winnipeg, Manitoba)

**A.** When you receive a program disk, put a write-protect tab over the write-protect notch. Don't even let it get near your computer without a write-protect tab in place. Since the disks seem to have only the directories rewritten, it is possible to recover the files, but it is a complex and time-consuming procedure. If you don't know how to interpret disk-allocation structuring in file entries or how to reconstruct these configurations, don't attempt it. Go to the distributor of the program disk and obtain a copy by backing up one of their disks onto your original disk(s). Some mail-order firms charge a fee for this. Check with them before you send the disk to them. The problem with the computer might be the controller, but it could also be the ribbon cable between the controller and the disk drives. Before purchasing a new cable or controller, try cleaning the cable contacts on the controller and the disk drives with contact cleaner, available at Radio Shack.

## Fix for Slow Spreadsheet

**Q.** I am running Lotus's 1-2-3, release 1A, on a Tandy 1000 with a Tandy 10-megabyte external hard disk and have encountered a peculiar problem with one spreadsheet's loading time. The spreadsheet occupies some 62,720 bytes and includes several macros. Loading it with /FR file name takes just over five minutes. I have tried to improve the situation but to no avail. A friend suggested what seemed a strange technique. Using the File/Combine feature, /FCCE file name, combine the spreadsheet to an empty dummy file. Then use the worksheet erase to clear the screen. Next do the normal load, /fr file name. I tried this silly procedure and *it worked!* The total time to do all three of these procedures from start to successful load is 55 seconds. My question is how can this be, particularly since it is only with this one file I have the problem? (Thomas O'Neill, Roseburg, OR)

**A.** I'm not sure, but I suspect it is due to the macro definitions. When a spreadsheet is loading into memory from disk, if the macro buffer does not contain enough room to store the currently loading macro, some housekeeping takes place to enlarge the buffer, and this can often eat up a lot of time. It seems that by using the file/combine technique you outlined, the dummy file reserves enough workspace in memory for storing your spreadsheet's macros, and so housekeeping is kept to a minimum, and therefore loads are much faster.

## Drive and DOSes

**Q.** A year ago, I purchased a pair of used Radio Shack external drives at a good price. The 2/3 drive (catalog no. 26-1164), having a cream housing and an internal transformer, worked great as a 2 or 3 drive. The second drive (no. 26-1161), having a silver case and the transformer on the rear of the unit, would not read or write correctly, showing oversize letters, no letters, or various ASCII characters. On return from a Tandy service center after spending \$125, I called them back, as it still did not work. I was informed it was a Model I drive. I adjusted the stepper rate to 30 ms using the System/CMD and Sysgen on TRSDOS 6.2, and it works great.

My problem is that a lot of my programs and utilities use TRSDOS 1.3, and I don't know of a way to adjust the stepper rate with this DOS. Is there a practical and feasible way to adjust the drive to 6 ms, short of a trip to the service center? Also, it would work great if I had a patch for TRSDOS 1.3 to adjust drive 2 to 30 ms. It seems that all four drives work great with Dosplus, however, as the

configuration table says 30 ms for all drives.

One more question, is there a way, using TRSDOS 1.3 EDTASM, that I can input some of the fine machine-language programs that are in *80 Micro* and are written for EDAS, Pro-Create, or MRAS? (Robert Nash, Vinita, OK)

**A.** Model III's TRSDOS 1.3 uses the same stepping rate information for all drives, so if one drive requires a 30-ms delay time, then all drives have to operate at 30 ms. The patch requires seven entries, as follows:

PATCH \*0 (ADD = 42EE, FIND = 0C,  
CHG = 0x)

PATCH \*0 (ADD = 4516, FIND = 0C,  
CHG = 0x)

PATCH \*0 (ADD = 4544, FIND = 1C,  
CHG = 1x)

PATCH \*0 (ADD = 4FE1, FIND = 0C,  
CHG = 0x)

PATCH \*7 (ADD = 580E, FIND = 0C,  
CHG = 0x)

PATCH \*7 (ADD = 5841, FIND = 0C,  
CHG = 0x)

PATCH \*7 (ADD = 5B3C, FIND = 0C,  
CHG = 5y)

Prior to installing the patches, change the "x" in each line to C, D, E, or F, and the "y" to 8, 9, A, or B for 6-, 12-, 20-, or 30-ms stepping rate, respectively. For other patches to TRSDOS 1.3, including this one, see "Patch Works" (*80 Micro*, January 1985, p. 112) and "Patch Work II: The Sequel" (August 1985, p. 72).

As far as using the Model III EDTASM with the macro assembler programs, such as those in The Next Step column, just remember that when each macro is defined, you must expand it manually each time it occurs. Also, you should change any PSECT to ORG. Finally, you need a good understanding of your assembler's pseudo-ops. Some assemblers allow the use of DB in place of DEFB, for example, and you should know what token you can use or must substitute.

## Adding On and On

**Q.** I have four questions that no one (at Radio Shack, at least) seems to have answers for. I am hoping you might be able to help.

Does anyone manufacture a chassis expander specifically for the Tandy 1000? If not, I guess those of us with three filled slots are out of luck.

Tandy makes an adapter (catalog no. 25-1016) so that you can use Plus boards in an IBM compatible. Does anyone make an adapter to allow the use of an IBM-type PC board in a Tandy?

Is it true that the 1000 SX is compatible with Enhanced Graphic Adapter (EGA) but the 1000 is not? If so, what are the chances of some sharp innovator de-



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signing/inventing a board or adapter that would give the 1000 EGA capabilities? (Robert B. Johnson, Houston, TX)

**A.** Matthew Electronics Inc. (386 Avenida de la Vereda, Ojai, CA 93023 805-646-7790, or 800-543-2233 for orders) makes an expansion chassis called Master/Chassis that lets you plug in seven IBM-size boards (the eighth slot contains the driver/receiver board) and four half-height drives. (See New Products, March, p. 121. Matthews Electronics is now marketing its own product.)

You can use IBM-compatible boards in the 1000 as long as they are 10 inches or less and are not video boards.

You can use EGA with the 1000 SX after you change some DIP switches on the motherboard. Matthew Electronics (see above) is introducing a two-chip/software combination that fits on the 1000 motherboard to disable Tandy video and allow short-card EGA. The company will also supply the EGA board.

## Gray Plus

**Q.** I am having problems with my Tandy 1000 keyboard. When using different software, I find that I need a gray + key. The scan code for IBM'S gray + is 78. I cannot seem to find the right sequence of keys on the Tandy to generate this code. What I want to know is whether or not Tandy makes an IBM-compatible keyboard that will work on the Tandy 1000. (Michael C. Everson, Fargo, ND)

**A.** Tandy has a Universal Keyboard Adapter (catalog no. 25-1030) for \$99.95 that allows you to use a standard PC, AT, or Enhanced keyboard on your Tandy 1000. It also supports the Keytronic keyboards and includes software drivers. You can also buy an Enhanced Keyboard (catalog no. 25-4038) for the 3000/1200 for \$99.99 that is compatible with PC/XT, AT, and AT&T PC 6300. This keyboard can be used with the adapter on the 1000.

## Sacrificial K

**Q.** I am not disappointed in my Model 2000 HD, but I am disappointed in the way Tandy apparently abandoned its first MS-DOS computer by not supporting it with add-on boards and other accessories. In my machine, a hard-drive controller, a graphics board, a mouse/clock board, and a 256K memory-expansion board fill the slots. I now have a 512K computer; I'd like to add another 256K but don't want to sacrifice any of the boards already in place. Do any vendors carry a piggyback board or any other means to upgrade my fully configured 2000 to its full 768K? (Barry J. Keene, Brownstown, PA)

**A.** Every 2000 devotee should know about Envision Designs (1909 Orchard Way, Richland, WA 99352, 509-627-5291). It offers several hardware options for the 2000, such as a 640K External RAM Memory Board that includes RAM disk software. Ask about its trade-in policy for your memory-expansion board.

## READERS RESPOND

### You Owe One Kingdom

Neil Smith of Seattle, WA, responded to Noel Parks's search for line feeds on the Model 100 (see "My Kingdom for a Line Feed" in Feedback Loop, April 1987, p. 14). Neil, Laptops sysop, reports that the Genie Laptops Roundtable (See the General Electric ad on the inside cover of the magazine) has two utilities in the Program Library to add line feeds. Both utilities add line feeds to the printer or modem, and one utility has other features, too. The smaller utility is file number 206 (documentation file no. 207), while the fancier one is file number 241 (documentation no. 242). Both programs add line feeds regardless of the program that you use. They both work on the Tandy 102.

Genie Laptops Roundtable has several hundred utilities, games, and other files in the library, including a spreadsheet, Tiny Basic compiler, print formatter, outline processor, x-modem program, and RAM/ROM system map. The library has files for the Model 100/102, 200, 600, NEC PC-8201, Olivetti M10, PC-compatible laptops, and Epson Geneva.

### Squish Those Bugs

Cy Shinkawa of Honolulu, HI, reports that he found a mildly surprising bug in Radio Shack's Model 4 Graphic Basic (BasicG) Graphic Utilities. After executing any of the Graphic Utilities, TRSDOS 6.2 is left running at Model III speed. He noticed it when executing the Sound command after running a BasicG utility. The tone was noticeably lower and duration was longer than normal. He then noticed that the cursor blinked slower. He does not have a patch to fix it, but he runs the SYSTEM(FAST) command from TRSDOS 6.2, or from BasicG, use SYSTEM"SYSTEM(FAST)" to bring the computer back to full speed.

### Bridge Over NLQ

Ronald J. Potaczala of Paisley, FL, responds to W.M. Staudenmaier's question in the May 1987 issue (see "Escape from NLQ," p. 12) on how to disable the near letter quality (NLQ) mode on the DMP 130 printer from Superscript. He suggests you program the user print codes as outlined on pages 108-114 of the Superscript owner's manual. He

programmed user key 2 with the code sequence 27 18, which the printer interprets as a command to enter the 10 characters-per-inch (cpi) NLQ mode. His user key, quotation mark, is programmed with the sequence 27 19, which is the code for 10-cpi draft mode. Another technique is to insert a pause print code by pressing clear-question mark at the top of the document (see p. 71 of the Superscript manual). Both keys should be pressed at the same time. When the "Do you wish to continue printing?" prompt appears in the status line, push the on-off line button, the NLQ-DP button, then the on-off line button again; then press the Y key to continue printing.

The one exception is with proportional print, which has no data mode counterpart; attempting this sequence with proportional print usually makes a mess of your right justification because it throws the dot count off in the printer driver. Also, keep in mind that 12-pitch print, because of documented constraints in the printer driver, always initializes in the data mode. However, 12-pitch correspondence mode is available by programming the user codes, as above.

## SEEKING HELP

►Orrin Clayton (511 Bloor Ave., Ottawa, Ontario K1G 0V2) is looking for a program like Printmaster or PC Print that will run on his Model 2000. He wants to have fonts of different sizes available.

►Edmond D. Phillips (6514 W. Langley Lane, McLean, VA 22101) wants a kit, board, or instructions on how to output the video for remote display on a monitor with his Model 4.

►Jim Ruissen (11820 Seaton Road, Richmond, British Columbia V7A 3G6) is looking for a handbook or "companion" book to the Modem80 communications package.

►John Funnell (3441 Court St., Saginaw, MI 48602) is looking for software to run the new "Uniform residential appraisal report" on a Model 4 or 16B.

►R.D. Malcom (28861 180th St. S.E., Kent, WA 98042) is looking for color ribbons and standard black for his daisy wheel DWP 220 and dot matrix DMP 430 printers.

►Tom Rooney (63 Tulane Crescent, Nepean, Ontario K2J 2G2) is looking for a copy of David Lien's book *Learning TRS-80 Model 4/4P Basic*.

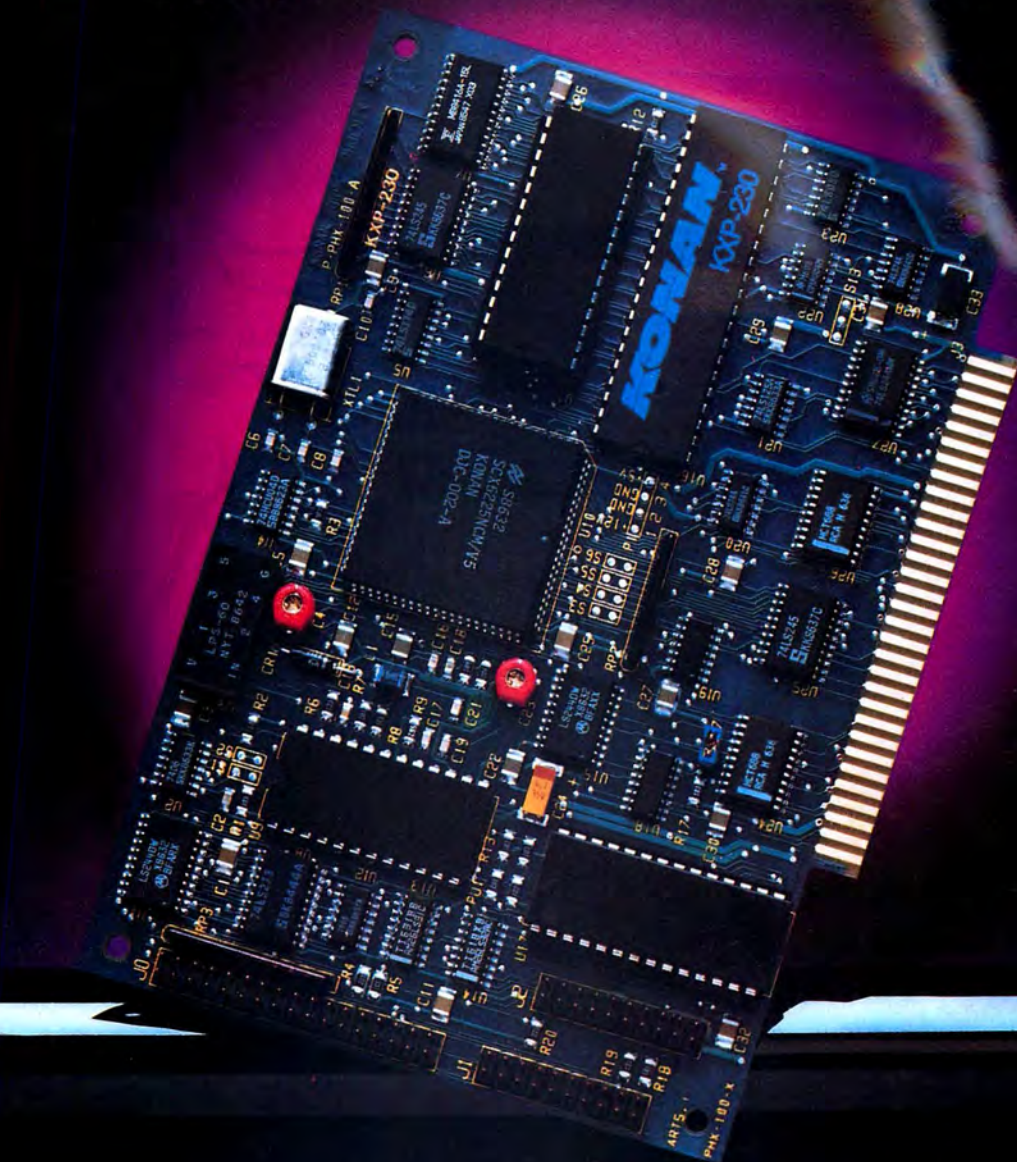
►Will I. Ramsey Jr. (2711 6th St. N.W., Suite E, Gainesville, FL 32609) has several problems using the Tandy PTC-64 printer controller with Superscript Pro. The printouts don't justify or pause between pages, or do superscript with the printer controller. He's looking for help with the printer controller. ■



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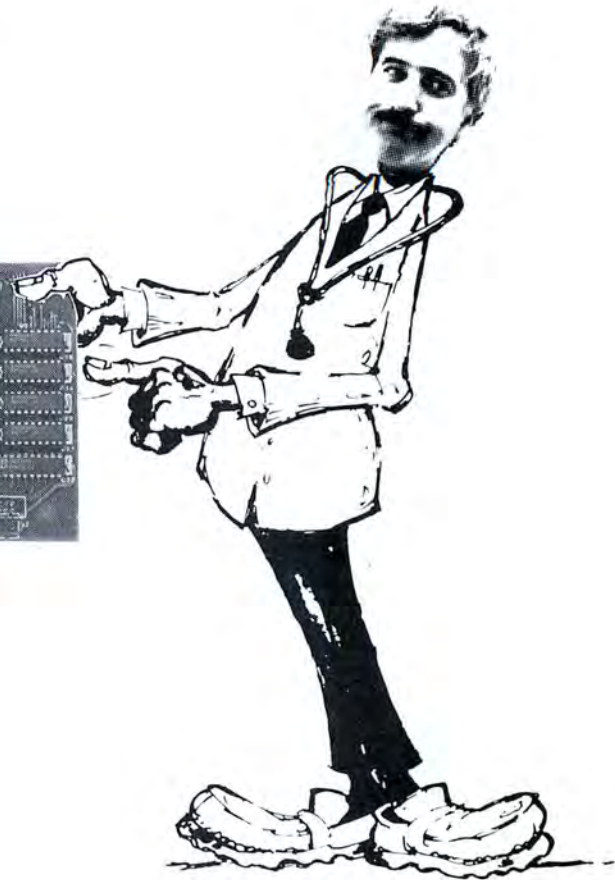
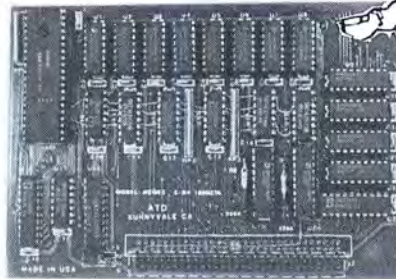
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# Tandy Gets Graded in the Schools

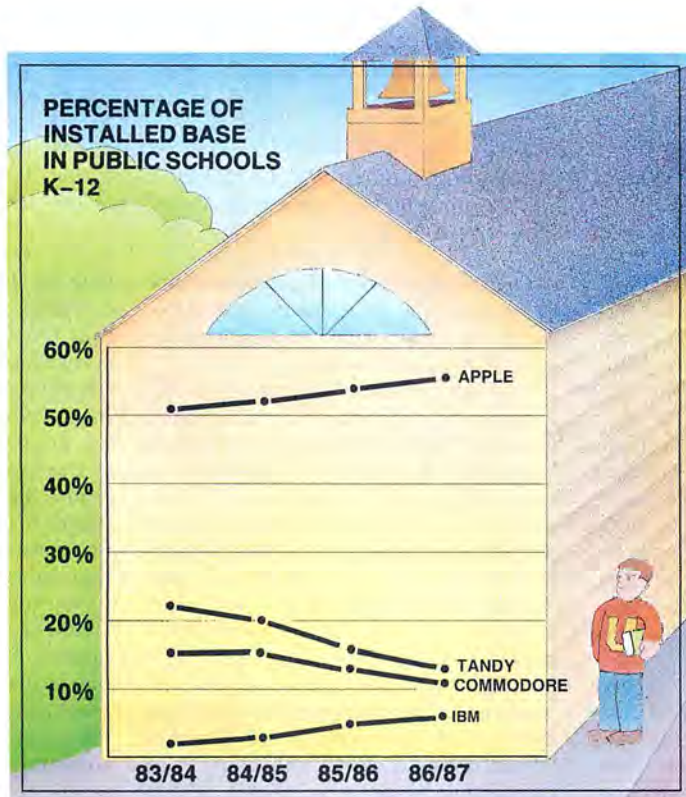
## Tandyland

The nation's schools have been among Tandy's best customers ever since personal computers became popular teaching tools for classroom instruction. Walk into any junior or senior high school and you have a good chance of finding a roomful of battered Model IIIs or 4's. It is no secret, though, that you are three times more likely to find a bushel of Apples. Now the Big Two of educational computing (Commodore is a close third) are seeing their long-standing special status threatened—perhaps—by the introduction into the classroom of a couple of "A" students.

IBM and Zenith are encouraging authorized dealers to approach local school districts with volume discount offers and special service arrangements. The word is that secondary school officials are looking more closely at MS-DOS machines in response to pressure from parents and college officials who want to make sure students are adequately prepared to face the IBM-compatible business world.

According to figures compiled by Quality Education Data Inc. (QED), a Denver-based market-research firm, IBM computers represented 6 percent of the installed base of 1,050,000 in the 1986-87 school year for grades K-12. (Big Blue tripled its share in three years.) Zenith didn't show up in the QED figures, but the Glenview, IL, based electronics giant already has 15 percent of the college market and could be a serious contender in secondary schools.

Tandy officials say they aren't worried about the new competition. Ed Juge, Tandy's director of market planning, said that even with reported 45-50 percent discounts, IBM's new Personal System/2 Model 30 is nearly twice as expensive as the Tandy 1000 SX. "IBM



really isn't competitive in the kind of system the schools want," Juge said.

The actual numbers for the last five years may be legitimate cause for alarm in the Tandy Towers (see above). QED, which polls about 99.5 percent of all 15,000 U.S. school districts by phone, shows Tandy's share of the installed base of PCs dropping by 10 percent since 1983-84, while Apple's share increased 6 percent and IBM made inroads. (Note that the Tandy figure doesn't include MS-DOS machines, which QED first broke out into a separate category this year. The latest Tandy share, even with all 5,600 compatibles thrown in, remains considerably lower than that of earlier years.)

Juge was skeptical of the QED numbers, noting that other market-research firms report that Tandy's share is closer to 30 percent and may be rising. He said many school officials don't cooperate fully with polling firms and that some might be so biased toward Apple products that they underestimate the Tandy presence. Juge placed more stock in gov-

ernment-mandated surveys in 17 states, available until fairly recently, which tended to place Tandy's share of the installed base in the 30 percent plus range.

Meanwhile, sales of the Trackstar, a Tandy 1000 add-in board that lets you run Apple software, have been strong, according to Juge. The Trackstar serves as Tandy's "security blanket" in case many teachers continue to believe they must stick with Apple machines to conserve large investments in Apple-compatible software. Sales of the 1000 SX and EX to schools are good, Juge said, although he wouldn't release exact figures. Thus, it appears—the IBM and Zenith efforts notwithstanding—that Tandy is well positioned to capitalize on the educators' move toward

IBM compatibility.

There will likely be plenty of business to go around. QED president Jeanne Hayes offered a conservative prediction that the number of personal computers installed in schools will climb to 4 million by 1990—one for every 10 students. Part of that growth will be fueled by the purchase plans of school districts in big cities like New York and Chicago, which have lagged behind their smaller counterparts in jumping on the computing bandwagon. Juge said Tandy is already negotiating with officials from both cities.

**Tandy had no new products to show** at Comdex/Spring in Atlanta last June, but it did get a member of the Atlanta Hawks to autograph little basketballs. Spud Webb, the diminutive and speedy guard from Atlanta's professional basketball team, generated one of the longest lines at the show. Let no one accuse Tandy of lacking marketing savvy.

Our reporter at Comdex noted that the line to see Webb was longer than the line for a *Playboy* playmate at the Consumer



Electronics Show last fall in Chicago.

**Advertising shapes reality—** or is it the other way around? Sometimes our perceptions do seem to mimic what the Madison Avenue Hemingways want us to *think*. Such was the case in April when the trade newspaper *Advertising Age* asked 1,000 people to name the first print or broadcast ad for computers that popped into their heads.

The three companies most frequently named are also the top three personal computer retailers, according to market studies: IBM, Apple, and Tandy. Twenty-three percent of the respondents named IBM, 21.1 percent Apple, and 2.3 percent Tandy. Big Blue's Personal System/2 ad blitz, featuring most of the M\*A\*S\*H cast minus Alan Alda, knocked Apple from first place for only the second time in three years.

Computers are small potatoes in the multi-billion-dollar advertising business (though IBM's M\*A\*S\*H attack reportedly cost \$50 million). When the 1,000 respondents were asked to pick the advertisement that first came to mind regardless of category, IBM wasn't even in the top 10 (AT&T's telephone ads, however, made the 10th spot). Cars, detergents, burgers, beer, soft drinks, and singing California raisins elbowed computers for forward position in the gray matter of the masses. As *Advertising Age* curtly pointed out, "Computers are hardly a mass-market product."

## Update

**Can you say "shakeout"?** Webster's defines the word thusly: "A sharp break in a particular industry that usually follows overproduction or excessive competition and tends to force out weaker producers." The computer mail-order industry appears to have caught a massive dose of it.

Tech PC in Anaheim, CA, a mail-order company that assembled and sold its own machines, cleaned up, cleared out, locked the doors, and disconnected the phones one day in May. According to reports in *PC Week* and elsewhere, angry customers called the Anaheim police department wanting to know why the company wasn't answering its phone. In response, a detective went to the company's warehouse only to find it had been "picked clean." Tech PC's officers were nowhere to be found, but a lawyer did say they planned to file for bankruptcy and liquidate their assets. An un-

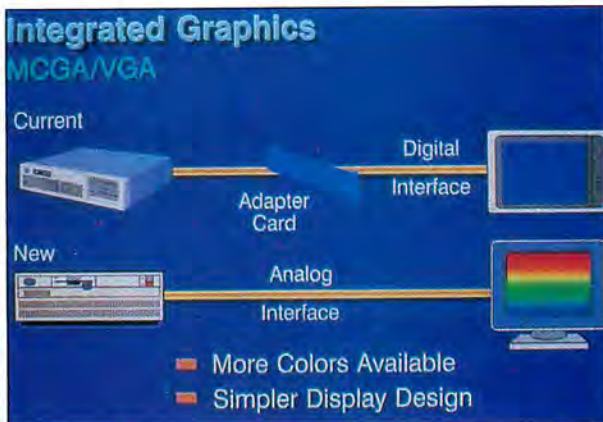


Photo. IBM's promotional material for its high-resolution MCGA and VGA graphics standards included this impressive shot of VGA in action.

determined number of customers are believed to have large claims against the company for undelivered and improperly repaired merchandise.

That same month, PC Network in Chicago filed for Chapter 11 bankruptcy protection while promising to remain in business if it can regain profitability. Company president Stephen Dukker said the firm lost \$1 million on sales of \$50 million during its latest fiscal year. He blamed the loss on rising costs coinciding with falling prices and profit margins brought about by increased competition in the mail-order industry.

Analysts said the Tech PC and PC Network bankruptcies weren't the first, and they won't be the last in an industry that is undergoing a classic shakeout. Price competition in an overcrowded field is cutting profit margins so low that smaller companies can quickly find themselves holding expensive inventory with not enough money coming in to pay debts. The weakest companies are likely to fold, leaving their share of the market to a few dominant players.

If you buy heavily from mail-order firms, keep a close eye on how well they serve you. Late shipments and otherwise sloppy service are often signs that a company is in trouble.

## Micro Trends

**Technological improvements** in monitors and graphics cards are getting into the hands of consumers with ever-growing rapidity. Hardly a week goes by without the announcement of a new "multisync" monitor or high-resolution video controller. And approximately once every year, the newest standard of graphics compatibility offers sharper resolution with more colors to choose from.

In 1987, the introduction of IBM's line of PS/2 computers promises solid, if not

spectacular, improvements in the quality of the displays millions of us stare at every day. The Video Graphics Array (VGA) standard (see Photo), which is built into the PS/2 Models 50, 60, and 80 and available on an add-on card for the Model 30, is seen by industry analysts as an extension of the Enhanced Graphics Adapter (EGA) standard. Both are likely to be the two standards you will hear most about in coming months, as EGA and super-EGA boards become relatively inexpensive and non-IBM VGA boards become more widely available.

VGA offers 640- by 480-pixel resolution, improving on the 640 by 350 of EGA. (The older Color Graphics Adapter [CGA] standard built into the Tandy 1000 EX and SX, by comparison, allows only 640 by 200 resolution.) The VGA's resolution is a magic number when it comes to graphics programming: The 4:3 pixel ratio is the same as that of a screen's dimensions, meaning pixels have the same length horizontally as they do vertically. Programmers will no longer have to make graphics images conform to asymmetrical pixel patterns.

IBM has also committed itself to analog instead of digital monitors, another move that is likely to further improvements in graphics available to users of IBM compatibles. The continuous analog signals can combine the three primary colors in thousands more variations than CGA or EGA can. The result is a "palette" of 262,144 colors, compared with the 16 and 64 available in the two older standards. Unfortunately, the current VGA implementation lets you display only 256 simultaneous colors at a lower-than-usual resolution (320 by 200) unless you buy an expensive add-on board.

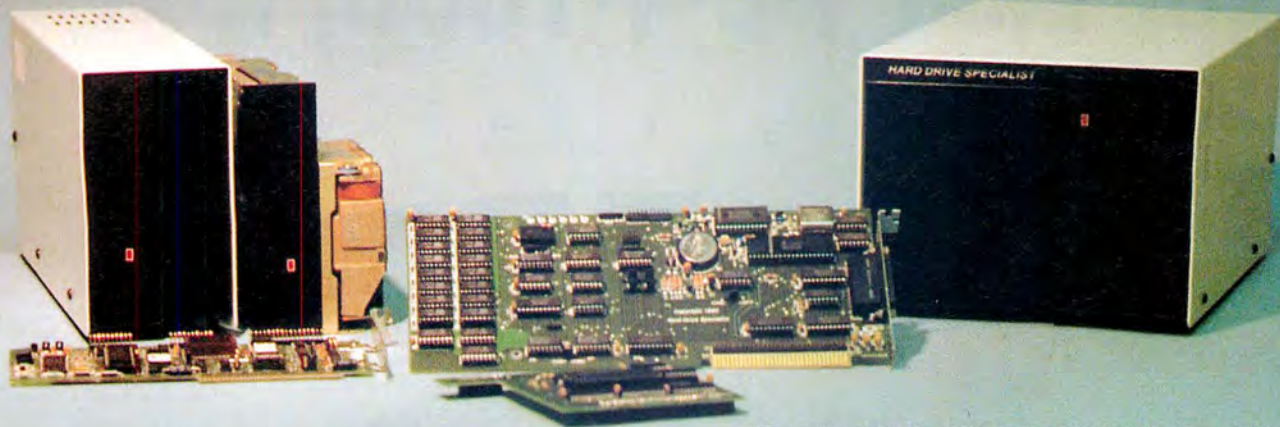
A third new standard, Multicolor Graphics Array (MCGA) is available only on the new Model 30. It offers CGA resolution but is *not* EGA compatible, a limitation which industry analysts believe dooms it to has-been status.

IBM didn't pioneer the latest graphics advances. Several third-party hardware makers, including Paradise Systems, STB Systems, and Video-7, have been selling super-EGA boards offering 640 by 480 resolution. Prices of EGA boards have started to drop below \$200, bringing a formerly glamorous application into the price range of most users.

Tandy, for its part, is predicting VGA compatibility sometime this year. The folks in Fort Worth tend to lag behind smaller companies in bringing technological advances to the marketplace. ■



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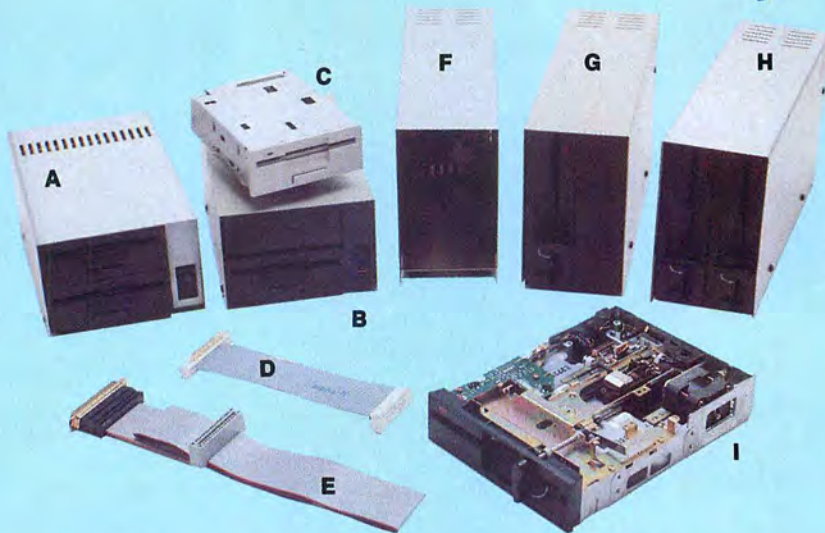
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- TM100-1/2 Service Manual ..... 20
- TM848-1/2 Service Manual ..... 20

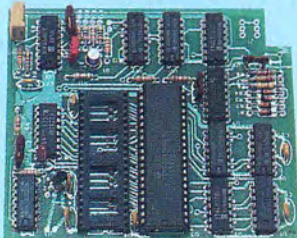
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Add \$4 shipping for non-drive items; \$6 for single drives; \$10 for dual drives.

## INCREASED DISK STORAGE FOR YOUR MODEL I Add 80% more capacity to your disk drives with our Double Density Controller (DDC).

Add double density to your TRS-80 Model I by installing our DDC in your expansion interface. Lets talk about density. The Model I was designed to store data on diskettes in single density. Single density refers to the method used to write data to the disk. Your diskette is organized into tracks and sectors. Early Model I's had 35 track drives while later models, and most aftermarket drives, had 40 tracks. In single density the tracks on the diskette surface are divided into 10 sectors. Each sector contains 256 bytes of data for a total of 2,560 bytes or 2.5k per track times the number of tracks your drive is capable of addressing. Double density, on the other hand, allows each track to be divided into 18 sectors. As in single density each sector contains 256 bytes but now there are 18 sectors instead of 10 giving an new storage capacity of 4,608 bytes or 4.5k per track. The result is 80% more data in the same space. You may wonder why Radio Shack did not choose to use double density in the beginning. The reason is simple. It costs more money. Double density disk storage techniques were more expensive to implement back then.



Reliable double density operation required a better disk drive than Radio Shack was furnishing in addition to better quality components and diskettes. Therefore, no double density for the Model I. We went to work and came up with a design that allowed

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We promise satisfaction and back it up with a 30 day money-back guarantee. If, for any reason, you are unhappy with your hard drive just let us know within 30 days of delivery and we will arrange the return and a full refund of your purchase price (less shipping).

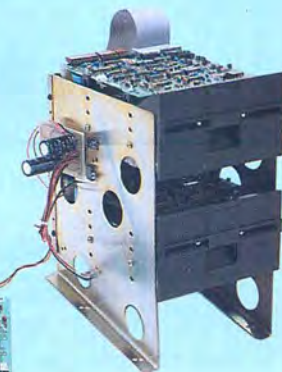


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Substitute DS drives for only \$10 each.  
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Got a hot tip you'd like to share with our readers? Send it to Reader Forum, c/o 80 Micro, 80 Elm St., Peterborough, NH 03458. We pay \$10 for each tip we use. Sorry, but we cannot return or acknowledge Reader Forum submissions.

## Showing Off

To make your Tandy 1000 automatically display and print information for MS-DOS disks, type in Program Listing 1. This program prints the disk name, the date and time, number of bytes free, and the location box. I wrote this for condensed mode on a DMP 430 printer. You might want to further modify it to suit your needs, such as printer line adjustment, form feeds, and such.

*David Goben  
Mansfield Center, CT*

## GBasic 2.0 Patch for LDOS 5.3

Micro-Labs' hi-res board and GBasic 2.0 won't merge with the new version of LDOS 5.3 Basic because the new version is 391 bytes larger. It writes over part of the L4Basic file, and most memory locations are different.

The GBasic master disk has a file for Newdos named NBasic/CMD that loads 914 bytes higher than L4Basic/CMD. Convert this file onto a backup copy of LDOS 5.3 and use BUILD GRAFYX/FIX to type in the patch. The patch corrects the load filespec to Basic/CMD.Basic (see Program Listing 2).

At LDOS Ready type PATCH NBASIC GRAFYX and press the enter key. Now you can rename it GBasic/CMD or anything else. It works exactly as before but you will lose 914 bytes of free memory. However, you can use the bonus of 520 bytes of protected RAM from 6646-684E hexadecimal.

*Dennis Unfried  
Inglewood, CA*

### Program Listing 1. A program to display information about MS-DOS disks.

```

3444 | 10 CLS:PRINT"MS-DOS Disk directory lister"
4401 | 20 INPUT "Load a disk into Drive A: and press RETURN ";A$
2447 | 30 CLEAR:CLS:FILES:BF$="":DN$="":X=1:Y=4
6132 | 40 LOCATE CSRLIN-1,25:PRINT"One moment while disk data is being collated
      | ...."
4221 | 50 A=SCREEN(X,Y):IF A<>32 THEN DN$=DN$+CHR$(A):Y=Y+1:GOTO 50 ELSE Y=1
1866 | 60 IF DN$="" THEN DN$="<NONAME>"
2734 | 70 A=SCREEN(X,Y):IF A<>32 THEN X=X+1:GOTO 70
3647 | 80 Y=Y+1:A=SCREEN(X,Y):IF A<>32 THEN BF$=BF$+CHR$(A):GOTO 80
2583 | 90 DIM R$(X-2):FOR Z=1 TO X-2:FOR Y= 1 TO 80
2957 | 100 R$(Z)=R$(Z)+CHR$(SCREEN(Z+1,Y)):NEXT Y,Z:CLS
1621 | 110 LPRINT CHR$(27);CHR$(20) 'set condensed mode
4595 | 120 CLS:PRINT"Diskette name: "DN$:LPRINT"Diskette Name: "DN$
3840 | 130 PRINT"# Bytes Free : "BF$:LPRINT"# Bytes Free : "BF$
4819 | 140 PRINT"Location Box :":LPRINT"Location Box :":PRINT:LPRINT" "
4313 | 150 FOR Z=1 TO X-2:PRINT R$(Z):LPRINT R$(Z):NEXT Z:LPRINT" ":GOTO 10
    
```

End

### Program Listing 2. Patch to allow the use of GBasic 2.0 with LDOS 5.3.

```

At LDOS ready type
BUILD GRAFYX/FIX <ENTER>
.Modify NBASIC/CMD to merge with LDOS Basic 5.3<ENTER>
X'7C48'=6B:X'7C4E'=69 7C 2A 43 4E:X'7C5A'=43 4E<ENTER>
X'7C65'=F9 53 E1 C3 00 00 42 41 53 49 43<ENTER>
X'7C70'=2F 43 4D 44 2E<ENTER>
X'7C7A'=0D 0D 00 00 00 00 20<ENTER>
<BREAK>
    
```

End

## No Stray Prompts

I have a tip for programming with Inkey\$ in Basic. To eliminate the possibility of hitting a key before a prompt is displayed, use two Inkey\$ commands. In Program Listing 3, if you hit a key before the prompt is shown, Inkey\$ retains the character and processes it. However, in Program Listing 4, which has two Inkey\$ commands, Inkey\$ resets when the prompt is issued.

*Brent Brian  
Stantonsburg, NC*

*Alex Roosakos  
Millbrae, CA*

### Program Listing 3. Demo with one Inkey\$ statement.

```

4926 | 10 'Inkey routine #1
4227 | 20 CLS:PRINT @527,"Sample: Please wait, sorting (Press a key)"
      | 30 FOR I= 1 TO 1000:NEXT:PRINT "Press A to Abort, S to Save"
      | 40 'Notice that in the next line there is only one statement
      | 50 'like this: I$=INKEY$
1664 | 60 I$=INKEY$:IF I$="" THEN 60
1741 | 70 IF I$="A" OR I$="S" THEN END
2599 | 80 PRINT "BAD ENTRY: Re-Enter":GOTO 60
    
```

End

### Program Listing 4. Demo with two Inkey\$ statements.

```

4926 | 10 'Inkey routine #2
4227 | 20 CLS:PRINT @527,"Sample: Please wait, sorting (Press a key)"
      | 30 FOR I= 1 TO 1000:NEXT:PRINT "Press A to Abort, S to Save"
      | 40 'Notice that in the next 2 lines there are 2 statements
      | 50 'like this: I$=INKEY$
      | 60 I$=INKEY$
1666 | 70 I$=INKEY$:IF I$="" THEN 70
1741 | 70 IF I$="A" OR I$="S" THEN END
2600 | 80 PRINT "BAD ENTRY: Re-Enter":GOTO 70
    
```

End



### Condensed Multiplan

You can output a 132-column Multiplan spreadsheet on an 80-column printer using condensed type. In Multiplan, go to the setup option under Print Options. The key is to send a pair of codes for each ASCII command code. Each pair starts with the command character (\*), which is ASCII 94 decimal, entered by clear-semicolon on the Model 4.

For the next character of the pair, look up its ASCII code. For example, the escape character is usually ASCII 27. Now, add 64 to that number (27 + 64 = 91). Look up the character that corresponds to ASCII 91; it is the open bracket ([), which is clear-comma on the Model 4, and type that in. Then type another command character (\*). You now have the string "[^.

From the printer manual, determine the code for condensed-type mode. For an Epson printer, it is 15; for a Radio Shack printer it is 20. Add 64 to this code, look up the corresponding character and type it in. For the Epson it is an uppercase O; for the Tandy, an uppercase T. (Don't forget to use the Print Margins command to enable 132 characters, including any left margin.) To make the Epson enter condensed-type mode from Multiplan, the Print Option setup command is "[^O.

When you save a Multiplan file, the Print Margins and Print Options are saved.

There's a catch on the Epson. Its master reset code is 64. Adding 64 and 64 gives 128, the code for break, so there is no obvious way to issue a master reset from Multiplan. If the item printed on the Epson prior to printing the Multiplan file is proportional or 12 pitch, you must turn the printer off and back on before issuing the command to print in condensed mode from Multiplan.

Robert Doerr  
Rolla, MO

My printer would not operate with Vidtex Plus 1.00.00. I found that on a Smith Corona TPII Daisy Wheel Printer or a Centronix 306, the input from the printer port was being masked with XOR 30H, re-

### Permanently Enable

If you want to enable logical drives 2 and 3 permanently, you can make the following patches on your LS-DOS system disk. (Be sure to make a backup copy of DOS first.)

For drive 2:  
PATCH BOOT/SYS.LSIDOS (D02, 84 = C3:F02,84 = C9)

For drive 3:  
PATCH BOOT/SYS.LSIDOS (D02, 8E = C3:F02,84 = C9)

You need to reboot to install the modification.

Marc A. Barrot  
Boulogne, France

### Vidtex Fixes

sulting in a "Printer not ready" message. The fix is to change 30 hexadecimal (hex) to 20 hex, as shown below:

```
PATCH VIDTEX/CMD (X'82EF' = 20)
```

or

```
PATCH VIDTEX/CMD (D36, C3 = 20:F36,C3 = 30)
```

Also, I have an Inmac Password modem, and I use auto-log files with the Vidtex I(n) option. I wanted to eliminate the procedure of the "Set up

modem and press enter" message before the log-in procedure. I bypass the keyboard scan function with LD A,ODH; then, when the program does a CP ODH, log-in starts. The patch follows:

```
PATCH VIDTEX/CMD (X'4827' = 3E OD 00)
```

or

```
PATCH VIDTEX/CMD (D18,8F = 3E OD 00:F18,8F = CD F7 43)
```

Howard Johnson  
Lakewood, CO

### Shell18 Opens Up

Based on Bob Littlepage's Reader Forum item ("Using Shell18/CMD with LS-DOS 6.3," May 1987, p. 22), I wrote two patches for LS-DOS 6.3. The first patch modifies SYS0/SYS to let Shell18 run, and the second one causes Format/CMD to format double-sided disks automati-

cally. The patches follow:  
PATCH SYS0/SYS.LSIDOS (D00, 91 = 62:F00,91 = 63)  
PATCH FORMAT/CMD.UTILITY (D09,65 = 02:F09,65 = 00)

I have installed both patches successfully in my modified Model 4P.

James C. Barnes  
Midwest City, OK



Program Listing 5. A JCL procedure to switch ac frequencies.

```
. HERTZ: Real Time Clock Tuner for LS-DOS 6.3.x
. <5> 50/HERTZ - <6> 60/HERTZ operation
//KEYIN.....Press Number for desired mode (HERTZ)
//5
Patch BOOT/SYS.LSIDOS:0 (D05,50=19:F05,50=1E)
.Note: reboot system to set new mode.
//EXIT
//6
Patch BOOT/SYS.LSIDOS:0 (D05,50=1E:F05,50=19)
.Note: reboot system to set new mode.
//EXIT
```

End

### Tuning In to the Right Frequency

The real-time clock of LS-DOS 6.3 is synchronized to the ac frequency.

This synchronization means that your Model 4 system keeps an accurate count of elapsed time since bootup only when you use it in the U.S. where the ac frequency is 60 hertz (Hz).

However, European ac frequency is 50 Hz, which disturbs the pace of LS-DOS 6.3's real-time clock. You can use the JCL procedure in Program Listing 5 to switch ac frequencies when traveling in and out of the U.S.

First type in the JCL file using Ted and save it as Hertz/JCL. Then enter DO = HERTZ from the DOS prompt and select the appropriate option. Finally, reboot your system to install the new real-time clock settings.

Marc A. Barrot  
Boulogne, France



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# Delete the Dupes

Once again you've proven that every programming problem has as many solutions as programmers to solve it—an old adage I just made up. The problem from the June issue was to get rid of any duplicates in a sorted list of words, with a subroutine contained in one line of Basic. Your solutions were many and varied, interesting, and occasionally surprising. As usual, I learned a thing or two.

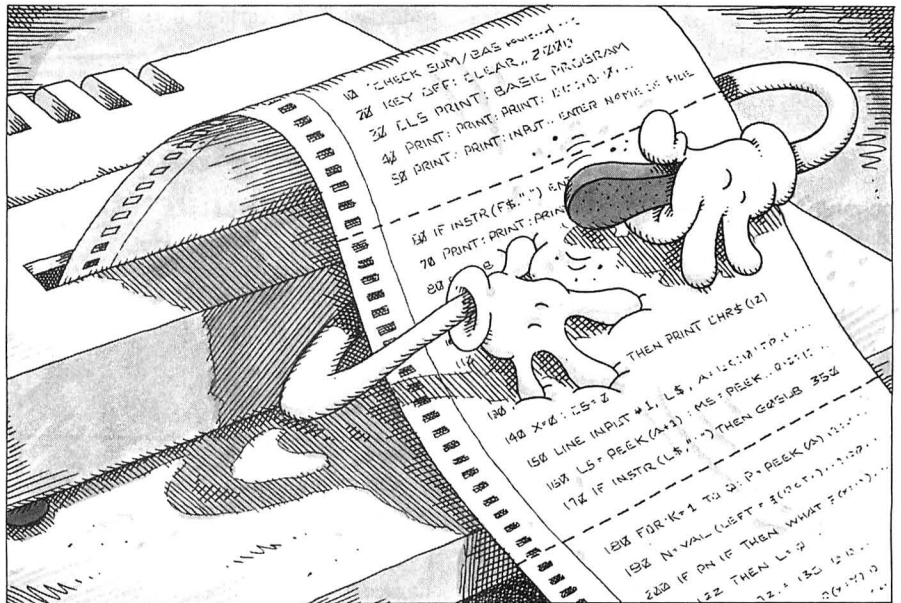
## Three Tricky Tests

The array, A\$, held the list, and initially it had S% elements. To test your routines, I used three lists. One list had 500 words and 195 duplicates scattered throughout. Any routine that reduced that list and S% to 305 discrete words in less than 15 minutes (the limit of my attention span) got to boil down 144 iterations of the same word to a list of one. The third list contained just one word and crashed more than a few routines. Several entries also could have handled an empty list, but I didn't force that assumption. I assumed, as most of you did, that any numeric variables other than S% were set to zero upon entering the subroutine at line 2000.

## The Magical Vending Machine

The most popular approach embraced variations of what I call the vending-machine algorithm. Visually it makes a good picture. When you pull out a duplicate, the words above it, like cigarettes in a vending machine, fall down to fill the gap. Unfortunately, Basic doesn't recognize the law of gravity. These routines have to simulate the phenomenon by moving the remaining elements one at a time.

Leo Estel (Chula Vista, CA) clearly demonstrates the vending-machine approach (Program Listing 1) and why it tends to be slow. Every time the routine identifies a duplicate at position P, it must move S% - P elements by reassigning them with A\$(J) = A\$(J + 1). That can mean much string manipulation, especially in a long list, if most of the duplicates are near the beginning. Too much string manipulation leads quite naturally to the agony of garbage collection in older TRSDOS Basics.



The reduction of S% every time the program purges a duplicate helps reduce the work load in this case and leaves less to move each time.

Leo's subroutine also points out another challenge, which is independent of the approach taken to the original problem. The problem is how to get a loop, particularly of the For...Next or While...Wend kind that contains a conditional statement, to work in one line. Several Model I/III entries used Next...Else...Next, which isn't permitted in later Basics, nor in most versions of Basic. (Personally, I miss the indiscriminate Next, which I always found handy.) Leo's solution, or a variation of it, which jumps out of the loop and starts over, is the most common and works under any Basic, at least when neither the list nor the program is extraordinarily long. In this example the starting over is literal, and the routine starts reading again from the beginning of the list each time it removes a duplicate.

Don Williams (Chester, NJ) avoids jumping out of loops with some neatly nested While...Wends. Don's solution (see Program Listing 2) also avoids reading from the beginning after every shift and is the fastest of the vending-machine routines.

## Look Ma, Two Hands

I'm compelled to say that jumping out of loops and leaving them unresolved is a bad

habit, even if it works. That said, witness Program Listing 3, wherein Curtis Strong (Chester, VA) does nothing *but* jump out of his While...Wend construction.

Curtis's method uses two pointers, like Don's. J% always points to the last word in the list that's been read and eventually reaches the top of the original list. T% always points to the last unique word. Unlike the vending-machine technique, when the program identifies a duplicate, it advances J% to the next word in the list. When it finds a word that's not a duplicate, it moves the word to the position after T% and increases T% to point to it. This way the routine reads the entire list in one pass and moves no more than the number of discrete words, which makes it dramatically faster than the vending-machine approach. When it's done, T% holds the new value for S%.

## No Ifs

Program Listing 4 shows another way to move two pointers independently and complete the purging operation in one pass. Dr. S. Aisenberg (Natick, MA) uses a For...Next loop but replaces the conditional statement with a comparison,  $X = 1 + (A$(J) = A$(K))$ , the truth (-1) or falseness (zero) of which determines whether the trailing pointer, K, advances or not.

Although the program moves every word in the original list, even if only to overwrite itself or a previously moved



word, this compact routine is faster than Strong's, which moves fewer words in most cases.

Kevin Butler (Rexburg, ID) doesn't use a conditional `IF`. . . Then statement either, but the conditionals are there in the nested `While`. . . `Wends`. Kevin's short subject (Program Listing 5), the shortest of the lot, is a bit slower than Dr. Aisenberg's when there are few duplicates in the list, but tends to get faster as the number of duplicates increases.

Finally, Lawrence Kesteloot, another Virginian, this time from McLean, managed the fastest overall performance by using two back-to-back loops (see Program Listing 6). The first loop finds the discrete words and moves them to a second array, `B$`; the second moves them back. You'd think the double move would make the routine slower. In fact Kesteloot's routine turned in exactly the same time as Aisenberg's, but got faster with more duplicates.

### The Mystery Of Movement

You could make some of these subroutines faster by using `SWAP A$(X), A$(Y)` instead of assigning them with (the silent) `Let`. If the instruction is available, `Swap` is often faster when you're handling strings. It amazed me that nobody used it. One Model III entry tried simulating the command, but shifting 3 bytes with consecutive `Poke`/`Peek` combinations for every string that needed moving actually slowed things down to a crawl.

Anyway, thinking about `Swap` got me to thinking how much faster Lawrence Kesteloot's program would be if it were possible to move all of `B$` array into `A$` array in a stroke—or, as my father was fond of saying, "in one fell swoop." Just imagine the usefulness of such a technique whenever you had to copy a long list of data from one array to another, which occurs frequently in programming.

Starting with Listing 6, I replaced the second `For`. . . `Next` loop with two `Basic` statements, which ported the whole of `B$` array into `A$` array in a lump. Solve the mystery. How did I do it? Better yet, how many different ways are there to do it? Even better, can you do it with one statement?

### Chronological Order

Dealing with a consequence of sorting this month brought to mind a particular sorting problem, that of sorting dates. How do you get a list of dates in order?

Sounds easy, doesn't it? Well, let's keep this exercise as simple as possible so that everyone can see what's going on. While most often you'll be sorting dates as part of a multidimensional array, to sort the whole matrix on the

date column, I'm concerned only with the dates.

I have a list of dates in no particular order stored in `D$` array. The first of them is `D$(1)`; the last is `D$(S%)`. They are in the familiar `mm/dd/yy` format that we all know and love. (Or if those of you running `MS-DOS` prefer, in `mm-dd-yyyy` format.) I need the dates in chronological order, with the earliest date first. Your

## Good programming avoids reinventing the wheel every time and builds on the work of others.

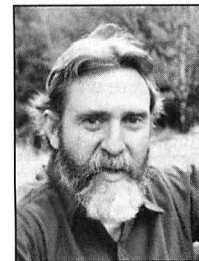
mission, should you decide to accept it, is to write a subroutine, beginning at line 1000, that will do that. I prewrite a test routine, so please use the variables I named. Whatever else you use is up to you. And keep it as short as possible.

If you're not sure how to write a sort routine, don't let that stop you. I'm not concerned with the kind of sort you use but with how to deal with formatted

dates. In fact, I'd be pleased if you refer to the March 1987 edition of this column ("Sorting Out the Winners," p. 132) or to Hardin Brothers' article (see "The Road to Better Sorts," October 1986, p. 114) to find a really swift sort and use it. Good programming avoids reinventing the wheel every time, and builds on the work of others.

### The Rules:

1. Write your program(s) or routine(s) in any `TRS` or `Tandy Basic`, except `Pocket Computer Basic`.
2. Your solution(s) to this month's poster(s) must reach us by September 15, 1987, to be considered for the December 1987 issue and a T-shirt, if we use it.
3. Employees of `CW Communications` already have T-shirts and are not eligible.
4. Send your solutions, comments, criticisms, suggestions, and T-shirt size to: *80 Micro*, Fine Lines, 80 Elm St., Peterborough, NH 03458. We are not able to return entries. ■



Harry Bee is a freelance writer, puzzle creator, programmer, and dreamer. You can contact him at P.O. Box 567, Cornish, ME 04020, or on `Compuserve` (74076,3461).

#### Program Listing 1. Leo Estel's vending-machine solution.

```
2000 IF S%=1 THEN RETURN ELSE FOR I=1 TO S%-1:IF A$(I)=A$(I+1) THEN FOR J=I+1 TO S%-1:A$(J)=A$(J+1):NEXT J:S%=S%-1:GOTO 2000 ELSE NEXT I:RETURN
```

End

#### Program Listing 2. Don Williams's neatly nested whiles.

```
2000 I=1:WHILE I<S%:J=I+1:WHILE A$(I)=A$(J):WHILE A$(I)=A$(J+1):J=J+1:WEND:II=I:FOR K=J+1 TO S%:II=II+1:A$(II)=A$(K):NEXT S%=II:J=0:WEND:I=I+1:WEND:RETURN
```

End

#### Program Listing 3. Curtis Strong's strong two-pointer.

```
2000 WHILE J%<S%:IF A$(J%)>A$(J%+1) THEN A$(T%+1)=A$(J%+1):J%=J%+1:T%=T%+1:GOTO 2000 ELSE J%=J%+1:GOTO 2000:WEND:S%=T%:RETURN
```

End

#### Program Listing 4. Dr. Aisenberg's one-step.

```
2000 K=1:FOR J=1 TO S%:X=1+(A$(J)=A$(K)):K=K+X:A$(K)=A$(J):NEXT J:S%=K:RETURN
```

End

#### Program Listing 5. Kevin Butler's brief.

```
2000 WHILE Z<S%:Z=Z+1:WHILE A$(Z)>A$(C):C=C+1:A$(C)=A$(Z):WEND:WEND:S%=C:RETURN
```

End

#### Program Listing 6. Lawrence Kesteloot's swift double-dealer.

```
2000 FOR T=1 TO S%:R=R-(A$(T)>A$(T-1)):B$(R)=A$(T):NEXT T:FOR T=1 TO R:A$(T)=B$(T):NEXT T:S%=R:RETURN
```

End



# Can we talk? CP/M vs TRSDOS

By moving to CP/M on your Model 4 you achieve two things. First you open the door to a wealth of existing software. More 8-bit software runs under CP/M than any other operating system. This includes virtually all of the "big name" programs which have set the standards by which all others are measured. Programs like **WordStar**, **dBASE II**, and **Turbo Pascal** are available for CP/M, but not TRSDOS. Public domain software, almost unknown under TRSDOS, fills hundreds of megabytes of disk space. Valuable public domain programs like the **Small C Compiler** are just a toll-free phone call away. Most importantly, hundreds of applications programs are available from a multitude of vendors. Many include the source code. Wouldn't you like to be able to choose from scores of Accounts Receivable or General Ledger programs, instead of the meager selection you now have? Circle our special Reader Service number 600 on the Reader Service Card to receive our comprehensive free listing of suppliers of application programs that run under CP/M.

## What about the future?

When the time comes to move up to another computer it will almost certainly use MS-DOS. That's when CP/M users get a pleasant surprise. Since MS-DOS was a derivative of CP/M it operates in almost the same manner. Even better, most of the same software packages are available in 16-bit form and they operate in virtually the same way that they did under CP/M.

## Is it easy to use?

Montezuma Micro's CP/M has been carefully crafted to present a maximum of features while taking a minimum of memory. It supports all of the standard features of the Model 4/4P/4D computers, as well as most of the optional ones. Our CP/M has been consistently been awarded the highest ratings in industry magazines. It is version 2.2, the most popular and reliable of all the versions of CP/M produced. Our CP/M has been made as easy to use as possible. All customer-selected features are chosen from simple menus in our CONFIG utility. This includes the ability to configure a disk drive to run like that of scores of other CP/M com-

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## Can I use a hard disk drive?

CP/M hard disk drivers are available for Radio Shack, Aerocomp, and most other popular brands of hard disk drives. These drivers allow the hard drive to be partitioned into one to four logical drives of varying sizes.

These drives may all be used by CP/M, or may be divided between CP/M and TRSDOS. A head-parking utility is included on the driver disk to minimize the risk of damage when the hard disk drive is not in use. Also included at no charge is a utility which will copy, compress, list, print, and delete files with ease. There isn't much you can say about a driver. It either works or it doesn't. Ours works supremely and it only costs \$30.

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★ Thank you for your patronage over the years! We have decided to have a big TRS-80 Birthday Celebration. PowerSoft software has always been rated highly and welcomed by the press and users alike. Each product is unique and without equal. Most of them have become industry standards for this popular machine. All of these products were considered necessities, so if you don't have one of them, now is the time to get it! This special will end shortly, so act now. Some supplies are limited, as we are cleaning out our stockroom and several of these products may be permanently out-of-stock after this sale. If there is something that you want, purchase it now, because the time will never be better. Due to the extreme reduction in price for this sale, and its close-out nature, support is not offered. All products are new, sealed packages, and contain complete, easy-to-follow documentation. (PowerSoft software purchased at regular prices, or from our dealers, do include full support.) All products work as advertised, and all have received 4 stars or more in magazine reviews. You can't go wrong at these low prices! ★

★ **Super Utility™ Plus Special Packages**  
This extremely powerful utility has been written up in every major computer magazine over the years as the very best set of tools you can purchase for your TRS-80. If you have ever crashed a disk, lost a file, got a CRC error, wanted to kill or transfer many files from all kinds of assorted DOSes in mixed densities, format or backup many disks, or forgot a password, you will appreciate SUPER UTILITY PLUS! Super Utility also removes passwords, backs up "funny" disks, and much much more! Truly the most extensive, useful disk utility ever written for the TRS-80, with approximately 65 different functions. Multiple FIVE Star reviews! Nothing comes close! Please specify Model 4/4P/4D or III/I version.

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"The very BEST mail-list system for the TRS-80, floppy or hard disk! Written in pure machine language, PowerMail works on floppy or hard disks and handles up to 97,000,000 records (average 1,150 per 40-trk DD disk). There is no way in this small space that we can properly describe this very powerful program. Write for full details. Here is some of what the press said; "PowerMail was selected as a 1st Place Winner in 80-MICRO's READERS CHOICE AWARDS." (Jan. '84 issue) - INFO-WORLD's Essential Guide To The TRS-80 said, "If you need to maintain large mailing data-bases, you should definitely consider PowerMail Plus. It is exceptionally fast. Overall concept and design are excellent. PowerMail Plus offers the kind of features that businesses, in particular, need." Please specify Model I/III, Model 4/4P version.

Normally \$99.95, now save 50%! PowerMail Plus now only \$49.95 Text/Merge form-letter module, is now reduced to only \$19.95

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Backups or restores an entire logical drive or file-by-file! Files larger than a floppy are NO PROBLEM any longer! BACK/REST can create a mirror-image of hard drive partitions on floppy disks in 20% of the time that a file-by-file backup would normally take; a full 15 megabyte drive should take about 20-35 minutes. BACK/REST is simple to use and will even tell you just how many floppies you will need to have formatted BEFORE you start. Furthermore, only allocated cylinders of the hard drive are copied to speed things up substantially. Platters may be restored either completely or file by file. If you've invested good money into a hard drive system, it doesn't make any sense not to have a good, fast BACKUP routine. BACK/REST makes that job easier and saves much time. TIME IS MONEY. Save yourself from a real problem if your hard drive crasnes. BACK/REST will work with all TANDY hard drives and most others that use LDOS or TRSDOS™ 6.x. 5-Star review in the Oct '85 issue! BACKREST is strongly recommended as insurance against possible digital disaster." Includes Model 4/4P/4D and III/I version on same disk. Save \$50! Normally \$99.95, now only \$49.95

★ **Tandy Hard Disk Drivers for TRSDOS 6.x and/or LDOS**

Includes Model 4/4P/4D and III/I version on same disk. Our own Hard Disk Drivers offer superior performance over those included with your drive. We include automatic setup for Tandy 5, 15, or 35 Meg drives. Features include automatic installation, automatic support for sharing, LDOS and TRSDOS 6 on same drive, faster access times, smaller memory requirement, and booting directly from a Tandy hard drive using a Model 4P (no holding F2 key) without a floppy. They allow you to split up your hard drive into partitions of differing sizes, and also allow you to define smaller granule sizes and other optimizing operating characteristics to achieve maximum use from your drive. The drivers (once relocated) are very small; less than 256 bytes. Normally \$99.95, now only \$49.95

★ **Need some tools for your hard disk or floppies?**

**The Model 4 ToolBelt (for Model 4 usage)**  
The LDOS ToolBox (for Model III or I usage)  
If you run a hard disk, you'll really want The Model 4 ToolBelt or The LDOS ToolBox! These programs add tremendous power and flexibility to your operating system, as well as performing maintenance and even "surgery", if necessary. Directory check and repair tools are included for complete safe operation. Repairs crunched HIT or GAT tables with ease. The utilities include programs for disk analysis and repair, file or directory checking and repair, extensive disk modifier, memory modifier, file modifier, sector verifiers, file and sector comparers, filters, file or disk mapping, password manipulation, password removal, mass file moving, mass file killing, erasing, disk drive exercising, disk and file search/replace, and much, much, MORE. Each program contains a built-in "HELP" prompt. All utilities written in machine language and con-

tain excellent documentation. Model 4 ToolBelt - Was \$49.95, now only \$29.95 LDOS ToolBox - Was \$49.95, now only \$29.95

If your hard drive is split Mod 4 and III - get both! Save even more, now only \$50.00

★ **PowerDraw™**

Model III/I version (uses Mod III mode of Model 4) Extremely easy to use drawing program that allows storing of up to 30 memory buffers to disk to allow full animation if desired. PowerDraw has many purposes, but is fun, useful, and educational. Graphics may be mixed with text. Three great Reviews!! Normally \$39.95, now only \$19.95

★ **PowerDriver™ Plus**

for SuperSCRIPSIT™ or SCRIPSIT PRO™ Includes Model 4/4P/4D and III/I version on same disk. Supreme printer driver for most EPSON or "PC compatible" printers. Control your printer to its fullest potential from within SuperSCRIPSIT, including proportional (if supported by your printer). Normally \$29.95, now only \$24.95

★ **PowerScript™ -**

A major enhancement to SCRIPSIT™ Includes Model 4/4P/4D and III/I version on same disk. PowerScript gives you many new features, including complete printer control, while retaining all the commands you already know - at a very low price! PowerScript also adds Directory and File functions, like DIR, FREE, KILL CHAIN, and LINK. All your previous files will, of course, be completely compatible. Supports Mod 4, III, and I versions of SCRIPSIT. 4+ Star Review in the July '85 issue of 80-MICRO. Regularly \$39.95, now add all this power to SCRIPSIT™ for only \$29.95

★ **ST80-III™ Smart Terminal Communication System Combo**

Complete Automated Communications for the TRS-80 Mod I, III, or 4 (in III mode) Please specify Model I or III/4(III mode) ST80-III Smart Terminal Program, a First Place award winner, was formerly \$150 by itself. The included X-10 HOST package; which allows you to leave your computer "on-line" securely with full password protection, etc., formerly sold for \$50, and the included Personal Bulletin Board System also formerly sold for \$50. All together we now put them together in one package for the special price of only \$49.95! If you have a modem (especially an auto-answer type) and don't have good software, this is the one to get! Now get EVERYTHING, in the way of telcom software, for your computer at one low price! Save over \$200! Now only \$49.95 complete

★ **Write or call for FREE TRS-80 software catalogue!**

Fine print: These prices for prepaid or COD orders only. Visa-MasterCard gladly accepted. Flat rate shipping on any item or combination of items from this ad is only \$3. Blue label, COD, or over-night shipping available at extra charge. Canada, please add \$5 for airmail. Other countries add \$10 for airmail. Foreign orders, please use Charge Cards ONLY. Checks not drawn on U.S. banks will not be accepted. Texas residents must add appropriate sales tax. No refunds or support at these low prices. Diskettes guaranteed to load.





# TRSDOS, Yes; MS-DOS, No

by Harry Bee

**LeScript 1.70** runs on the Models I/II/III/4/4P/4D/12/16 and the Tandy 1000/1200/2000/3000 under TRSDOS, Newdos, Dosplus, Multidos, CP/M 2.2, and MS-DOS and requires one disk drive. Anitek Software Products, P.O. Box 361136, Melbourne, FL 32936, 305-259-9397. Model 1/III/4 version, \$129.95. Model 2/12/16, CP/M, and MS-DOS versions, \$199.95.

Except for CoCos and portables, a version of LeScript exists for every TRS-80 and Tandy computer, and such work-alikes as the LNW and IBM. That makes this product particularly interesting to folks like me who own several Radio Shack computers and often use another MS-DOS PC at the office.

LeScript began in 1983 as an easy, no-frills word processor. Over the years, it matured as Anitek added features to each new version. Built into the latest edition are the abilities to print columns, footnotes, and endnotes and to do disk searches.

Not a LeScript user, I approached this review with the same question I'd have of any new product: Aside from its impressive loyalty to the Tandy product line, does this word processor compare favorably to others in its class and price range? The answer is a resounding yes and no.

When it comes to printing a document, LeScript is powerful, flexible, smooth, and accurate. It offers advanced features that stand up well in comparison to any available word processor. Its file-handling and disk-management abilities are adequate—exceptional in the TRS-80 world. But its composition and editing tools are nearly primitive. And it's slow.

## Vive la Difference

I put LeScript to work on a Model III, a Model 4P in both III and 4 modes, a Tandy 1000 under MS-DOS 2.11 and 3.20, and a Compaq running MS-DOS



Photo 1. Under MS-DOS, LeScript uses color effectively, plus it looks good on a monochrome monitor.

2.10. The program performed very much the same in each environment, and its similarity from one version to the next was encouraging. Learn it on one computer, and you have only to adjust to repositioned keys to use it on another.

While the program's operation is comfortably familiar from computer to computer, document storage structure is identical. As long as you can convert from one disk format to another—with TRSDOS's Convert programs, third-party file conversion utilities, or modem and null modem transmission—you won't have to reconstruct the document every time you move it, saving hours of work over ASCII transfer methods.

Using a binary protocol, I uploaded documents written with my Model 4P, which I use when I'm traveling, to Compuserve. I was then able to download them to my Tandy 1000 at home, and, with the MS-DOS version of LeScript, print them, fully formatted, without another keystroke.

On the other hand, the differences among the many versions are not inconsequential. For example, the size of a document depends on the memory available for it. A 48K Model III gives you a 15K workspace; a 64K Model 4 allows about 19K. An excellent chain-printing function lets you produce larger documents. If your Model 4 has 128K, your workspace expands to 84K. In Model III mode, LeScript still uses both banks of RAM and gives you 80K to work in. On

a 640K Tandy 1000 running no resident utilities, you'll have trouble filling the 570K buffer.

LeScript treats the variety of video displays well. Under MS-DOS it uses color effectively and looks good on a monochrome monitor, too (see Photo 1). The Model III version gives you 64 columns on a stock Model III, but 80 columns on a Model 4 in III mode.

I was disappointed that LeScript doesn't fully support the Tandy 1000 keyboard. Otherwise, the program uses an imaginative

range of key combinations to let you type your computer's full character set. If your printer supports them, you can print them. If not, you can use those key combinations to stand for the characters your printer does support, or to produce graphics.

The program disk comes with drivers for more than 200 printers, with specific support in most cases, for all the modes and fonts of which each is capable. The list of drivers seems to include every printer Radio Shack ever sold, and a wide range of popular brands and their latest models. Laser printer support is not yet available. I drove three printers with each version of the program and got trouble-free results each time.

## What's Up, Docs?

LeScript's manual is a fine example of the kind of document this program turns out. Anitek used LeScript and a Radio Shack DMP 2100 dot-matrix printer to produce the 100-page, half-size, loose-leaf book. The result is worth bragging about. The variety and complexity of text formatting and the included graphics are impressive—more so when you learn to use the printer commands and find out how easy it all is. I only wish they had used something other than the office copier for a printing press. The reproduction quality is terrible.

The information it contains is reasonably complete, but the manual is a dictionary of definitions, not a course of instruc-



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Prices include postage and handling. Please allow 4-6 weeks for delivery. Foreign Airmail, please add US \$1.50 per disk. US funds drawn on US banks only.

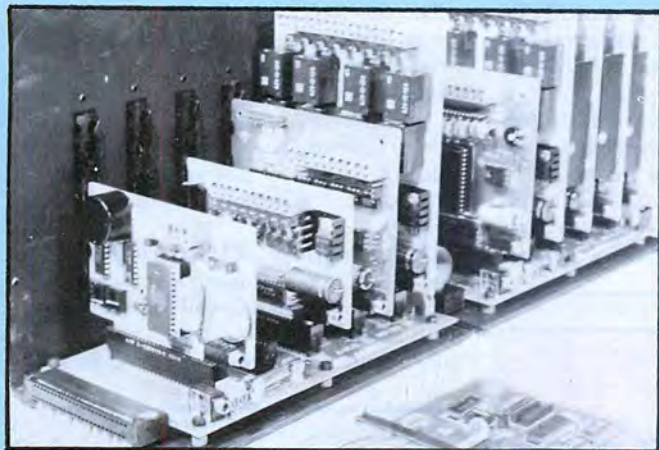
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# The Amazing A-BUS

**NEW**



An A-BUS system with two Motherboards  
A-BUS adapter (IBM) in foreground

## Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

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An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for \$10.

### About the A-BUS:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

#### Relay Card

RE-140: \$129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

#### Reed Relay Card

RE-156: \$99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

#### Analog Input Card

AD-142: \$129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

#### 12 Bit A/D Converter

AN-146: \$139

This analog to digital converter is accurate to .025%. Input range is -4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

#### Digital Input Card

IN-141: \$59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

#### 24 Line TTL I/O

DG-148: \$65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

#### Clock with Alarm

CL-144: \$89

Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

#### Touch Tone® Decoder

PH-145: \$79

Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

#### A-BUS Prototyping Card

PR-152: \$15

3 1/2 by 4 1/2 in. with power and ground bus. Fits up to 10 I.C.s



ST-143



CL-144



RE-140



IN-141



AD-142

### Smart Stepper Controller SC-149: \$299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

### Remote Control Keypad Option RC-121: \$49

To control the 4 motors directly, and "teach" sequences of motions.

### Power Driver Board Option PD-123: \$89

Boost controller drive to 5 amps per phase. For two motors (eight drivers).

### Breakout Board Option BB-122: \$19

For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

### Stepper Motor Driver ST-143: \$79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

### Special Package: 2 motors (MO-103) + ST-143: PA-181: \$99

### Stepper Motors MO-103: \$15 or 4 for \$39

Pancake type, 2 1/4" dia, 1/4" shaft, 7.5"/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

### Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

### A-BUS Adapters for:

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| Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.           | AR-133...\$69 |
| Apple II, II+, IIe. Uses any slot.                                   | AR-134...\$49 |
| TRS-80 Model 102, 200 Plugs into 40 pin "system bus".                | AR-136...\$69 |
| Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).    | AR-135...\$69 |
| TRS-80 Mod 3, 4, 4D. Fits 50 pin bus. (With hard disk, use Y-cable). | AR-132...\$49 |
| TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).     | AR-137...\$62 |
| TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.              | AR-131...\$39 |
| Color Computers (Tandy). Fits ROM slot, Multipak, or Y-cable.        | AR-138...\$49 |

### A-BUS Cable (3 ft, 50 cond.) CA-163: \$24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.  
Special cable for two A-BUS cards: CA-162: \$34

### A-BUS Motherboard MB-120: \$99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: \$12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

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tion. Once you've learned the program, it's a good reference. Two command-summary cards have page references and serve as something of an index.

On-line help is a LeScript document that duplicates the command-summary cards. It loads into an alternate text area, and you search for what you need. Among TRS-80 applications, where on-line help is unusual, the approach is acceptable, but if you have experienced integrated, context-sensitive help common in MS-DOS applications, you will find this archaic. The on-line help also

prevents you from using the alternate text area for a second document.

The one-page "mini tutorial" at the beginning of the manual is silly. What's finally valuable is the tutorial file on disk. This long document takes you step by step on a hands-on tour of LeScript and its capabilities.

Other files on the program disk demonstrate form letters (in an incredibly sexist fashion), footnotes, and macros. The macro demonstration contains additional documentation, provides hands-on experience of macros, and becomes a template

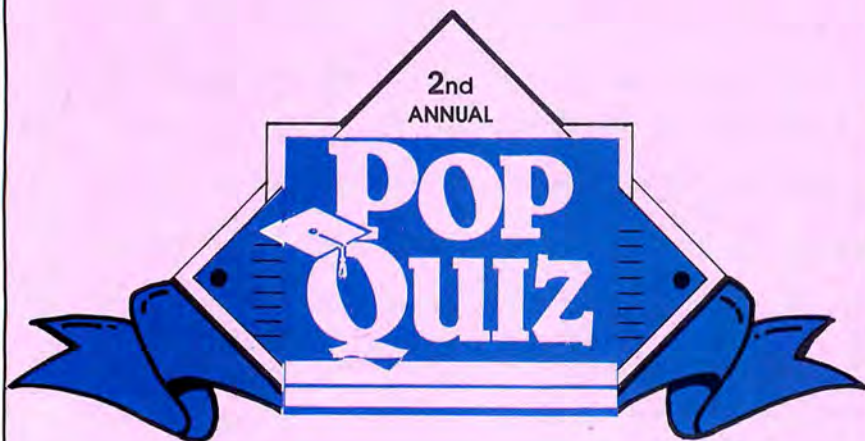
you can use to build your own library of up to 60 automated procedures.

### No Power Writer

The shortcomings of LeScript's editor derive first from the way it handles the video display. The program appears to use an unformatted screen with embedded commands for the printer. That's true to a point. The program saves formatting, except for line length and justification for the printer. The exceptions are critical.

The attempt to provide some of the benefits of what-you-see-is-what-you-get displays is admirable, but the implementation is awkward. To show you every line fully justified, the program seems to read

# Get ready to win with the



## \$20,000!

*worth of fabulous prizes in the 80 Micro Pop Quiz Sweepstakes II!*

## In this issue on pages 101 & 102

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***To show you every line fully justified, LeScript reads from the beginning of the document when it rewrites the screen.***

---

from the beginning of the document each time it rewrites the screen. The result is that every editing function beyond the simplest is either slow or very slow, or it simulates hang-up, depending on the length of the document and how far you are from the beginning.

To take 20 seconds to jump to the end of a 70K document (on a Tandy 1000) is at least remarkably inefficient; 40 seconds to search for and display in context a marker placed at the end of the same document is unacceptable.

Furthermore, LeScript lacks sophistication in cursor movement and editing functions. Besides character by character and line by line, you can move the cursor from one end of a line to the other, to the beginning of the screen (but not the end), forward or backward a screen at a time, to the beginning of text and the end. That's all. You can't move in either direction by word, sentence, paragraph, document page, or any other convenient measure.

Deletion functions are similarly stilted and forward only. And make no mistake; there is no undelete function.

All the block actions—deletion, moving, copying—initiate screen reformatting and are accordingly slow. Block deletion, which operates from the cursor forward to the first block marker or the end of text, is further affected by the



clumsy cursor control.

Search-and-replace options (except the automatic variety) are similarly slow and suffer other limitations. A search is always by character. To define a term as a discrete word you add delimiting spaces with a procedure that is uncertain at best.

Searching never distinguishes between upper- and lowercase letters. Replacement also ignores case; you must recapitalize manually. You search and delete by leaving the replacement term blank, but if you delete something followed by punctuation, LeScript leaves a space in front of the punctuation that you have to remove manually. All of which makes it difficult to use the relatively swift automatic search-and-replace feature.

Semi-automatic hyphenation lets you

mark the place where a word ought to break if it won't fit at the end of a line, and LeScript will hyphenate the word when it's necessary. However, if you then edit so that the word no longer needs to be broken, the program doesn't reverse the process. Instead, it leaves the word interrupted by a hyphen and a space.

My litany of pickable nits also includes such items as no indication of the condition of the capitals-lock toggle, or the numbers-lock toggle under MS-DOS; the lack of an integrated spelling checker, acceptable in the TRS-80 world, but below par among MS-DOS offerings (one is scheduled for mid-1987 release); no editing tools when you enter search-and-replacement terms; obsessive space compression; an all but useless "end-of-sentence" character that even the man-

ual calls redundant; and the horrors of horizontal scrolling.

The alternate text area, which promises much if you have memory enough to make good use of it, suffers a double dose of the program's sluggishness.

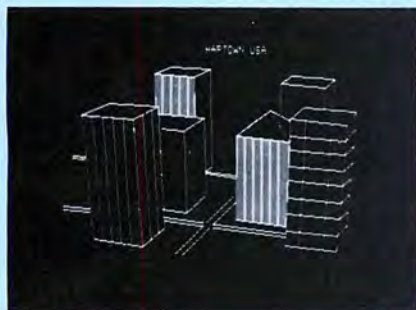
LeScript's ability to handle disk directories in several useful ways, to select files directly to merge, delete or chain print, and to search the files on a disk for key words and phrases is exceptional for a TRSDOS word processor.

By MS-DOS standards, however, file management is limited, most severely because subdirectory names aren't listed. If you don't know your directory structure, you guess or exit to DOS. Under TRSDOS, you can leave the program without saving your document and return with the text intact; you can't do that under MS-DOS, where such a capa-

## WHAT'S WRONG WITH THIS AD?

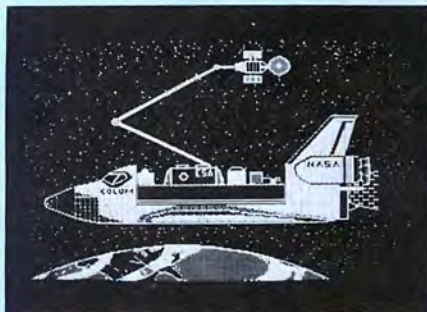
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bility is *de rigueur*.

Finally, the documentation makes much of LeScript's ability to perform as an editor for Basic and assembly-language source code. The special features included for this purpose either didn't work well enough to matter (automatic line insertion) or were of no value (renumbering that doesn't redirect branches).

**Proofs Positive**

I don't know of another word processor in LeScript's class and price range, especially one that spans the gulf between TRS-80 and Tandy/MS-DOS computers and offers such a capable set of document formatting features and executes them so well. For arranging text on paper, almost everything is possible, short of what's touted these days as "page composition."

LeScript approaches even that threshold with the ability to dynamically alter character pitch, density, width, emphasis, and print quality. Furthermore, with a capable printer you can include graphics enough to make borders, special characters, fancy symbols and doohickies, charts, and even pictures, if you have the patience.

LeScript supports documents 255 columns wide and as many lines deep, as well as unpaginated printing. It can print continuously or pause automatically for single sheets. It sends code sequences as complex as you need them to control your special hardware. Line-feed toggles are useful for graphics and convenient for Tandy (in)compatibilities. Independent of its drivers, the program supports serial interfaces.

You can have multiple, multiline headers and footers and change them dynamically. You can also change margins dynamically, indents and outdents, justification, tabs, and line spacing. And you can maintain separate formats for left and right pages.

The automatic page numbering is more flexible than most others I've used. Page numbering, top-of-form tracking, and other necessary criteria carry over faultlessly when you're chain-printing a series of documents. You can print one copy, or many automatically.

An on/off toggle lets you print several parts of a document in one pass, without having to print blocks one at a time. (There is no block printing function, per se.) The toggle also lets you include comments and notes.

Another command prints a selected series of pages from a document. Combined with chain printing, these features provide a lot of mix-and-match power.

A series of commands lets you fine-tune your document's appearance further. One causes the printer to skip

ahead a number of lines relative to its position on the page. Another directs the printer to jump to a specific line on the current page or the next. A third makes the jump command conditional. LeScript also prints legal line numbers in the left margin.

LeScript's multicolumn printing is good. Very good. The program fully preformats the columns and prints them all at once across the page. Within columns you can change justification on the fly.

You can drop in and out of columnar printing and change the widths of columns and gutters (the space between columns) at will, too. Each of up to 10 columns, and each gutter, can be a different width. This is a difficult feature to implement, and I tested it mercilessly. I was unable to get it to misprint.

The footnoting feature is just as good. You define a pair of symbols as brackets to set the notes off from the rest of the text on the screen. You define the method of reference and the way it will look in the printed text—symbols or consecutive numbers, super- or subscripted, bold, italicized, bracketed, and so on.

The program is sufficiently flexible to suit both your fancy and your hardware. You define the notes as footnotes, along with the device used to separate them from the text, or as endnotes. Again, LeScript performed this function flawlessly.

The addition of columns and footnotes nearly completes the standard wish list of specialty features. The only one I can think of that's still missing is automatic indexing.

I wasn't as pleased with the form-letter functions as I was with the other print-related features. I couldn't produce a data file that worked without change using any of the data-base programs I have. In every case I had to rework the file with LeScript. Otherwise the feature worked reasonably well.

**Summary**

Oh, for a better editor. But for that, LeScript could be an outstanding product. It's not. For composition it's a dinosaur.

Being practical, if you've just migrated from TRSDOS to MS-DOS, or are about to, LeScript is worth considering. The shortcomings of its editor are not unusual among TRS-80 word processors, and you won't be sensitive to them immediately. Meanwhile, the ability to transport fully formatted documents from one environment to another is a major benefit.

Considered strictly as a word processor for the TRS-80, LeScript is exceptional, maybe the best there'll ever be. In the general scheme of things, however, it's deficient. In the world of MS-DOS products, it falls far short of making the grade. ■



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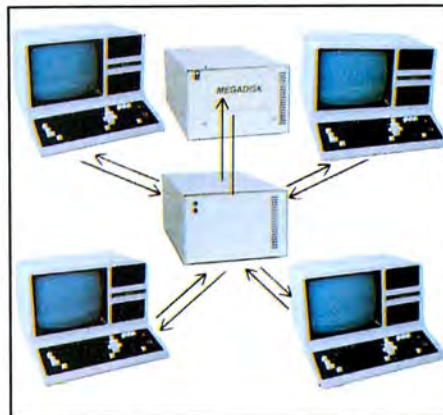
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## Open Access II by John B. Harrell III

**Open Access II** runs on the Tandy 1000/1200/3000 (256K) and requires two disk drives. Software Products International (SPI), 10240 Sorrento Valley Road, San Diego, CA 92121, 619-450-1526. \$595.

**O**pen Access II (OA II) is an integrated software package that consists of modules that perform data-base management using the sophisticated Structured Query Language (SQL), an advanced spreadsheet with integrated graphics capability, a full-featured word processor, a communications program, and an applications programmer. OA II also contains a pop-up desktop utilities package that offers a clock, calendar management, a notebook, and business-card files.

You can also get a full macro facility that spans different applications. A full-featured interpretive programming language lets you generate special applications to access your data bases and perform other tasks. You can integrate both the macro definitions and the programs into the OA II menu system with the user-installed application facilities.

### The Data-Base Manager

OA II's data-base manager, Database, is one of the most powerful and easiest-to-use tools I have seen. Dbase III is also powerful. However, if you're not a programmer, reaching Dbase's deeper features isn't so easy. This is where OA II's menu-driven data base excels.

Creating a data base is easy: You select the design mode and build a screen mask that labels the data fields and defines the field areas, types, and sizes. You have full control over numeric and text entries and can also restrict entries by case and special characters.

You can designate each field as a non-key, index-key, or unique-key field. In the latter case, OA II automatically checks to ensure that there's no other record with this same field entry in the data base. OA II allows up to 100 indexed fields per file and automatically selects, updates, and uses this index field every time it accesses the file.

You can also indicate a field entry as dependent on other information in the record, and OA II automatically calculates it according to the formula provided. You can annotate other entries with a range of allowed values where OA II again automatically generates the necessary range checks.

You can designate each field entry as a must-fill field. Another handy selector is the must-match entry, by which the entry in the current data-base field must match an entry in a related data base. If it doesn't, a window automatically opens showing the related information in the other data base for easy selection of the correct entry.

You can access data with the forms-query method, specifically designed for the non-programmer, to set up condi-

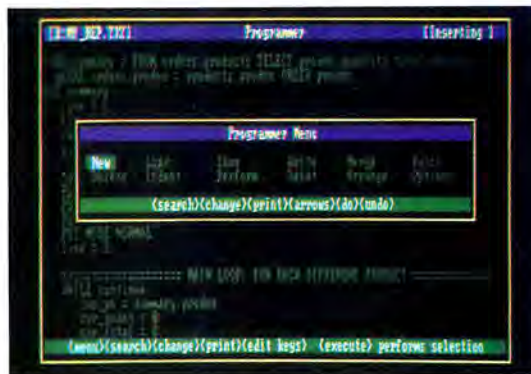


Photo 1. The Programmer offers particularly useful tutorial and sample programs.

tions for data selection. You use the screen mask designed for data entry and enter conditional values in the fields to establish selection criteria.

The other method composes an SQL query using four keywords to specify the conditions for data-base access. The query can specify multiple data-base files (up to eight), in which selected information will be joined to form a virtual data-base structure containing components from each of the original data bases.

You can tell Database to test fields and decide if these records should be included in the final display. It can test constants, ranges, text-pattern matching (similar to wild cards), text similarity (phonetics), and field comparisons. You can express multiple-selection criteria and combine it with parentheses and logical operators.

You can sort the retrieved records for display or printing for any number of sort fields from one to 15 total sort selections. The query can also specify a recursive search of Database files to retrieve a record in one file while using search conditions that pertain to a second file.

Printing reports using OA II's Database is just as easy. You design a print mask that represents an exact layout of your printed page and includes any special print characters. Then you select the query to retrieve the records you want.

### The Spreadsheet

OA II's Spreadsheet, 3D Graphics module (see Photo 2) supports an unbe-

lievable 216 columns by 3,000 rows, and it has all the standard functions and commands found in industry heavy-weights like Symphony or Supercalc-4 and more.

This module uses a virtual spreadsheet architecture and pages sections to and from the disk as needed, so it runs on 256K and still lets you use all its functions and space.

One handy feature lets you select special print attributes for each of your cells.

You can select such things as bold, italics, underlined, and shadowed print mode; cell color and alignment; and decimal precision.

Goal-seeking is an innovative feature that lets you specify a set of goals and stipulate the relationships that must be met to achieve them. Then, a simple command uses iterative techniques to solve these complex dependencies and displays the independent-variable values required to achieve your goals.

OA II takes the concept of naming a range of cells one step further: You can tell it to use the values contained in one named

range to index another named range. OA II also provides a Locate function that searches the text in your spreadsheet for a particular string value.

The spreadsheet gives you up to six windows into which you can segment your worksheet. This feature has the unique ability to open an external link to another spreadsheet and then display it in one of the subordinate windows. This window can contain actual spreadsheet cells or a graphics representation from the linked spreadsheet.

OA II combines graphics into the spreadsheet module. As with Lotus's 1-2-3, you select ranges and assign them to discrete graph elements. Unlike 1-2-3, OA II can handle a host of different graph types and display adapters. You can also build each of your graphs into a slide and combine your slides into a carousel for a super graphics show.

OA II provides a spreadsheet macro facility that rivals 1-2-3's. This is independent of the OA II-system macro facility, but you can combine the two to create some powerful applications. Unlike the more prevalent spreadsheets, OA II generates menus using simple macro instructions, If statements, messages requiring confirmation responses, and execution jumps. In other words, this is a mini-programming language designed especially for spreadsheet manipulations.

### The Word Processor

The full-featured Word Processor will satisfy most of your writing needs. It's



got a maximum document length of 32,000 characters, but you can include other documents anywhere in your printout. It even has a mechanism to embed an OA II graphics image within the document.

Word Processor supports a limited version of style sheets like Microsoft Word. You can set and then access structures for up to eight paragraphs. You can store up to 10 common abbreviations; when you type them, Word Processor automatically substitutes the words from which the abbreviations came.

This module supports all standard word-processing features and lets you insert from another document. It can mail-merge data you've extracted from other OA II modules.

### Communications

The OA II Communications module supports automated log-on and service processing, binary protocol file support, and smart terminal emulation.

With Communications, accessing popular services like Compuserve, Dow Jones, or The Source is easy. The module also lets you host a limited bulletin-board service.

Communications supports a number of different modems and provides an interface for changing any parameter or for designing your own modem-support file. It provides many prototype services that let you set up the modem, dial the correct number, and automatically log on to the service. They also allow you to assign several commands to the function keys.

These services are fine for the general user, but communication programs that provide scripts allow a much more flexible definition of features like logging on, collecting all the new messages and mail, and logging off the system.

On the plus side, Communications provides the popular x-modem transfer protocol for full error checking of your files. It also provides Kermit protocol, widely used on VAX mainframes and several information services.

Terminal emulation is important if you want to connect your computer to a mainframe. Unfortunately, Communications only emulates a dumb terminal that displays the characters sent with no special significance and a VT-100, popular with many of the non-IBM mainframes.

### The Programmer

The Programmer provides an applications language and programming environment for developing tasks to perform more sophisticated access to existing data-base files. It was designed to give you more precise control over the Data-base functions.

The Programmer uses a language that closely resembles Pascal and other high-order languages. Many commands are devoted to precise screen management using windows, menus, and other display enhancements.

Most importantly, you can build any completed program into an application module. With a few keystrokes, you can integrate this application into the OA II main menu. When you use this application, you still have all of OA II's power, including the desktop functions, at your fingertips.

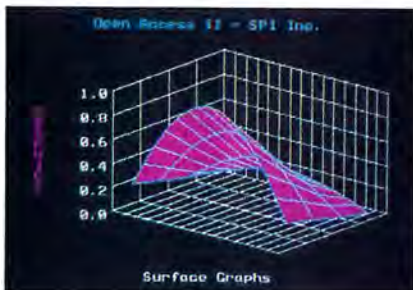


Photo 2. Open Access II combines graphics into the spreadsheet module.

The tutorial and sample programs in this section of the documentation are particularly useful. It was easy to implement a sophisticated add, update, delete, and print reports application based on the tutorial. Only your imagination limits the feats you can perform.

### The Utilities

The Utilities module basically has two separate features: installation and configuration tools and the desktop accessory functions. The first group contains all the functions necessary to change the OA II parameters, which includes modifying the searching paths, screen colors, date structure, function keys, and printer-configuration files.

OA II also provides the user with a macro maintenance tool that changes macros to text and then back. Once the macro is converted to text, you can modify it with the Word Processor module, programmer's editor, or the desk-accessory notebook editor and then save any changes as a macro.

The data-conversion functions let OA II converse with the outside world. OA II can convert DIF, Lotus, Dbase II/III, and Wordstar files. Unfortunately, OA II doesn't support files in the document context architecture (DCA) that has become a de facto standard in most of the current word processors as a data-exchange medium.

Like Sidekick, pressing a key brings the desk-accessory functions, including a programmer's ASCII character table containing all the hexadecimal and decimal

character codes, to your fingertips.

The OA II desk accessories contain an alarm clock with audible alarm, an appointment scheduler for multiple owners, a business-card file, date and time functions, and a value converter. It also includes a calculator with many business and scientific functions and a notepad that is nearly identical to the editor in the Programmer and any of the other editors you use throughout the OAII system.

### Summary

It's a good idea to performance-test a program against its predecessor. However, the first version of OA that I saw ran on the Tandy 2000, while OA II only runs on IBM PC compatibles. Comparing the two yielded some surprising results. The 2000 is three to four times faster than a standard IBM PC, but OA II generally ran as fast on the slower PC as its older version did on the 2000.

OA II data-base operations are easier to perform and faster than similar operations in Dbase III Plus.

OA II's documentation is satisfactory, although the reference material could have been presented more concisely to speed an experienced user's access to vital information. I also would like to see more details on printer graphics implementation. The information given just doesn't tell you exactly how OA II uses these codes so you can select the most appropriate printer feature to satisfy this option.

OA II comes on eight floppy disks, but installation is easy; SPI did an exceptional job in this area. Just answer the questions with "yes," "no," or a selection from a menu and insert the disks when requested. It took me 15 minutes to install the program, and that included opening the box.

The system runs nicely from floppy disks, but you'll do a lot of disk swapping in drive A. And data-base and spreadsheet size are limited by the size of the data disk. Obviously, OA II is best on a hard disk, where the system takes up 1.2 megabytes. The tutorial files require an additional 900K.

Is this system for you, and should you pay almost \$600 for it? If you need an excellent data-base manager and a powerful spreadsheet combined with a word processor, Open Access II certainly fills the bill. Don't forget it also includes a good communications package, desktop accessories, and an applications development tool.

Considering the price of Lotus's 1-2-3, Dbase III Plus, your favorite word processor, and the other packages OA II includes, OA II is a great deal. A network version of Open Access is also available. ■



## Ride the Painted Pony

by Ameer Eisenberg

**Software Carousel** runs on the Tandy 1000/1200/3000 (192K). A hard disk is recommended. Softlogic Solutions Inc., 1 Perimeter Road, Manchester, NH 03101, 603-644-5555. \$59.95.

If your computer work-style forces you to shuffle between nonintegrated applications software, you spend too much time exiting and reloading programs. Wouldn't it be nice to load all your applications at once, then just toggle from one to the other? With **Software Carousel** and enough memory in your computer, you can.

The **Software Carousel** is a memory manager that divides the computer's memory into discrete blocks. You can use each block for a different purpose and switch among them with a keystroke, leaving their contents undisturbed. For example, you're writing a report when someone calls and asks about last month's billing. Instead of closing your report file, quitting the word processor, loading the spreadsheet

software, and opening the spreadsheet, **Software Carousel** lets you access the information with two keystrokes. Two more keystrokes and you're back at work on the report. Neat, huh?

Like the slide-projector carousel, **Software Carousel** slips the software applications in and out of view. This isn't multitasking; a program out of view is frozen at the point you left it. Rather, it's a useful partitioning of memory that lets your computer load a number of applications at once, then lets you choose between them.

### Getting the Picture

The **Software Carousel** creates up to 10 memory partitions. You decide how many and the size of each. The choices are menu-driven; text statements in the program's "personality" file let you fine-tune the program. Such options let the **Software Carousel** step through multiple command-loading procedures to automatically boot any application you select. Very handy.

For example, when used with a hard disk, **Software Carousel** can change directory paths on each partition before loading a program, thus maintaining your carefully organized filing hierarchy.

Earlier incarnations of the program included copy protection; vestiges remain. The master disk contains both an Install and an Uninstall program. The latter resets the former's copy counter from three to zero, freeing you to make three more copies. A good thing, too, since deciding exactly how and where you want the **Carousel** to work may require a few test versions.

Superficially, the installation procedure is no more complicated than giving the correct answer when asked how many drives your system has: one, two, hard, or disk. This is where the child's play ends.

The questions get tougher: How many applications do you need to run at once? How much memory does each application need? The **Software Carousel** creates a storage system for your programs, but it can't organize what you haven't organized. This program works well, if you figure out what you need it for.

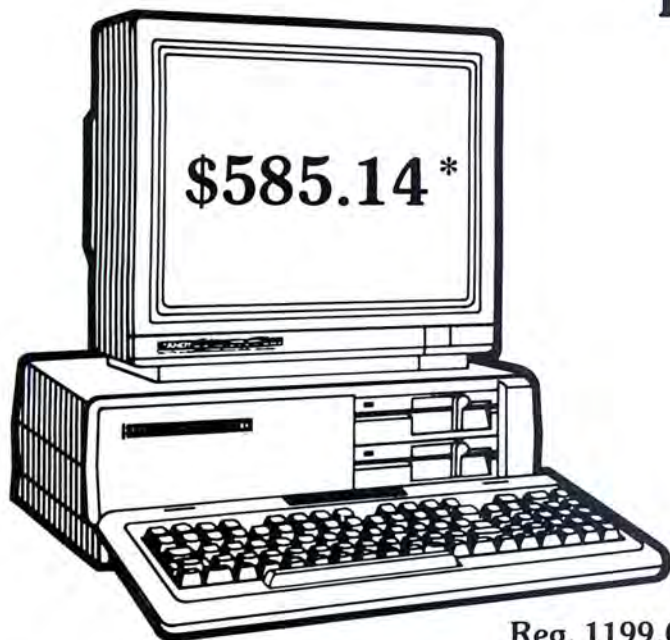
### Custom Prints

Once you've determined what you want to do, **Software Carousel** makes it easy to accomplish. At startup, the program automatically uses all of lower RAM (the first 640K of memory), then

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asks you about using other stuff. If your system has extended memory available (PC AT clones), expanded memory, or a hard disk, the Software Carousel can use that area too, if you authorize it. The program offers to save those parameters, freeing you from ever answering those questions again.

**Basic Keystrokes**

Control of the Software Carousel is accomplished through three basic keystroke sequences: toggle, job, and menu. The toggle keys let you switch sequentially around the Carousel partitions, the job keys take you directly to a selected partition, and the menu keys call up the Options menu. The preselected keystroke sequences are neither awkward nor objectionable. Nevertheless, the manual provides instructions for redefining them.

The Options menu lets you allocate memory space to specific partitions and rename those partitions something snazzier than "Memory Partition 1, Un-named." Options also gives you a way to kill or reboot a single section of memory without rebooting the entire system. This is a blessing when your printer is running amok and your soft-

ware will not respond.

**It Comes with Instructions**

The 100-page manual's organization is unique, as software manuals go. Instead of beginning with a jump-right-in tutorial, this book starts with four complete and occasionally redundant chapters on what Software Carousel is and exactly what it does. Then it gets to the tutorial.

While this is frustrating to the press-a-button-and-see-what-happens types (myself included), until you understand what this program can do—and set it up to do it—Software Carousel doesn't do much. So expect to read the manual. It's well done and accurate.

One minor gripe: It wasn't until page 71 that the authors made it clear how I was to edit and customize the Software Carousel's personality file, although suggestions as to what changes I might like to make appear from the book's beginning. As it happens, Carousel.OPT (the personality file) is an ASCII file you can edit with any word processor or with Edlin, options I would have guessed. Logically, however, the customizing information should have appeared earlier in the manual.

Softlogic Solutions offers a couple of foolproof methods of ensuring customer satisfaction in the form of their technical-support phone line and BBS. The people answering their phone are courteous and helpful. It took me a full day to find a program problem that wasn't answered in the manual. As it turned out, I wasn't reading carefully, and the problem was resolved quickly.

**The Big Picture**

The manufacturer gives a minimum system requirement of 192K for Software Carousel. I don't doubt the program runs within 192K (it doesn't within 128K), but I haven't the slightest idea why you'd want it on a small-memoried machine. What are you going to do with three 64K partitions? Adapt TRS-80 Model I software? On the other hand, if your computer contains a megabyte of memory, stop wasting your time and start using the Software Carousel.

I don't use Prokey or Sidekick or any of the resident keyboard enhancers, but Softlogic claims the Carousel works with as many as you'd like at the same time. The manual's accuracy and the product's flawless performance gave me no reason to doubt its claim. ■

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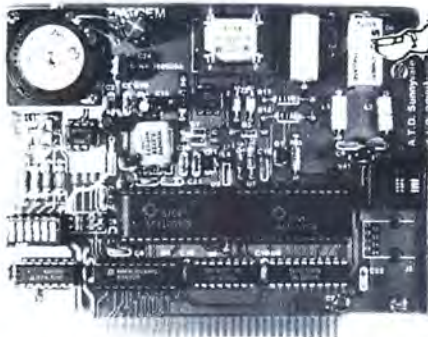


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## Entry-Level CAD

### by Douglas A. Severson

**First CADD** runs on the Tandy 1000/1200/3000 (256K) and requires two disk drives; a mouse, math coprocessor, 640K, and a dot-matrix printer are recommended. Generic Software Inc., 8763 148th Ave. N.E., Redmond, WA 98052, 800-228-3601. \$49.95.

**F**irst CADD is a puzzling program. In the MS-DOS world of computer-aided-design programs with three- and four-figure price tags, its object-based design, powerful features, and low price suggest it's a bargain. Yet, it somehow leaves you with the feeling that it's more of an almost-full-function demo for Generic CADD 3.0—Generic Software's principal product.

There are two major types of graphics programs: pixel-based paint and object-based draw programs. First CADD falls into the latter category.

The paint programs view the drawing as a matrix of individual dots, usually corresponding to the pixels on your monitor. This ultimately limits resolution, and, although you can create geometric figures, they lose identity as drawing elements once you have placed them on the screen. You can use them to create arbitrary shapes, however, though it is probably best to use them for sketches and limited business graphics.

Object-based programs use geometric forms to create drawings, which you can describe mathematically and keep as individual shapes, allowing almost unlimited resolution. You can combine simple elements into ever larger and more complex objects, which you can then manipulate as a whole. The drawing's dimensional accuracy is also good.

First CADD includes a small manual and a disk, packed with the computer-aided-design (CAD) program, the batch files to help with installation, a configuration program, one text font, a handful of video and mouse drivers, and over 80 printer drivers.

You can also choose one of four resolutions for each printer type: low, medium, high, and very high.

### Documentation

The manual is logical and informal and, as a result, readable, but it is a little too brief at times. Except for an example of the supplied text font, the manual strangely (for a CAD program) has no illustrations, even though they would have a welcomed way to explain some features.

A little more editing would have helped, too—sentences like "this feature is pro-

vided to provide compatibility with other Generic products" became annoying.

### Performance

When I installed the program on my hard disk using the supplied batch file, it promptly copied every file (except the one demo drawing) to a directory it created, using up an unnecessary amount of space. Luckily, the device drivers had recognizable names, so I could erase all but the ones I needed.

I then ran the Config program, as the manual directed, to create the necessary configuration file for the CAD program. Mine is a single floppy-drive system, so I couldn't use the floppy-disk installation batch file. I copied the First CADD directory from my hard disk to a bootable floppy, which almost filled it.

---

## *The lack of an 'undo' or 'unerase' makes the window commands kind of unnerving.*

---

You interact with First CADD via a conventional menu panel with control line. Although not as intuitive as the icons used in most paint programs, with their pull-down and pop-up menus, this system is relatively easy to learn. Since the program doesn't offer any on-screen help, a command-reference card would have been helpful.

You can manipulate First CADD through the keyboard, but a mouse or other digitizing device (it doesn't work with joysticks) is more effective. I found it most convenient to use a combination of keyboard input and mouse selection.

To make this interaction easier, First CADD lets you do a bit of customizing. From the configuration program, you can assign up to 10 commands to the function keys. You can also use an ordinary text editor to modify the menu file and create custom menus.

The manual is sketchy on this point, but I was able to build a custom menu after a couple of tries. The program doesn't have a keyboard macro facility—something I thought would greatly enhance the customization features.

### Drawing with First CADD

The essential drawing elements are as you'd expect: points, lines, rectangles, regular polygons, circles, ellipses, arcs,

and complex (b-spline) curves. You can rubberband (stretch) lines and rectangles into position and define circles and arcs in two different ways.

You can place all elements on any one of 256 different drawing layers (imagine 256 pieces of transparent paper piled up). Color and line type can also take on 256 different values, but the color selection depends on your display mode (IBM PC modes only) and monitor.

Line type is useless, since it has no visual significance—a major deficiency. For some types of drawings, the ability to use dashed or dotted lines as well as different line thickness is important. Lack of any area pattern fill is also a drawback.

Almost by definition, CAD programs need good dimensional accuracy. To aid this, you can set up a visible or invisible regular grid system of any size. Combining a grid with the snap-to-grid mode ensures that your drawing elements are precisely positioned and sized. Snap-to-point and snap-to-tolerance modes further enhance accuracy.

The heart of any CAD program is its ability to edit drawings, and First CADD does pretty well. Elements (or "lines," as the manual calls them) can be moved, erased, copied (one or more times) or changed (color, type, layer, and so on).

Window versions of the editing commands allow similar functions to operate over multiple elements. The lack of an "undo" or "unerase" makes the window commands kind of unnerving though.

Indirectly related to the window commands is the ability to create components, groupings of elements that you define and name and then save, load, remove, scale, and rotate as a whole. This is a valuable feature for drawings that need repetitive blocks or predefined symbols. Up to 256 of them can be active in one drawing.

In general, text handling is one of First CADD's stronger features. You can size, rotate, and place text in almost any manner. You can also create your own text fonts, including numbers and whatever special symbols you can imagine. Although the tools First CADD uses to help define fonts are good, it's still a tedious process.

The drawback to the text features is that they dramatically slow display redraw. To overcome that, First CADD added a Fasttext mode command, but it doesn't appear in the manual. It's in a Readme file on the distribution disk. In that mode, text is drawn only as construction points, denoting position but not shape.

General display handling is another measure of CAD program performance, and First CADD does well here, too. The object-based design lets you zoom (mag-



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What we have here is a computer that is truly IBM PC/XT compatible. The Clone computer is completely MS-DOS compatible and it has all the hardware capability of the IBM PC/XT (except cassette) plus some and comes with MS-DOS 3.2 (the latest version), GW-BASIC and reference manuals (manuals are extra cost on the Tandy 1000!). With the Clone you get eight IBM compatible expansion slots, seven of them a full 13" long. You have six additional slots available; something a Tandy 1000 owner can only dream about.

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Flight Simulator, one of the classic tests of compatibility, runs perfectly. Lotus 1-2-3® can't tell it's not running on an IBM. In fact, we have not discovered an off-the-shelf MS-DOS software package that wouldn't run properly on the Clone. The ability to run standard, off-the-shelf, software is important because it allows you to obtain software from any number of sources.

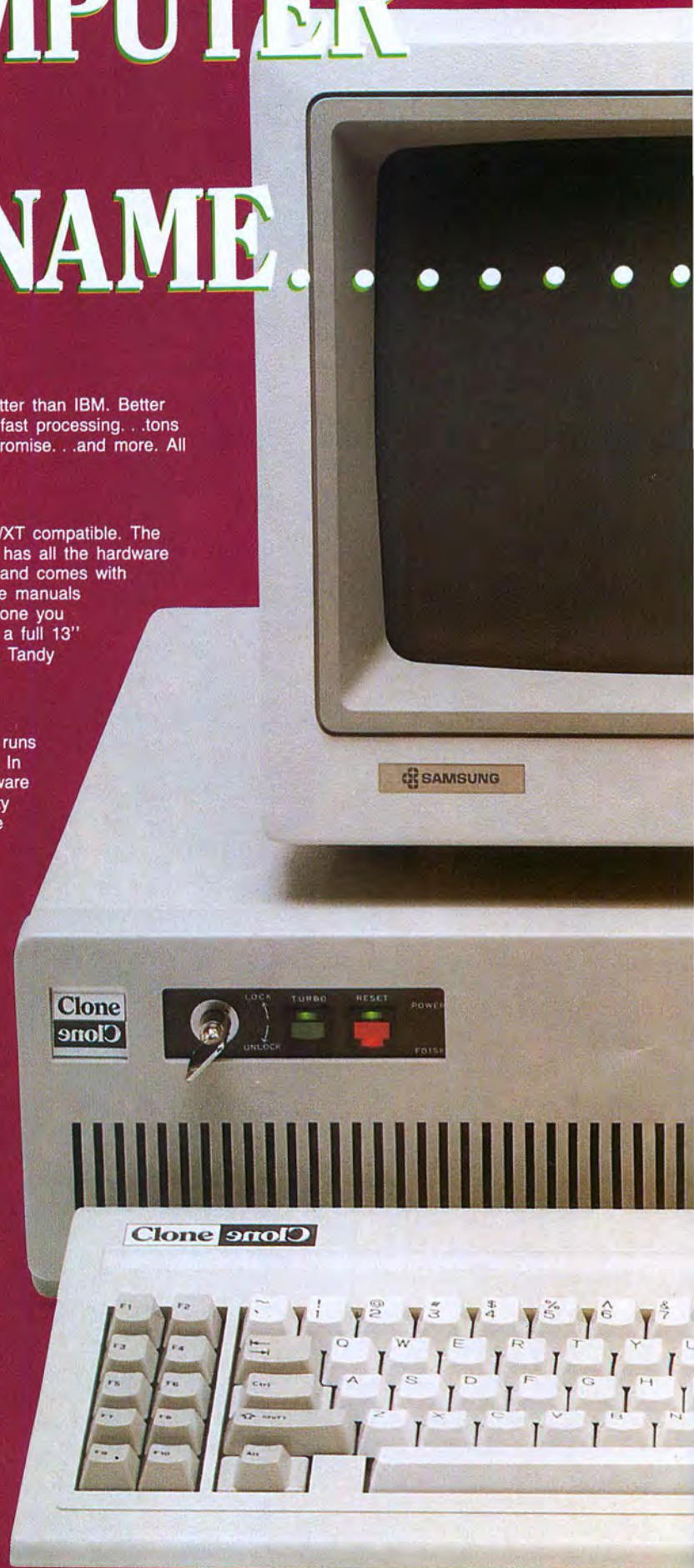
### STANDARD FEATURES:

The Clone computer comes complete, ready to run, with lots of standard features. Like the maximum 640K of system memory installed. Like an IBM standard parallel printer port, a clock/calendar with automatic battery backup, a speaker, two serial ports (one populated), a game adapter/joystick port, a light pen port, a 2-drive floppy disk controller, and the newest AT style keyboard. The video output is IBM standard color graphics with a special port that allows you to view color software on a monochrome monitor as well as 80 x 25 text. A 360K ultra-reliable floppy drive is included with space for three additional half-height floppy or hard disk drives. The 135 Watt power supply runs cool and assures you of adequate power for future expansion.

PC-DeskMates, a powerful multi-function memory resident utility, is included so you can start using the Clone when you receive it. You get an alarm, clock, calculator, calendar, notepad, phone dialer, typewriter, and access to DOS level commands. The Clone also comes with Qmodem, the famous modem program which enables you to access the world of telecommunications. PC-Write, probably the best shareware word processor available, is also furnished. Your Clone comes ready to work for you.

### WHAT'S MISSING?

The Big Blue price tag.





# . For serious users only.

## OPTIONAL FEATURES:

The Turbo Clone is equipped to run at the standard 4.77MHz clock rate or at a blazing 8mHz. That's almost 70% faster processing than a standard IBM. Front panel lights indicate Turbo operation, power status and hard disk activity. A key-lock switch allows the keyboard to be electrically "locked out" for unattended security. Imagine a lengthy Lotus 1-2-3 spreadsheet recalculation with an 8mHz processor! It's awesome.

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We sell Clones exclusively by mail. And there's a good reason why. Supporting the expensive overhead of a chain of retail stores is not our idea of keeping costs down. You're buying the Clone computer at wholesale prices, directly from the manufacturer. Your Clone comes with an ironclad guarantee that exceeds most other manufacturers'. We guarantee your satisfaction or we'll refund your purchase price within thirty days, no questions asked. Our guarantee is backed by a reputation earned in years of experience in the mail order business. Think about it. Repeat orders come from satisfied customers. This makes us work very hard to get it right the first time.



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FEATURES	CLONE	IBM PC/XT	TANDY 1000 EX (SX)	LEADING EDGE Model D
Microprocessor: Intel 8088 @ 4.77MHz	YES	YES	YES	YES
Power Supply Rating	8mHz Optional	NO	7.16mHz STD	NO
IBM Standard Bus:	150 WATT	63.5 WATT	54 WATT	130 WATT
Operating System:	YES	YES	NO	MS-DOS 3.1
Disk BASIC:	MS-DOS 3.2	EXTRA	MS-DOS 2.11 (3.2)	YES
MS-DOS and BASIC Ref. manuals:	YES	IN ROM	YES	YES
Standard System RAM:	YES	EXTRA	EXTRA	YES
Cost to Expand RAM:	640K	256K	256K (384K)	512K
Keyboard:	-0-	\$\$	\$259 (\$129)	\$
Video Monitor: (composite)	*AT* STYLE	STD	NON-STD	STD
Video Outputs:	INCLUDED	EXTRA	EXTRA	INCLUDED
Disk Drive Capacity:	BW/NTSC/RGB	EXTRA	NTSC, RGB	B/W, RGB
Max Number of Internal Drives:	1-360K	1-360K	1-360K (2-360K)	2-360K
Internal Expansion Slots:	4	4	1 (2)	2
Accepts Standard IBM Cards:	8	5	1 (5)	4
8087 Math Co-Processor Option:	YES	YES	NO (10" Only)	YES
Sturdy Steel Case:	YES	YES	NO (YES)	YES
Standard Parallel Ports:	YES	YES	PLASTIC	PLASTIC
Standard Joystick and Light Pen Ports:	1	0	1	1
Standard Serial Ports:	YES	NO	J (J/LP)	NO
Warranty:	2 (1 Optional)	0	0	1
Clock/Calendar:	1 YEAR	90 DAYS	90 DAYS	15 MONTHS
Cost Ready-to-Run	YES	NO	NO	YES
8mHz Option	\$699	\$3,063	\$1,398+ (\$1,683+)	\$1,295
	\$799			

Add \$35 for ground delivery; \$70 for air.

IBM XT cost figures\*: Video Display Adapter \$250; Video Display \$275; IBM XT computer \$2,145; Additional Ports, serial port, game port, parallel port, 640K RAM \$308; DOS 3.2 and BASIC \$85; Total \$3,063. Does not include the battery back-up clock calendar. No light pen port.

\*The above prices are list prices as best we could determine. Both the IBM and Tandy are available at a discount. Tandy 1000 cost figures\*: DOS 2.11 and BASIC reference manuals \$29+; Memory Plus Expansion Board (to 384K) \$129+; 256K Additional RAM \$129+; One serial Port \$79+; Battery Back-up Clock

Calendar \$99+; Composite Monochrome Monitor \$129+; Model 1000 EX Computer \$799; Model 1000 SX Computer \$1199; We were not able to equip the Tandy 1000 to directly compare with the Clone because of the 1000's inherent design limitations.

## CLONE OPTIONAL EQUIPMENT

<h3>STAR PRINTERS</h3> <p>NP-10 100/25cps NLQ .....\$140*                      NX-10 120/30cps NLQ .....\$180*                      NX-15 Wide carriage .....\$299*                      ND 10 180/45cps NLQ .....\$299*                      ND-15 Wide carriage .....\$399*                      NR-15 240/60cps NLQ .....\$499*                      NB-15 300/100cps NLQ .....\$799*                      NB24-15 216/72 NLQ .....\$699*                      10' Printer cable .....\$12*                      *With purchase of our computer.</p>	<h3>MODEMS</h3> <p>300/1200 baud Everex with software .....\$99                      300/1200/2400 baud Everex with software .....\$199</p> <h3>MICE</h3> <p>Microsoft Serial Mouse .....\$125                      Microsoft Bus Mouse .....\$115                      TAC 1+ Joystick .....\$21</p>	<h3>VIDEO MONITORS</h3> <p>HiRes monochrome green or amber 1000x350 .....\$80*                      RGB color 640x200 .....\$259*                      EGA HiRes 720x350 .....\$419*                      MultiSync 15kHz to 34kHz 926x580 resolution .....\$559*                      Tilt/swivel base .....FREE*                      Video extender cable 6' .....\$9                      *With purchase of our computer.</p>
<h3>FLOPPY DRIVES</h3> <p>36K 5.25" half-high .....\$99                      720K 3.5" TEAC .....\$149                      External case for above .....\$59                      External drive cable .....\$39</p> <h3>TAPE BACKUP</h3> <p>10MB Internal tape unit .....\$299                      20MB Internal tape unit .....\$399                      40MB Internal tape unit .....\$499                      20MB External tape unit .....\$449</p>	<h3>HARD DRIVES</h3> <p>20MB Seagate 65ms kit .....\$329                      30MB ST238 65ms kit .....\$399                      30MB ST4038 40ms kit .....\$599                      40MB ST251 40ms kit .....\$599                      80MB ST4096 28ms kit .....\$999                      All kits include cables and complete instructions for the proper installation in your computer                      Free installation in our computer.</p>	<h3>VIDEO CARDS</h3> <p>Hercules compatible monographics w/printer .....\$109*                      EGA color graphics includes CGA/Herc. modes .....\$179*</p> <h3>KEYBOARDS</h3> <p>5339 AT style 102 key .....\$49*                      Extender cable 6' .....\$9                      *With purchase of our computer</p>


## OUR GUARANTEE

Simply, if anything is wrong with your Clone or any of its peripherals, we'll fix it free for up to one year after you've received your Clone. You have probably read other manufacturers' warranties, and gotten confused, suspicious or even mad. You're probably skeptical about anything as simple and straightforward as our warranty. So here's the fine print.

You can void your warranty by failing to exercise normal care when hooking up or operating your Clone. Or trashing the guts with a hammer. Or running it over with something. Or burning it up.

You have thirty days after receipt of your Clone to see if you and it are going to be compatible. If you are not satisfied with your Clone for any reason within that time you may return it to us for a full refund, less shipping charges. Just don't write in the manuals or lose anything that was in the original container as it all has to be intact.

The other guys only give a 90 day guarantee. Ever wonder why? Ever try to get a refund? Complete warranty details are available on request.

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nify or shrink) the drawing to show as much or as little detail as you want. The several zoom-command variations, coupled with panning (displaying different parts of a drawing that's too large to fit on one screen), make it easy to view your work. These features are so important that I assigned most of the zoom commands to function keys.

First CADD can print your work on a dot-matrix printer, but it doesn't support plotters. With high- or very-high-resolution versions of your printer driver installed, the drawings are crisp and clear. Printing graphics is always painfully slow, but First CADD makes it excruciating.

The program's rasterization process (conversion of line descriptions to dot patterns) is so slow that the printer pauses at the end of each line. Now I see why the package includes the low-resolution printer drivers: You'll save time if you use the low res for check plots. Use the hi res only for the finished product.

First CADD has many other convenient features, including ones that let you change layers, vary cursor size, and enable the menu display. Its ability to load and save drawings in an ASCII format is particularly intriguing, because it opens many possibilities for using the program (with other software) for some diverse applications.

The manual didn't explain the file formats at all, so I couldn't try anything like importing data from other programs or extracting information from a drawing.

The program is capable of sensing the presence of a math coprocessor (8087 or 80287) and using it, if there is one. Overall, First CADD performs somewhat dismally without a coprocessor, probably because it must perform so many computations just to redraw the display.

Generic Software provides a free technical-support line for registered users. The support person I talked to was helpful and knowledgeable, and he told me that future releases of First CADD will correct some of my complaints (line types and additional fonts). Generic doesn't intend to remedy the product's other shortcomings like area fill and macros, because First CADD is an entry-level program.

**Summary**

Generally, I liked First CADD. However, I'm still puzzled because it seems to have no clearly defined audience. Casual graphics users should be better off with a good paint program, and more serious users should probably take Generic Software up on their 60-day, money-back guarantee and try out the more powerful Generic CADD 3.0—I'm tempted myself. ■

**Back Up Fast  
by Wynne Keller**

**DS Backup +** runs on the Tandy 1000/1200/3000 with a hard-disk drive, 256K, and DOS 2.x. Design Software, 1275 W. Roosevelt Road, West Chicago, IL 60185, 312-231-4540. \$79.95.

The hard-disk backup utility that comes with MS-DOS is so slow, several companies offer speed backup programs. DS Backup + is a major contender among them. It is easy to use, fast, and

flexible and includes a separate program, Speedbak, that makes backups even faster, but not without some sacrifice.

You don't need such a utility to back up a file that's not larger than the capacity of a floppy disk (360K), because it's just as easy to use the simple DOS Copy command. If your files are larger than 360K, however, you need a backup utility. It also comes in handy if you're saving several files (e.g., the entire subdirectory of a hard disk).

For comparison, copying a 979,000-byte subdirectory containing many

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small files and a few large ones took the MS-DOS Backup utility over 10 minutes. DS Backup +, with the verify feature on, completed the same task in under three minutes.

DS Backup + 's Squeeze option, which compresses the file and improves backup time by reducing the number of disks needed, sped things up even more. In copying the above-mentioned subdirectory, Squeeze saved an additional 30 seconds and reduced the number of disks needed from three to two.

The Speedbak program uses its own format, which is different from MS-DOS, and, for this reason, might not work with all compatibles (it doesn't work on the Tandy 2000). Copying the 979,000-byte subdirectory on disks in Speedbak format took 2.15 minutes without Squeeze and 1.30 minutes with Squeeze. Speedbak does not have as many options as DS Backup +, but it is much faster.

The Table shows how the different utilities and options performed the same task. Remember that the time involved in a disk swap is a factor in calculating the speed of any backup program. In a smaller backup such as mine, the disk swaps represent a larger percentage of the time involved than they would with a backup of, say, 10 disks.

Speedbak gains some speed by not turning off the floppy drive during disk swaps; as soon as you close the drive door, it is off again at full tilt.

**Documentation**

An experienced computer user will find DS Backup + a pleasure to use; it practically runs itself. Most of the time you won't need the manual, because the on-screen options are self-explanatory. Some of the features you can control (turn on or off) include Verify, Report (dump file names to printer during backup), Subdirectories (include them in backup), Prompt (include only selected directories during backup or restore), Archive (back up those files changed since last backup), and Date (backup based on date of file).

A novice is likely to find things difficult at first, not because the program is hard, but because the manual doesn't lead you by the hand. For one thing, it

assumes that you're familiar with DOS. Since you should have a copy of the DOS manual, there's nothing wrong with this assumption, but if you haven't done your homework, DS Backup + might send you leafing through the manual more than once. Make sure you've learned about subdirectories and file wild-card specifications.

The disk's Readme file contains important information that describes all the error messages the program can generate. Disk files like this are fine for public-domain software, but commercial software should also include such information in the manual. Many novices have no idea they can use the Type command to read a file on the disk.

**Using DS Backup +**

This version (1.06) includes three utility programs, but scant reference to them in an accompanying flyer is all you get. One tests a backup's validity, which is helpful if you're planning to archive a subdirectory to make room on your hard disk and want to make sure the backup is good before you erase the subdirectory.

Another tests all files on the hard drive and tells you which ones have changed since the last backup. The third program tests a disk to see if Speedbak produced it. It would be nice to see these incorporated into DS Backup + itself.

Novices might find it difficult to master the source (the hard drive) and destination (usually, drive A) directories. You can specify a subdirectory of the hard drive as the source. This much is easy enough to understand, but restoring a previous backup to the hard disk is more difficult.

The on-screen source and destination specifications do not change, even though you know that the old source (the hard drive) is now the destination. Of course, all this is explained on screen before the restore begins, and you're given ample opportunity to back out. It's not difficult once you get used to the concept.

One of the program's best features is the flexibility with which it lets the user specify what he wants to back up. Most people back up a single program application at one session.

DS Backup + uses standard MS-DOS format, and you can format a disk during

a backup. Although the program tells you in advance how many disks you'll probably need, this feature is handy if you find you don't have enough disks ready after the backup has started. DS Backup + doesn't automatically format blank disks, however. You interrupt the backup process during a disk swap, select the format option, and proceed with the backup.

It is possible to save setup files for later reuse. If you've specified the subdirectory and files to backup, it's convenient to use this information each time you make a new backup. You can use this file to make sure the restore specifies the proper files and directories.

DS Backup + numbers disks as it uses them. The final disk in the series contains file information and is known as the Vol-Ser disk. When restoring, insert this disk first for the file names and then proceed with each disk in numerical order. It is important to label the disks numerically during backup.

If you attempt to restore with disks out of order, the program tells you, so you can try other disks to find the right one. You have the same opportunity to look for the Vol-Ser disk also, but you can't restore its files properly until you find it.

In such a case, you aren't entirely out of luck, however. DS Backup + includes a utility program, Retrieve, that retrieves files even if you've lost or damaged Vol-Ser. This utility needs the ANSI.SYS device driver; once that's loaded, Retrieve can restore specific files or all files, or re-create the Vol-Ser disk.

When making a backup, the program tells you not to accidentally reuse a disk that was part of another backup. If you are on, say, disk three of the current backup, and you accidentally insert disk three from another backup, the program will refuse to use the disk, because it thinks you've forgotten to remove the previous disk three.

The backup screen is informative. It tells you how many disks you'll need (this number will be too high if the Squeeze option is on). As backup proceeds, the program tells you which disk it is working on, what percent of the task remains, what percent of the disk remains, and how much time has elapsed.

**Summary**

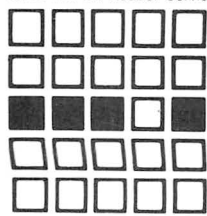
I recently read a comparison test of backup utilities in which the programs were expected to handle 1,578 subdirectories, each containing two files. Obviously, DS Backup + scored poorly, because it failed this part of the test.

In my opinion, the test was unreasonable; I find DS Backup +, on the whole, a solid program that's easy to use and that offers good value for the money. ■

*Table. A comparison showing DS Backup + 's advantages over the DOS Backup utility.*

Program	Disks	Time (in minutes)
MS-DOS Backup	3	10.5
DS Backup +	3	2.58
DS Backup + w/Squeeze	2	2.25
Speedbak	3	2.15
Speedbak w/Squeeze	2	1.30





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## Color/Mono Adapter

The **Color/Mono** video adapter runs on the Tandy 1000/1200/3000. STB Systems Inc., 1651 N. Glenville, Suite 210, Richardson, TX 75081, 214-234-8750. \$149.

In the beginning, there were two display adapter/monitor combinations available for the MS-DOS computer: the monochrome display adapter (MDA) and the color graphics adapter (CGA). The MDA features high-resolution text and the ability to display underlining, reverse video, and highlighted text, but no graphics. The CGA provides crude graphics, comic-page-quality color, and text resolution that can give you a headache.

Today there are several new and better display standards available. The Hercules adapter and its many clones add graphics capability to the MDA's high-resolution text. If you must have color, the Enhanced Graphics Adapter (EGA) is the way to go. Still, the old standbys are alive and well, and, believe it or not, new products based on these standards still appear. One of the latest is STB's Color/Mono adapter.

This three-quarter length board supports both the MDA and the CGA standards and includes a parallel port. A clock is optional. An added sweetener is a disk containing productivity software, including a print spooler and a RAM disk.

While the board supports both standards, the procedure to change from one to the other isn't simple. First, you have to disconnect one monitor and connect the other. Then you must set the system switches on your motherboard and two switches on the Color/Mono board. Two other DIP switches on the board control the printer port's address. You can set it to LPT1, 2, or 3, or disable it completely—a nice touch.

The board performs as advertised, but who needs it? I, for one, need both types of monitors, but I'm not willing to put up with the cumbersome changeover procedure. Furthermore, you can buy a Hercules clone and a separate CGA board for about the same price. ■

—David A. Williams

## Wordstar Pro

**Wordstar Professional** runs on the Model 4/4P/4D and requires two disk drives and Montezuma Micro's CP/M. Montezuma Micro, P.O. Box 224767, Dallas, TX 75375, 800-527-0347. \$250.

Montezuma Micro has tailored Micropro's popular word processor, Wordstar, to run with Montezuma's CP/M. Micropro controls the licensing agreement under which you use the program and provides software support.

Montezuma's Wordstar comes on two

disks: One contains the main file and the overlays, and the other contains copies of the main file, the configuration program, and some DOC files with information on configuring Wordstar.

The main file comes in two versions: MMWS/STD.COM is the Model 4 version. In order to speed up the program, Montezuma Micro has memory mapped the I/O (input/output). I/O now goes straight to the Model 4 hardware instead of to the BIOS to be redirected to the hardware. MMWS/STD has been configured for a generic printer. You also get the original Micropro WSU file, so you can do your own customization or use the program with another CP/M computer.

Since Radio Shack printers have only lately begun to follow the most popular control codes, a text file on the second disk lists all the information needed to install Radio Shack printers from the Line Printer series to the latest dot-matrix and daisy-wheel printers. You also get a file to help you customize the installation of control codes for Epson and similar printers. Both these files list the questions the install program asks and the correct answer to each question.

A text file lets you customize the repeat function that you activate by holding down a key, and another works with the KEYDIF utility to redefine the arrow, clear, and break keys. However, there's much more that the program could do with the utility.

Montezuma's CP/M includes a RAM-disk feature onto which you can install the two overlays that Wordstar needs to do its job. Then you can create a submit file or use the Auto utility to automatically load the RAM disk, KEYDIF, and Wordstar so the program will run smoothly, quickly, and without disk thrashing.

With fewer and fewer TRSDOS programs coming out, Montezuma's Wordstar package offers a solution that will keep your Model 4 strong. Montezuma offers you a nicely integrated version of a CP/M classic at a package price competitive with TRSDOS-based word processors. ■

—Jack Feldman

## Stylewriter

**Stylewriter** requires a computer with a parallel printer port and a dot-matrix printer. Carolina Engineering Laboratories, 818 Tyvola Road/109, Charlotte, NC 28217, 704-525-4423. \$99 (includes a non-expandable 8K buffer and two type fonts). Extra fonts, \$13.95.

Stylewriter doesn't have a convenient label. It acts as a printer buffer, but its primary job is to take an ASCII file, convert the characters to graphics, and then send the graphic characters to the printer. The end result is a string of near-

letter-quality (NLQ), proportionally spaced characters.

A Stylewriter unit can contain a variety of popular fonts in several sizes; the 8K-buffer version can hold up to six font ROMs, but if you want to speed up the graphic printing, you'll have to use fewer fonts to free up more buffer space.

Stylewriter comes with a power module, printer cable, and two-part manual. Be ready when you order: You must know your printer's graphic dot resolution and control codes. If you don't, call Carolina and have your printer manual in hand.

The first part of the Stylewriter manual gets you set up, which is easy. The second part contains additional commands and illustrations of new fonts. The manual can sometimes be misleading. Although its installation instructions are clear, it omitted other information, which made the unit difficult to use.

The documentation tells you that Stylewriter acts as a print formatter, so you can't use your word processor's underline, tab, center, or margin commands. All the fonts are proportionally spaced, which means you have to set the number of characters per line of text in your word processor based upon the manual's information for a particular font.

Four DIP switches control two options. One governs the parallel port's pin 14, which always generates a line feed when you press enter. The other lets you change the character that tells the logic you are giving it a command. Unfortunately, you have to search the documentation to find any mention of the options.

Using Stylewriter proved difficult. The options were poorly described in the manual. First, the backslash (\) code didn't work. The \? command should list all of the fonts installed in the Stylewriter, but all it printed was \?.

When I tried @ as a code, Stylewriter gave me a printout of its fonts with a list of switch positions across the top, which should have been the four possible positions for the DIP switches. However, the positions it listed are backward. I also found I sometimes had to press the reset button to get Stylewriter to initialize. The undocumented secret: Turn on Stylewriter before you turn on your computer.

Stylewriter also generates more radio-frequency interference (RFI) than a Model I, so don't plan to watch TV while your job is printing.

Print quality depends on the printer. Generally, printers with high dot resolution give excellent results. Printing on an Epson MX-80 wasn't clear, while an Epson FX produced characters almost as sharp as a 24-pin NLQ printer. The MX-80 was at its best when printing the larger fonts. ■

—Jack Feldman



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# TANDY'S TWO NEW 1000s

The folks at Fort Worth add the HX and the TX models to the 1000 line and introduce their first laser printer.

by John Wolfskill and Michael E. Nadeau

**O**n Aug. 3, Tandy celebrated its tenth anniversary in the computer business by introducing four new computers and a laser printer in New York City. Debuting were the Tandy 1000 HX and TX, the Tandy 1400 LT MS-DOS laptop, the Tandy 4000 80386-based machine, and the LP-1000 laser printer. We got a look at the HX, TX, and LP-1000 in June. As of this writing, we have not seen either the 1400 LT or the 4000, which we will report on in a later issue.

No production units were available, but we were told that the prototypes demonstrated to us performed as would those you can now order at the local Radio Shack. Our time with these computers and the printer was limited; we ran a couple of benchmark tests, peeked under the hood, and played around with the new Personal Deskmate 2. What follows are our initial impressions, not a product review. We will publish full reviews of the HX, TX, and LP-1000 in an upcoming issue.

## The 1000 HX: A New Breed?

Less than a year has gone by since Tandy introduced the 1000 EX. Its features were designed to attract both educators and home users, and they include

a small desktop footprint, an attached keyboard, and a headphone jack with volume control. Although the EX wasn't fully hardware compatible with the IBM PC, it could run a lion's share of PC applications.

While the new HX retains all the features of the EX, it has a few surprises of its own. A side-by-side comparison of the 1000 HX with the EX may evoke a "So what's new?" response. On closer inspection, you'll notice the side-facing 360K, 5¼-inch floppy drive has been supplanted by a trim new 720K, 3½-inch drive positioned above the keyboard to the right. You can put a second, optional 3½-inch drive in the space behind the adjacent knockout bezel, providing a four-fold increase in internal data-storage capacity over the EX.

The remarkable differences between the two machines become apparent only after you turn on the HX. Tandy has apparently listened to home users and educators who have indicated that PCs are still too difficult to start up and operate. MS-DOS's cryptic command structure was held responsible for most of the problems.

The 1000 HX addresses this complaint by placing DOS in ROM. When you turn on the power, Tandy's version 2.11 of MS-DOS

boots within three seconds. If you want to time DOS as it loads, you must first warm up the monitor before turning on the CPU. Otherwise, you'll miss the event entirely. In the 1000 HX, the venerable MS-DOS system disk is but a memory.

Tandy chose MS-DOS 2.11 over later versions of DOS to put into ROM because of its relative stability. It is unlikely that any significant bugs will crop up, necessitating upgrading the ROM. Tandy also believes that the typical purchaser of the HX will have little need for the features of newer DOSes, which primarily involve networking.

A DOS shell takes over after bootup, eliminating the confusing A> prompt. Its menu has options to run Personal Deskmate 2, set system date and time, view programs on drive A, and start up from the internal drive. The function keys 1-4 perform these tasks, respectively (see Photo 1).

In addition, the HX's start-up configuration is stored in a special EEPROM (electronically erasable programmable read-only memory) chip. The EEPROM automatically provides start-up configuration information to DOS each time you turn on the computer. The EEPROM retains its



last settings (even when power is off) until you change them.

You use a utility called SETUPHX to program the EEPROM. The menu-driven interface lets you select the monitor type and bypass lengthy start-up diagnostics. You can also toggle the DOS time and date prompts, adjust the CPU clock speed (4.77 or 7.16 megahertz [MHz]), and reserve the desired number of DOS disk buffers. SETUPHX even has an option to change the language of the DOS shell menu, should English not be your native tongue.

You can also specify an application program to automatically load and execute each time you turn on the computer. Among the other SETUPHX options, you can automatically start the Personal Desk-mate 2 software or display a menu of the executable (EXE or COM) files available on drive A. With a single keystroke, you can either start the chosen application or return to the DOS Ready prompt.

For more exotic Config.SYS and Auto-exec.BAT configurations, SETUPHX can program the EEPROM to look on drive A for these files. And if you think the whole idea of "toaster easy" technology is beneath your abilities, simply tell SETUPHX to boot the system in the traditional manner from whatever DOS version system disk mounted in drive A.

Pricewise, Tandy has positioned the 1000 HX just above the EX at \$699. The Table lists the HX's standard features in relation to the rest of the 1000 line. All current options for the EX are available for the HX, as well. Tandy has no plans to market an enhanced graphics adapter (EGA) module for the EX or HX models. A Tandy spokesperson did mention a high-

resolution color graphics adapter (not EGA compatible) being developed by a third-party vendor. The Table lists the HX's standard features.

### The 1000 TX: In the Fast Lane

At \$1,199, the Tandy 1000 TX represents the top of the "low-end" MS-DOS-compatible line, both in price and performance. While Tandy expects to sell the TX in the home and education markets, company officials were quick to point out that it could serve as an inexpensive, intelligent terminal within a network in a business environment.

Except for the slightly modified front panel and the addition of a speaker volume control and headset jack (popular features on the EX with educators), the 1000 TX has the same outward appearance as the 1000 SX. New standard features include replacement of the 5¼-inch floppy drives found on the SX with a single, higher-capacity 720K, 3½-inch internal drive (see the Table). The seldom-used light-pen port has been replaced by a nine-pin serial port.

Just as with the 1000 HX, Tandy has packed a few surprises inside the system



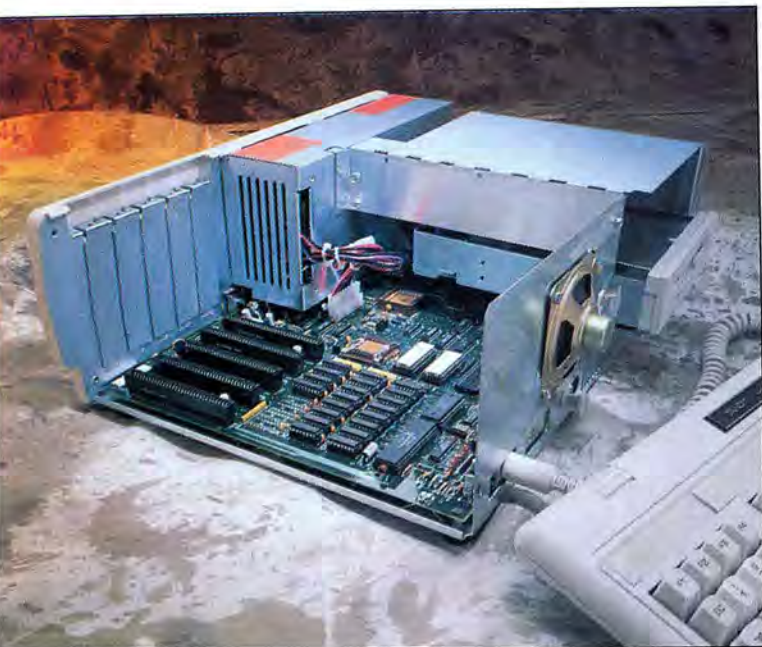
Photo 1. After booting the 1000 HX, you will see this menu.

case. Gone is the Intel 8088-2 CPU found in the SX. Instead you'll find an Intel 80286 CPU running at either 4.77 or 8MHz. Despite the 80286 processor, the TX is not an IBM PC/AT-compatible machine. The system board retains the 8088's original 8-bit data path, and the expansion channel uses the same 8-bit card (10-inch maximum length) slots found in the SX. An empty system-board socket awaits an optional Intel 80287 math coprocessor. In addition to the now standard 640K RAM, the TX can accommodate an optional 128K of RAM (\$49.95) dedicated for use as video memory. Applications can use the extra RAM for paged video addressing.

The extra video RAM seems to earn its keep. We saw an impressive demo show-

Photos by Geno Loro Jr.





*Photo 2. A look inside the 1000 TX reveals some Tandy proprietary chips (the square gold ones).*

*Table. At right. Tandy 1000 HX, 1000 TX, and LP-1000 specs, prices, and options.*

ing five simultaneously rotating 3D objects. The movement was smooth and relatively rapid.

The 1000 TX scores a scorching 7.1 on the Norton Utilities Sysinfo speed index. (Sysinfo returns a processing speed index relative to a standard IBM PC, where a reading of 1.0 indicates the machine runs

## **The 1000 TX scores a scorching 7.1 on the Norton Utilities Sysinfo speed index**

at the same speed as the original IBM PC). The TX is, therefore, over seven times faster than the original IBM PC and approximately three times faster than IBM's new System/2 Model 30.

The TX has a second half-height device slot that can hold a 3½- or 5¼-inch floppy drive, a 20- or 40-megabyte (MB) hard drive, or a tape backup system. The only Tandy mass-storage device the TX won't accept is the internally mounted, Bernoulli-technology Disk Cartridge System.

The TX uses the same 90-key keyboard as all other computers in the 1000 line. However, an optional deluxe keyboard adapter (\$99) is available to allow the use of other IBM compatible keyboards. The TX has five 8-bit expansion slots on the

expansion channel. The 67-watt power supply is adequate to match the expected five-card expansion load, including the use of an internal hard-disk drive. See Photo 2 for a look inside the 1000 TX.

Start-up software includes Personal Deskmate 2, GW-Basic, and MS-DOS 3.2. (Version 3.3 will be shipped when available.) Comprehensive DOS and Basic manuals are extra-cost options. Tandy is also planning to introduce a Microsoft-compatible mouse for under \$50.

### **Personal Deskmate 2**

Personal Deskmate was first introduced last year as integrated start-up software for the the 1000 EX. With separate modules for desktop applications, notepad, calculator, file manager, spreadsheet, and a paint program, the original Personal Deskmate represented a substantial improvement over earlier versions. However, its monster size made it slow and cumbersome to use with a single-drive system. Individual modules had to be dispersed over a series of disks to make practical use of them. Tandy has neatly solved this problem in the new HX by placing several of the Personal Deskmate 2 modules in the computer's on-board ROM. With the 3½-inch, 720K drive, the HX now runs the package briskly from a single disk.

Enhancements in Personal Deskmate 2 include a 16-color paint program (the original provided only four-color support) and an interesting graphics-based music composition program that takes advantage of the Texas Instruments three-voice sound chip (see Photos 3 and 4). Other improvements make the Personal Deskmate 2 interface more intuitive. Alternative key choices are provided for the awkward alternate-letter, spacebar, and tab-key com-

## **Tandy 1000 HX: \$699**

### *Standard features*

- Intel 8088-2 CPU, speed switchable between 4.77 and 7.16MHz
- 256K RAM, expandable to 640K
- one 720K, 3½-inch disk drive
- three Plus expansion slots
- parallel printer port
- two joystick ports
- three-voice sound
- enhanced CGA (accepts RGB or monochrome monitor)
- headphone jack/volume control
- MS-DOS 2.11 in ROM, GW-Basic and Personal Deskmate 2 on disk

### *Options (excluding those already available for the 1000 EX)*

- second internal 3½-inch disk drive
- external 20MB hard drive
- high-resolution video
- Microsoft-compatible mouse

## **Tandy 1000 TX: \$1,199**

### *Standard features*

- Intel 80286 CPU, speed switchable between 4 and 8MHz
- 640K RAM, expandable to 768K (including video RAM)
- one 720K, 3½-inch disk drive
- five 8-bit expansion slots
- parallel and serial ports
- two joystick ports
- three-voice sound
- enhanced CGA (accepts RGB or monochrome monitor)
- headphone jack/volume control
- MS-DOS 3.2 (3.3 when available), GW-Basic, Personal Deskmate 2

### *Options (excluding those already available for the 1000 SX)*

- second internal 3½-inch disk drive
- high-resolution video
- Microsoft-compatible mouse
- 128K video RAM
- Intel 80287 math coprocessor

## **LP-1000 Laser Printer: \$2,199**

### *Standard features*

- 1.5MB internal memory
- Centronics-type hardware interface
- four hard fonts, expandable to 16
- HP Laserjet Plus, IBM Proprinter, IBM Wheelwriter, and Tandy printer emulation modes
- 150-sheet capacity paper tray

### *Options*

- video bus interface
- maintenance kits



binations used to move the cursor and select choices from the menus. Optional function-key assignments have been added to most of the pull-down menus.

### The LP-1000 Laser Printer: At Last

While other major printer manufacturers plunged into the laser market in its infancy, Tandy adopted a wait-and-see attitude, hoping for the dust to settle over a standard for laser engines and page-description language (PDL) technology. While the standard hasn't evolved, the wait is over. At \$2,199, the LP-1000 (available in October) is Tandy's first entry into the laser-printer market (see Photo 5).

Tandy has positioned the LP-1000 as a high-end replacement for daisy-wheel printers. It provides typeset-quality documents and serves as a vehicle for entry-level desktop publishing.

The compact desktop unit is driven by a second-generation Ricoh laser engine and sports 1.5MB of internal memory—enough to reproduce full 300- by 300-dot-per-inch (dpi) graphic pages at the rate of six pages per minute. The LP-1000 is ready to print when you unpack it from the box. Aside from a standard Tandy parallel printer cable, no extra-cost options are required.

The LP-1000's emulation modes include the HP Laserjet Plus, IBM Proprinter, IBM Wheelwriter, and Tandy printers. Compatibility extends to all computers in the Tandy line with the single exception of the Color Computer. Hardware interface to the computer is provided through a standard Centronics-type parallel adapter or an optional video bus arrangement.

The LP-1000 comes standard with four assigned hard fonts: Letter Gothic 12, Letter Gothic 16.7, Prestige Elite 12, and Courier 10. Also, it accepts up to 16 additional software-downloadable fonts.

The clip-on paper tray accepts 150 sheets of 20-pound bond paper in letter, half-letter, A4, A5, and B5 paper sizes. A switch-selectable paper path allows finished pages to exit through either the side or top of the printer in sorted or reverse order. The printable area of each page is 8 inches wide by 13½ inches long, depending on the selected addressable print area and paper-size settings.

After a 20-second warm-up period, the LP-1000 prints and ejects a single page configuration summary with a press of the test button to inform you of the current print quality and settings. The LP-1000's dimensions are 16½ inches long by 16½ inches wide by 8½ inches high, and it weighs 37½ pounds. The rated duty cycle is 3,000 sheets per month.

The toner and drum are separate, so you don't have to discard the drum whenever the toner runs out. The toner is good for 1,500 sheets and the drum for 15,000

Photo 3. Personal Deskmate 2 now features a music-composition module.

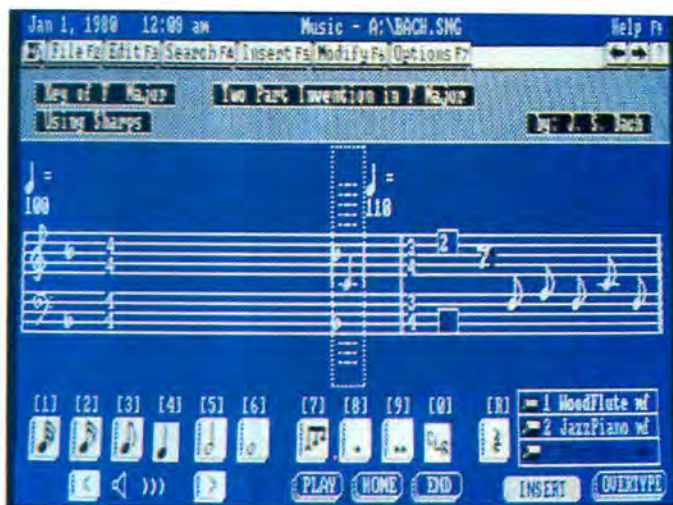


Photo 4. A duck drawn with Personal Deskmate 2's updated Paint module.

sheets. All components inside are color-coded to indicate which you can service yourself and which require professional attention.

### The Big Lineup

Does the world really need four versions of the Tandy 1000? Consumers will answer that question in the next few months. Tandy is betting that the differences in base configurations and price spreads will allow them to blanket the low-end MS-DOS-compatible market.

Tandy is taking what it calls a "building block" approach to computer marketing. Each base model comes with one type of disk drive, and Tandy lets the customer decide what else is necessary. There is nothing new about this strategy; in fact, it's common among smaller makers of PC compatibles. It's a good idea if you want to keep prices competitive.

The move to 3½-inch drives is also a good idea. Personal Deskmate 2 certainly benefits from the extra disk capacity, as would many other popular software packages that consume several 5¼-inch disks. The smaller disks are also more durable, being encased in hard plastic. The larger floppies appear archaic by comparison.

The first-time computer buyer purchasing an HX or TX will find few complaints with the 3½-inch drives. Not all commercial software will be immediately available for the smaller disks, but it's inevitable that all MS-DOS software will eventually go in that direction. Anyone upgrading from a 5¼-inch MS-DOS system, however, will have to find a way to transfer his or her software library to the new medium. This can be done in a number of ways: use a commercial transfer utility, send the programs via a null-modem cable, or buy an external 5¼-inch drive. All are a pain in the butt and could cost money.

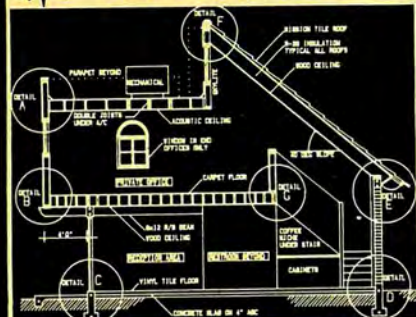
Tandy is not the only major MS-DOS-compatible maker to go to 3½-inch drives. Zenith's recently introduced Eazy-PC sports one; it sells for \$999 in its base configuration.

The DOS-in-ROM approach is both unique and impressive. It will sell computers to the home and education markets Tandy is targeting. Veteran users, however, tend to sneer at DOS shells, no matter how technically elegant they are. Tandy officials did not rule out the DOS-in-ROM approach for other 1000 models, saying they would wait and see how well



## Professional results with Models III 4 \* PC/XT/AT Tandy 1000 - 1200 - 3000

**new** All MSDOS software is now also available on optional 3.5" disks



**xT.CAD PROFESSIONAL** by Microdex. Computer Aided Drafting software for technical production and education. Create, edit, modify precise drawings, details. Features include overlays, grids, cursor snap, zoom, pan, block copy, enlarge, reduce, rotate, mirror, clip, merge, text labels, more. Requires hi-res screen and RS-232 interface. Output to pen plotters. Input from keyboard, or optional digitizer or mouse. Friendly, competent support since 1984. Software is backup-free. Was \$345 in 1986 catalog.

<b>Model III (48K)</b>	\$245.00
<b>Model 4 4p 4d (64K)</b>	\$245.00
<b>MSDOS computers (256K, fast!)</b>	\$195.00

**xT.CAD BILL of Materials** by Microdex. Software utilizes text labels from xT.CAD drawings to automatically generate invoices, parts requests, shipping lists, etc. Includes a mini-editor for customizing of output to line printers.

<b>Model 4 4p 4d or MSDOS</b>	\$ 45.00
-------------------------------	----------

**CASH PROFESSIONAL** by Microdex. Bookkeeping software with automatic double-entry ledger distribution in user-definable accounts. Reports by period, account, project, etc. Ideal for small business, professional or personal accounts.

<b>Model 4 4p 4d or MSDOS</b>	\$ 45.00
-------------------------------	----------

**GRAFYX Solution** by Micro-Labs. Easy to install board provides hi-res similar to Radio Shack boards. Includes popular GBASIC software and manual. Supports xT.CAD and other graphic programs.

<b>Model 4 4p 4d (640x240 pixels)</b>	\$145.00
---------------------------------------	----------

**MOUSE** interface by Micro-Labs connects to 50-pin I/O port and allows the use of Tandy Color Mouse 26-3025 (not included) with xT.CAD and other programs.

<b>Model III 4 4p 4d</b>	\$115.00
--------------------------	----------

Microdex Corporation  
1212 N. Sawtelle  
Tucson AZ 85716



602/326-3502

Write or call for details.

# MICRODEX



Photo 5. The LP-1000 is Tandy's first entry into the laser-printer market.

the HX was accepted.

The TX is simply a very fast SX with 3½-inch drives. The computer does not use its 80286 to its full potential. Cost-conscious businesses will find the TX's price and speed tempting. And the swap of the light-pen port for the serial port is a smart move. Light pens are rather esoteric these days, and a serial port is often an extra-cost item on other PCs.

The two remaining breaks with PC-compatible tradition still exist on the TX: the use of 10-inch boards and the non-standard keyboard. However, these differences are becoming less and less significant; many PC-compatible makers are also requiring the smaller boards in an effort to reduce the desktop footprint, and most major software vendors are addressing the differences in the keyboard in the wake of Tandy's success.

At the low end, Tandy seems to have all the bases covered. Time will tell if any one model will steal sales from another. The EX is in the greatest danger of losing customers; both the HX and EX compete for the first-time buyer, and the HX has more to offer for only another \$100.

Few, if any, computer companies can boast such a large MS-DOS offering as Tandy. The company now has eight MS-DOS models: the 1000 EX, HX, SX, and TX; the 1400 LT; 3000 HL and HD; and the 4000. (The Model 2000 is no longer being made, and the Tandy 600 is not fully MS-DOS compatible.) The Aug. 3 announcements indicate that Tandy is not content to rest on its laurels. They also reaffirm Tandy's stated commitment to sell computers that are more than just PC compatible. It looks like the next year will be an interesting one for Tandy. ■

## CALL FOR ARTICLES

Have you written a program or utility that might be interesting to other *80 Micro* readers? Do you know a DOS or programming technique that you'd like to share? Then how about sending it in to *80 Micro* for possible publication?

We're looking for people with good ideas. In particular, we'd like to see some useful utilities, small-business and personal management programs, tutorials on Basic and Pascal programming for all levels of expertise, and interesting science, math, and hobby applications.

The procedure is simple. Write us a query letter telling us about your proposed article. We'll tell you whether we think your article is appropriate for *80 Micro*. We'll also send you a copy of our author's guidelines, which will give you information on manuscript preparation, style, payment rates, and the like.

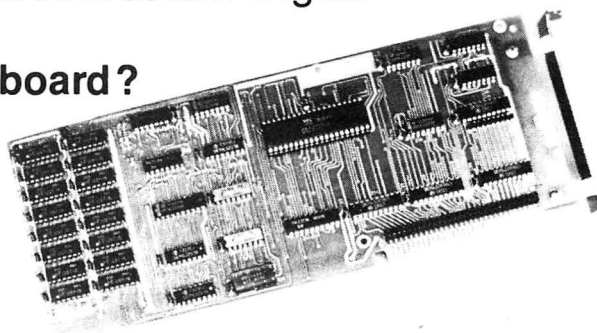
Send your letter or proposal to:  
Submissions Committee  
80 *Micro*  
80 Elm St.  
Peterborough, NH 03458.  
(No phone calls, please.)



# Tandy 1000 Memory Card

another high quality product from Southwestern Digital

Why spend a bundle on a Tandy board?  
Our Board is only  
**\$135.**



**Features:**

- 512K of Memory
- DMA
- Expansion Port
- Gold Edge Cards
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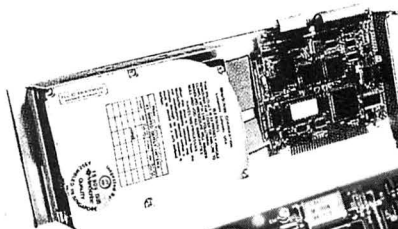
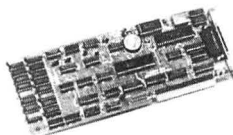
The Southwestern Digital Memory Expansion Plus Card has all the features of the Radio Shack Board but the price; you save almost \$400. Features include 512K installed, burned in, and tested to give you a total of 640K, a DMA circuit that is fully tested for hard drive operation, and an expansion port that will work with any of the Radio Shack Memory Plus Expansion Card options. High quality manufacturing, and features such as gold plated card edges make this the logical choice in upgrading your memory.

## Multifunction Card for 1000, 1000A

Includes 512K, RS232C Serial Port, Clock/Calendar, Plus Expansion Port, RAM Disk, And Printer Spooler ..... \$239.

## Hard Cards for the 1000, 1000SX, 3000HL

- 20 Meg ..... \$479.
- 30 Meg ..... \$629.
- 45 Meg ..... \$799.



## Tandy 1000 Add on Boards Serial, Clock, or Both Tandy 1000, 1000SX, 1000EX

The Southwestern Digital new Add-On boards were developed for use with the Plus Card Port, ( a piggy-back type, add on port established by Tandy to eliminate the need for an additional card slot ). These cards are fully compatible with the Memory Expansion Plus Card from Southwestern Digital and the Memory Expansion Plus Board from Tandy.

### RS232C PLUS Option Board

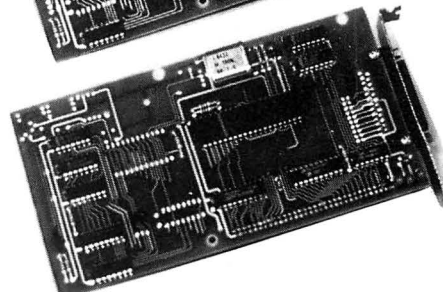
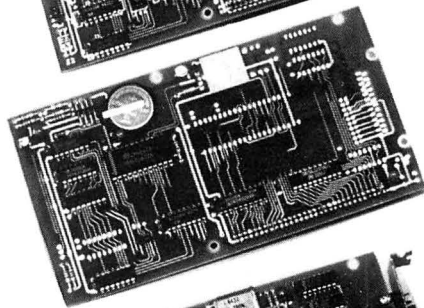
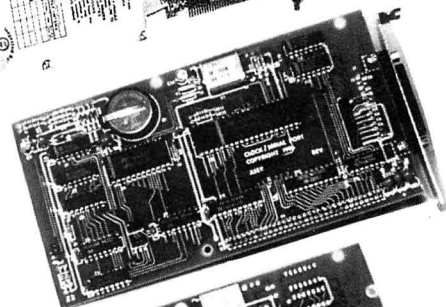
Mounts on a PLUS expansion board, and features selectivity between COM Port 1 and COM Port 2. The RS232C output connector is the standard Tandy female DB25, and is fully compatible with the Tandy output. **\$59.**

### Clock/Calendar PLUS Option Board

Mounts on a Plus expansion board, and features selectivity between two ports so that you can run two clocks at one time. The Clock Calendar Board gives you perpetual time/date so that you don't have to re-input time and date into your application programs as part of your power up routine. **\$59.**

### RS232C-Clock/Calendar PLUS Option Board

Features options of both of the above boards on just one board. **\$129.**



## Tandy 1000SX Computer System

- with 640K, RS232C Serial Port, 20 Meg Hard Drive, (1) 360K Disk Drive, Clock/Calendar ..... \$1399.
- With a 30 Meg ..... \$1549.

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# Turning Pro

## Convert your customized Superscriptsit printer drivers to work with Scripsit Pro.

If you have a customized Superscriptsit printer driver for your non-Radio Shack printer and you move to Scripsit Pro, you soon discover that no company supports customized Scripsit Pro printer drivers. This lack of support might cause you to avoid Scripsit Pro. The investment you made of up to \$50 in purchasing that original driver might also make you pause.

My effort to understand this void of independent driver support resulted in a surprising discovery—Superscriptsit and Scripsit Pro have *exactly* the same format, but the Pro's drivers reside much lower in memory.

If you have the source code for your driver, I can show you how to convert the source data to the new format. If you purchased your driver from Apparat, Alps, Powersoft, or Holmes Engineering and you don't have the source code for your driver, my program converts your Model III or 4 Superscriptsit driver to work with Scripsit Pro.

### Driver Conflicts

The major difference between the Superscriptsit and the Scripsit Pro drivers is in the address area where they reside. Superscriptsit drivers begin their code at BAD3 hexadecimal (hex) and have an upper limit of address C1D2 hex, which allows a driver to occupy a hefty maximum of 1,792 bytes of memory, though I haven't yet seen a driver that large. Scripsit Pro's authors must agree, because they changed the maximum size of a file to 1,378 bytes. He also moved the beginning address of the driver down to 5F9E hex, with a ceiling set at 6500 hex.

This difference in address area also occurs with the Model III Superscriptsit driv-

ers. The only major difference between the Model III's and the Model 4's Superscriptsit or Scripsit Pro drivers is that the drivers for the Model III contain their own printer-communications routines, but the Model 4 drivers (Radio Shack's at least) use printer supervisory calls to communicate with the printer. You can re-route devices, such as to a serial printer, by using printer supervisory calls. If you can live without this device independence, your custom Model III driver can work with the Model 4 version of Superscriptsit without change. Model III users with customized Superscriptsit drivers who hesitate to upgrade to the Model 4, and to either Superscriptsit or to Scripsit Pro, no longer have reason to pause.

Finally, Model I owners with customized Superscriptsit printer drivers for parallel printers can also use their drivers on the Model III and the Model 4 version of Superscriptsit or Model 4's Scripsit Pro if they first use a disk zapper (such as the File Patch utility in Debug under TRSDOS 1.3) and change all references of 32E837 to D3F800, and all references of 3AE837 to DBF800. This changes the references to the Model I's parallel printer-communications address at 37E8 hex to the printer port F8 hex on the Model III and 4.

### Upgrading Your Source Code

If you have the source code for your customized printer driver, upgrading it to Scripsit Pro printer driver only requires slight changes to your listing. First, you must change the ORG or PSECT directive at the start of your file from 0BAD3H to 5F9EH. This gets complicated if you have multiple ORG directives peppered throughout your listing, and to simplify matters you can append -23349 to each ORG value. Change ORG 0BAD3H to ORG 0BAD3H - 23349. This effectively sets this address to 5F9EH. Appending this offset value to your other ORG values properly offsets them.

The next step is to modify the calls to the three Scripsit routines that it allows you to access. Under Superscriptsit, these routines are PRTER at BAB5 hex, PRPAUS at BAB8 hex, and PRSTOP at BABB hex. Scripsit Pro uses the following addresses instead: PRTER at 5F90 hex,

PRPAUS at 5F93 hex, and PRSTOP at 5F96 hex.

### Modifying Absolute Addresses

If you purchase a commercial package that doesn't supply you with the source code, as is usually the case, you might have started to panic. Relocating a program to a different portion of memory requires one of three things: the source code to alter it; the program written entirely with relative addressing; or the use of a table that points to all of the absolute addressing locations and a relocation routine to use it.

If you do not have the source code, it is difficult to create a table or modify the code, and the space limitations make writing a relative-address program extremely difficult. Because of this I invented a fourth option that makes absolute addresses relocatable.

I wrote a small machine-language disassembler that detects absolute-address references. When an absolute address such as a jump, call, or memory pointer is located, an offset value is applied to the referenced address, and the new value is then written back to the location from where it was pulled. I move the entire program, once it is modified, to its new operating environment and dump the new program to disk.

### Converting Your Driver

Type Program Listing 1 into an editor/assembler to convert your driver for use on Scripsit Pro and assemble to it a file called PRODRV/CMD. Note that the program doesn't have checksums in the Basic listing—the checksums are built into the program. Save the source code to another file in case you err when typing. This listing is written in EDTASM format, because most readers have this format, and it is the format that many other assemblers can read. Some assemblers, such as the powerful macroassemblers, require the ORG at the start of the program to change to a PSECT. If you only have a Model I or III assembler, assemble it on that machine and transfer the PRODRV/CMD file to a Model 4 disk.

If you do not have an assembler, type

### System Requirements

**Model 4  
64K RAM  
Editor/assembler or Basic  
Model III or 4 Superscriptsit  
printer driver  
(Model I driver with changes)  
Available on The Disk Series**



**It is also a good idea to save the Basic program to a data disk in case you need to use it again.**

Program Listing 2 into Model 4 Disk Basic and run it. It creates the machine-language disk file called PRODRVR/CMD. This is the actual file that converts your driver. If the Basic program reports a checksum error, compare the data in the error line to the data in the magazine, correct it, and rerun it. It is also a good idea to save the Basic program to a data disk in case you need to use it again. Once PRODRVR/CMD is properly created, return to DOS by entering SYSTEM.

Your next step is to copy your driver to a duplicate file on a Model 4 disk. Remember, you must convert the driver to the Model 4 environment, because PRODRVR/CMD doesn't work in the Model I or III modes. You should also verify that the driver file contains a CTL extension. Finally, never modify an original file. If something goes wrong, and you did not heed this warning, then you have only yourself to blame.

If, for example, your file is named MX80/CTL, from the Model 4 DOS prompt you would enter the line PRODRVR MX80. Entering the extension is optional, but the driver file's extension must be CTL. PRODRVR first checks for valid parameters, clears memory up to the high memory setting, and loads the printer driver. If it does not find any code at address BAD4 hex, which is the storage location reserved for the average number of characters per inch, it assumes that the driver is not a Superscript driver and aborts. If it passes this test, it then locates the end of the program (plus 1) by examining the address saved at BB73 hex. This value is then recomputed for low memory storage and saved for reinsertion later. Next, its current value in memory is nulled to prevent conflicts with the relocation routine.

The program scans the driver and relocates and modifies all the absolute addressing that falls within the driver's range. It safely does this, even in tables, because none of the possible unit-width tables or hammer-set tables contain any values that would be misinterpreted as absolute addressing. Those values in the possible special-character table that can be misinterpreted are filtered out with an addressing-range check. If the transfer, loading, or modification address is above or below certain limits during this check, the data is not modified, because these are

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System Requirements: PC or compatible, MS-DOS 2.0 and above, 512K RAM and a printer.



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probably table values that were mistaken for references (or in one case mistaken for the \*PR device scan on most Model 4 drivers). Once you complete relocation, the new end-program address is reinserted into the code, the program is moved down to its new operating environment, a memory dump is performed, and finally an exit is made to DOS.

The moment of truth is when you test your new driver by taking it for a spin with Scripsit Pro.

### In Case of Trouble

If for any reason you have trouble with the new driver (if you are not an assembly programmer, contact a friend who knows Z80 assembly), obtain a disassembly of

the original file and the new file, and examine it for corruptions. If there is indeed a problem, you can probably repair it with a simple patch.

You might have problems if your custom printer driver exceeds the new 1,378-byte limit. Check this by clearing the upper memory with the SYSTEM (Clear) command from the DOS level, type DEBUG and press the enter key, and then load the new converted driver to memory (it is stored in CMD-file format) by entering DRIVER/CTL, where "DRIVER" substitutes for the name of your printer driver. Finally, type D6500 and press enter. If code exists above 6500 hex (its existence is indicated by non-zero values), then you might have problems with the code invad-

ing Scripsit Pro's program space, but chances are good that it will not.

If the author of your custom Model I or III driver chose to use a call to ROM address 003B hex to effect printer communications rather than writing a specific short printer output routine, you might also have problems. I am sure that someone in the world has indeed written such a routine into a driver, but I consider this unlikely, because this call also limits the special-effects capability of the printer. ■

*David Goben is a free-lance programmer who specializes in troubleshooting programs and writing utilities. Write to him at 67 Highland Road, Mansfield Center, CT 06250.*

*Program Listing 1. A program for converting printer drivers from Superscripts to Scripsit Pro.*

```

00100 ;*****
00110 ; SUPERSCRIPIT PRINTER DRIVER CONVERSION UTILITY ;
00120 ; WRITTEN BY DAVID GOBEN. APRIL 19, 1987. ;
00130 ; 67 HIGHLAND RD, MANSFIELD CTR, CT 06250 ;
00140 ;*****
00150 HIBASE EQU 0BAD3H ;start of superscripts driver
00160 LOBASE EQU 5F9EH ;start of scripsit pro driver
00170 HIGH EQU 100 ;get high memory address
00180 DSPLY EQU 10 ;display a message
00190 ERROR EQU 26 ;display error message
00200 FSPEC EQU 78 ;derive a filespec
00210 FEXT EQU 79 ;add a file extent

```

```

00220 OPEN EQU 59 ;open a file
00230 LOAD EQU 76 ;load a file
00240 CMDR EQU 25 ;execute command and return
00250 OFFSET EQU -23349 ;offset for relocation
00260 OFFST2 EQU -23333 ;special routine offset
00270 CR EQU 13 ;carriage return
00280 LF EQU 10 ;line feed
00290 ORG 3000H
00300 FCB DEFS 32 ;file control block
00310 TBUF DEFS 24 ;temporary buffer
00320 ;*****
00330 ;MAIN entry point of program
00340 MAIN PUSH HL ;save buffer pointer
00350 LD (BCSAVE+1),BC ;save buffer address
00360 LD HL,INTRO ;display intro message
00370 LD A,DSPLY
00380 RST 28H
00390 POP HL ;get pointer back

```

*Listing 1 continued*

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Listing 1 continued

```

00400 JP REL2
00410 INTRO DEFM 'SuperScript to Script Pro Printer Driver Conversion'
00420 DEFM ' Utility.'
00430 DEFB LF
00440 DEFM 'Copyright (c) 1987 by David Goben. All rights reserved!'
00450 DEFM ' by author'
00460 DEFB LF
00470 DEFB CR
00480 REL2 LD A,(HL) ;anything there?
00490 CP CR
00500 JR NZ,REL3 ;yes
00510 PERR LD A,44 ;parameter error
00520 ERRX OR 0C0H ;apply error mask
00530 LD C,A
00540 LD A,ERROR ;display error
00550 RST 28H
00560 RET ;return to DOS
00570 REL3 LD DE,TBUF ;check for invalid data
00580 LD A,FSPEC
00590 RST 28H
00600 JR Z,REL4 ;OK so far
00610 ILFIL LD A,19 ;illegal file name
00620 JR ERRX
00630 EXT DEFM 'CTL' ;default extent
00640 REL4 LD HL,EXT ;add extent if not there
00650 PUSH HL
00660 LD A,FEXT
00670 RST 28H
00680 LOOP1 LD A,(DE) ;now search for '/'
00690 INC DE
00700 CP '/'
00710 JR NZ,LOOP1
00720 LD B,3 ;test 3 bytes for match with CTL
00730 POP HL ;get EXT pointer
00740 LOOP2 LD A,(DE)
00750 CP (HL) ;match?
00760 JR NZ,ILFIL ;no, so bad data
00770 INC DE ;else try next
00780 INC HL
00790 DJNZ LOOP2
00800 LD HL,TBUF ;now see if file exists
00810 LD DE,FCB
00820 LD A,FSPEC
00830 RST 28H

```

```

00840 LD HL,MAIN ;set false I/O buffer
00850 LD A,OPEN
00860 RST 28H
00870 JR NZ,ERRX ;error, report and exit
00880 LD HL,TBUF ;OK, so reset FCB
00890 LD A,FSPEC
00900 RST 28H
00910 LD HL,$-$ ;get high memory address
00920 LD A,HIGH
00930 RST 28H
00940 LD BC,HIBASE ;get start of I/O buffer
00950 AND A
00960 SBC HL,BC ;compute length of memory
00970 INC HL ;correct count
00980 PUSH BC ;switch values
00990 EX (SP),HL
01000 POP BC
01010 LOOPA LD (HL),0 ;null entire buffer
01020 INC HL
01030 DEC BC
01040 LD A,B
01050 OR C ;entire buffer nulled?
01060 JR NZ,LOOPA ;not yet
01070 LD A,LOAD ;else load driver file
01080 RST 28H
01090 LD HL,HIBASE+1 ;get pointer to HIBASE+1
01100 LD A,(HL) ;any data there?
01110 OR A
01120 JR NZ,REL5 ;yes, OK
01130 LD HL,NSF ;else report error
01140 LD A,DSPLY
01150 RST 28H
01160 RET ;and exit to DOS
01170 NSF DEFM 'Not a SuperScript Driver!'
01180 DEFB CR
01190 REL5 LD HL,0BB73H ;point to LAST+1 storage area
01200 LD E,(HL) ;put the address to DE
01210 INC HL
01220 LD D,(HL)
01230 LD (HL),0 ;null data for a while
01240 DEC HL
01250 LD (HL),0
01260 LD H,D ;copy address to HL
01270 LD L,E

```

Listing 1 continued

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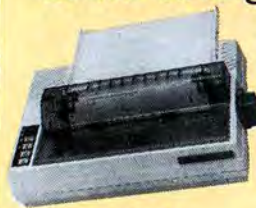
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Listing 1 continued

```

01280 LD BC,OFFSET ;apply offset
01290 ADD HL,BC
01300 LD (NEWEND+1),HL ;save it for later re-insertion
01310 LD HL,0BB36H ;point to start of transfers less 1
01320 ;-----
01330 ;process all bytes of driver file
01340 LOOP INC HL ;point to a byte
01350 PUSH HL ;save pointer
01360 AND A ;reset carry flag
01370 SBC HL,DE ;at end of driver?
01380 POP HL ;recover pointer
01390 JP NC,DONE ;yes, finish up housecleaning
01400 LD A,(HL) ;else get a program byte
01410 CP 3FH ;low page data?
01420 JR C,DOLOW ;yes
01430 CP 0C2H ;1-byte instruction?
01440 JR C,LOOP ;yes
01450 CP 0CBH ;extended instruction?
01460 JR NZ,SKIP ;no, check other special references
01470 ;skip over two program instructions
01480 PASS2 INC HL ;skip over two spaces
01490 JR LOOP ;skip over next
01500 SKIP CP 0DDH ;and IX register ref?
01510 JP Z,DOIXIY
01520 CP 0FDH ;IY ref?
01530 JP Z,DOIXIY
01540 CP 0EDH ;other extended ref?
01550 JP Z,DOED ;yes
01560 AND 7 ;else check instruction type
01570 CP 2 ;1-byte instr?
01580 JR C,LOOP ;yes, skip it
01590 JR Z,USEADD ;else it's a conditional JP
01600 CP 7 ;1-byter?
01610 JR Z,LOOP ;yes, so skip it
01620 CP 6 ;2-byter?
01630 JR Z,PASS2 ;yes
01640 CP 4 ;conditional call instr?
01650 JR Z,USEADD ;yes, check address ref'ed
01660 LD A,(HL) ;else get original byte
01670 CP 0C3H ;JP?
01680 JR Z,USEADD
01690 CP 0D3H ;OUT?
01700 JR Z,PASS2
01710 CP 0DBH ;IN?
01720 JR Z,PASS2
01730 CP 0CDH ;CALL?
01740 JR NZ,LOOP ;no, so it's a 1-byter: skip it
01750 ;an address is referenced, so check it for validity
01760 USEADD INC HL ;point to the address
01770 PUSH DE ;save the used register
01780 LD E,(HL) ;get work address to DE
01790 INC HL
01800 LD D,(HL)
01810 DEC HL
01820 LD A,D ;possible special function call?
01830 CP 0BAH
01840 JR Z,SPECL ;yes
01850 JR C,PASS2B ;else out of range, so skip
01860 CP 0C2H
01870 JR NC,PASS2B ;too high, so out of range
01880 USEAD1 EX DE,HL ;else put value to HL
01890 ADD HL,BC ;and apply offset
01900 USEAD2 EX DE,HL ;set new address back to memory
01910 LD (HL),E
01920 INC HL
01930 LD (HL),D
01940 DEC HL
01950 PASS2B POP DE ;get used register back
01960 JR PASS2 ;now pass up these two bytes
01970 ;check to see if special script routine calls
01980 SPECL LD A,E ;script routine call?
01990 CP 0BCH
02000 JR NC,SPEC2 ;no, out of range, but check further
02010 CP 0B5H
02020 JR C,PASS2B ;too low: out of range
02030 PUSH BC ;else apply special offset
02040 LD BC,OFFST2
02050 EX DE,HL ;put address to HL
02060 ADD HL,BC ;apply special offset
02070 POP BC
02080 JR USEAD2 ;then finish up address placement
02090 SPEC2 CP 0D3H ;part of driver?
02100 JR NC,USEAD1 ;yes, switch DE,HL and add offset
02110 JR PASS2B ;else entirely out of range, so skip
02120 ;-----
02130 ;handle low page instructions
02140 DOLOW AND 7 ;do byte values 00-3F
02150 JR Z,DL2 ;possible rel address
02160 CP 6 ;2-byter?
02170 JR Z,PASS2
02180 CP 3 ;1-byter?
02190 JP NC,LOOP ;yes
02200 CP 1 ;load reg command?
02210 LD A,(HL) ;get original value
02220 JR NZ,DL1 ;no, memory load
02230 AND 0FH
02240 CP 9 ;1-byter?
02250 JP Z,LOOP ;yes
02260 JR USEADD ;else an address ref
02270 DL1 CP 22H ;1-byter?
02280 JP C,LOOP ;yes
02290 JR USEADD
02300 DL2 LD A,(HL) ;get original byte
    
```

Listing 1 continued



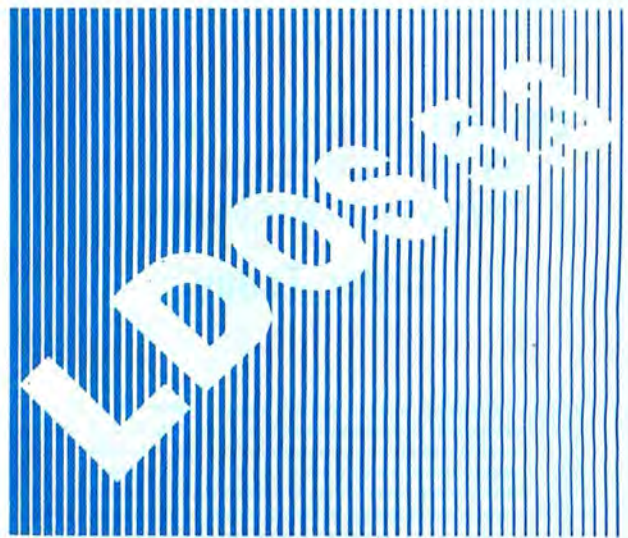
## Listing 1 continued

```

02310 CP 9 ;NOP or EX AF,AF'?
02320 JP C,LOOP ;yes
02330 JP PASS2
02340 -----
02350 ;check extended command
02360 DOED INC HL ;get next byte
02370 LD A,(HL)
02380 CP 7CH ;1-byter?
02390 JP NC,LOOP ;yes
02400 AND 7
02410 CP 3 ;1-byter?
02420 JP NZ,LOOP ;yes
02430 JR USEADD
02440 -----
02450 ;handle index register commands
02460 DOIXY INC HL ;get next byte
02470 LD A,(HL)
02480 CP 0CBH ;bit manipulation command?
02490 JR Z,PASS3 ;yes, skip it all
02500 CP 21H ;load register?
02510 JR Z,USEADD
02520 CP 22H ;load memory?
02530 JR Z,USEADD
02540 CP 2AH ;register from mem?
02550 JR Z,USEADD
02560 CP 34H ;reg to mem?
02570 JP C,LOOP
02580 CP 36H
02590 JP C,PASS2
02600 JR NZ,DO1
02610 ;pass up next 3 bytes
02620 PASS3 INC HL
02630 JP PASS2
02640 DO1 CP 7FH ;high half command?
02650 JR C,DOLOW2 ;no
02660 CP 0BFH ;1-byte instruction?
02670 JP NC,LOOP
02680 AND 7
02690 CP 6 ;indexed offset ref?
02700 JP NZ,LOOP ;no
02710 JP PASS2 ;else skip the two bytes
02720 DOLOW2 CP 70H ;check range for 2-byter
02730 JR C,DOLOW3 ;not in range
02740 CP 7CH ;2-byter?
02750 JP C,PASS2 ;yes
02760 CP 7EH ;1-byter?
02770 JP C,LOOP ;yes
02780 JP PASS2 ;else 2-byter
02790 DOLOW3 AND 7 ;check type
02800 CP 6 ;indexed offset?
02810 JP Z,PASS2 ;yes, skip 2 bytes
02820 JP LOOP ;else skip just 1
02830 -----
02840 ;done processing relocation for addresses
02850 DONE LD HL,0BB73H ;get end of driver pointer
02860 NEWEND LD BC,$-5 ;set new end address
02870 LD (HL),C
02880 INC HL
02890 LD (HL),B
02900 EX DE,HL ;put current end to HL
02910 LD DE,HIBASE ;compute length of file
02920 AND A ;reset carry flag
02930 SBC HL,DE
02940 LD B,H ;set counter
02950 LD C,L
02960 EX DE,HL ;set HL to start of file
02970 LD DE,LOBASE ;set new start
02980 LDIR ;move file down in memory
02990 DEC DE ;point to last byte of file
03000 PUSH DE ;save a copy to the stack
03010 ;now set up the dump file command
03020 LD HL,TBUF ;transfer filename to dump message
03030 LD DE,PT2
03040 LD A,FSPEC
03050 RST 28H
03060 LOOP3 INC DE ;find terminator
03070 LD A,(DE)
03080 CP 32 ;control?
03090 JR NC,LOOP3 ;no
03100 LD HL,PT3 ;append next section of data
03110 LOOP4 LD A,(HL) ;transfer a byte
03120 LD (DE),A
03130 INC HL
03140 INC DE
03150 OR A ;done?
03160 JR NZ,LOOP4 ;no
03170 DEC DE ;else point to END address buffer
03180 POP HL ;get end address
03190 LD A,H ;put as ascii data
03200 CALL SETASC
03210 LD A,L
03220 CALL SETASC
03230 LD HL,PT4 ;then append final part
03240 LOOP5 LD A,(HL)
03250 LD (DE),A
03260 INC HL
03270 INC DE
03280 CP CR
03290 JR NZ,LOOP5
03300 LD HL,DUMP ;execute command
03310 LD A,CMDR
03320 RST 28H
03330 BCSAVE LD BC,$-5 ;get start of dos buffer

```

Listing 1 continued



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#### Listing 1 continued

```

03340 LD A,CR ;null it
03350 LD (BC),A
03360 RET ;return to DOS
03370 ;-----
03380 ;support subroutine
03390 SETASC PUSH AF ;save byte
03400 RLCA ;move high nibble to low
03410 RLCA
03420 RLCA
03430 RLCA
03440 CALL ASC ;set current low nibble to buffer
03450 POP AF ;get other nibble
03460 ASC AND 0FH ;drop high nibble
03470 CP 10 ;less than 10?
03480 JR C,$+4 ;yes
03490 ADD A,7 ;add A-F offset
03500 ADD A,'0' ;add ASCII offset
03510 LD (DE),A ;put value to DE buffer
03520 INC DE ;bump buffer
03530 RET ;return to caller
03540 ;-----
03550 ;dump buffer area
03560 PT4 DEFB 39 ;end of message
03570 DEFB ')'
03580 DEFB CR
03590 PT3 DEFM '(S=X'5F9E',E=X'1'
03600 DEFB 0
03610 DUMP DEFM 'DUMP '
03620 PT2 EQU $ ;variable area
03630 ;-----
03640 END MAIN ;done
    
```

End

#### Program Listing 2. A program to convert printer drivers without an assembler.

```

1 'PRODRV/BAS AND PRODRV/CMD COPYRIGHT 1987 BY DAVID GOBEN
2 'ALL RIGHTS RESERVED. RIGHTS GIVEN FOR PERSONAL, NOT COMMERCIAL USE
10 'DATA POKE FORMAT CREATED ON DATAPOKE/BAS
20 CLS:PRINT"BUILDING 'PRODRV/CMD'":RESTORE
30 OPEN"O",1,"PRODRV/CMD":L=90
40 CS=0:L=L+10
50 READ A$:IF A$="END"THEN CLOSE:END ELSE IF LEFT$(A$,1)<>"- "THEN 70
60 IF VAL(MID$(A$,2))=CS THEN 40 ELSE PRINT"CHECKSUM ERROR IN LINE"L:END
70 A=VAL("6H"+A$):PRINT#1,CHR$(A)::CS=CS+A
80 GOTO 50
90 ''' DATA AREA '''
100 DATA 05,09,00,00,00,50,52,4F,20,20,20,05,09,00,00,-365
110 DATA 30,20,20,20,20,20,01,FE,38,30,E5,ED,43,CC,-1336
120 DATA 32,21,47,30,3E,0A,EF,E1,C3,CA,30,53,75,70,65,-1596
130 DATA 72,53,63,72,69,70,73,69,74,20,74,6F,20,53,63,-1436
140 DATA 72,69,70,73,69,74,20,50,72,6F,20,50,72,69,6E,-1445
150 DATA 74,65,72,20,44,72,69,76,65,72,20,43,6F,6E,76,-1421
160 DATA 65,72,73,69,6F,6E,20,55,74,69,6C,69,74,79,2E,-1490
170 DATA 0A,43,6F,70,79,72,69,6F,68,74,20,28,63,29,20,-1207
180 DATA 31,39,38,37,20,62,79,20,44,61,76,69,64,20,47,-1091
190 DATA 6F,62,65,6E,2E,20,41,6C,6C,20,72,69,6F,68,74,-1353
200 DATA 73,20,72,65,73,65,72,76,65,64,20,62,79,20,61,-1391
210 DATA 75,74,68,6F,72,0A,0D,7E,FE,0D,20,09,3E,2C,FE,-1371
220 DATA C0,4F,3E,1A,EF,C9,11,20,30,3E,4E,EF,28,07,3E,-1384
230 DATA 13,18,ED,43,54,4C,21,E4,30,E5,3E,4F,EF,1A,13,-1470
240 DATA FE,2F,20,FA,06,03,E1,1A,BE,20,E5,13,23,10,F8,-1612
250 DATA 21,20,30,11,00,30,3E,4E,EF,21,38,30,3E,3B,EF,-1054
260 DATA 20,C1,21,20,30,3E,4E,EF,21,00,00,3E,64,EF,01,-1152
270 DATA D3,BA,A7,ED,42,23,C5,E3,C1,36,00,23,0B,78,B1,-1916
280 DATA 20,F8,3E,4C,EF,21,D4,BA,01,FE,34,31,7E,B7,20,-1785
290 DATA 23,21,3F,31,3E,0A,EF,C9,4E,6F,74,20,61,20,53,-1241
300 DATA 75,70,65,72,53,63,72,69,70,73,69,74,20,44,72,-1507
310 DATA 69,76,65,72,21,0D,21,73,BB,5E,23,56,36,00,2B,-1131
320 DATA 36,00,62,6B,01,CB,A4,09,22,81,32,21,36,BB,23,-1158
330 DATA E5,A7,ED,52,E1,D2,7D,32,7E,FE,3F,38,72,FE,C2,-2386
340 DATA 38,EE,FE,CB,20,03,23,18,E7,FE,DD,CA,2D,32,FE,-2102
350 DATA FD,CA,2D,32,FE,ED,CA,1D,32,E6,07,FE,02,38,D2,-2081
360 DATA 28,1D,FE,07,28,CC,FE,06,28,DE,FE,04,28,11,7E,-1537
370 DATA FE,C3,28,0C,FE,D3,28,D1,FE,DB,28,CD,FE,CD,20,-2424
380 DATA B3,23,05,5E,23,56,2B,7A,FE,BA,28,10,38,0B,FE,-1624
390 DATA C2,30,07,EB,09,EB,73,23,72,2B,D1,18,AE,7B,FE,-1819
400 DATA BC,30,0D,FE,E5,38,FA,C5,01,DB,A4,EB,09,C1,18,-2026
410 DATA E6,FE,D3,30,E0,18,E5,E6,07,28,1E,FE,06,28,8E,-1969
420 DATA FE,03,D2,72,31,FE,01,7E,20,09,E6,0F,FE,09,CA,-1762
430 DATA 72,31,18,82,FE,22,DA,72,31,18,AB,7E,FE,09,DA,-1836
440 DATA 72,31,C3,88,31,23,7E,FE,7C,0D,72,31,E6,07,FE,-1946
450 DATA 03,C2,72,31,18,92,23,7E,FE,01,D3,30,32,CB,28,-1498
460 DATA 18,FE,21,28,88,FE,22,84,FE,2A,28,80,FE,34,-1717
470 DATA DA,72,31,FE,36,DA,88,31,20,04,23,C3,88,31,FE,-1797
480 DATA 7F,38,0F,FE,8F,D2,72,31,E6,07,FE,06,C2,72,31,-1870
490 DATA C3,88,31,FE,70,38,0D,FE,7C,DA,88,31,FE,7E,DA,-2194
500 DATA 72,31,C3,88,31,E6,07,FE,06,CA,88,31,C3,72,31,-1785
510 DATA 21,73,BB,01,00,00,71,23,70,FE,E1,11,D3,BA,A7,ED,-1649
520 DATA 52,44,4D,EB,11,9E,5F,ED,0B,1B,05,21,20,30,11,-1515
530 DATA 01,33,3E,4E,EF,13,1A,FE,20,30,FA,21,EB,32,7E,-1504
540 DATA 12,23,13,87,20,F9,1B,E1,7C,CD,D2,32,7D,CD,D2,-1917
550 DATA 32,21,E8,32,7E,12,23,13,FE,0D,20,FB,21,FC,32,-1445
560 DATA 3E,19,EF,01,00,00,3E,0D,C2,09,F5,07,07,07,-878
570 DATA CD,DB,32,F1,E6,0F,FE,0A,38,02,C6,07,C6,30,12,-1751
580 DATA 13,C9,27,29,0D,20,28,53,3D,58,27,35,46,39,45,-905
590 DATA 27,2C,45,3D,58,27,00,44,55,4D,50,20,02,02,38,-742
600 DATA 30,-48,END
    
```

End



# Calendars to Go

Print out activity calendars for your club, school, church, or family.

NOVEMBER 1987						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 9:30 Church Sch. Johan offering 11:00 Communion Service 5:30 Youth Group 7:00 Hymnsing/Study	2 7:30 Elders 7:30 Pathfinders 7:30 Polk Group	3 7:30 Home Bible Studies	4 6:00 Youth Bells 7:00 Adult Bells	5 10:30 Church Bible Study 7:30 Prayer and Praise	6	7
8 9:30 Church Sch. 11:00 Worship Service 3:00 Nursing Home Service 5:30 Youth Group 7:00 Hymnsing/Study	9 7:30 Christian Education 7:30 Folk Group	10 Over-Fifties 7:30 Home Bible Studies	11 Retreat 6:00 Youth Bells 7:00 Adult Bells	12 10:30 Church Bible Study	13 7:00 Volleyball	14
15 8:00 Communion 9:30 Church Sch 11:00 Worship Service 5:30 Youth Group 7:00 Hymnsing/Study	16 7:30 Church School Teachers 7:30 Folk Group	17 7:30 Home Bible Studies	18 6:00 Youth Bells 7:00 Adult Bells	19 10:30 Church Bible Study 7:30 Prayer and Praise	20 6:00 Wedding Rehearsal	21 1:00 Vallier/ Woodbury Wedding
22 9:30 Church Sch 11:00 Worship Service 5:30 Youth Group 7:00 Hymnsing/Study	23 7:30 Building and Grounds 7:30 Folk Group	24 7:30 Home Bible Studies	25 6:30 Thanksgiving Eve Service	26 THANKSGIVING	27 7:00 Volley ball	28
29	30					

Figure. Sample calendar.

Creating an activity calendar with a word processor is tedious. You have to insert all the date numbers into their respective boxes and then renumber them for each month. Calmaker (see the Program Listing) is a Basic program with two parts. It runs as is on the Models III and 4. To run it on the Tandy 1000, change the slash (/) to a period in line 390. The first part creates a ready-to-use monthly activity calendar form. You only need to supply the month and the year. The program then writes your calendar to disk as a text file ready to load and use. All of the dates are in the right places. You can load the form into your word processor, enter the data for each date, and print the finished calendar with your word processor (see the Figure). If you do not own a printer, you can still use Calmaker with your word processor and store activities on disk.

You can see what happens when Calmaker creates the file on disk. The left portion of each line prints to the screen to confirm the program is working. The program gives the calendar form a file name consisting of the first three letters of the month, the year, and the extension CAL (for example, March 1987 would be MAR1987/CAL).

I designed this format for Scripsit, but it

## System Requirements

Models III/4  
(Tandy 1000 with changes)  
64K RAM  
Disk Basic  
Printer  
Word processor  
Available on The Disk Series

should work with any word processor able to load an ASCII text file. You need to change the formatting commands if you use another word processor. Calmaker is easy to understand, and it is easy to customize.

The second part of the program automatically fills in the created calendar forms with an overlay of regularly scheduled activities. For example, if a group meets on the first and third Sundays of every month, Calmaker notes this and inserts it into the calendar.

## Planning Ahead

Calmaker displays a menu of four choices:

1. Create and fill calendar
2. Create calendar
3. Fill calendar
4. End



```

576 | 10 GOTO 60
3951 | 20 Z$="Activity Calendar Page File Maker":RETURN
4024 | 30 Z$="For Loading into a Word processor":RETURN
3709 | 40 Z$="By Howard W. Mueller - Version 3.1":RETURN
3714 | 50 Z$="Box 17, Pocahontas, Missouri 63779":RETURN
1051 | 60 CLS:CLEAR 20000
2400 | 70 GOSUB 20:GOSUB 920:GOSUB 30:GOSUB 920
2405 | 80 GOSUB 40:GOSUB 920:GOSUB 50:GOSUB 920
1793 | 90 Z$=STRING$(63,61):GOSUB 920
4093 | 100 P=12:PRINT "Pitch 10, 12, or 15 (Default = ";P;"):INPUT P$
1110 | 110 IF P$="" THEN P=12 ELSE P=VAL(P$)
2401 | 120 IF P=12 THEN 150 ELSE IF P=10 THEN 140
1116 | 130 IF P=15 THEN 160
4561 | 140 DS=100:SD=18:WD=14:SB=4:WB=2:WE=2:BE=21:EN=96:ST=15:Z=13:BP=3:GOTO
170
4610 | 150 DS=130:SD=22:WD=17:SB=6:WB=3:WE=4:BE=25:EN=115:ST=18:Z=15:BP=4:GOTO
170
4056 | 160 DS=162:SD=24:WD=22:SB=7:WB=6:WE=6:BE=27:EN=142:ST=23:Z=20:BP=1
2733 | 170 DIM M(12),M$(12),DNS(42),W$(7),S$(56),M$(56),D(7)
856 | 180 US=CHR$(124)
2106 | 190 DATA 31,28,31,30,31,30,31,31,30,31,30,31
6573 | 200 DATA JANUARY,FEBRUARY,MARCH,APRIL,MAY,JUNE,JULY,AUGUST,SEPTEMBER,OC
TOBER,NOVEMBER,DECEMBER
5712 | 210 DATA " SUNDAY "," MONDAY "," TUESDAY "," WEDNESDAY "," THURSDAY
"," FRIDAY "," SATURDAY "
1964 | 220 FOR X=1 TO 12:READ M(X):NEXT
2001 | 230 FOR X=1 TO 12:READ M$(X):NEXT
1968 | 240 FOR X=1 TO 7:READ W$(X):NEXT
3632 | 250 PRINT:PRINT:PRINT TAB(15);"1. MAKE AND FILL CALENDAR"
2154 | 260 PRINT TAB(15);"2. MAKE CALENDAR"
2165 | 270 PRINT TAB(15);"3. FILL CALENDAR"
1485 | 280 PRINT TAB(15);"4. END"
3648 | 290 PRINT:PRINT TAB(20);INPUT "ENTER CHOICE #";MC:PRINT
2236 | 300 IF MC<0 OR MC>4 THEN CLS:GOTO 250
1180 | 310 IF MC=4 THEN 1260
1810 | 320 IF MC=3 THEN F$="":GOTO 1000
3468 | 330 FOR X=1 TO 12:PRINT X;" = ";M$(X);:NEXT:PRINT:PRINT
3829 | 340 INPUT "WHAT IS THE MONTH NUMBER OF THE CALENDAR (1-12)";M
1688 | 350 IF (M<1) OR (M>12) THEN 340
3118 | 360 PRINT:PRINT "CALENDAR FOR ";M$(M);" FOR YEAR";
3786 | 370 INPUT Y:IF Y<100 THEN Y=Y+1900:Y$=STR$(Y) ELSE Y$=STR$(Y)
4403 | 380 IF Y<1753 THEN PRINT "DATES BEFORE SEPTEMBER 14, 1752 ARE IN ERROR"
2266 | 390 F$=LEFT$(M$(M),3)+RIGHT$(Y$,4)+"/CAL"
3178 | 400 IF Y/4=INT(Y/4) THEN M(2)=29:IF Y=1900 THEN M(2)=28
2403 | 410 M1=M:Y1=Y:IF M1=1 THEN M1=13:Y1=Y1-1
1689 | 420 IF M=2 THEN M1=14:Y1=Y1-1
3678 | 430 W=1+(INT(13*(M1+1)/5))+(INT(5*Y1/4))-(INT(Y1/100))+(INT(Y1/400))
2065 | 440 W=W-INT(W/7)*7:IF W=0 THEN W=7
2896 | 450 PRINT M$(M);" ";Y$;" Begins on ";W$(W):D=W
1038 | 460 PRINT:PRINT
915 | 470 OPEN "O",1,F$
4827 | 480 Z$=">"+"F$+" ACTIVITY CALENDAR TEXT FILE FOR WORDPROCESSOR":PRINT
#1,Z$
1337 | 490 GOSUB 860:GOSUB 40
1482 | 500 Z$=">"+"Z$:PRINT #1,Z$
2690 | 510 GOSUB 860:GOSUB 50:Z$=">"+"Z$:PRINT #1,Z$
3294 | 520 GOSUB 860:DS$=STR$(DS+2):DS$=RIGHT$(DS$,LEN(DS$)-1)
2833 | 530 Z$=">PL=52 TM=1 BM=52 LM=0 RM="+DS$+" C=N J=N"
1500 | 540 PRINT #1,Z$:GOSUB 860
2596 | 550 Z$=">"+" SET PRINTER TO"+STR$(P)+" PITCH"
1502 | 560 PRINT #1,Z$:GOSUB 860
3932 | 570 Z$=">"+" SET SCREEN WIDTH TO"+STR$(DS+2):PRINT #1,Z$:GOSUB 860
476 | 580 Z$=" "
1453 | 590 FOR X=1 TO LEN(M$(M))
1512 | 600 Z$=Z$+MID$(M$(M),X,1)+" "
622 | 610 NEXT X
1301 | 620 FOR X=1 TO LEN(Y$)
1369 | 630 Z$=Z$+MID$(Y$,X,1)+" "
625 | 640 NEXT X
2351 | 650 Z$=STRING$( ((DS/2)-LEN(Z$)/2)+2,32)+Z$
2136 | 660 PRINT #1,Z$:GOSUB 860:GOSUB 870
2479 | 670 Z$=STRING$(SB,32)+W$(1)+STRING$(SB,32)
4162 | 680 FOR X=2 TO 7:Z$=Z$+US+STRING$(WB,32)+W$(X)+STRING$(WE,32):NEXT X
1506 | 690 PRINT #1,Z$:GOSUB 860
2721 | 700 FOR X=1 TO 40:DNS(X)=STRING$(2,32):NEXT X
2599 | 710 FOR X=1 TO 7:DS(X)=STRING$(2,32):NEXT X
4118 | 720 FOR X=1 TO M(M):DNS(X)=" "+STR$(X):DNS(X)=RIGHT$(DNS(X),2):NEXT X
2506 | 730 DS=1:FOR Q=1 TO 5:GOSUB 870:GOSUB 830
2763 | 740 GOSUB 880:PRINT #1,Z$:GOSUB 860:GOSUB 900
1578 | 750 IF (Q=5) THEN GOSUB 840
996 | 760 FOR X=1 TO 7
2130 | 770 IF (Q=5) AND (X=4) THEN GOTO 930
2136 | 780 IF (Q=5) AND (X=5) THEN GOTO 970
1571 | 790 PRINT #1,Z$:GOSUB 860
687 | 800 NEXT X
1049 | 810 NEXT Q:CLOSE
1687 | 820 IF MC=1 THEN 1000 ELSE 250
4865 | 830 IF D THEN FOR X=D TO 7:DS(X)=DNS(DX):DX=DX+1:NEXT:D=0:GOTO 850
2877 | 840 FOR X=1 TO 7:DS(X)=DNS(DX):DX=DX+1:NEXT:D=0
669 | 850 RETURN
1848 | 860 PRINT LEFT$(Z$,63):RETURN
3185 | 870 Z$=STRING$(DS,"-"):PRINT #1,Z$:GOSUB 860:RETURN
1779 | 880 Z$=" "+DS(1)+STRING$(SD-3,32)
3852 | 890 FOR Y=2 TO 7:Z$=Z$+US+DS(Y)+STRING$(WD-2,32):NEXT Y:RETURN
1256 | 900 Z$=STRING$(SD,32)
3433 | 910 FOR Y=2 TO 7:Z$=Z$+US+STRING$(WD,32):NEXT Y:RETURN

```

Listing continued

First, you need to create an initial overlay. Choose option 2 to create a calendar form for a month in which the first day falls on Sunday.

You could use March 1987, since it was such a month. Enter 3 for the month and 1987 (or 87) for the year. The calendar's file name is MAR1987/CAL. When the program returns to the menu, select op-

**You can load the form into your word processor, enter the data for each date, and print the finished calendar.**

tion 4 (End), and load MAR1987/CAL into your word processor.

Overlays you create are used only with calendars of matching pitch. Assuming you use 12 pitch, set the screen width to 132. The date numbers in the boxes of the overlay are not important, but they help prevent you from putting information where the calendar prints the date numbers. Enter the regular meetings and activities, and save these in ASCII under the file name Standard. This calendar form is now your overlay for any month of any year. When you want to use a different name, or make the name variable, change line 1000 in the Listing.

To create the calendar for the month you want, go back to Basic and load Calmaker. When you choose option 1, you are asked for the month and the year. Calmaker writes the form with the standard agenda in place. You can choose to create more months, or you can end the program. Next you can load the specific file into your word processor to insert those activities that occur only in the month you are planning. After you double-check the calendar page, you are ready to print the calendar.

### Fits Perfectly

Calendars in all three pitches are meant to be printed horizontally on an 8 1/2" by 11-inch sheet of paper and will fill any sheet. However, you can print the 10- or 12-pitch calendar on any sheet of paper provided your printer has a 132-column format. Lines 100-130 allow you to set the format for your file by the pitch you use on your printer. If you always use the same format, you can delete lines 100-130; then change line 100 to read P=nn, where "nn" would represent your



printer pitch.

Most activity calendars printed on 8½-by 11-inch paper have room for only five rows of boxes. Calmaker calendars are designed the same way. When a month has 30 or 31 days and the first day of the month is a Friday or Saturday, the accepted format is to double up the extra date or dates in the last row. Calmaker uses the same form. You might need to use your word processor to edit the text of the events that fall on these dates to make sure that they will fit into the split boxes.

In Calmaker, U\$ contains the vertical character used on the calendar. It is defined in line 180. If the print wheel you use has another character in that position, re-define it with an appropriate character you select.

### One Quick Glance

Every organization and club has a need for activity calendars. You can use one to remember birthdays and anniversaries, or to assign responsibilities that change during the year. Any month of the year is at your disposal. ■

Howard W. Mueller is a Lutheran pastor in Poca-hontas and Shawneetown, Missouri. Contact him at Box 17, Poca-hontas, MO 63779.

Listing continued

```

2767 | 920 PRINT STRING$( (32-LEN(Z$)/2),32)Z$:RETURN
1662 | 930 IF D$(1)=" " THEN GOTO 790
1272 | 940 Z$=STRING$(SD,"-")
4285 | 950 IF D$(2)=" " THEN GOSUB 910:PRINT #1,Z$:GOSUB 860:GOSUB 900:GOTO 800
7094 | 960 Z$=Z$+U$+STRING$(WD,"-"):FOR Y=3 TO 7:Z$=Z$+U$+STRING$(WD,32):NEXT Y:PRINT #1,Z$:GOSUB 860 :GOSUB 900 :GOTO 800
1666 | 970 IF D$(1)=" " THEN GOTO 790
3324 | 980 GOSUB 880:PRINT #1,Z$:GOSUB 860:GOSUB 900:GOTO 800
| 990 '*****
1502 | 1000 OPEN "I",1,"STANDARD"
3294 | 1010 IF F$="" THEN INPUT "ENTER NAME OF MONTH FILE";F$
2755 | 1020 PRINT:PRINT TAB(15);"FILLING CALENDAR"
983 | 1030 OPEN "I",2, F$
2746 | 1040 FOR K=1 TO 54:LINE INPUT #1, S$(K):NEXT K
2307 | 1050 FOR K=1 TO 54:LINE INPUT #2, M1$(K)
1089 | 1060 NEXT K:CLOSE
5280 | 1070 IF VAL(MID$(M1$(1),3,1))=1 THEN FOR J=1 TO 7:D(J)=11:NEXT J:GOTO 1110 ELSE D(1)=20:X=1
2075 | 1080 FOR K=BE TO EN STEP ST:X=X+1
5160 | 1090 IF VAL(MID$(M1$(11),K,1))=1 THEN FOR J=X TO 7:D(J)=11: NEXT J:GOTO 1110 ELSE D(X)=20
652 | 1100 NEXT K
3648 | 1110 P=4:Q=ST:IF DS=162 THEN Q=Q-2 ELSE IF DS=130 THEN Q=Q+1
1676 | 1120 FOR K=1 TO 7:L=11:R=D(K)
1019 | 1130 FOR J=1 TO 4
2872 | 1140 MID$(M1$(R),P,Q)=MID$(S$(L),P,Q):P=P-2:Q=Q+2
1086 | 1150 FOR H=1 TO 7
3805 | 1160 L=L+1:R=R+1:IF R=51 THEN IF MID$(M1$(R),P,3)="---" THEN 1190
5776 | 1170 IF R=52 THEN IF MID$(M1$(R-1),P,3)="---" THEN MID$(M1$(R),P+3,Q-3)=MID$(S$(L),P+3,Q-3):GOTO 1190
2192 | 1180 MID$(M1$(R),P,Q)=MID$(S$(L),P,Q)
2274 | 1190 NEXT H:L=L+2:R=R+2:P=P+2:Q=Q-2
1919 | 1200 NEXT J:IF P=4 THEN P=P+BP
1013 | 1210 P=P+ST:Q=Z
655 | 1220 NEXT K
958 | 1230 OPEN "O",1,F$
2460 | 1240 FOR K=1 TO 54:PRINT #1, M1$(K):NEXT K
1615 | 1250 CLOSE:PRINT:GOTO 250
1085 | 1260 PRINT:PRINT
5261 | 1270 PRINT "Now you may load ";F$;" into your wordprocessor":END

```

End

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# Putting It on the Line

Produce line graphs using your Model 4 and dot-matrix printer.

**K**wikplot gives graphics enthusiasts a quick way to print line graphs. You can use it as written or modify it easily for your own needs. Kwikplot (see the Program Listing) runs on the Model 4 with a DMP 105 printer, but you can change the CHR\$ values to adjust for another printer.

## Data Format

You can merge the data you plan to graph, or input the data from files. You can also include the data in Data statements in the programs and retain the Data statements, selecting the ones that you want to print when the title appears. The first three items in the Data statements must be:

- the title of the graph, expressed at T\$,
- the number of values (points) you plan to plot, and
- the digit that selects the type of x-axis scale you want (see below).

The number of data items is limited only by the dimensioned values in the DIM statement in line 20 and the length of the paper. Each x,y pair counts as one data value.

## Printing Modes

The program lets you choose three printing modes: normal, compressed, or expanded x-axis scale. All the x-axis scales are linear. Type 1 requests the starting value of the x axis. Type 2 requests the fiscal year. Type 3 requests the calendar year scales (see Figure 1). Type 4 uses the x value in the x,y data pair (see Figure 2).

A graph is drawn using the CHR\$ values set in lines 40 and 50. By changing these values, you can adapt the program to output to other printers. In addition to changing the values for CHR\$ in lines 40 and 50, adjust the CHR\$ values for line

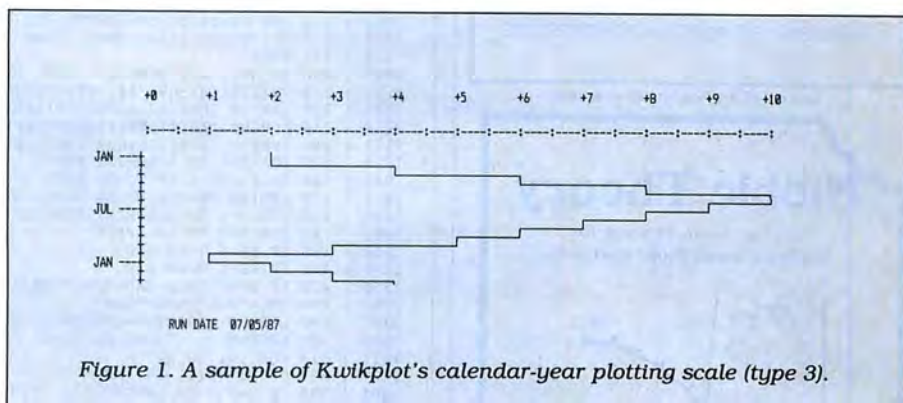


Figure 1. A sample of Kwikplot's calendar-year plotting scale (type 3).

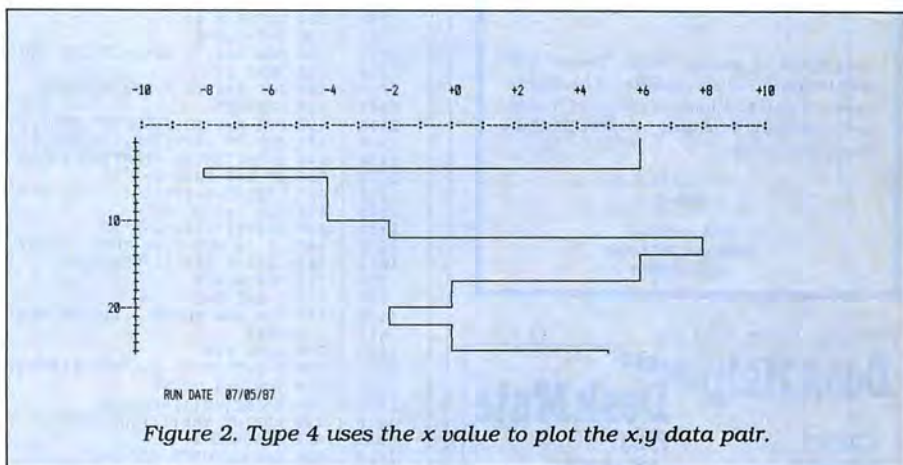


Figure 2. Type 4 uses the x value to plot the x,y data pair.

feed and compression in lines 380-390.

The length of the horizontal scale remains at 6 inches. The values of the data determine the scale values. The vertical scale is linear (line feed), and the type of scale that you choose determines the values.

Using Kwikplot to print your graphs is

much faster than dot plotting and gives better quality than set, point, and reset graphics. ■

H. J. Heuer is a retired Air Force colonel and a computer hobbyist. You can write to him by SASE at 4023 Northwest Blvd. Spokane, WA 99205.

## System Requirements

**Model 4/4P/4D  
Basic  
Printer**

**Available on The Disk Series**

Program Listing. Kwikplot. See p. 100 for information on using checksums.

```
4063 | 10 CLS:PRINT TAB(25)"THIS IS KWIKPLOT":FOR Q=1 TO 1000:NEXT:CLS
2270 | 20 CLS:CLEAR 500:DIM D(200),S(200),X(200)
2007 | 30 I$="      " :M$="      " :N$="      " :G$="      " :P$="      "
2204 | 40 A$=CHR$(240):B$=CHR$(241):C$=CHR$(242)
2229 | 50 D$=CHR$(245):E$=CHR$(246):F$=CHR$(247)
4710 | 60 CLS:READ T$,NP,HS:PRINT:PRINT:PRINT"      TITLE OF NEXT DATA FILE IS
      :
```

Listing continued



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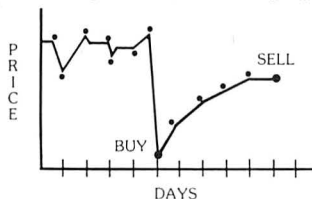
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Listing continued

```

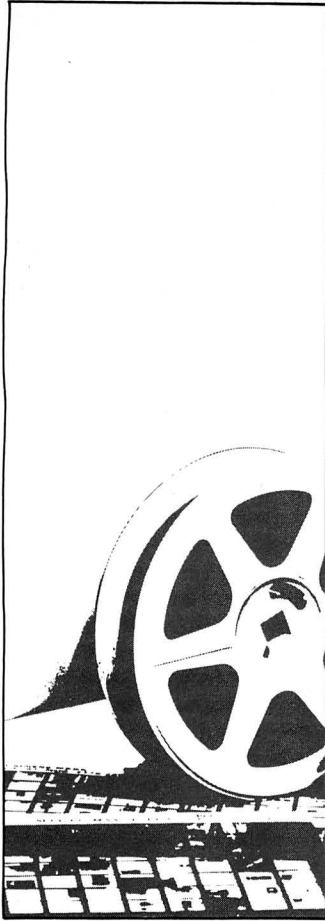
1945 | 70 PRINT:PRINT:PRINT"          ";T$
4157 | 80 IF T$="NO MORE DATA IN FILES" THEN LPRINT CHR$(27);CHR$(54):STOP
3159 | 90 PRINT:PRINT:INPUT"GRAPH THIS DATA -- Y/N ";Y$
2259 | 100 IF LEFT$(Y$,1)="Y" THEN 140 ELSE 110
1135 | 110 IF HS<4 THEN 130
2814 | 120 FOR X=1 TO NP:READ S(X),D(X):NEXT:GOTO 60
2534 | 130 FOR X=1 TO NP:READ S(X):NEXT:GOTO 60
1143 | 140 IF HS=4 THEN 170
2965 | 150 INPUT"ENTER X-AXIS EXPANSION FACTOR ";RR
1808 | 160 IF RR>0 THEN CF=6:GOTO 190
2481 | 170 INPUT"COMPRESSED X-AXIS (Y/N) ";MC$
2496 | 180 IF LEFT$(MC$,1)="Y" THEN CF=3 ELSE CF=6
4678 | 190 CLS:PRINT:PRINT"THE DATA YOU SELECTED IS NOW BEING GRAPHED"
1135 | 200 IF HS<4 THEN 220
2821 | 210 FOR I=1 TO NP:READ X(I),D(I):NEXT:GOTO 230
1984 | 220 FOR I=1 TO NP:READ D(I):NEXT
996 | 230 DN=D(1):DM=DN
1014 | 240 FOR I=2 TO NP
1582 | 250 IF D(I)<DN THEN DN=D(I)
1583 | 260 IF D(I)>DM THEN DM=D(I)
504 | 270 NEXT
1272 | 280 FOR DM=DM TO DM+9
1781 | 290 IF(DM MOD 10)=0 THEN HV=DM
498 | 300 NEXT
2313 | 310 IF DN<0 THEN 320 ELSE LV=0:GOTO 360
1746 | 320 FOR DN=DN TO DN-9 STEP -1
1782 | 330 IF(DN MOD 10)=0 THEN LV=DN
502 | 340 NEXT
2609 | 350 IF HV<(-LV) THEN LV=(-HV) ELSE HV=(-LV)
2228 | 360 VV=INT((HV-LV)/10):MF=100/(HV-LV)
3161 | 370 LPRINT CHR$(27);CHR$(19):TL=LEN(T$):TT=38-(TL*.5)
2836 | 380 LPRINT TAB(TT)T$;LPRINT CHR$(27);CHR$(20)
2173 | 390 LPRINT CHR$(27);CHR$(91);CHR$(CF)
1828 | 400 FOR X=1 TO 4:LPRINT:NEXT
1987 | 410 T=10:FOR S=LV TO HV STEP VV
2633 | 420 LPRINT TAB(T) USING G$;S;T=T+10:NEXT
3286 | 430 FOR N=1 TO 4:LPRINT:NEXT:LPRINT TAB(13)CHR$(58);
3081 | 440 FOR N=1 TO 10:LPRINT"-----";:NEXT:LPRINT
1152 | 450 IF HS=4 THEN 760
1146 | 460 IF HS=1 THEN 630
2660 | 470 IF HS=3 THEN CA$="JAN":BB$="JUL":GOTO 490
1292 | 480 CA$="JUL":BB$="JAN"
2383 | 490 LPRINT:LPRINT:P=INT((D(1)-LV)*MF)
1565 | 500 LPRINT"          ";CA$;N$;X=1
1013 | 510 FOR I=1 TO NP
1327 | 520 D=INT((D(I)-LV)*MF)
2090 | 530 IF X=7 THEN LPRINT"          ";BB$;N$;
2392 | 540 IF X=13 THEN LPRINT"          ";CA$;N$;X=1
1634 | 550 LPRINT TAB(12)CHR$(250);
762 | 560 GOSUB 870
784 | 570 X=X+1:P=D
4181 | 580 FOR A=0 TO RR-1:LPRINT TAB(12)"";CHR$(245);STRING$(P," ") +D$:NEXT A
614 | 590 NEXT I
1830 | 600 FOR X=1 TO 4:LPRINT:NEXT
2244 | 610 LPRINT"          RUN DATE ";DATE$ 'MAY DELETE IF NOT DESIRED
2338 | 620 FOR X=1 TO 5:LPRINT:NEXT:GOTO 60
2953 | 630 CLS:IF LEFT$(T$,1)=CHR$(42) THEN X=71:GOTO 660
3430 | 640 INPUT"ENTER STARTING VALUE FOR X-AXIS VALUE ";X
1124 | 650 IF X=0 THEN X=1
1851 | 660 LPRINT:P=INT((D(1)-LV)*MF)
1020 | 670 FOR I=1 TO NP
1334 | 680 D=INT((D(I)-LV)*MF)
3630 | 690 IF (X MOD 5)=0 THEN LPRINT USING "          ###";X;:LPRINT "--";
1631 | 700 LPRINT TAB(12)CHR$(250);
759 | 710 GOSUB 870
781 | 720 X=X+1:P=D
4178 | 730 FOR A=0 TO RR-1:LPRINT TAB(12)"";CHR$(245);STRING$(P," ") +D$:NEXT A
611 | 740 NEXT I
683 | 750 GOTO 600
2277 | 760 P=INT((D(1)-LV)*MF):LPRINT:X=X(1)
1021 | 770 FOR I=1 TO NP
1335 | 780 D=INT((D(I)-LV)*MF)
1640 | 790 LPRINT TAB(12)CHR$(250);
759 | 800 GOSUB 870
1410 | 810 X=X+1:GOSUB 920:P=D
1115 | 820 SS=(X(I+1))-X(I)
1122 | 830 FOR K=1 TO SS-1
3976 | 840 LPRINT TAB(12)CHR$(250);STRING$(D," ") +D$:X=X+1:GOSUB 920:NEXT
613 | 850 NEXT I
685 | 860 GOTO 600
4255 | 870 IF D>P THEN LPRINT STRING$(P," ") +E$+STRING$(D-P),B$)+C$:GOTO 90
0
4241 | 880 IF D<P THEN LPRINT STRING$(D," ") +A$+STRING$(P-D),B$)+F$:GOTO 90
0
2408 | 890 IF D=P THEN LPRINT STRING$(P," ") +D$
665 | 900 RETURN
424 | 910 -1000
3638 | 920 IF(X MOD 10)=0 THEN LPRINT USING "          ###";X;:LPRINT "--";
668 | 930 RETURN
158 | 950 ' DATA FOLLOWS (REPLACE THIS SAMPLE OR MERGE--BUT RETAIN LINE 5000)
1948 | 1000 DATA ALL VALUES = OR > 0,12,1
1870 | 1010 DATA 1,2,3,4,5,6,10,20,30,20,10,0
2107 | 1020 DATA MIXED VALUES + AND -,12,1
1769 | 1030 DATA 1,3,-5,-2,0,1,3,9,-2,0,2,4
2209 | 1040 DATA FISCAL YEAR PLOTTING,13,2
1802 | 1050 DATA 2,4,6,8,10,9,7,5,3,1,4,4,4
2350 | 1060 DATA CALENDAR YEAR PLOTTING,15,3
1999 | 1070 DATA 2,4,6,8,10,9,8,7,6,5,3,1,2,3,4
1727 | 1080 DATA X - Y PLOTTING,10,4
2941 | 1090 DATA 1,6,4,-8,5,-4,10,-2,12,8,14,6,17,0,20,-2,22,0,25,5
2123 | 5000 DATA NO MORE DATA IN FILES,0,0

```

End



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## Fixes and Updates

### Debug the Debug

I discovered an error in the changes from Jay Sheppard ("In Search Of. . .," Debug, June 1987, p. 107) to recover the printer control codes after getting back to a new Superscript document (see my article "In Search of Lost Superscript Files," April 1987, p. 114). In line 410, omit :GOSUB 100.

David Goben  
Mansfield Center, CT

### Not So Easy Labels

An error appears three times in the program listing for "Easy Labels" by John Collicott (July 1987, p. 76). To fix the Labeler program, change the PRINT @ 1600,STRING\$ portion to LOCATE 20, 1:PRINT STRING\$ in lines 790, 890, and 1010.

### Son of Fakeout

Fakeout2 is the companion program to Fakeout (see "Data to Order," August 1987, p. 69), which I wrote for sequential data handling. The advantage of Fakeout2 (see the Program Listing) is that it creates dummy *random* data to manipulate and test your program. As with Fakeout, Fakeout2 provides code in an ASCII format suitable for merging.

Fakeout2 prompts for string lengths, but for integers, single-precision, and double-precision variables, it assigns lengths automatically.

When you run your new code, a prompt asks for "2-digits or 0 to end." This is a dual-purpose prompt. First, your new code asks for the record number to create the dummy data in. You receive this prompt as long as you continue to give two-digit answers. Of course, this means that you will have more dummy records in your test file. When you answer zero to the prompt, the file is closed and control is given to the input routine.

The input routine asks the same question. To view dummy data, type in one of the two-digit record numbers you gave to the output routine. After each answer, the dummy data is read from the disk and displayed. The dummy data is randomly produced in different lengths to simulate actual data entries for each string variable. For example, a string variable set for a length of 50 might only show 11 filled positions when displayed. When you press zero in answer to the input routine, the program ends.

Fakeout2 allows changes to any variables before writing the new code and also checks the file name and drive destination for Model I/III/4 file-name conventions. Further, it asks for the drive

continued on p.86

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# Troubleshooting TANDY 1000

**N**othing is more frustrating than a broken computer. We take it for granted they will always work, and justifiably so. Your computer will hardly ever let you down.

Rare as they are, hardware problems do sometimes occur, and for a feeling of sheer helplessness they are hard to beat. Should you ever find yourself with a crippled computer on your hands, I would like to offer some troubleshooting suggestions for the various subsystems that might fail.

Photos by Larry Dunn

BY ED CLINTON





# Your







**Photo 1.** Remove the screws holding the keyboard cover together.



**Photo 2.** Separate the cover halves from the keyboard assembly.



**Photo 3.** Remove the keyboard assembly from the printed circuit board.



**Photo 4.** Metal contacts are underneath each key.



**Photo 5.** Use a moist cloth to clean the key contacts.

## The Keyboard

One common cause of keyboard maladies is a liquid spill that runs between the keys and dries on the switch contacts. This mishap can cause intermittent failures of the affected keys.

The switch contacts in the keyboard are copper pads on the printed circuit board, one set of two per key. Each key has a piece of conductive foam on its bottom that serves to close the connection between these copper pads when you press a key. If you should spill something that runs in between the keys of the keyboard, it can dry on the contacts and possibly prevent the conductive foam from making good contact.

If you suspect that this could be the cause of your keyboard problems, you can probably manage the cleaning chore yourself if you are careful.

First, unplug the keyboard from the computer. Remove the screws that hold the two halves of the cover together, being sure to keep the screws in a safe place for reassembly. On my Tandy, nine phillips screws are on the bottom of the keyboard. When you remove these, the cover separates into two halves and you are left holding the keyboard circuit assembly. This consists of a printed circuit board with a metal assembly that holds the keys in place.

To get to the keypads to clean them, remove the key assembly from the top of the printed circuit board. A number of screws on the bottom of the circuit board opposite the keys hold the metal key assembly in place. Remove these and put the key assembly aside.

You can now see the metal contacts underneath each key on the keyboard. Use a

moist cloth to remove any residue that might be on the contacts, but be careful not to get any water anywhere else on the circuit board. Also, do not bend up the key contacts. Gently slide a damp cloth underneath to remove the residue. Dry the circuit board as much as possible with a lint-free cloth or perhaps a hair dryer.

You might also check the conductive plastic pads to make sure that they are clean as well. If there is any obvious crud on them you should *very carefully* try to remove it with a moist cloth, but don't touch the pads if they don't need cleaning. Make sure that the pads are completely dry before you reassemble the keyboard.

When everything is clean and absolutely dry, make sure that the keyboard end of the cord is plugged firmly in place, then put everything back together by reversing the sequence above.

## Memory Errors

When you first turn on your computer you'll notice that it spends some time checking itself out before it lets you run anything on it. One of the first things the operating system of the computer does is check the amount of memory that is available and verify that all the memory is working.

Should a word or words of the memory fail to read and write properly, an error message displays on the screen. The format of the error message varies from computer to computer, but the Tandy 1000 operating system prints an error message that looks like the Figure.

This message tells you that the computer tried to write the hexadecimal number 056A to the memory location 9000:

WRITTEN	READ	BASE	OFFSET
056A	856A	9000	57AB

**Figure.** Sample memory error message.

57A8, and upon attempting to read back from that location, it found the number 856A hex instead of the value written. This constitutes a memory error, most of which are caused by a failed memory chip. The trick is to find which memory chip has failed so that you can replace it.

The memory bank containing the failed chip is indicated by the column of the error message labeled Base. The diagnostic routine tests the memory in banks of 64K. If your machine uses 64K memory chips, it has one bank per set of eight chips. If it uses 256K chips, one set of chips contains four banks of memory. The base address is given in increments of 1000H, with the lowest bank of memory being the one located at base address 0000H. Subsequent banks of memory are labeled 1000H, 2000H, and so on, up to 9000H for the highest paragraph in a machine with 640K of system memory. If your machine has only the 256K of memory, for instance, you will have four banks labeled 0000H, 1000H, 2000H, and 3000H.

When determining which bit of a particular bank failed, remember that the Tandy 1000 uses an 8-bit wide data bus even though it is a 16-bit machine. The 16-bit values that you see on your screen in the Written and Read columns of the error message are actually two 8-bit words strung together to form a 16-bit word. Therefore, if you have an error in bit 9 it is actually in bit 1 of the next address up.

It would be impossible to catalog all of the chip layouts for all of the various computers and memory expansion cards, so I can't offer any specific advice as to which chip corresponds to which address on a particular machine other than the Tandy 1000. You can do two things to isolate the failed memory if you are lacking the schematics to the machine.

First, the banks of memory are usually laid out in rows of eight or nine chips, each chip being 1 bit in the 8-bit word, plus 1 parity bit in machines that have parity checking (the Tandy 1000 does not). You can remove one of these chips and boot



the machine without it to see which bank and which bit is impacted by its absence. Repeat the experiment with different chips until you locate the bank with the error. Remember never to remove a chip or an expansion card without first turning off the power, or you might multiply your troubles instead of fixing them.

Second, you can swap chips between banks, or between locations in the same bank, to see if the error moves to a different spot.

If the faulty memory is on the motherboard of the original Tandy 1000 and is in the low bank of memory, the chips involved are U11, U25, U27, U33, U48, U54, U65, or U67, listed from low bit to high bit. If the failure is in the high bank, the chips involved are U12, U26, U28, U34, U49, U55, U66, or U68, again listed from low bit to high bit.

One particularly odd thing about the Tandy 1000's design is that the video memory is not located on a video card. Rather, it is located within the system-board memory.

All of the clones with which I am familiar (except the PCjr), the color video memory starts in paragraph B800H. Tandy uses the last 16K of the system-board memory for the video memory and routes all reads and writes that normally would access the B800H paragraph to this last 16K of this memory. For instance, if you have a 640K system, when you read from or write to location B800:0000, you are actually reading from or writing to location 9000:C000.

Because of this, if you add memory to your Tandy 1000, the added memory is addressed as the lowest memory in the system to keep the video memory at the top of the available memory, where it will be out of the way. Therefore, the memory on the motherboard is always the uppermost two banks of memory in the system. Any other compatible stacks the added memory on top of the original memory.

### Monitor Burn-in

Monitor burn-in is the condition that occurs when you leave the same image on the monitor for such a long time that the ghost of the image becomes permanently burned on the screen. There is good news and bad news here. The bad news is that there is no cure short of replacing the CRT. The good news is that the condition can be prevented. It takes a long, long time for an image to be burned onto the screen in this manner, so a little preventive medicine can obviate the problem.

A number of screen-blanking programs are on the market, many of them in the public domain. These are resident utilities that you can load into the system from the Autoexec.BAT file. Once the computer is idle for several minutes with such a program installed (you can usually specify the amount of time), the screen is blanked out so that there is no chance of monitor

burn-in. Pressing any key restores the display until another idle period occurs. Some of the programs to look for include Blank and BURNDDEV.

### Serial Port

The IBM PC serial communications port is an RS-232C-type interface designed specifically to let the computer communicate with a modem. Most frequently, the problems you encounter with the serial port are due to improper setup of the communication parameters. It is important that all the settings are exactly the same as those for the device with which you are communicating. You can use the Mode command in DOS to change these parameters.

One other item occasionally causes grief. If both devices you are interfacing with the serial port are terminal devices, such as computers, you need to make a special cable or an adapter for the normal cable that connects the two devices. This is because of the function of the pins as specified in the definition of the RS-232C interface, specifically pins 2, 3, 4, and 5. Pins 2 and 3 are the transmit and receive lines for the serial data. Pins 4 and 5 are the request-to-send and the clear-to-send lines that provide handshaking for the data transfer.

The typical RS-232C interface consists of a terminal device, such as a computer, talking to a communications device such as a modem. In the interface cable for such a system, pin 2 on one end of the cable is connected to pin 2 on the other end of the cable. All the other pins are connected one-to-one in a similar fashion. The problem arises when you try to communicate

between two terminal devices where pin 2 is defined as the transmit pin at both ends of the cable. Then you need to make an adapter that connects pin 2 on one end of the cable to pin 3 on the other end of the cable, and vice versa, so that the transmit line of one device is connected to the receive line of the other device. In most cases, pins 4 and 5 must also be swapped for the same reasons.

### The Printer Interface

The heart of the Tandy 1000 printer interface is a semicustom chip containing three registers that can be accessed to write data to the printer and to read back the printer status. These registers are at input/output (I/O) locations 378H, 379H, and 37AH for LPT1, and 37C, 37D, and 37E for LPT2. (The information in this section applies in specifics only to the Tandy 1000. Other machines will have similar, but possibly not identical, arrangements.)

The data register is at location 278H. When the output is enabled, an ASCII value written to this register is applied to the data lines of the printer.

The status register is at location 279H. The contents of this register are shown in Table 1.

The control register is at location 37AH. Data is written to this register to control the operation of the printer. The control bits are shown in Table 2.

Tandy 1000 owners can write a simple routine using Debug or Basic to write to these registers and verify that the printer interface is working. First, write an ASCII value to the data register. Next, write a data word to the command register that

Bit 0	Not used
Bit 1	Not used
Bit 2	Not used
Bit 3	Error. If this bit is zero, an error condition is indicated.
Bit 4	Printer selected. A 1 in this bit indicates that the printer is enabled.
Bit 5	End of form. A zero here means you are out of paper.
Bit 6	Acknowledge. A zero indicates that the printer accepted a data word and is ready for another.
Bit 7	Busy. A zero tells you the printer is working and can't accept more data until this signal goes to a 1 again.

Table 1. The contents of the status register.

Bit 0	Strobe. A zero written to this bit latches the value in the data register into the printer (output must be enabled).
Bit 1	Auto feed. A zero causes the printer to execute a line feed and a carriage return whenever it receives a carriage return.
Bit 2	Initialize. A zero written here resets the printer to its default state and clears the printer buffer.
Bit 3	Select printer. A zero enables the printer.
Bit 4	Enable interrupt. Enables interrupts used in print spoolers.
Bit 5	Enable output. A zero allows the value in the data register to be applied to the data lines of the printer interface.
Bit 6	Not used
Bit 7	Not used

Table 2. The bits of the control register.



sets Output enable to zero. Finally, read back the data word to verify that it is actually in the register.

In Basic you can do this as follows:

```
10 OUT 888,69
20 OUT 890,7
30 PRINT INP(888)
```

The Print statement should display the same value as was written to the data register, 69, the ASCII code in decimal for the letter E.

This verifies that the data is actually being applied to the output pins of the printer controller. If this works, write to the command register, toggling the values of each bit and then reading back the command register to verify that the bit is toggling. All the bits that you read back will be inverted compared to the written value with the exception of the initialize bit and the unused bits 6 and 7. The initialize bit is read back uninverted, and the unused bits are always 1.

A simple Basic program can test this register:

```
10 OUT 890, 0
20 PRINT INP(890)
```

Here you set all the control bits to zero. Line 20 should print the decimal value 203, the equivalent of CBH. Try outputting different values to the register to verify that each of the bits is not stuck in one state.

Having verified that these signals are working correctly, next read the status register. All the signals shown in the status register are outputs from the printer, so the actual function of the bits in this register might vary slightly depending on the brand of printer.

The status register can be read in Basic as follows:

```
10 PRINT INP(889)
```

Once you verify that all the registers can be accessed properly from the computer, the next order of business is to use your voltmeter or logic probe to measure the signal levels of each bit at the computer interface port and at the printer end of the cable as you turn the bit on and off using a Basic routine or Debug. In this manner, you can narrow down the cause of the problem to the computer, the cable, or the printer.

## Power Supply

A failure in a portion of the power supply could show up in a variety of ways depending on which section of the supply malfunctioned. If the -12-volt (V) supply is down, for instance, nothing might be affected but the serial port. On the other hand, when the +5V dies, everything dies.

You can measure the +12V and the +5V supplies with your voltmeter at interface ports without opening up the computer. This saves you some work and gives the advantage of measuring the supply under load. You can measure the +12V supply on pin 7 of the RGBI port. Use pin 1 for ground or use a chassis

ground. The +5V supply can be measured at pin 5 of the joystick port with pin 3 as ground, or at pin 5 of the keyboard interface with pin 3 as ground.

If you find the supply voltages are low when measured at these ports, it is a good idea to disconnect the supply from the drives and the motherboard to see if an unusual load on either the disk drives or the motherboard is causing a strain on the supply. (Never disconnect or reconnect anything without first turning off the computer.) The power supply is plugged into the motherboard via a nine-pin connector located near the power supply. The pin assignments for this connector are shown in Table 3.

1	+5V	2	+5V
3	+5V	4	ground
5	ground	6	ground
7	ground	8	-12V
9	+12V		

Table 3. The pin assignments for the power supply connector.

If any of these voltages are low or non-existent with the supply disconnected, in all likelihood a problem exists within the supply. If the supply voltage is different when the supply is connected, there is probably a loading problem on the motherboard, in an expansion card, or in one of the disk drives.

## The Fan

A failure of the cooling fan is an easy problem to ignore: The computer will still work, so why fix it? I have even known people who have disconnected the fan in their computer because it was old and getting noisy.

The fan is there for a reason. If it isn't working, the additional thermal strain on the integrated circuits might not cause an immediate failure, but you could experience problems in the future. There is no need to subject your machine to any unnecessary stress when the problem is as easy to solve as replacing a cooling fan.

If the fan isn't turning when the power switch is on, something is wrong. To be sure that the fan itself has failed, you might want to measure the voltage at the power plug to the fan. To do this, remove



Photo 6. Measuring the voltage at the power plug to the fan.

the cover from the computer (the power should be off) and disconnect the power plug from the fan. Select the AC range on your meter that allows you to measure 115V. Insert the two meter probes into the two sockets of the half of the connector that is attached to the power supply and turn on the power. You should have a reading of 110-115V. If not, your problem is in the power supply itself.

Most likely, if the rest of the computer is working the power supply is fine. If the fan needs replacing, simply remove the few screws that hold it in place and install a new one. Just make sure the replacement fan is the same type as the old one. There are AC fans that run on 115V AC and DC fans that use 5V or 12V DC. Needless to say, you don't want to apply 115V AC to a fan that is expecting 5V DC. You can usually find a little label on the motor that describes the power requirements.

## Dust

It is important to keep the inside of your computer free of any significant buildup of dust. When a layer of dust accumulates on the printed circuit board, it can cause overheating problems, or on rarer occasions it can actually result in quirky short circuits.



Photo 7. Vacuuming dust from inside surfaces.

For a good cleaning, make sure the machine is turned off, then remove the two screws in the front and slide the cover off the front. If the insides look dirty or dusty, use a small vacuum cleaner attachment to remove the dust from all the surface you can see. (Starting with a clear vacuum bag is a good idea.) Try to blow the dust out from under the disk drives if you can't get under them any other way.

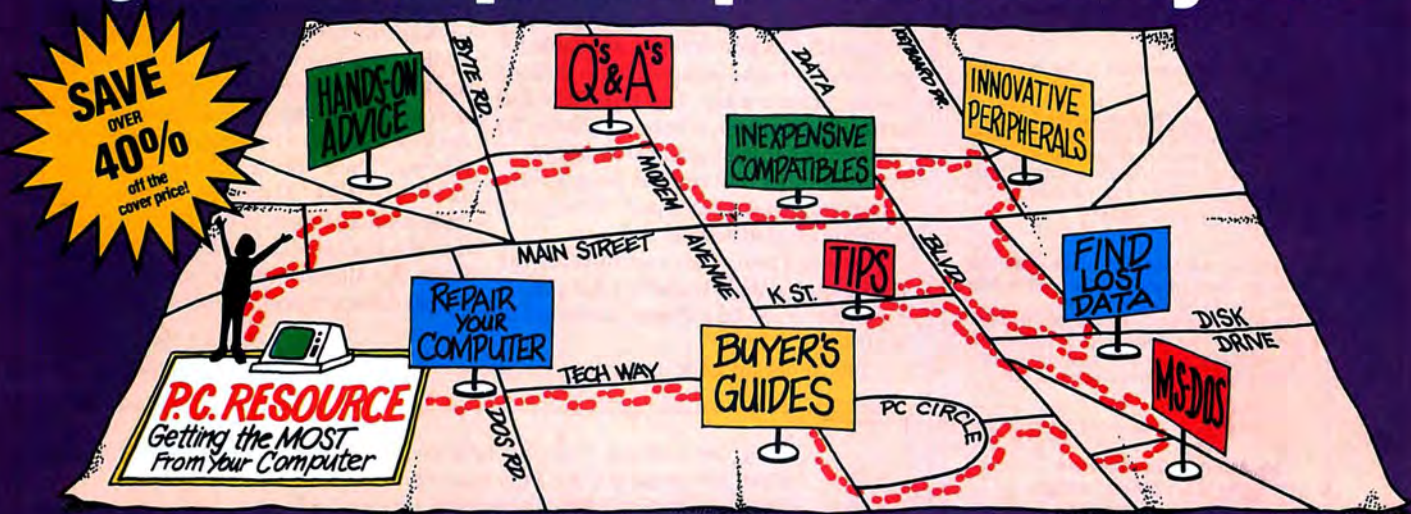
## Putting the Lid On

Some of the above troubleshooting measures are hands-on, while others are more preventive or diagnostic. You may or may not want to attempt repairs yourself, but if you can identify the source of your computer's failure you'll relieve some of the sense of helplessness. At the very least, knowing the possibilities will help you communicate your suspicions to a repair person. ■

Ed Clinton is an electrical engineer for Westinghouse Electric Corp. You can write him at 19 Craftsman Court, Reisterstown, MD 21136.



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## Fixes and Updates

Continued from p. 79

destination of the dummy data file. Fakeout2 also performs a merge of the new code to let you inspect the code before using it to create dummy data or merging it into developing program code. Because the code is merged into Fakeout2, it is immediately available for running to make dummy data without loading it separately. Just type RUN and press the enter key. A note of caution: Do not renumber Fakeout2 below 10000. If you renumber and run the program before saving, you replace part of Fakeout2 with the created source code.

You can change all variables in the Data statements to those of your choice. You must have 26 different variables in each set.

The program code is written for the

Model 4. For those using the Tandy 1000 or 2000, do not type in lines 11370-11470 and remove the GOSUB 11380:IF FLAG = . . . portion from line 10510.

For those using the Models I and III, you must change all variables used in Fakeout2 to two-character variables. Change the 39 in line 10170 to 2. In line 10360, the Print Using must be either modified (for the correct string substitution delimiters) or deleted depending on the level of Basic available. If you pull the line out, then you should remove lines 10370-10430. Although I have used INSTR on a Model I before, I realize that it is not available for all levels of Model I Basic. An alternative is to use IF MID\$(... to test different positions of strings.

David L. Kuzminski  
Petersburg, VA

Program Listing. Fakeout2 for creating random dummy data. See page 100 for information on using checksums.

```

10000 'fakeout2/u0.3 Mod 4 Copyright 12Jan87 D.Kuzminski
4577 | 10010 CLEAR:DEFSTR A-H:DEFINT I-N:DIM B(26), BQ(26), SV(26), LAY(26), Q
      | NT(26,4)
      | 10020 'assign definitions
2967 | 10030 FOR L=65 TO 90:HM=HM+CHR$(L)+CHR$(L+32):NEXT
1564 | 10040 LD(0)=9:LD(1)=4:LD(2)=9
988  | 10050 CLS:TVAR=0
    
```

Listing continued

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# Fixes and Updates

Listing continued

```

5285 | 10060 DISS(1)="String":DISS(2)="Integer":DISS(3)="Single":DISS(4)="Double"
2060 | 10070 LVAR(2)=2:LVAR(3)=4:LVAR(4)=8
2985 | 10080 DISS(2)="CVI":DISS(3)="CVS":DISS(4)="CVD"
3148 | 10090 DISSV(2)="MKI$":DISSV(3)="MKS$":DISSV(4)="MKD$"
3233 | 10100 DS(1)="$:DS(2)="%":DS(3)="!":DS(4)="#":FLAG1="xxxx"
      | 10110 'determine how many variables
      | 10120 INPUT "How many variables":VAR:IF VAR>26 OR VAR<1 THEN 10120
      | 10130 'start loop for user assignments
2650 | 10140 FOR I=1 TO VAR:PRINT "Variable" I
1974 | 10150 GOSUB 10170:NEXT:GOTO 10360
      | 10160 'get variable name
5492 | 10170 INPUT "Variable name";B(I):IF LEN(B)>39 THEN 10170 ELSE IF B(I)="
      | " THEN READ B(I)
      | 10180 'validate variable name
2433 | 10190 GOSUB 11560:IF FLAG="on" THEN 10170
      | 10200 'validate non-duplicate variable name
2290 | 10210 GOSUB 11490:IF FLAG2="!" THEN 10170
3978 | 10220 PRINT "Variable has been designated as " B(I)
1920 | 10230 IF FLAG="skip" THEN 10270
      | 10240 'determine variable type
8636 | 10250 PRINT "Is " B(I) " to be a 1) string, 2) integer, 3) single-precision, or 4) double-precision variable?"
2253 | 10260 GOSUB 11320:SV(I)=INSTR("1234",H)
4334 | 10270 IF SV(I)=0 THEN 10260 ELSE MID$(FLAG1,SV(I),1)=RIGHT$(STR$(SV(I)),1)
      | 949 | 10280 GOSUB 11530
      | 10290 'determine length of variable
3131 | 10300 IF SV(I)>1 THEN LOV(I)=LVAR(SV(I)):GOTO 10330
5750 | 10310 PRINT "For " B(I) 256-TVAR "bytes remain available.";:IF TVAR=256 THEN STOP
4932 | 10320 INPUT "Give length";LOV(I):IF LOV(I)<1 OR LOV(I)>(256-TVAR) THEN 10310
11010 | 10330 TVAR=TVAR+LOV(I):IF TVAR>256 THEN PRINT "You have exceeded valid total of variable lengths; you must redo your variables.":STOP
      | 760 | 10340 RETURN
      | 10350 'display definitions
2488 | 10360 A=" \ \ \ ###"
      | 10370 'display variables
2154 | 10380 X=1:Y=10:IF Y>VAR THEN Y=VAR
1086 | 10390 FOR I=X TO Y
2792 | 10400 PRINT USING A; B(I); DISS(SV(I)); LOV(I)
2538 | 10410 NEXT:GOSUB 11340:IF I>VAR THEN 10450
3384 | 10420 IF Y<VAR THEN X=X+10:Y=Y+10:IF Y>VAR THEN Y=VAR
      | 878 | 10430 GOTO 10390
      | 10440 'user validation
2987 | 10450 PRINT:PRINT "Were they all okay?"
3221 | 10460 GOSUB 11320:IF H="N" OR H="n" THEN 10470 ELSE 10510
1190 | 10470 FOR I=1 TO VAR
5635 | 10480 PRINT "Edit " B(I) "?":GOSUB 11320:IF H="Y" OR H="y" THEN TVAR=TVAR-LOV(I):GOSUB 10170
1260 | 10490 NEXT:GOTO 10380
      | 10500 'determine ASCII program name for merging
8007 | 10510 INPUT "Name of test program and drive destination (FILENAME:D)":D:GOSUB 11380:IF FLAG2="on" THEN 10510
      | 10520 'determine destination of test data
6632 | 10530 INPUT "Test file destination drive number";TDEST:IF TDEST<0 OR TDDEST>3 THEN 10530
      | 10540 'start writing ASCII program lines to file
1037 | 10550 OPEN "O", 1, D
2100 | 10560 PRINT#1, "10 "+"D+" Mod 4 "+DATES"
2174 | 10570 PRINT#1, "100 CLEAR:DEFINT I-N"
      | 10580 'write FLAG set for logic control
1449 | 10590 PRINT#1, "200 KUZ=0"
1717 | 10600 PRINT#1, "210 goto 2001"
      | 10610 'write error control 1
2542 | 10620 PRINT#1, "990 CLS:ON ERROR GOTO 5010"
      | 10630 'write file input routine
7154 | 10640 PRINT#1, "1000 OPEN "+CHR$(34)+"R"+CHR$(34)+"", 1, "+CHR$(34)+"testrdm:"+RIGHT$(STR$(TDEST),1)+CHR$(34)+"", "+STR$(TVAR)
      | 10650 'set up field statement
951 | 10660 GOSUB 11620
1320 | 10670 PRINT#1, "1010 "+FF
5155 | 10680 PRINT#1, "1070 INPUT "+CHR$(34)+"2-Digit code or 0 to End"+CHR$(34)+"":ICOD="
2349 | 10690 PRINT#1, "1080 IF ICOD=0 THEN 1300"
1876 | 10700 PRINT#1, "1090 GET 1, ICOD"
      | 10710 'write file display routine
3115 | 10720 C="1200 ":FOR J=1 TO VAR:GOSUB 11190:GOSUB 11210
1099 | 10730 PRINT#1, C+FO
603 | 10740 NEXT
1691 | 10750 PRINT#1, "1290 GOTO 1070"
1594 | 10760 PRINT#1, "1300 CLOSE 1"
      | 10770 'write FLAG check to prevent endless loop in program
2370 | 10780 PRINT#1, "1400 IF KUZ=1 THEN STOP"
      | 10790 'write dummy data creation routine
3121 | 10800 C="2000 ":FOR J=1 TO VAR:GOSUB 11190:GOSUB 11290
1098 | 10810 PRINT#1, C+FO
602 | 10820 NEXT
      | 10830 'write FLAG reset for logic control
1497 | 10840 PRINT#1, "2100 KUZ=1"
      | 10850 'write error control 2
2315 | 10860 PRINT#1, "2990 ON ERROR GOTO 5020"
      | 10870 'write file output routine
7162 | 10880 PRINT#1, "3000 OPEN "+CHR$(34)+"R"+CHR$(34)+"", 1, "+CHR$(34)+"testrdm:"+RIGHT$(STR$(TDEST),1)+CHR$(34)+"", "+STR$(TVAR)
      | 10890 'set up field statement
949 | 10900 GOSUB 11630
1319 | 10910 PRINT#1, "3010 "+FF
5154 | 10920 PRINT#1, "3070 INPUT "+CHR$(34)+"2-Digit code or 0 to End"+CHR$(34)

```

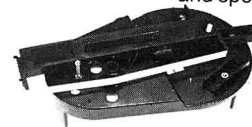
Listing continued

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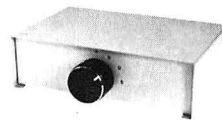
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## Fixes and Updates

Listing continued

```

4)+"; ICODE"
2356 | 10930 PRINT#1, "3080 IF ICODE=0 THEN 3360"
4014 | 10940 C="3100 ":RESTORE 11650:FOR J=1 TO VAR:GOSUB 11190:GOSUB 11240
1103 | 10950 PRINT#1, C+FO
607 | 10960 NEXT
1910 | 10970 PRINT#1, "3340 PUT 1, ICODE"
1697 | 10980 PRINT#1, "3350 GOTO 3070"
1607 | 10990 PRINT#1, "3360 CLOSE 1"
| 11000 'write message display
4317 | 11010 PRINT#1, "3400 PRINT "+CHR$(34)+"Testfile written!"+CHR$(34)
| 11020 'write routine to re-route program to input and display dummy fil
7840 | 11020 'write routine to re-route program to input and display dummy fil
| e just created
2312 | 11030 PRINT#1, "3500 GOSUB 4010:GOTO 990"
1346 | 11040 PRINT#1, "4000 END"
| 11050 'write timer routine
2959 | 11060 PRINT#1, "4010 FOR TM=1 TO 500:NEXT:RETURN"
| 11070 'write error control routines
2342 | 11080 PRINT#1, "5010 CLOSE 1:RESUME 2001"
1840 | 11090 PRINT#1, "5020 RESUME 3360"
| 11100 'write display source code routine
1725 | 11110 PRINT#1, "7000 LIST -8000"
1349 | 11120 PRINT#1, "8000 END"
733 | 11130 CLOSE 1
| 11140 'inform user that source code is complete
2806 | 11150 PRINT:PRINT "Program written!"
| 11160 'load newly created source code into FakeOut for user inspection
1705 | 11170 CHAIN MERGE D, 7000, ALL
| 11180 'assign line numbers
3858 | 11190 X=LEN(STR$(J)):MID$(C,6-X,X-1)=RIGHT$(STR$(J),X-1):RETURN
| 11200 'set up PRINT statements
3179 | 11210 PO="PRINT ":IF SV(J)=1 THEN FO=FO+B(J):RETURN
3679 | 11220 PO=FO+DISSV(SV(J))+(" "+LEFT$(B(J),LEN(B(J))-1)+"$"):RETURN
| 11230 'set up LSETs
4028 | 11240 READ CV:FO="LSET ":IF SV(J)=1 THEN FO=FO+CV+"$="+B(J):RETURN
2990 | 11250 FO=FO+CV+"$="+DISSV(SV(J))+(" "+B(J)+""):RETURN
| 11260 'set up display PRINT routine
1984 | 11270 FO=FO+"PRINT "+B(J):RETURN
| 11280 'setup dummy data assignment lines routine
7405 | 11290 IF SV(J)=1 THEN FO=B(J)+"=STRING$(RND(" "+RIGHT$(STR$(LOV(J)),LEN(S
| TR$(LOV(J))-1)+"),RND(95)+32)" ELSE FO=B(J)+"=RND(100)"
757 | 11300 RETURN
| 11310 'keyboard scan
2721 | 11320 H=INKEY$:IF H="" THEN 11320 ELSE RETURN
| 11330 'timer
2106 | 11340 FOR TM=1 TO 500:NEXT:RETURN
| 11350 'default variables
6527 | 11360 DATA AA, BB, CC, DD, EE, FF, GG, HH, II, JJ, KK, LL, MM, NN, OO,
| PP, QQ, RR, SS, TT, UU, VV, WW, XX, YY, ZZ
| 11370 'validate filename routine
3413 | 11380 FLAG2="":L=0:KX=0:IF LEN(D)<1 OR LEN(D)>23 THEN 11470
4494 | 11390 I=L+1:GOSUB 11460:IF Q<4 OR Q>55 THEN 11470 ELSE IF I=LEN(D) THEN
| 11450
4803 | 11400 FOR I=L+2 TO L+LD(KX):GOSUB 11460:IF Q<4 OR I=LEN(D) THEN LB=I:I=
| L+LD(KX)
4855 | 11410 NEXT:IF Q=0 OR (LB=L+LD(KX) AND Q>3) THEN 11470 ELSE IF LB=LEN(D)
| THEN 11450
2108 | 11420 IF KX>Q THEN 11470 ELSE KX=Q
1688 | 11430 L=LB:IF KX<3 THEN 11390
3828 | 11440 I=LB+1:GOSUB 11460:IF (Q<56 OR Q>59) OR I<>LEN(D) THEN 11470
763 | 11450 RETURN
3149 | 11460 Q=INSTR("/.:_#0123456789",MID$(D,I,1)):RETURN
3367 | 11470 FLAG2="on":PRINT "Invalid name!":GOTO 11340
| 11480 'duplicate variable names routine
4299 | 11490 FLAG2="":FOR J=1 TO I-1:IF FLAG="skip" THEN SKIP=0 ELSE SKIP=1
5001 | 11500 IF J<>I AND B(I)=LEFT$(B(J),LEN(B(J))-SKIP) THEN FLAG2="!":PRINT
| "Invalid!"
1137 | 11510 NEXT:RETURN
| 11520 'assign or validate variable type routine
3685 | 11530 Q1=INSTR(RIGHT$(B(I),1),DS(SV(I))):IF Q1=1 THEN RETURN
1920 | 11540 B(I)=B(I)+DS(SV(I)):RETURN
| 11550 'validate variable name routine
7211 | 11560 FLAG="":FOR L=1 TO LEN(B(I)):Q=INSTR("$%&!#.0123456789"+HM,MID$(B(
| I),L,1)):IF Q=0 THEN FLAG="on":L=LEN(B(I)):GOTO 11600
4021 | 11570 IF L<LEN(B(I)) AND Q<5 THEN FLAG="on":L=LEN(B(I)):GOTO 11600
2885 | 11580 IF Q<16 AND L=1 THEN FLAG="on":L=LEN(B(I))
2397 | 11590 IF Q<5 THEN FLAG="skip":SV(I)=Q
1137 | 11600 NEXT:RETURN
| 11610 'set up field statements
7785 | 11620 FF="FIELD 1":FOR L=1 TO VAR:FF=FF+", "+RIGHT$(STR$(LOV(L)),LEN(ST
| R$(LOV(L))-1)+" AS "+LEFT$(B(L),LEN(B(L))-1)+"$":NEXT:RETURN
8053 | 11630 RESTORE 11650:FF="FIELD 1":FOR L=1 TO VAR:READ CV:FF=FF+", "+RIGH
| T$(STR$(LOV(L)),LEN(STR$(LOV(L))-1)+" AS "+CV+"$":NEXT:RETURN
| 11640 'field output variables
6105 | 11650 DATA AB, BC, CD, DE, EF, FG, GH, HI, AC, BD, CE, DF, EG, FH, GI,
| HJ, AD, BE, CF, DG, EH, FI, GJ, HK, AE, BF

```

End

# Hey!

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Thanks. . .



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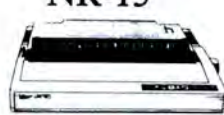
- 180 cps draft, 45 cps NLQ
- Friction and push tractor
- 12.6K buffer
- Parallel interface
- IBM graphics
- Single sheet auto-feed

## ND-15

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136 col.

## NR-15



**\$549**

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# Will They Fly?

**B**eware of on-screen tutorials. First, they seduce you with the copywriter's prose: "Learn everything!" "A revolutionary teaching tool!" "Become an expert in no time!"

Then, they put you at ease with a folksy, down-to-earth introduction.

Finally, they grab you with fancy color graphics, important-looking diagrams, and slick scrolling text screens.

And when it's all over, it's too often as if you never started.

I am probably being unfair to the on-screen tutorial genre of software. Not all of the examples I discuss this month are that bad, but they still miss the mark.

My first inclination was to give a blow-by-blow account of using each program. But the problems I encountered are common to each product, in varying degree. I will describe these problems, using specific examples from the programs. The tutorials I used are Mr. DOS, Total Learning System (TLS) for the Tandy 1000 SX Computer & MS-DOS Training, TLS for the Tandy EX Computer, TLS for Deskmate II, and TLS for Personal Deskmate. The Table lists the companies' addresses and product prices.

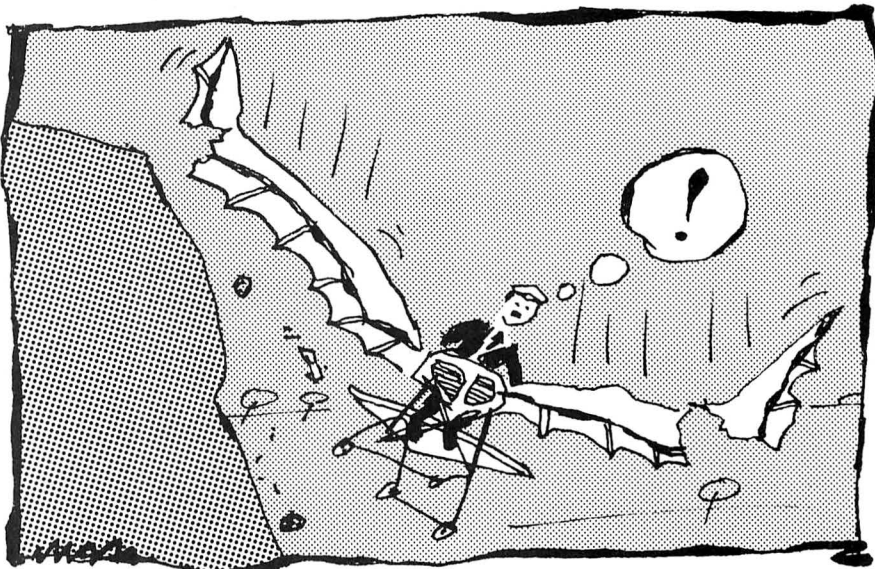
## Sound Idea, But . . .

The on-screen tutorial concept seems like a good one: Let the computer teach the user. Many well-known programs are sold with on-screen tutorials, and I have seen several excellent examples—Lotus's 1-2-3 has one that is exceptional. These teaching programs can work, and when they do, it is for three reasons.

First, they target the user well. They don't try to take all possible levels of expertise into account. Second, they tightly focus the task. You won't see the 1-2-3 tutorial explaining how data is stored on disk. Finally, and most importantly, they are well-executed.

## One Size Fits All

Mr. DOS and the TLS series both suffer from trying to cater to too many levels of user expertise, but in different ways. Mr. DOS intermixes remedial and advanced information with no apparent purpose. It starts off with pointing out



what the various components are (keyboard, CPU, monitor), then jumps into an explanation of binary code, and returns to the basics of the system hardware. This is confusing. Mr. DOS seems to be targeted at the novice, but I doubt a novice would stick with the tutorial through the first of its three disks. A more experienced user might laugh if he or she hadn't paid for it.

The TLS series' approach is to use a menu system. Which menu you get depends on how you answered the experience-level question. At first blush, this seems like a practical setup. However, even though I told the TLS Tandy 1000 SX tutorial (which is virtually identical to the 1000 EX tutorial) that I had used computers before, it still insisted on pointing out the keyboard, monitor, and disk drive to me. I also had to sit through the same cutesy introduction to the wonderful world of microcomputers the novices receive. This bored me, and I question its value to the novice.

I ran the same tutorial again, this time stating that I had never used a computer before. The main menu was different, listing topics such as keyboard, disk parts, and parts of the computer. Once I went through everything on this menu, the menu for the experienced user appeared. The subject matter for either the novice or expe-

rienced user never exceeded what I consider an intermediate level. Overall, the content of the TLS tutorials is targeted to the beginner and is a vast improvement over Mr. DOS.

Nevertheless, the TLS series suffers because it was originally designed as courseware for use in Radio Shack Learning Centers. With a teacher available, the tutorials make sense. The individual left alone with a disk and a Tandy 1000 will not get as much from the TLS series. This point falls mainly under the category of execution, but it also underscores the importance of producing tutorials appropriate for the intended audience. I'll come back to this topic later.

## Beating Around the Bush

Defining your audience means you must also define the limits of the subject matter if you want to make it in the on-screen tutorial business. Even a beginner's lesson on DOS can cover a lot of ground. You must pick only those topics that are necessary for the user to make immediate, practical use of DOS.

I've already said that Mr. DOS mixes advanced topics with remedial ones. Not only is this confusing, much of the information is unnecessary. Is there really a need to teach a novice about nibbles and bits for him or her to use



DOS? This stream-of-consciousness approach indicates that the program's author had little idea of the goals of the tutorial.

I have little to complain about the TLS series' content focus. The Tandy 1000 EX and SX tutorials could do without the sales pitch for using computers. And the Deskmate II tutorial doesn't cover enough ground, particularly on the Worksheet. At one point, the tutorial refers you to the manual to discover formulas other than those shown. A spreadsheet can be intimidating to a beginner, and referring him or her to a manual isn't very comforting.

## Execute, Execute, Execute

Focus isn't everything. You must translate it into a workable product. If Mr. DOS ever had a focus, you'd never know it by the product. The organization is screwy, the text is illiterate, and the approach inappropriate for a teaching tool. I could write a book about how badly Mr. DOS was executed, but space allows me only to cover the highlights.

Not only is there no logical progression from one topic to another, screens seem to be transposed at times. At one point, I was suddenly staring at a screenful of binary numbers. The next few screens tried to explain what I had seen with cryptic figures.

The on-screen text exhibited poor grammar and wordiness. The 100-page manual was no better. For example, this description of the Copy command comes from page 43 of the manual:

"The Copy command allows you to copy files from one disk to another; or to the same disk in different directories; with or without a specified namechange; copy files between computer hardware devices; and to combine many files into one."

I would hope that the people who produce these tutorials had some background in education. This is apparently not the case with Mr. DOS.

But the worst aspect of Mr. DOS is its overall approach. On-screen tutorials must interact with the user if they are going to reinforce the concepts taught. This means having the user actually type commands and other key sequences and watch the results. Nothing about Mr. DOS is interactive. Screen after screen of text, graphics, and figures (three disks' worth) scroll by without offering anything to reinforce the concepts covered. The manual is no help; it hardly mentions Mr. DOS except in the Getting Started section. It could pass for just another book on using MS-DOS.

Other minor points include inconsistent use of character fonts and insufficiently explained diagrams. Some of the fonts are large in more readable

Mr. DOS  
Compucourse  
A117 Plaza del Sol  
Wimberly, TX 78676  
\$69.95

TLS for Deskmate II  
TLS for Personal Deskmate  
Training—Tandy 1000 EX  
TLS for Tandy 1000 EX  
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Damon International Corp.  
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800-433-4530  
\$39.95 each  
\$49.95 for two

*Table. Products mentioned in this column.*

upper- and lowercase, while others are small and in uppercase. The diagrams are often confusing in themselves and are often not explained at all until the following screen, when you no longer have the diagram to refer to. This was especially maddening in the section on directories.

While the TLS series was executed much better, it still has problems. Most important, it seems to be the same software used in the classroom. For at-home use, the series needs to be more interactive than it is. For example, the Deskmate II tutorial often took over for the user when filling in a text screen, Filer record, or Worksheet page after a few entries. This was like having someone standing over you typing in the right commands as you learn a program.

Repetition of even the simplest tasks is important; it reinforces what you have learned and lets you become familiar with the functions in a stressless way. The 1-2-3 tutorial makes you do a lot of work, and this is one reason why it is so effective.

A classroom environment doesn't always allow the time for this kind of learning, and going through each TLS tutorial, I felt like I was under a time limit. I wasn't particularly bothered by this, but I think it is another indication of the series' classroom origins.

The TLS series had a couple of other problems related to execution. The EX tutorial showed the same graphic PC when describing the computer's parts as the SX tutorial did. It even indicated where a hard drive would go. Of course, it looks nothing like the EX, and the EX will not take an internal hard drive.

I would have liked to be able to back up a screen at a time, but the TLS tutorials only allow you to skip ahead a topic at a time.

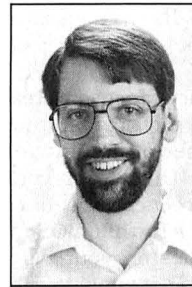
## Summary

Mr. DOS is enough to turn anyone off to on-screen tutorials. With three disks of information, it does contain worthwhile information, but you would go through less trouble finding it in your documentation or a much less expensive book on DOS. I can't recommend Mr. DOS to anyone.

The TLS series is a different story. It will at least get the first-time user familiar enough with each topic to take the next step. For those with slightly more experience, taking a class through the Radio Shack Learning Centers would be more worthwhile. Veteran users would be better off with a good book on the subject.

## Next Month

I've got a lot to write about in October. First, I'll give you a checklist of questions to ask when ordering hardware by mail. Then, I'll talk about Tandy's new 1000 models—the HX and TX. Finally, I'll review ATD Inc.'s new memory board for the EX—the first third-party board for the EX that I know of. ■



*Michael Nadeau is 80 Micro's executive editor. He has been editing computer magazines for six years, using Tandy equipment all the while. Write to him c/o 80 Micro, 80 Elm St., Peterborough, NH 03458.*

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# Beating the Hard-Disk Hodgepodge

This month's column is the first of two articles that will help you better organize your hard disk. This is a particularly important aspect of operating your computer, and some of the principles can apply to floppy-disk operations as well. In this article, I will guide you in establishing the proper disk structure. A subsequent column will explain what happens after you use your disk for a while.

Periodically, someone asks me to figure out why an application won't work properly. When I try to run it, nothing dismays me more than to find it is part of the 500+ files all clustered in the root directory on a hard disk. Pages and pages of files scroll across the screen with no end in sight.

This is unsatisfactory for several reasons. First, DOS has a physical limit for the maximum number of file entries (generally 512 or 1,024) allowed in your root directory. You can conceivably have vast amounts of space left while DOS refuses to store more files on your disk. This file limitation does not apply to sub-directories.

## Endless Directory Mazes

Huge numbers of files slow down file access. For each file access, DOS searches the current directories beginning with the first entry and ending with a file match or when it encounters the first unused entry. Deleted files leave gaps in this structure that DOS must still search when accessing files. The difference in file access that you achieve by using smaller directories can be significant.

You can also lose files and never realize it until you need a particular one. Several applications have files with the same name. When you load the first software package, everything is fine. Loading the second one overwrites the files from the first application, and you lose their contents. Applications creating backup files is another area where a potential loss can occur.

Most important, you can't find the file you want when you need it. "I know it is there" is your cry as you search screens and screens of files for your latest work

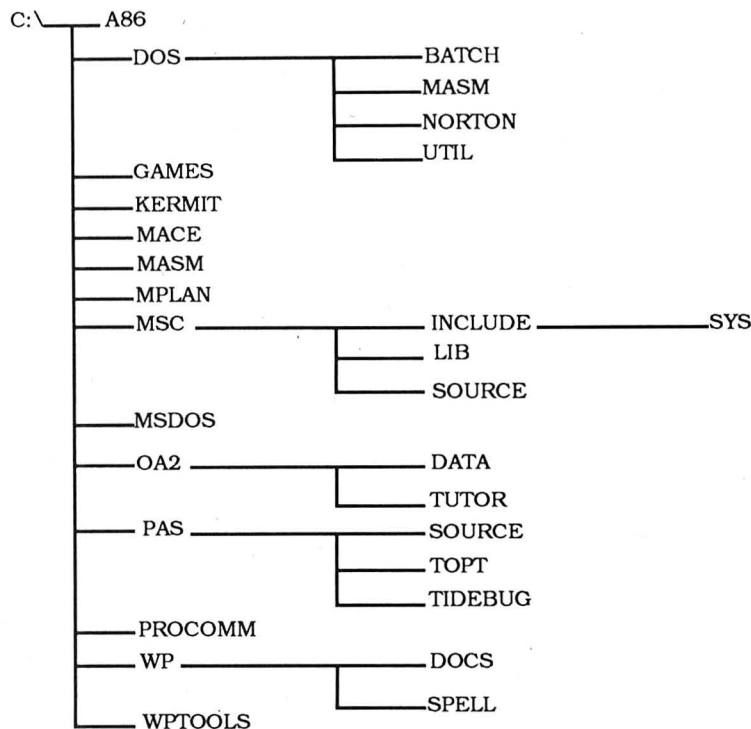
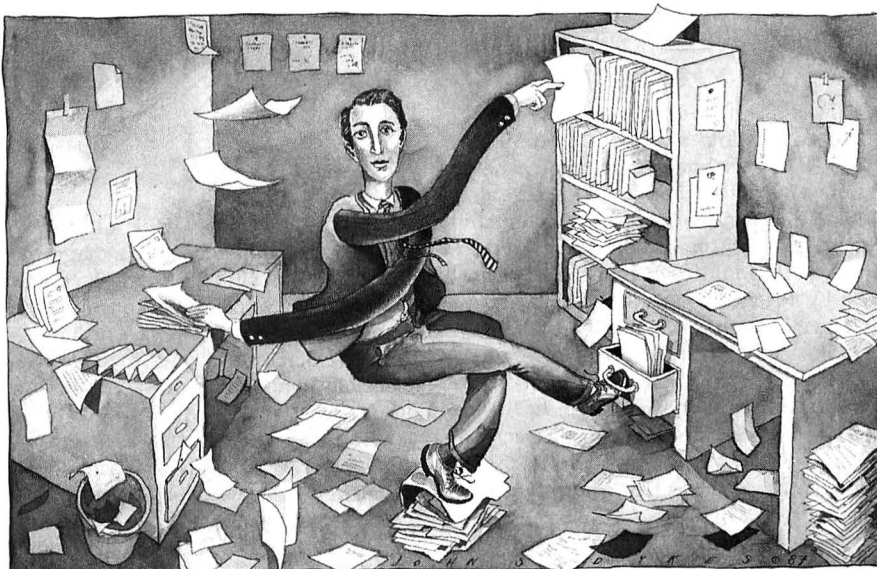


Figure 1. A sample hard-disk directory structure.



```
Volume in drive C is .The_Wizz/
Directory of C:\
A86          <DIR>      4-24-87  10:26p
DOS          <DIR>      4-24-87  5:05p
GAMES       <DIR>      4-24-87  9:55p
KERMIT      <DIR>      4-24-87  9:55p
MACE        <DIR>      4-24-87  5:27p
MASM        <DIR>      4-24-87  8:02p
MPLAN       <DIR>      5-25-87  9:19p
MSC         <DIR>      4-24-87  5:25p
MSDOS       <DIR>      5-25-87  8:55p
OA2         <DIR>      4-25-87  2:40p
PAS         <DIR>      4-24-87  5:25p
PROCOMM     <DIR>      4-24-87  5:25p
WP          <DIR>      4-24-87  5:26p
WPTOOLS     <DIR>      4-24-87  5:26p
AUTOEXEC   BAT      595     5-25-87  10:15p
COMMAND    COM     15957   4-25-87  8:02a
CONFIG     SYS      83      6-07-87  8:18a
TREEINFO   NCD      475     5-31-87  1:51p
18 File(s) 1093632 bytes free
```

Figure 2. The files in the sample disk's root directory.

of art. You cannot easily delete items from this massive root. Did you get them all? Did you get only the ones you want?

## Starting Out

The easiest way to properly set up a hard disk is by beginning with a clean disk. Grit your teeth, back up your data files, and grab your DOS master disk. I recommend saving only the data files that you require, as you should reload the applications software using its installation procedures on the distribution disks. I prefer saving the data files using the DOS Copy or XCopy commands instead of the Backup command, as I can then place them anywhere I want when restoring them. You must save files bigger than 360K with Backup.

Boot up using the DOS master disk. Then format the hard disk, selecting the /S option to transfer the operating system to the disk. This formats the disk and transfers three files to it: your two hidden system-boot files and Command.COM. If you are using DOS 3.2, also select the /V option and place a label on your hard disk. This adds a layer of protection; you cannot format the disk without correctly entering this label.

The key point to building a useful file structure on your hard disk is that each application gets its own subdirectory. Make that an inviolate principle. Figure 1 is a graphical structure for one of my small hard disks, while Figure 2 is the list of files in the root directory for this disk. Short and sweet is the key to a manageable hard disk, and these concepts apply to any size disk.

The following discussion assumes that you know how to use the MKDIR, CHDIR, and RMDIR commands. I will use the common abbreviations MD, CD, and RD for these commands in my examples and batch-file figures. Figure 3 contains the example MKDIR com-

mands that build the disk structure for Figure 1.

Other than directory entries, only four files are in my root directory. DOS expects to find the command interpreter and the configuration file in your root directory. The DOS command interpreter also looks for the automatic start-up batch file there. The fourth file is a data file for one of the Norton Utility programs.

Before reloading any of your software applications, refer to Figure 1. I'll take DOS itself as the first example. I consider all the remaining program files on your DOS disk as separate applications. Because they are related, I have stored them

```
MD \A86
MD \DOS
MD \DOS\BATCH
MD \DOS\MASM
MD \DOS\UTIL
MD \DOS\NORTON
MD \GAMES
MD \KERMIT
MD \MACE
MD \MASM
MD \MPLAN
MD \MSC
MD \MSC\INCLUDE
MD \MSC\INCLUDE\SYS
MD \MSC\LIB
MD \MSC\SOURCE
MD \MSDOS
MD \OA2
MD \OA2\DATA
MD \OA2\TUTOR
MD \PAS
MD \PAS\SOURCE
MD \PAS\TOPT
MD \PAS\TDEBUG
MD \PROCOMM
MD \WP
MD \WP\DOCS
MD \WP\SPELL
MD \WPTOOLS
```

Figure 3. The MKDIR commands to build the sample disk structure.

in a common directory: DOS. Do not worry about not being able to access them readily—I'll take care of that later on.

Use the DOS Copy command to install your DOS utilities. While you are copying the files into this directory, remove some of the more dastardly tools that can damage your hard disk. You do not need items such as FDisk, HFormat, and Recover. Several other items are useless, such as the KEYBxx utilities and Share on the DOS 3.x disks. Install only the utilities you use in regular system operation.

To separate the DOS files from my own utilities and other tools, I have

placed each group into separate subdirectories under DOS. My favorite tools went into Util, while all of Norton's Utilities go into that separate directory. Microsoft language tools, such as the assembler and debugger, are in their own subdirectory, and I reserve a fourth subdirectory for system batch files.

Now, use the MKDIR command and build a separate directory for each of your applications. You can also elect to place the data files in subdirectories under the main one if your application supports this method of storing files (most recent ones do). Then follow the installation procedures for your software to build a clean configuration in each subdirectory. Save the data files that you backed up originally as the last files to load.

## Connectivity

The next part of your disk's configuration is to connect all the appropriate applications for easy access. Program Listing 1 shows the contents of a typical configuration (Config.SYS) file. It establishes a RAM disk, installs the enhanced keyboard/screen, and sets the number of file buffers and maximum files allowed. The Shell command tells DOS to install the command interpreter with an expanded environment size (DOS 3.2) of 512 bytes, which some of the newer software uses for communications.

On a hard disk, proper use of the Buff-

Program Listing 1. A typical configuration file.

```
device=c:\dos\ansi.sys
device=c:\dos\ramdrive.sys 18 128 4
shell=c:\command.com /e:512 /p
files=20
buffers=20
```

End

Program Listing 2. A sample application file.

```
echo off
c:
cd \wp
wp
cd \
```

End

Program Listing 3. An example of an Autoexec file.

```
echo off
path d:\;c:\dos;c:\dos\util;c:\wptools;c:\dos\masm;c:\dos\batch;
c:\dos\norton;c:\games;c:\pas
set comspec=d:\command.com
copy command.com d:\>nul
prompt $e|lm {$t$sh$sh} $e|0m $p$g
kbfix /d0 /t1 /s1
ced -f\dos\util\ced.set
```

End

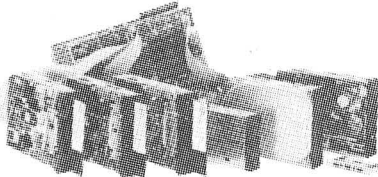


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## JOHN'S MS-DOS COLUMN

ers command can dramatically enhance performance. DOS allocates one 512-byte buffer for each entry you specify here, and the system performs each disk

### **Each application has unique execution requirements, and you must decide how to start each up.**

operation through these buffers. If you attempt to reuse the data and DOS contains it in memory, no further disk access is required. This is just like using a RAM disk.

The default value is ridiculously small, even for a floppy-based system. You should increase it if you have the available RAM. You size this parameter correctly by trial and error. You have to experiment with several and determine which works best for you. Too many buffers are just as bad as too few—DOS spends most of its file-access time searching through the buffers looking for your data. I recommend at least 20 buffers for a hard disk. Again, this depends on how much memory you can dedicate to this function.

Each application has unique execution requirements, and you must decide how to start each up. Simply put, it is a matter of selecting the correct directory and typing in the program name. Program Listing 2 contains an example batch file that I use to execute Wordperfect, which I store in subdirectory WP.

The first command suppresses listing of the remaining commands to the video screen. Since my batch file is accessible via my Path statement all the time, the next command selects my hard disk (I could be on a floppy drive) and then changes into the proper subdirectory. Wordperfect executes and, when it terminates, the last command changes directory back to the root before exiting. Many applications do not require any more commands than this to set up and execute them.

You will need to create one of these batch files for each application you want to run directly from the DOS prompt. I chose to store them in a common subdirectory (Batch) located in the DOS group (see Figure 1).

The last part of the connections is the Autoexec file (Program Listing 3). The

most important part of this command file is the Path command. It tells DOS how you want to search this directory structure if it cannot locate the command you type. For example, note that I told DOS to search the entire DOS subdirectory structure for programs, as well as my small RAM disk and a few other directories.

Search order is important. DOS will scan directories from left to right in this Path command. You must also consider DOS file-naming and execution conventions when contemplating this search order. For example, DOS considers the following files distinct and executable candidates: PRG.COM, PRG.EXE, and PRG.BAT.

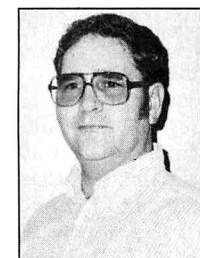
DOS scans the files in each directory in the Path statement and considers files in the order listed above. COM files execute before EXE files. DOS processes both files prior to any batch files of the same names. If DOS identifies no candidates in the current search directory, it considers the next directory from the Path statement.

I want to stress that the most important link in this entire hard-disk reorganization is effective use of the Path command and batch files to link your important applications. Clever prompts and memory-resident software can only improve on this. Tools such as the Change Working Directory program in my July 1987 column (p. 84) add greatly to your capabilities.

### **Full Circle**

This is the first part of the problem. And it's never right. I continually adjust the look and feel of my hard disk whenever I get a better idea for handling an application. Using these techniques, I maintain a 30-megabyte (MB) hard disk virtually full with over 90 subdirectories and 1,700 files, yet I can find anything I want in seconds. The most astounding feat with this disk is that the root directory is no larger than that displayed in Figure 1.

Next month, I will address the second part of this problem: maintenance of the disk after you have built your structure. I will look at the tools you need to do the job and some of the techniques. ■



*John B. Harrell III is a naval electronic warfare systems analyst. He programs in Pascal, C, and assembly language. Write to him c/o 80 Micro, 80 Elm St., Peterborough, NH 03458.*

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# Hard-Disk Companions

With more and more people turning to larger mass-storage devices, efficiently managing and protecting the programs stored on them becomes a prominent consideration. The public-domain and shareware programs discussed here cover DOS shells, backup utilities, hard-disk file organizers, and hard-disk file-protection programs. There is even a program to avoid that little nuisance of turning on your computer with a data disk in drive A, which keeps you from booting your computer system off of the hard drive.

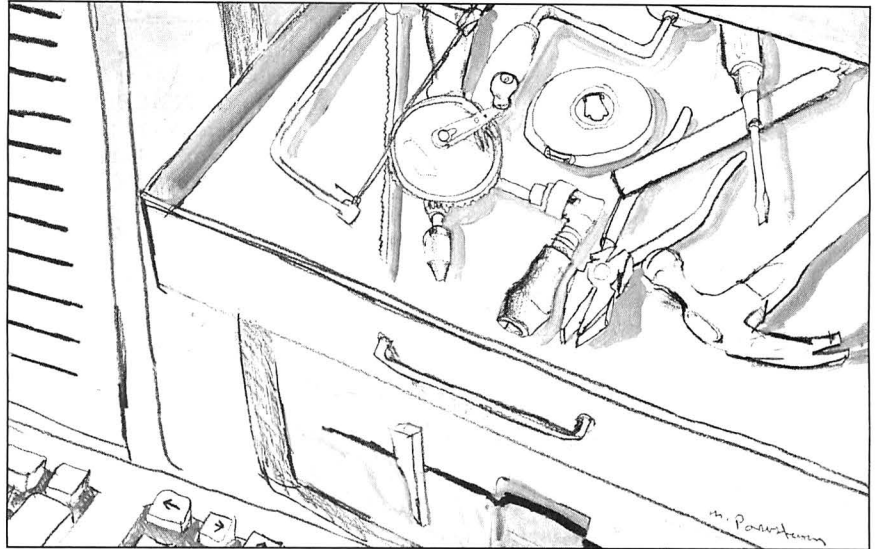
## DOS Shells

A DOS shell is a program that lets you perform many DOS command functions from a menu rather than by keying in the command. Though mainly for hard disks, you can use DOS shells with your floppy drives. The complexity of files on a hard disk with all its subdirectories creates more of a need for a DOS shell.

Directory Scan, by Nat Martino, rivals commercial programs costing much more than the \$15 suggested donation. Directory Scan, like all other programs discussed, will be placed on the *80 Micro* BBS and listed as DS300.ARC. The program is as simple as just calling up the program and running it. An on-line help menu aids you. Directory Scan displays a directory tree on the left side of your screen and your programs on the right three quarters of the screen. You use the arrow keys to select files for running or other operations. You use the function keys to manipulate the highlighted directory; pressing the enter key puts you into that directory and displays its files.

Directory Scan started out as a hard-disk backup utility and soon expanded to provide complete and easy control over many more functions, including executing files. You can tag files for copying, deleting, moving, and even choosing certain attributes of protection such as read only, hidden, and setting the archive bit for the file. You can program several macro keys the first time you use DS300 to call and run your programs.

You can display files according to different sorting options such as ascending or descending sorts by file name, file extension, or date. You can use filters to only display files that meet certain file-



match parameters. You can make and delete subdirectories and then move files from the root directory or other subdirectories to a newly created subdirectory.

If, by chance, you can't perform some command easily by keystroke, there is also a command to go directly to DOS and key it in manually.

Directory Scan works with color and monochrome monitors and includes initialization routines for setting up default parameters and colors.

## Companion Programs

From a file named LIST62A.ARC is a listing program by Vernon D. Bueg that can be called directly from Directory Scan or as a stand-alone program to examine text files. List does more than the Type command from DOS in that it can page back and forth; it covers other display controls such as searching forward and backward and filtering of control codes and the eighth bit of unprintable characters. For color monitors, you can change colors and save them as default values within List.COM. This program has many more features than described here and is easy to use.

Dpath, from a file called DPATH.ARC by James A. McGreggor Jr., is a public-domain program to help you use your files more effectively from within programs like Directory Scan and HDmenu (see Table). Many programs like Wordstar have overlay files that must be

called from within the program. Usually these files have to be in the same directory that you are running the program from. Using the DOS Path command, you can run the main program from other directories, but the Path command won't tell where to find the overlays. Dpath corrects this. No contribution is asked.

From a file called HDMENU22.ARC comes HDmenu 2.2. This program gives you a different kind of menu control over your hard disk. HDmenu is a full-function demo program from VAI Financial Software. VAI entices you to donate \$39 by promising additional utilities that work with HDmenu. You are free to use HDmenu without paying if you don't want the other utilities and manual.

HDmenu lets you create customized applications menus and submenus to run your programs. Though not as sophisticated as Directory Scan, HDmenu gives you more control over running your programs according to application than Directory Scan does. HDmenu allows you to see a menu of your applications programs while Directory Scan makes you remember which macro key brings up a certain application. HDmenu also provides multilevel password security to prevent unauthorized operation of the computer or specific applications. It also lets you create a system log that records all computer usage. On-line help screens explain the menu operation and help you set them up.



## Backup Utilities

Since is a file from Since.ARC that helps you back up your hard disk. By giving the command SINCE mm dd yy (month, day, year) all files with a date tag after the specified date are displayed. The author of this program is unknown.

BKUPCALC from the file BKUP-CALC.ARC estimates how many disks you will need to back up all the files on your hard disk. This program was written by Glen E. Thompson and is in the public domain. No donation is asked.

Sbackup is an interesting program from the file SBACKUP.ARC that performs a menu-driven backup of your hard drive. It was written by Chuck Elliot and placed into the public domain. I've found the instructions for Sbackup somewhat cryptic, but if you spend some time with it, you can probably figure it out. You have to set up a template to indicate which types of files you want to back up. There are no instructions on how to do this, although wild-card characters can be used.

## File Organizers

Two hard-disk file organizers of note are Hard Disk Organizer (also called DOG) from the file DOG101A.ARC and Seek Stopper (SST) from the file SST-V201.ARC. DOG is a shareware program written by Allen Morris. SST was written by Alfred Heyman.

Both programs physically organize the files on your hard disk so that it takes less time to read the disk and load the file into memory. When you use a hard disk for a while, files get fragmented; that is, when you rewrite data files, or add and delete files, small spaces for program storage crop up here and there on the disk. As you add files, pieces of them may be stored in these available spaces so that when you call the program, DOS has to collect all these pieces as it puts the program into memory.

These two programs analyze your hard-disk directory and put these program pieces back together for faster access. On a 20-megabyte hard drive, it might take 15 to 30 minutes for these programs to reorganize the files on the drive. After completion, there is an apparent increase in hard-drive speed.

DOG is by far the safer of the two programs but slower. It rewrites the directory entry after it moves each file. SST saves all its directory information in memory until it has completed its task and then writes the directory. If you have a power failure before SST is completed, you'll lose your files.

## File Protection

There are always devious individuals bent on destruction of other people's

property. Computer users can become victims of vandalism through programs written or altered to reformat disks or hard drives. Andy Hopkins has written two public-domain programs called Bombsqad and CHK4bomb to check programs that you download from a bulletin board to make sure that they haven't been altered to destroy your data. These files (from BOMBSQAD.ARC and CHK4BOMB.ARC, respectively) do their jobs in different ways.

Bombsqad loads into memory and monitors calls to the ROM BIOS (basic input/output system) to determine if read/write functions are taking place as your program is running. You can specify which types of functions you want to monitor. Remember, it also flags legitimate read/write operations as well, so you have to decide whether the program is legitimate or not depending on what you expect it to do. I had a problem with Bombsqad with my Tandy 1000A and Taxan color monitor. The program might only work with monochrome monitors.

CHK4bomb works by reading and analyzing your program file and lists suspicious code. Again, legitimate read/write operations are flagged, so you have to decide on the validity of the program.

Sometimes the offending code is encrypted. In this case Bombsqad is the only way to detect it. These programs won't do you much good unless you are a programmer. Most bulletin boards are tightly run anyway, and the sysop (system operator) probably checks programs before making them available.

WPHD (Write Protect Hard Drive), in a file called WPHD.ARC, seems to be a better solution. This program puts a temporary write-protect flag onto your hard drive so that no one, not even you, can write data to the hard drive until you unprotect it. Running the program a second time removes the write protection. The author of this program is unknown.

## A Convenience Utility

Boot Thru is a file from BT105.ARC written by Bill Gibson and placed in the public domain. This program avoids an annoyance that besets all hard-disk users at one time or another. Often when booting my computer, I have left a data disk in drive A. When you have a hard disk, your computer wants to read the system files on the hard disk, drive C. If you have a disk in drive A, the computer assumes you want to boot up from that disk. If a data disk is in drive A, you get a message on the screen telling you that it is not a system disk. Boot Thru writes a new boot directory on the disk in drive A that allows the boot procedure to pass through to drive C.

DS300.ARC (Directory Scan)  
Nat Martino  
501 W. Vineyard Ave. #514  
Oxnard, CA 93030  
\$15

LIST62A.ARC  
Vernon D. Bueg  
456 Lakeshire Drive  
Daly City, CA 94015  
\$15

HDMENU22.ARC  
VAI Financial Software  
P.O. Box 37034  
Honolulu, HI 96837  
\$39 for complete program

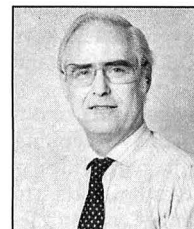
DOG101A.ARC (Hard Disk Organizer)  
Soft GAMs Software  
Mr. G. Allen Morris III  
1411 10th Ave.  
Oakland, CA 94606  
\$20

SST-V201.ARC  
Mr. Alfred J. Heyman  
Room 101  
P.O. Box 172101  
Memphis, TN 38187  
\$10

*Table. Public-domain and shareware programs mentioned in this column by authors who request a donation.*

## Next Month

Several good business programs are available as shareware and public-domain offerings. I will talk about a few of them next month. All programs discussed this month are available on the 80 Micro BBS at 603-924-6985 (300/1,200 baud, 8-bit words, no parity, 1 stop bit) for a limited time. As a convenience to readers, Directory Sort, Dpath, HDmenu, Since, BKUPCALC, Sbackup, Boot Thru, Bombsqad, CHK4bomb, and WPHD are available in a two-disk set for \$10 (including postage). Send a check or money order with a mailing label to my home address below. Due to restrictions on distribution, I cannot offer the other programs, List, DOG, and SST, although they are on the 80 Micro BBS. See the Table for information on how to contact the authors of these programs. ■



*Thomas Quindry has written for 80 Micro since 1980. Write Tom at 6237 Windward Drive, Burke, VA 22015. Enclose a stamped, self-addressed envelope for a reply.*



# Let's Link

One of this column's frequent topics is how to use assembly-language modules with Basic and other languages on the Model 4. I've discussed methods of loading assembly routines into memory that make linking those routines and Basic easy.

I thought that I had covered almost every technique imaginable, including the storage of machine-language routines in strings, in protected high memory, in back banks, in integer arrays, in Basic's disk buffers, and below Basic's program-code table. But the extended Basic supplied with LS-DOS 6.3 provides another method—perhaps the most elegant one yet—of linking machine code with Basic programs.

One enhancement of LS-DOS 6.3 Basic is its ability, through the USR11 command, to directly call one of the DOS supervisory calls (SVCs). To use the SVCs intelligently, you need a copy of Radio Shack's *Model 4 Technical Reference Manual*. If you can find a copy of Roy Soltoff's *Programmer's Guide to LDOS/TRSDOS 6*, it is also helpful because it explains the same concepts in more depth than Radio Shack's manual.

If you look at the numeric list of SVCs in either reference book, you soon realize that not all of the possible 128 SVCs have been used. The unused ones are marked "reserved" in both books, which means that some future version of TRSDOS/LS-DOS 6 might claim them, but this is unlikely.

Some of the unused SVCs have been adopted by other software. Pro-Wam from Misosys uses SVC 124. The extended memory handler in volume I, issue 3, of the *Misosys Quarterly* uses SVC 108 to give programs written in any language access to back banks of memory for data storage.

## Systems Requirements

Model 4/4P/4D

128K RAM

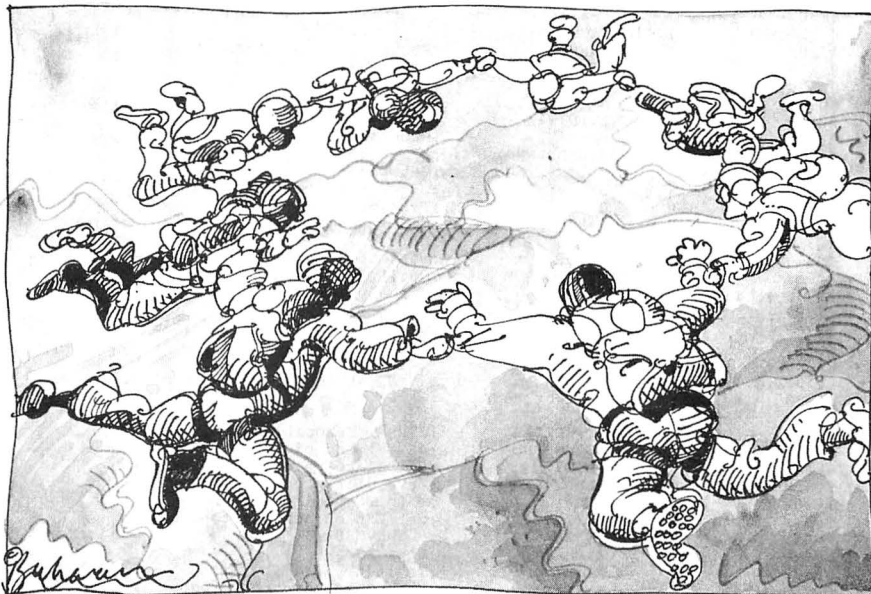
Assembly language

Basic

Editor/assembler

(Pro-Create 4.3a or MRAS)

Available on The Disk Series



Program Listing 1. A short program to display the current SVC vectors.

```

00100 ;-----
00110 ; SVC Vector Display
00120 ; Short program to display the current SVC vectors.
00130 ; If you want a printout of the list, LINK *DO *PR
00140 ; before running this program, then RESET *DO.
00150 ;-----
00160 ;SVCs used:
00170 @DSPLY EQU 0AH
00180 @HEX8 EQU 62H
00190 @HEX16 EQU 63H
00200 @FLAGS EQU 65H
00210 SVC MACRO #NUM
00220 LD A,#NUM
00230 RST 28H
00240 ENDM
00250 ;
00260 ORG 3000H
00270 BEGIN SVC @FLAGS ;IY ==> flag table
00280 LD H,(IY+26) ;H ==> SVC page
00290 LD L,0 ;HL ==> SVC #0 vector
00300 PUSH HL ;Move pointer
00310 POP IX ; to IX
00320 LD BC,128<8 ;C will count SVCs
00330 LOOP LD E,(IX) ;Get vector
00340 LD D,(IX+1) ; in DE
00350 LD HL,VECTOR ;HL ==> buffer
00360 SVC @HEX16 ;Convert DE to HEX-ASCII
00370 LD HL,SVC_NUM ;HL ==> buffer
00380 SVC @HEX8 ;Convert C to HEX-ASCII
00390 LD HL,SVC_NUM ;HL ==> buffer again
00400 SVC @DSPLY ;Print it
00410 INC IX ;Bump pointer
00420 INC IX ; twice
00430 INC C ;Increment counter
00440 DJNZ LOOP ;Repeat for all
00450 LD HL,0 ;No error
00460 RET ;Return to DOS
00470 ;-----
00480 ; Data area
00490 ;-----
00500 SVC_NUM DB ' : ' ;2 spaces & colon for SVC #
00510 VECTOR DB ' ' ;4 spaces for vector
00520 DC 9,' ' ;9 spaces for the screen
00530 DB 3 ;End string with ETX
00540 END BEGIN

```

End



Program Listing 2. The installation routine for an extended BCD supervisory call.

```

00100 ; -----
00110 ; Installation Routine for Extended BCD Supervisory Call
00120 ; Save as INSTALL/ASM
00130 ; Install with the following command:
00140 ; XBCD (SVC=n)
00150 ; The SVC parameter determines the SVC slot that
00160 ; will be used. It defaults to SVC 127. The
00170 ; parameter may be abbreviated 'S'.
00180 ; -----
00190 INIT @@DSPLY SIGNON$ ;Say hello
00200 @@PARAM PARMTBL ;Parse the parameter
00210 JP NZ,BADPARAM ;Go if bad parameter
00220 LD A,(RESP) ;Get the response byte
00230 OR A ;And parameters at all?
00240 JP Z,INIT1 ;No -- go
00250 AND 80H ;Numeric response?
00260 JP Z,BADPARAM ;No -- go
00270 LD HL,(SVC_NUM) ;Get the response
00280 LD DE,109 ;DE = maximum acceptable value +1
00290 SBC HL,DE ;Test user's value
00300 JP C,BADPARAM ;Go if too small
00310 LD DE,19 ;DE = 127 - 108
00320 SBC HL,DE ;Test top of range
00330 JP NC,BADPARAM ;Go if too large
00340 INIT1 @@GTMOD MODNAM ;Already installed?
00350 JP Z,INSTLD ;Error if already in memory
00360 @@HIGH$ HIGH,0 ;Get current high$
00370 LD (OLDHI),HL ;Keep old value
00380 ; -----
00390 ; Tests have been passed
00400 ; Relocate and protect code
00410 ; -----
00420 LD IY,RELTAB ;IY ==> relocation table
00430 LD DE,MODEND ;DE ==> end of main program
00440 SBC HL,DE ;Calculate relocation distance
00450 PUSH HL ;Move distance
00460 POP BC ; to BC register pair
00470 RELOC1 LD L,(IY+0) ;Get LSB of address to change
00480 LD H,(IY+1) ; and MSB
00490 LD A,H ;Copy MSB
00500 OR A ;Is it 0?
00510 JR Z,MOVMOD ;Yes -- go move the program
00520 LD E,(HL) ;Else get present LSB
00530 INC HL ;Point to MSB
00540 LD D,(HL) ;And present MSB
00550 EX DE,HL ;Value in HL
00560 ADD HL,BC ;Add the offset
00570 EX DE,HL ;Move new value to DE
00580 LD (HL),D ;Put back new MSB
00590 DEC HL ;Point to LSB
00600 LD (HL),E ;Now the value is in place
00610 INC IY ;Bump twice
00620 INC IY ; to point to next address
00630 JR RELOC1 ;And change next address
00640 ; -----
00650 ; Move and protect
00660 ; -----
00670 MOVMOD LD DE,(OLDHI) ;DE ==> destination
00680 LD HL,MODEND ;HL ==> end of program
00690 LD BC,MODLEN ;BC = bytes to move
00700 LDDR ;Move it all
00710 EX DE,HL ;New HIGH$ in HL
00720 PUSH HL ;Save new HIGH$
00730 @@HIGH$ HIGH ;Set new value
00740 ; -----
00750 ; Set new SVC pointer
00760 ; -----
00770 @@FLAGS ;IY ==> flag table
00780 LD H,(IY+26) ;H => SVC table page
00790 LD DE,127 ;Default SVC value
00800 SVC_NUM EQU $-2 ;Label for number
00810 LD A,E ;A has SVC #
00820 ADD A,A ;SVC * 2
00830 LD L,A ;HL ==> SVC slot
00840 POP DE ;DE = new HIGH$
00850 INC DE ;DE = program entry point
00860 LD (HL),E ;Save LSB of address
00870 INC HL ;Bump pointer
00880 LD (HL),D ;New SVC is set
00890 @@HEXD 3,(SVC_NUM),SVC_RPT ;Change number to decimal
00900 @@DSPLY SUCCESS$ ;Report successful installation
00910 @@EXIT ;End of installation
00920 ; -----
00930 ; Error exits
00940 ; -----
00950 BADPARAM LD HL,BADPRM$ ;HL ==> message
00960 DB 0FDH
00970 INSTLD LD HL,INSTLDS$
00980 @@DSPLY ;Print the message
00990 @@DSPLY ABORT$
01000 @@ABORT ;Error exit to TRSDOS
01010 ; -----
01020 ; Data areas
01030 ; -----
01040 PARMTBL DB 80H ;Beginning of table

```

Listing 2 continued

The other unused SVCs, especially those with high numbers, are rarely claimed. If you write your own or modify existing SVCs and add them to the SVC table, the chance is small that they will conflict with the operating system or any applications.

Adding a new SVC is simple. You write the machine-language routine just like any other. During its installation process, and after loading and protecting itself somewhere in memory, the routine adds the address of its entry point to an appropriate location in the SVC table that LS-DOS keeps in low memory. The routine itself merely needs to keep the stack in good order and end with a RET (return) instruction, after perhaps setting the appropriate values in the registers and status flags.

Once you install the new routine, you can call it like any other SVC. If you use LS-DOS 6.3 Basic, you need to create an array of six integers, load the SVC number into the first position of the array, and invoke USR11 to call the SVC. The array contains the register and flag values that the SVC returns.

The USR11 routine has one annoying bug. Despite what the documentation states, USR11 only works if the control array has a name that is one or two characters long. If you give the array a longer name, your Basic program reports an "Illegal function call" when you try to use USR11. The method Logical Systems Inc. (LSI) used to ensure that the array passed to USR11 is, in fact, an integer array causes the problem. Until LSI changes the checking algorithm in an update of LS-DOS 6, we must live with the restriction of using a two-letter variable name for the array passed to USR11.

Since there is a slight chance that you might install a new SVC routine on top of a current routine, you need a method to check which SVCs are in use. The easiest way is to run Program Listing 1, a short program that displays all the current SVC vectors from the TRSDOS/LS-DOS vector table. Near the end of the list are several identical vectors, such as 1AF4 hexadecimal (hex) in my version of LS-DOS 6.3. The vectors comprise the address of the SVC error routine, which means those SVCs are not in use. You can use any SVC with that address for your own purposes.

Once you find an unused SVC vector, you are ready to assemble and install this month's demonstration routines, Program Listings 2-4. To demonstrate how you can use a new SVC, I wrote a program that performs exact addition and subtraction of any integers up to 254 digits long. Program Listing 5 is a Basic program that demonstrates how you can use the arithmetic SVC.



Listing 2 demonstrates how to install a new SVC in LS-DOS. It begins by letting you designate which SVC to use and checks if the chosen value is between 108 and 127. If you do not specify an SVC, the program uses SVC 127 by default.

After the call to @PARAM to parse your parameter and the necessary

## **The essential point is that by using page addressing, the vector address can be found more quickly.**

checks to determine that you specified a satisfactory SVC number, the installation routine goes through the normal process of relocating a module to high memory and protecting it there. The only part of the routine unique to installing an SVC begins in the last third of the listing. The @Flags SVC points IY at the flag table. The value at (IY + 26) then tells the program where to find the SVC vector table.

TRSDOS/LS-DOS 6 always puts the SVC table on an even page boundary; its beginning address is always in the form XX00 hex. The value of XX is found at IY + 26. To find the address of any particular SVC, the XX value can be put in the H register, and then the SVC number is doubled and placed in the L register. The vector address is then at (HL) and (HL + 1). This might sound more complex than it really is. The essential point is that by using page addressing, the vector address can be found more quickly and easily, by both the DOS and the installation routine, than if the SVC table were placed at an arbitrary memory location.

The last part of the installation routine consists of messages to report success or failure and the necessary data areas. They are all standard and follow the format of past relocation routines in programs I've presented here.

### **Accurate Math**

There are many ways to represent numbers inside a computer. Microsoft Basic generally uses one of three forms: 2-byte integers limited to the -32768 to +32767 range, single-precision floating-point numbers stored in 4 bytes, and double-precision floating-point numbers stored in 8 bytes. Unfortunately, most arithmetic done with Microsoft's float-

#### *Listing 2 continued*

```

01050 DB 10010011B ;Accept numeric entry, abbr., 3-byte name
01060 DB 'SVC'
01070 RESP DB $-$ ;TRSDOS's response
01080 DW SVC_NUM ;Location for response
01090 NOP ;End of table
01100 ;
01110 RELTAB IRP X,<1,2,3,4,5,6,7,8,9> ;Create relocation table
01120 DW RL_X
01130 ENDM
01140 DW 0 ;Mark end of table
01150 ;
01160 SIGNON$ DB 'LS-DOS 6.3 / Basic ASCII Arithmetic Routines',CR
01170 BADPRM$ DB 'Bad installation parameter. Install as ',LF
01180 DB ' XBCD (SVC = n) ',LF
01190 DB 'with "n" between 109 and 127.',CR
01200 INSTLD$ DB 'High-mcmory module already installed.',CR
01210 ABORT$ DB 'Installation aborted.',LF,CR
01220 SUCCESS$ DB 'High memory module installed and linked to SVC #'
01230 SVC_RPT DB '000',LF,CR
01240 ;
01250 END
    
```

End

#### *Program Listing 3. ASCII arithmetic routine to be installed as an SVC accessible from Basic under LS-DOS 6.3.*

```

00100 ;-----
00110 ; ASCII Math Routines to be installed as an SVC
00120 ; accessible from Basic under LS-DOS 6.3
00130 ; Assemble as XBCD/CMD
00140 ;
00150 ; Calling conventions:
00160 ; C = function #
00170 ; IX = VARPTR(string 1)
00180 ; IY = VARPTR(string 2)
00190 ;
00200 ; Return:
00210 ; Z-flag set = success
00220 ; NZ set = failure, error code in A
00230 ;
00240 ; Function choices:
00250 ; 0: string1 = string1 + string2
00260 ; 1: string1 = string1 - string2
00270 ;-----
00280 *LIST OFF
00290 *GET MACLIB/ASM
00300 *LIST ON
00310 ORG 3000H ;Will relocate
00320 BEGIN JR ENTRY ;Standard TRSDOS Memory Header
00330 OLDHI DW $-$ ;Word for old HIGH$
00340 DB MODDCB-BEGIN-5 ;Length of module name
00350 MODNAM DB 'XBCD' ;Module name
00360 MODDCB DW $-$ ;Word for DCB address
00370 DW 0 ;Reserved word
00380 ;-----
00390 ; Entry for all SVC services
00400 ;-----
00410 ENTRY:
00420 RPUSH BC,IX,IY ;Save received values
00430 LD A,C ;Get function code
00440 IFGE_JR 2,BADFUNC ;Go if bad function call
00450 ADD A,A ;Else double function number
00460 LD HL,JPTBL ;HL ==> jump table
00470 RL_1 EQU $-2 ;Address to relocate
00480 ADD A,L ;Add function to LSB
00490 LD L,A ;And save it
00500 JR NC,$+3 ;Go if no carry
00510 INC H ;Else increment H
00520 LD A,(HL) ;Get LSB of jump address
00530 INC HL ;HL ==> MSB of jump address
00540 LD H,(HL) ;Get MSB in H
00550 LD L,A ;HL ==> function routine
00560 JP (HL) ;Go do it!
00570 BADFUNC: ;Here if illegal function request
00580 LD A,2BH ;"SVC Parameter error"
00590 EXIT: OR A ;Set Z flag
00600 RPOF IY,IX,BC ;Recover original values
00610 RET ;And leave
00620 ;-----
00630 ; Table of routines in this SVC
00640 ;-----
00650 JPTBL DW FNC_ADD ;0: Add strings
00660 RL_2 EQU $-2
00670 DW FNC_SUB ;1: Subtract string1 from string2
00680 RL_3 EQU $-2
00690 ;-----
00700 ; Prepare strings for use
00710 ; Check: strings of equal length and both start with
00720 ; a space or 0
00730 ; Change each string to expanded BCD
00740 ; Return: DE ==> end of string 1
00750 ; HL ==> end of string 2
    
```

Listing 3 continued



# How to Use 80 Micro Program Listings

Basic Program Listings in *80 Micro* include a checksum value at the beginning of each line. This value is the sum of the ASCII values of all characters and spaces in the line, excluding remarks. You can use these values to test the accuracy of your typing.

● Type in the program code exactly as listed, omitting the indentations (when program lines continue to a second or third magazine line). Do not type the checksum values at the beginning of each line or the vertical bar (|).

● Save the program in ASCII format with the command SAVE "file name",A.

● Load and run Checksum (see Program Listing; Model 4 changes are below). The program prompts you for the name of the file to be verified and gives you the option of sending the checksum values and program lines to the printer or to the screen.

When printing to the screen, Checksum lists 22 lines and then waits for you to press the enter key. You can change the number of lines displayed in line 190.

● Compare the checksum values with the checksums shown in the listing. Correct errors in lines having checksum values that don't match.

To modify Checksum for the Model 4, make the following changes. Omit line 45. Replace lines 100 and 110 with the lines in the Figure. Replace all occurrences of PRINT#2, after 100 with PRINT.

—Beverly Woodbury,  
Technical Editor

## Program Listing. Checksum for MS-DOS.

```

| 10 'CHECKSUM/BAS revised -- 08/87
3504 | 20 CLS:PRINT "PRINT PROGRAM LISTING WITH CHECKSUMS"
4218 | 30 PRINT:PRINT:PRINT "Basic program must be in ASCII."
4015 | 40 PRINT:PRINT:INPUT "Enter name of File to PRINT";F$
2273 | 45 IF INSTR(F$,".")=0 THEN F$=F$+".bas"
3061 | 50 PRINT:PRINT:PRINT "List program to:"
3124 | 60 PRINT TAB(20) "<P>rinter or <S>creen ?";
3098 | 70 K$=INKEY$:IF K$="" OR INSTR("PpSs",K$)=0 THEN 70
2441 | 80 PRINT K$:IF K$="P" OR K$="p" THEN PN=1
3653 | 90 PRINT:B$=CHR$(34):E$=CHR$(32)+CHR$(124)+CHR$(32):OPEN "I",1,F$
5529 | 100 IF PN THEN OPEN "LPT1:" FOR OUTPUT AS 2:GOSUB 480:ELSE OPEN "SCRN:"
      FOR OUTPUT AS 2
3991 | 110 IF EOF(1) THEN CLOSE:IF PN THEN LPRINT CHR$(12):END ELSE END
693 | 120 X=0:CS=0
3361 | 130 LINE INPUT #1, L$: A=VARPTR(L$):GOSUB 310:Q=PEEK(A)
3110 | 140 LS=PEEK(A+1):MS=PEEK(A+2):A=MS*256+LS:GOSUB 310
2034 | 150 IF INSTR(L$,"") THEN GOSUB 330
2944 | 160 FOR K=1 TO Q:P=PEEK(A):A=A+1:CS=CS+P:NEXT K
1619 | 170 N=VAL(LEFT$(L$,5)):L=L+1
3301 | 180 IF PN THEN IF L>58 THEN GOSUB 470:GOTO 200 ELSE 200
1854 | 190 IF L>22 THEN L=0:INPUT XY$
1463 | 200 IF Q>72 THEN GOTO 240
1126 | 210 IF CS=0 THEN 110
3016 | 220 IF X=2 OR X=3 THEN PRINT#2, " ";E$:L$:GOTO 110
3430 | 230 PRINT#2, USING "####";CS:PRINT#2, E$:L$:CS=0:GOTO 110
2005 | 240 NL=LEN(STR$(N)):S1=NL+8:S=NL
2986 | 250 L=L+1:IF X=3 THEN PRINT#2, " ";E$:MID$(L$,1,72)
3507 | 260 L=L+1:PRINT#2, USING "####";CS:PRINT#2, E$:MID$(L$,1,72)
2540 | 270 PRINT#2, STRING$(S1, " ");MID$(L$,73,72-S)
4046 | 280 IF Q>144-S THEN L=L+1:PRINT#2, STRING$(S1, " ");MID$(L$,145-S,72-S)
4393 | 290 IF Q>216-(S*2) THEN L=L+1:PRINT#2, STRING$(S1, " ");MID$(L$,217-(S*2),
      72-S)
987 | 300 CS=0:GOTO 110
1865 | 310 IF A>32767 THEN A=(655361-A)*-1
661 | 320 RETURN
1756 | 330 I=INSTR(L$,""):IQ=I-1:X=1
2683 | 340 IF LEN(L$)=INSTR(L$,"") THEN X=2:RETURN
2716 | 350 N=VAL(LEFT$(L$,4)):N$=STR$(N):LN=LEN(N$)+2
1813 | 360 IF I<LN THEN X=3:RETURN
2596 | 370 Q1=INSTR(L$,B$):IF Q1>I OR Q1=0 THEN 430
3168 | 380 Q2=INSTR(Q1+1,L$,B$):IF Q2 THEN I=INSTR(Q2,L$,"")
1392 | 390 IF I=0 THEN RETURN
2863 | 400 Q3=INSTR(Q2+1,L$,B$):IF Q3>I OR Q3=0 THEN 430
3170 | 410 Q4=INSTR(Q3+1,L$,B$):IF Q4 THEN I=INSTR(Q4,L$,"")
1386 | 420 IF I=0 THEN RETURN
1484 | 430 FOR I=IQ TO 1 STEP -1
1265 | 440 C=ASC(MID$(L$,I,1))
1380 | 450 IF C<33 THEN NEXT I
2939 | 460 QM=Q:X=4:RL$=LEFT$(L$,I):Q=LEN(RL$):RETURN
1182 | 470 PRINT#2, CHR$(12)
3389 | 480 PRINT#2, STRING$(10, " ");F$:STRING$(32, " ");"Page ";PN
2610 | 490 PRINT#2,:PRINT#2,:PN=PN+1:L=3:RETURN

```

End

## Figure. Replacement lines for the Model 4.

```

2916 | 100 IF PN THEN SYSTEM"ROUTE *DO *PR":GOSUB 480
5242 | 110 IF EOF(1) THEN CLOSE:IF PN THEN SYSTEM "RESET *DO":LPRINT CHR$(12):E
      ND ELSE END

```

End

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52 57 62 67 72	202 207 212 217 222	352 357 362 367 372	502 507 512 517 522
53 58 63 68 73	203 208 213 218 223	353 358 363 368 373	503 508 513 518 523
54 59 64 69 74	204 209 214 219 224	354 359 364 369 374	504 509 514 519 524
55 60 65 70 75	205 210 215 220 225	355 360 365 370 375	505 510 515 520 525
76 81 86 91 96	226 231 236 241 246	376 381 386 391 396	526 531 536 541 546
77 82 87 92 97	227 232 237 242 247	377 382 387 392 397	527 532 537 542 547
78 83 88 93 98	228 233 238 243 248	378 383 388 393 398	528 533 538 543 548
79 84 89 94 99	229 234 239 244 249	379 384 389 394 399	529 534 539 544 549
80 85 90 95 100	230 235 240 245 250	380 385 390 395 400	530 535 540 545 550
101 106 111 116 121	251 256 261 266 271	401 406 411 416 421	551 556 561 566 571
102 107 112 117 122	252 257 262 267 272	402 407 412 417 422	552 557 562 567 572
103 108 113 118 123	253 258 263 268 273	403 408 413 418 423	553 558 563 568 573
104 109 114 119 124	254 259 264 269 274	404 409 414 419 424	554 559 564 569 574
105 110 115 120 125	255 260 265 270 275	405 410 415 420 425	555 560 565 570 575
126 131 136 141 146	276 281 286 291 296	426 431 436 441 446	576 581 586 591 596
127 132 137 142 147	277 282 287 292 297	427 432 437 442 447	577 582 587 592 597
128 133 138 143 148	278 283 288 293 298	428 433 438 443 448	578 583 588 593 598
129 134 139 144 149	279 284 289 294 299	429 434 439 444 449	579 584 589 594 599
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ing-point numbers is inaccurate. For example, if you type the command PRINT 20.2-20, you get an incorrect answer of .200001.

For many applications, Basic's inaccuracies are unimportant and you can eliminate them with the Print Using command and rounding routines. For business and scientific applications, however, Basic's inaccuracies are unacceptable. Some languages, including the ZBasic compiler, include binary-coded decimal (BCD) arithmetic that can be absolutely accurate.

In BCD representation, every byte holds two decimal digits. The lower and upper halves of the byte, or nibbles, can have values from zero to 9. Instead of representing values from zero to 255, a BCD byte can only represent values from zero to 99. The Z80 CPU has a special instruction, the decimal-adjust accumulator (DAA), that makes BCD addition and subtraction easy. If you are interested in BCD routines, my May 1984 column ("Build Up Your Micro's Mathematical Muscle," p. 192) discussed methods of converting between ASCII and BCD, as well as describing BCD addition. You might also want to look at Lance Leventhal and Winthrop Saville's *Z80 Assembly Language Subroutines* (Osborne/McGraw-Hill books, 1983) for BCD addition, subtraction, multiplication, and division routines.

Another method of representing numbers in the computer is just as accurate as BCD arithmetic. Often called extended BCD (XBCD), this representation restricts each byte to values from zero to 9, or one decimal digit. Although only 10 percent as efficient at storing values as normal BCD (and about 96 percent less efficient than normal binary storage), XBCD's advantage is that it can easily convert between ASCII representation and internal storage. To convert between a decimal ASCII string and XBCD format, you have to subtract 30 hex, or ASCII "0", from each digit. Adding 30 hex to each digit converts from XBCD to ASCII format.

Listing 3, the heart of this month's demonstration program, receives two ASCII strings from Basic, converts them to XBCD format, either adds or subtracts them, and then converts them back to ASCII format. It makes two requirements of Basic: The strings must be of equal length and each must begin with at least one space or zero. One string is destroyed and contains the result when control is passed back to Basic. The other is left unchanged.

Since Basic restricts strings to 255 characters or less, Listing 3 can add or subtract numbers up to 254 digits long, which is sufficient for almost any applica-

Listing 3 continued

```

00760 ;
00770 ;----- B = string length
00780 SETUP LD A,(IX) ;Get length of string 1
00790 CP (IX) ;Are strings of equal length?
00800 JR NZ,FAIL ;No -- go
00810 LD B,A ;Save length
00820 LD E,(IX+1) ;DE ==> string 1
00830 LD D,(IX+2)
00840 LD L,(IX+1) ;HL ==> string 2
00850 LD H,(IX+2)
00860 SET1 LD A,(DE) ;Get 1st character of string 1
00870 CP ' ' ;Is it a space?
00880 JR Z,SET2 ;Yes -- ok. Go
00890 CP '0' ;Or is it a 0?
00900 JR NZ,FAIL ;No -- go
00910 SET2 LD A,(HL) ;Get first character of string 2
00920 CP ' ' ;Is it a space?
00930 JR Z,SET3 ;Yes -- ok. Go
00940 CP '0' ;Or is it a 0?
00950 JR NZ,FAIL ;No -- go
00960 SET3 PUSH BC ;Save count
00970 SET4 LD A,(DE) ;Get character from string 1
00980 SUB '0' ;Change to binary form
00990 JR NC,$+3 ;Go if it was numeric (or higher)
01000 XOR A ;Else change to zero
01010 LD (DE),A ;And put it back
01020 LD A,(HL) ;Do the same with string 2
01030 SUB '0' ;Change to binary
01040 JR NC,$+3 ;Skip if numeric
01050 XOR A ;Else change to 0
01060 LD (HL),A ;Put it back
01070 INC HL ;Bump both pointers
01080 INC DE
01090 DJNZ SET4 ;Repeat for length of string
01100 POP BC ;Recover original value
01110 DEC HL ;Point to last character
01120 DEC DE ; of each string
01130 RET ;And get to work
01140 FAIL POP HL ;Clear return address from stack
01150 JR BADFUNC ;Report error & leave
01160 ;-----
01170 ; Change expanded BCD strings to ASCII
01180 ;-----
01190 RESULT:
01200 LD B,(IX) ;Get length again
01210 RPUSH BC,DE,HL ;Save count and pointers
01220 RES1 LD A,(DE) ;Get value from string 1
01230 ADD A,'0' ;Convert to ASCII
01240 LD (DE),A ;Put it back
01250 LD A,(HL) ;Get value from string 2
01260 ADD A,'0' ;Convert to ASCII
01270 LD (HL),A ;Put it back
01280 INC DE ;Bump both
01290 INC HL ; pointers
01300 DJNZ RES1 ;Repeat for entire string
01310 RPOP HL,DE,BC ;Get original values
01320 PUSH BC ;Save count again
01330 RES2 LD A,(DE) ;Get first digit of string 1
01340 CP '0' ;Is it a 0?
01350 JR NZ,RES3 ;No -- go
01360 LD A,' ' ;Else convert to space
01370 LD (DE),A ;And save it
01380 INC DE ;And point to next
01390 DJNZ RES2 ;Repeat until non-0 found
01400 RES3 POP BC ;Get count once more
01410 RES4 LD A,(HL) ;Get first digit of string 2
01420 CP '0' ;Is it a 0?
01430 JR NZ,RES5 ;No -- go
01440 LD A,' ' ;Else convert to space
01450 LD (HL),A ;And save it
01460 INC HL ;And point to next
01470 DJNZ RES4 ;Repeat until non-0 found
01480 RES5 RET ;And leave
01490 ;-----
01500 ; S2 = S2 + S1
01510 ;-----
01520 FNC_ADD:
01530 CALL SETUP ;Prepare strings for addition
01540 RL_4 EQU $-2
01550 XOR A ;Clear carry
01560 LD C,A ; register
01570 ADD1 LD A,(DE) ;Get string 1 digit
01580 ADD A,(HL) ;Add string 2 digit
01590 DAA ;Adjust for BCD addition
01600 ADD A,C ;Add carry value
01610 DAA ;Adjust for BCD addition
01620 PUSH AF ;Save result
01630 AND 0FH ;Mask off top nibble
01640 LD (DE),A ;Save result
01650 POP AF ;Get result again
01660 AND 0F0H ;Mask off low nibble
01670 OR A ;Is it 0?
01680 JR Z,$+4 ;Yes -- skip
01690 LD A,1 ;Else set to 1
01700 LD C,A ;Store carry in C
01710 DEC HL ;Move pointers
01720 DEC DE ; to next digit

```

Listing 3 continued

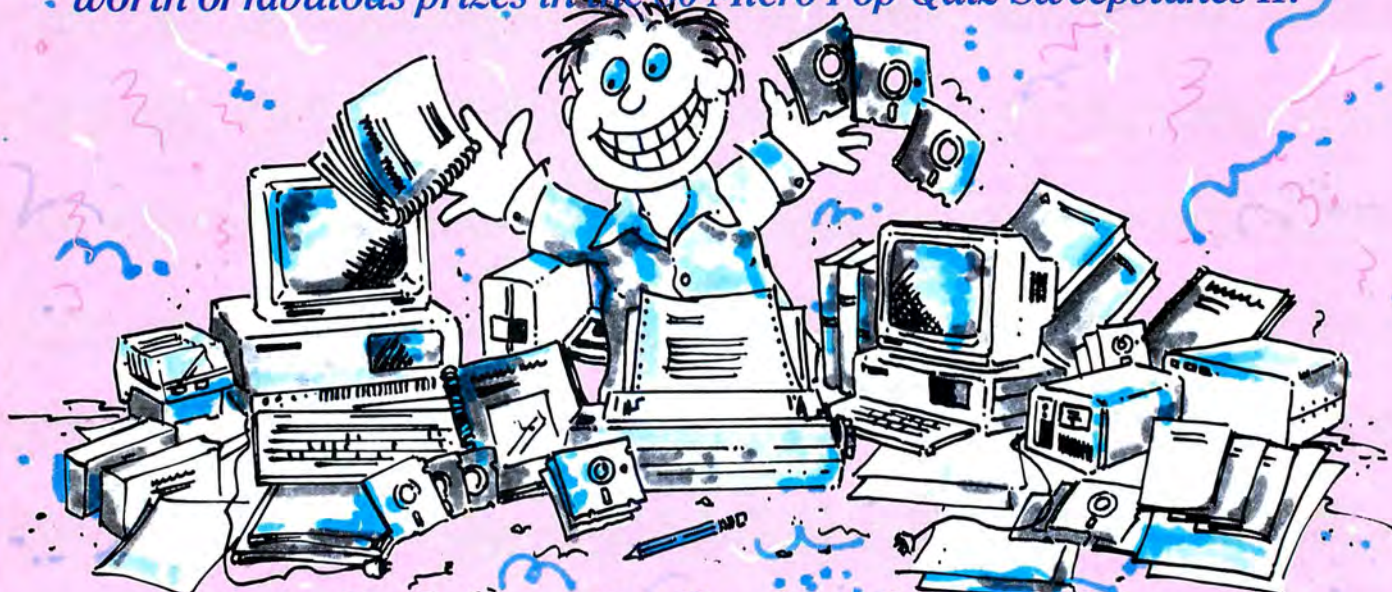


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# POP QUIZ

S W E E P S T A K E S

- Does your Model 4 speak XZ#M%S? Who helps it speak ASSEMBLER, BASIC C and RATFOR?
- Which Tandy dealer donates to charity with every purchase?
- Who's the "mad genius" behind all those Zuckerboards?
- Even the Marines will be singing in the halls when they save a bundle with what company?
- Who welcomes telephone orders with a \$2.00 credit towards purchases?
- Who offers The Solution! to power problems?
- They're going to take your Model III or 4 (in 3 mode) to the year 2000.
- These colorful guys on Constitution Avenue sell the TTX printer.
- You don't have to be a professor to know who sells quality tools for handicapping sports.
- Who has a low-cost product, has been an "innovator since 1978", and "eclipses all other hard disk solutions"?
- What Garden Grove company "grows" modems specifically for 4P users?
- Cornucopia/Software Sales designed it so you won't say its name while you type.
- They're "The Technology Store." Who are they?
- Deep in the heart of Texas, this company offers all Radio Shack software at 20% off catalog prices.
- Microdex cut the price of the xT.CAD. How much do you save?
- If you want the next generation operating system for your 4/4P/4D, it's only logical to contact...
- This Texas company brags its hard drives are the ultimate expansion for your Tandy. Name the company.
- It's cold in Minnesota, but if you call 1-800-248-3823 you'll get hot prices from what firm?
- What size check do you have to send Howe Software for its Home Budget & Checkbook Analyst?
- They've been selling "Mail Order Electronics • World Wide • Since 1974." Name them.
- Whom do you have to connect with down in Texas for prices just 8% over wholesale?
- Uh, oh! Micro-Labs says the price of its unique Grafyx Solution package is \$199.95. What's the true price?
- If you want to toss out your No. 2 pencil and get into word processing, what package can get you going in 20 minutes?

*MISOLANS*

*Pro-De Techie*  
*MicroSmart*

Powersoft\*

Teletrends\*

- It's nothing but plus after plus when you deal with this Bay State dealer.
- The name may sound French, but this software was named the No. 1 choice in word processors.
- The grapevine says this computer center has great prices 'cause it's real close to the Tandy warehouse.
- What system makes your Tandy 1000 and 1000A faster than an SX for \$99.95?
- Whose business graphics toolkit is so fine they named it after a great Dutch painter?
- Missouri's the "Show Me State." And this Summersville dealer shows you a complete line of printer ribbons.
- Don't drive to Dallas for a deal on "low cost hard disk drives for your TRS 80". Who's the dealer to dial?
- It costs \$699.95 and the software is free! You'd be smart to buy an IBM clone from this company.
- Complete this phone number: 1-800-FOR-\_\_\_\_\_. Hint: It connects you to Roanoke, TX and low prices.
- Whom can you run to for a Pro Football prediction program that was 61% + accurate in '86?
- This warehouse introduces the Turbo XT/AT Personal Computer and lots of extras if you need 'em.
- Name the world's largest independent authorized computer dealer.
- Which version of Forth programming language allows use of the same data disk in IBM PC/XT/AT/PS2, Tandy 1000, TRS-80 Model III/4 and even the original TRS-80 Model I? Name the maker, too.
- Name the "final ingredient" that dramatically extends the use of Deskmate and Deskmate II?
- Hi! Who makes the XLR8 Upgrade Board that extends the life of your Model 4?
- In spite of its funny name, this could be "the best computer value in America." Get serious and name the computer.
- For the TRS-80 user who loves surprises, who offers a Grab Bag worth over \$200 for just \$38.95?
- Time to convert! Name the firm who can save you \$100s when it's time to make your printer IBM-compatible.
- Down in Granbury, Texas, they claim to be "The Saving Place for all Tandy Computers and Printers".

MicroSmart\*

\*Due to last minute changes, answers to these questions are provided.

(please print)

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 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Phone ( ) \_\_\_\_\_

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Listing 3 continued

```

01730      DJNZ   ADD1       ;Repeat for all digits
01740      INC    HL        ;Point to first digit
01750      INC    DE
01760      CALL  RESULT    ;Convert back to ASCII
01770 RL_5  EQU    $-2
01780      XOR    A        ;Report no error
01790      JP     EXIT     ;And leave
01800 RL_6  EQU    $-2
01810 ;-----
01820 ; S2 = S2 - S1
01830 ;-----
01840 FNC_SUB:
01850      CALL  SETUP     ;Prepare strings for addition
01860 RL_7  EQU    $-2
01870      XOR    A        ;Clear carry
01880      LD    C,A       ; register
01890 SUB1  LD    A,(DE)   ;Get string 1 digit
01900      SUB   (HL)      ;Subtract string 2 digit
01910      DAA          ;Adjust for BCD addition
01920      SUB   C        ;Subtract borrow value
01930      DAA          ;Adjust for BCD addition
01940      PUSH AF        ;Save result
01950      AND   0FH      ;Mask off top nibble
01960      LD    (DE),A   ;Save result
01970      POP  AF        ;Get result again
01980      AND   0F0H     ;Mask off bottom nibble
01990      OR    A        ;Is it 0?
02000      JR    Z,$+4    ;Yes -- skip
02010      LD    A,1     ;Else set borrow to 1
02020      LD    C,A     ;Store borrow in C
02030      DEC  HL       ;Move pointers
02040      DEC  DE       ; to next digit
02050      DJNZ SUB1     ;Repeat for all digits
02060      INC  HL       ;Point to first digit
02070      INC  DE
02080      CALL  RESULT    ;Convert back to ASCII
02090 RL_8  EQU    $-2
02100      XOR    A        ;Report no error
02110      JP     EXIT     ;And leave
02120 RL_9  EQU    $-2
02130 MODEND EQU    $-1
02140 MODLEN EQU    $-BEGIN
02150 *GET  INSTALL/ASM
02160      END    INIT     ;Start by initializing

```

End

tion. The value it actually receives from Basic for each string is the same as that generated by the VARPTR function—the address of the string's 3-byte descriptor.

The first byte of the descriptor is the string's length; the second and third bytes contain the string's address. The routine also receives a function code in the C register. A value of zero in the code means "add the strings," while a value of 1 is a command to subtract one from the other.

The routine begins by checking the function code to be sure it is appropriate.

---

**The first  
byte of the  
descriptor is  
the string's length;  
the second  
and third bytes  
contain the  
string's address.**

---

Then it doubles the function number, adds that value to the address of a jump table, and finds a vector to the appropriate routine. Since there are only two possible valid functions in the program, the use of a jump table may seem unnecessarily complex. However, I wrote the program with the intention of eventually adding several more functions. You can easily expand Listing 3 to include up to 126 additional functions.

Both the addition and subtraction functions begin by calling a routine called Setup, which checks the validity of the strings and converts them to extended BCD form. If the strings are of unequal length or if either of them begins with a character other than a space or a zero, the Setup routine reports an error and immediately sends control back to Basic. Otherwise, it subtracts 30 hex from each digit and changes spaces to binary zeros. When it is finished, HL and DE contain the addresses of the last byte of each string, and the B register contains the length of each.

The addition and subtraction routines are similar. Both work from right to left, both use the DAA instruction to keep each digit within the range of zero to 9, and both use the C register to record any necessary carry or borrow. After the result for each digit is computed, the lower nibble is placed in the result string. If the upper nibble is zero, there has not been any carry or borrow, and a zero is placed in the C register. If the upper nibble is

Program Listing 4. Macro commands and definitions used in XBCD/ASM.

```

00100 ;-----
00110 ; Macro commands and definitions
00120 ; used in XBCD/ASM
00130 ;-----
00140 ETX    EQU    03H
00150 LF     EQU    0AH
00160 CR     EQU    0DH
00170 ;
00180 ;-----
00190 ; @@ABORT -- Ends program and reports
00200 ; extended error to TRSDOS
00210 ;-----
00220 @@ABORT MACRO
00230     DEFINE  @ABORT,15H
00240     SVC    @ABORT
00250     ENDM
00260 ;
00270 ;-----
00280 ; DEFINE -- Define a label unless it
00290 ; is already defined.
00300 ;-----
00310 DEFINE  MACRO #LABEL,#VALUE
00320     IFNDEF #LABEL
00330 #LABEL EQU    #VALUE
00340     ENDEF
00350     ENDM
00360 ;
00370 ;-----
00380 ; @@DSPLY -- Displays line of text
00390 ; LINE defaults to value in HL
00400 ;-----
00410 @@DSPLY MACRO #LINE
00420     DEFINE  @DSPLY,0AH
00430     IFEQ   ##,1
00440         RPUSH DE,HL
00450         LD   HL,#LINE
00460         SVC  @DSPLY,CHECK
00470         RPOP HL,DE
00480     ELSE
00490         PUSH DE
00500         SVC  @DSPLY,CHECK
00510         POP  DE
00520     ENDEF
00530     ENDM
00540 ;

```

Listing 4 continued



# THE NEXT STEP

Circle 358 on Reader Service card.

Listing 4 continued

```

00550 ; -----
00560 ; @@EXIT -- Exits program
00570 ; #RETCOD defaults to 0 (no error)
00580 ; -----
00590 @@EXIT MACRO #RETCOD
00600 DEFINE @EXIT,16H
00610 IFEQ %%,1
00620 LD HL,#RETCOD
00630 ELSE
00640 LD HL,0
00650 ENDIF
00660 SVC @EXIT
00670 ENDM
00680 ; -----
00690 ; -----
00700 ; @@FLAGS -- Points IY to flag table
00710 ; -----
00720 @@FLAGS MACRO
00730 DEFINE @FLAGS,65H
00740 SVC @FLAGS
00750 ENDM
00760 ; -----
00770 ; -----
00780 ; @GTMOD -- Finds address of module in memory
00790 ; If #MODNAM is not specified, defaults to
00800 ; current value in DE
00810 ; -----
00820 @GTMOD MACRO #MODNAM
00830 DEFINE @GTMOD,53H
00840 IFEQ %%,1
00850 PUSH DE
00860 LD DE,#MODNAM
00870 ENDF
00880 SVC @GTMOD
00890 IFEQ %%,1
00900 POP DE
00910 ENDF
00920 ENDM
00930 ; -----
00940 ; -----
00950 ; @@HEXD -- Convert #Value to ASCII and store at #BUFFER
00960 ; with length of #LEN
00970 ; All three parameters must be specified
00980 ; -----
00990 @HEXD MACRO #LEN,#VALUE,#BUFFER
01000 DEFINE @HEXD,5FH
01010 RPUSH BC,DE,HL
01020 LD B,#LEN
01030 LD HL,#VALUE
01040 LD DE,#BUFFER
01050 SVC @HEXD
01060 RPOP HL,DE,BC
01070 ENDM
01080 ; -----
01090 ; -----
01100 ; @@HIGH$ -- Reads or sets HIGH$ or LOW$
01110 ; If #Val not specified, defaults to
01120 ; current value in HL
01130 ; -----
01140 @@HIGH$ MACRO #MEM_SEL,#VAL
01150 DEFINE @HIGH$,64H
01160 PUSH BC
01170 IFEQ$ #MEM_SEL,HIGH
01180 LD B,0
01190 ELSE
01200 LD B,-1
01210 ENDF
01220 IFEQ %%,2
01230 LD HL,#VAL
01240 ENDF
01250 SVC @HIGH$,CHECK
01260 POP BC
01270 ENDM
01280 ; -----
01290 ; -----
01300 ; IFGE_JR -- Performs a JR if A >= #Value
01310 ; -----
01320 IFGE_JR MACRO #VALUE,#JUMP
01330 CP #VALUE
01340 JR NC,#JUMP
01350 ENDM
01360 ; -----
01370 ; -----
01380 ; @@PARAM -- Uses TRSDOS to parse parameter string
01390 ; If #Table not specified, uses value in DE
01400 ; Assumes HL ==> command line
01410 ; -----
01420 @@PARAM MACRO #TABLE
01430 DEFINE @PARAM,11H
01440 IFEQ %%,1
01450 LD DE,#TABLE
01460 ENDF
01470 SVC @PARAM
01480 ENDM
01490 ; -----
01500 ; -----
01510 ; RPOP -- Version 2
    
```

Listing 4 continued

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Listing 4 continued

```

01520 ; Pops 0 to 6 registers from the stack
01530 ; Example: RPOP BC,DE,HL,IX
01540 ; -----
01550 RPOP MACRO #R1,#R2,#R3,#R4,#R5,#R6
01560 IFGT %% ,0
01570 POP #R1
01580 ENDIF
01590 IFGT %% ,1
01600 POP #R2
01610 ENDIF
01620 IFGT %% ,2
01630 POP #R3
01640 ENDIF
01650 IFGT %% ,3
01660 POP #R4
01670 ENDIF
01680 IFGT %% ,4
01690 POP #R5
01700 ENDIF
01710 IFGT %% ,5
01720 POP #R6
01730 ENDIF
01740 ENDM
01750 ;
01760 ; -----
01770 ; RPOP -- Version 2
01780 ; Pushes 0 to 6 registers onto the stack
01790 ; Example: RPUSH BC,DE,HL,IX
01800 ; -----
01810 RPUSH MACRO #R1,#R2,#R3,#R4,#R5,#R6
01820 IFGT %% ,0
01830 PUSH #R1
01840 ENDIF
01850 IFGT %% ,1
01860 PUSH #R2
01870 ENDIF
01880 IFGT %% ,2
01890 PUSH #R3
01900 ENDIF
01910 IFGT %% ,3
01920 PUSH #R4
01930 ENDIF
01940 IFGT %% ,4
01950 PUSH #R5
01960 ENDIF
01970 IFGT %% ,5
01980 PUSH #R6
01990 ENDIF
02000 ENDM
02010 ;
02020 ; -----
02030 ; Invoke a TRSDOS 6 SVC
02040 ; If "check" is specified, exit
02050 ; through @ERROR if NZ flag is returned
02060 ; from TRSDOS.
02070 ; -----
02080 SVC MACRO #NUM,#CHECK
02090 LD A,#NUM ;;A = SVC number
02100 RST 28H ;;Perform SVC
02110 IFGT %% ,1 ;;More than one argument?
02120 JR Z,$! ? ;;Go if no error
02130 LD C,A ;;Put error code in C
02140 LD A,LAH ;;@ERROR SVC number
02150 RST 28H ;;Exit through @ERROR
02160 $! ? EQU $ ;;Here if no error
02170 ENDIF
02180 ENDM
02190 ;

```

End

not a zero, a carry or borrow occurred, and a 1 is placed in the C register.

Both the addition and subtraction routines call Result to convert the strings back to ASCII form. This routine first adds 30 hex to each byte of both strings, then suppresses all leading zeros in each. Finally, control is returned to Basic with the Zero flag set to indicate that no errors have occurred.

You might want to fix two problems with the subtraction routine. First, instead of generating a negative value if the subtrahend is larger than the minuend, the subtraction routine generates the "ten's complement" of the correct result. To find the true answer, subtract each digit in the result from 9, add 1 to the answer, and insert a minus sign (-) to the front of the string.

Second, the Result routine suppresses leading zeros too thoroughly. If the result of a subtraction is zero, the result string is returned as nothing but spaces. You might want to add some code to Result that places a single zero in the result string if it contains only space characters after suppressing the leading zeros.

It is important to realize that Listing 3 manipulates the characters within each string, but it does not change the length or address of the strings. When the 3-byte string descriptor returns, it is unchanged and still correct. You should be able to shorten strings and adjust the string descriptor accordingly without any problem in an assembly routine. However, if you want to create a new string or add to the length of a string,

you have to dig deeper into Basic's method of allocating string space.

Listing 4 contains the necessary character definitions and macro commands needed to assemble the demonstration program. If you save Listing 2 as Install/ASM and Listing 4 as MACLIB/ASM, then

## **Make sure that the string sent to the SVC are true variables and not constants defined in the program.**

you can assemble Listing 3 with Pro-Creat or MRAS without any problems.

Finally, Listing 5 demonstrates how to call the routine from Basic. It presents a short menu of function choices and asks for two strings. It then finds the length of the longer of the two strings and creates two new strings of that length plus one. It uses the RSet function to place your strings into the new strings with padding on the left. Then it sets the appropriate values in the AR%() array and uses USR11 to invoke the SVC.

When control returns from USR11, the program checks for errors in the value in AR%(0). If bit 6 of the result is

set (if AR%(0) AND 64 is non-zero), then no error occurred and the program reports the results. If an error occurred, it prints an error message and ends.

An SVC is not restricted to string data, of course. A Basic program can send it any kind of data, provided both programs agree on the meaning of each register before and after the SVC executes. If five 16-bit registers do not give you enough space to communicate between a Basic program and an SVC, you can send pointers to more complex data structures, perhaps with the real data stored in another integer array. The possibilities are practically endless.

You do have to take some precautions, however. Make sure that the strings sent to an SVC are true variables and not constants defined in the program. For example, if the program contained a line that said S1\$ = " 123" and you sent to Listing 3 the VARPTR of that string, the SVC changes the string in your program code. To avoid this problem, force Basic to move the string to its variable space by defining S1\$ = " 123" + "". Basic is not smart enough to know that adding a null string does not change the original string. Basic dutifully goes through the motions of concatenating " 123" and "", including moving the result to the string variable space in high memory.

You must also ensure that you do not let any strings move in memory after using the VARPTR function to find the address of their descriptors. The results can be confusing if you perform more string operations or a FRE(0) after using VARPTR and before calling USR11.



**Program Listing 5. A program for the extended BCD routines. For information on using checksums see p. 100.**

```

1 ' Test and demonstration program for the
2 ' extended BCD arithmetic routines. This program
3 ' assumes that XBCD/CMD was installed using SVC #127
4
745 100 DIM AR%(5) 'array for SVC call
794 110 SVC% = 127 'Define SVC number
469 120 CLS
2448 130 PRINT "Select operation: " 'Print selection menu
1933 140 PRINT " A -- addition"
2306 150 PRINT " S -- subtraction"
2164 160 PRINT " E -- end program"
645 170 PRINT "
2175 180 PRINT " Your choice ";
959 190 SELECT% = " " 'Clear previous choice
2118 200 WHILE INSTR("ASE",SELECT%) = 0 'Wait for appropriate choice
2696 210 SELECT% = CHR$(ASC(INPUT$(1)) AND 223) 'force to upper-case
546 220 WEND
2064 230 IF SELECT% = "E" THEN CLS: END 'User wants out
2870 240 IF SELECT% = "A" THEN AR%(3) = 0 ELSE AR%(3) = 1 'Select function
644 250 PRINT
2889 260 INPUT "Enter first number : ",S1$ 'Get numbers
2943 270 INPUT "Enter second number : ",S2$
4284 280 SLENGTH = LEN(S1$): IF SLENGTH < LEN(S2$) THEN SLENGTH = LN(S2$)
1598 290 SLENGTH = SLENGTH + 1 'Add 1 for leading space
1549 300 R1$ = SPACE$(SLENGTH) 'Make two blank strings
704 310 R2$ = R1$
1605 320 RSET R1$ = S1$: S1$ = R1$ 'Copy user strings with
1610 330 RSET R2$ = S2$: S2$ = R2$ 'leading space, then copy back
958 340 AR%(0) = SVC% 'Set SVC # for call
1418 350 AR%(4) = VARPTR(R2$) 'Get address for call
1419 360 AR%(5) = VARPTR(R1$)
1802 370 X% = USR11(VARPTR(AR%(0))) 'Call SVC
3571 380 IF AR%(0) AND 64 = 0 THEN PRINT "SVC Error!": GOTO 480
1025 390 PRINT , " "S1$ 'Else print results
3241 400 IF SELECT% = "A" THEN PRINT , "+"; ELSE PRINT , "-";
843 410 PRINT S2$
2122 420 PRINT , STRINGS$(SLENGTH+2,"-")
1019 430 PRINT , " "R1$
2546 440 PRINT @(23,20), "press any key";
1692 450 WHILE INKEY$ <>"": WEND 'And let user look at results
1664 460 WHILE INKEY$ = "": WEND 'Drain type-ahead buffer
679 470 GOTO 120 'Wait for a key
403 480 END 'Do it again
    
```

End

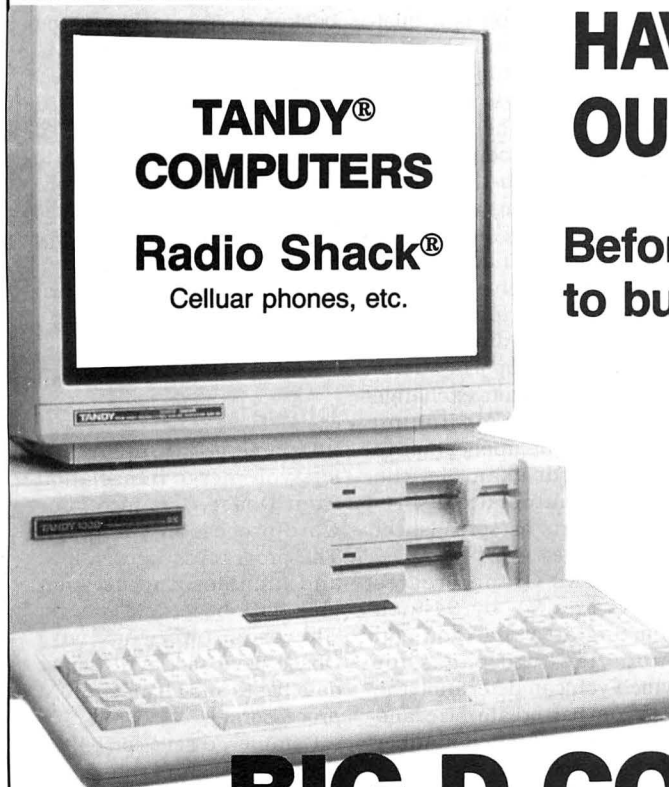
Finally, be sure that you put the correct value into AR%(0). If you call any SVC that does not exist, you will quickly find yourself looking at an error message and the LS-DOS Ready prompt. You won't recover your Basic program in memory without some heroic efforts. Also, many SVCs are quite powerful—if you call some of them by mistake, you can destroy a disk directory or lock up the computer. Test your program first with your disk-drive doors open.

But these warnings are true of any assembly routine called by Basic. The important point is that loading your routines as SVCs makes them easily accessible from LS-DOS Basic and provides an elegant method of linking assembly and Basic together. ■



Write Hardin Brothers at 280 N. Campus Ave., Upland, CA 91786. Enclose a stamped, self-addressed envelope for a reply. You can also contact Hardin on Compuserve's WE-SIG (PCS-117).

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## Beginning Bookkeeping

Checkmaster is an accounting system for business people who need to keep accurate accounting records but don't want to be burdened with the intricacies of double-entry accounting. The program is easy to use and refers to accounts by their English-language names.

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Checkmaster can distribute transaction amounts to income or expense accounts, maintain checking transactions for many bank accounts, and handle multiple checkbooks for the same account. The program automatically schedules important payments and receipts.

A bank-reconciliation function reduces end-of-month clerical duties and detects bank errors. Checkmaster prepares an end-of-the-month profit/loss transaction batch. The program can display or print your financial summary, which it adjusts according to each of your transactions.

Checkmaster lists for \$395 from Microcomputer Specialists Inc., 18 Lyman St., Westboro, MA 01581, 802-457-4600.

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## Interactive DOS Tutor

DS Tutor is a series of interactive, menu-driven lessons designed to teach beginners how to use their computer's disk operating system (DOS). The lessons cover both software and hardware topics and include reference sections and on-line help.

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Check Number: [1885 ] Date: [10/22/86]		
Pay to: [AT&T ] [American Telephone & Telegraph] [135 Broadway ] [New York ] [New York ] [10021 ]	Amount: [ 20.25 ]	
Memo: [August Long Distance Service ] Reference: [Acct. 8025551234-7688 ] Category: [UTIL ]		
Select: <input checked="" type="checkbox"/> Record <input type="checkbox"/> Void <input type="checkbox"/> Cancel		Press RETURN to continue.

Checkmaster offers accounting help to the non-accountant.

DS Tutor sells for \$29.95 from Design Software, 1275 W. Roosevelt Road, W. Chicago, IL 60185, 800-231-3088 (in IL or AK, 312-231-4540).

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## Fonts & Borders

Fonts and Borders enhances the capabilities of Printmaster Plus, Unison World's printing and graphics software. Fonts and Borders adds 20 fonts that range in size from 12- to 60-point type and 20 borders, including some for holidays and special occasions.

Fonts and Borders sells for \$34.95 from Unison World, 2150 Shattuck Ave., Suite 902, Berkeley, CA 94704, 415-848-6666.

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## Write, Organize, Report, and Calculate

W.O.R.K. at Home is an integrated word processor, data-base manager, and spreadsheet designed for home users who only use such programs occasionally and don't want to spend hours learning complicated instructions. The program includes help screens, pull-down menus, prompt lines, and an undo feature that lets you unerase material you've accidentally deleted.

W.O.R.K. at Home is cur-

rently sold for an introductory price of \$49.95. Contact Britannica Software, 185 Berry St., San Francisco, CA 94107, 415-546-1866.

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## Business Graphs

Windows Graph is a business graphics and charting program compatible with Microsoft Windows. It creates charts and graphs from data files and can produce all the common graph and chart types, including area, bar, column, line, pie, scatter, table, and combination, with variations of each type.

Windows Graph lets you produce three-dimensional graphs and supports Microsoft's dynamic data exchange (DDE) protocol for linking data from one application to another. For example, the program automatically redraws charts as spreadsheet data changes.

Windows Graph creates charts in a 34- by 34-inch charting area that you can subdivide into pages for which you can determine the size. You can create, size, and display an unlimited number of charts per page.

Windows Graph sells for \$395 and requires 320K and two floppy disk drives, a graphics card, a graphics monitor, and a printer, although 512K and a hard disk

are recommended. Contact Micrografx Inc., 1820 N. Greenville Ave., Richardson, TX 75081, 214-234-1769.

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## Hard-Disk Backup

EZ-Back is a menu-driven hard-disk backup program that lets you enhance your hard disk's performance. The program can back up to 360K and 1.2MB floppy disks, a hard disk, a tape drive, or removable cartridges and restore to devices and directories other than the original.

EZ-Back can back up and restore any file, group of files, directory, or separate groups of directories. You can include or exclude specific files and groups. The utility can estimate and automatically format backup disks, verify disk operations, update file archive bits, and generate a backup or restore report. You can customize the backups to be as comprehensive or selective as you wish.

EZ-Back places scattered hard-disk file fragments into contiguous blocks to improve most disk-oriented operations.

EZ-Back sells for \$69.95. For more information, contact Lateral Technologies, Hornby Island, BC V0R 1Z0, 604-335-0617.

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## Dbase Merge

Datamerge is a utility that lets you merge information from Dbase files into your word-processing program. The program is written in C and includes a utility that lists data-base field names. The programs work with Dbase, Foxbase, and Clipper data bases and all major word processors.

Datamerge sells for \$49 (a special version that runs from within Displaywrite 4 is \$59). Contact Online Consulting, 913 Market Street Mall, Suite 805, Wilmington, DE 19801, 302-658-3018.

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Finally!'s Turbo version supports Borland's Turbo Basic.

## Finally!

The Finally! Modules are advanced subroutines that are compatible with Microsoft's Quick Basic and the IBM Compiler 2.0. The package includes programming modules for pull-down Windows-like menus, horizontal Lotus-like menus, pop-up help screens, an input screen manager, and a directory manager.

All Finally! Modules are fully documented and come with examples. They sell for \$99.

Turbo Finally! is a subroutine library containing over 100 subroutines in a three-disk set to use with Borland's Turbo Basic Compiler. There are subroutines for screen control, system status, printer output, graphics, math, disk I/O, date and time conversion, unequal-length string comparison, numeric sorts, string sorts, screen saver, number conversion to any base, file and directory control, hardware interface, and windowing.

The routines are well documented in the manual, which includes exact calling sequences. The package lists the source code for each routine, for which there are matching test programs on the examples disk.

Turbo Finally! sells for \$99. For more information on either

Finally! program, contact Komputerwerk, 851 Parkview Boulevard, Pittsburgh, PA 15215, 412-782-0384.

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## Magic Mirror

Magic Mirror is a memory-resident program that lets you automatically reformat and transfer data between incompatible programs. You highlight the on-screen data you want to transfer, and Mirror captures it and stores each block of data in a memory buffer. The information you capture can't exceed the free available disk space.

With the target program running, you complete the transfer of data from the buffer. A series of style-control commands format the data to satisfy the receiving program, which then receives the data as if it were coming from the keyboard.

Magic Mirror requires DOS 2.x and 256K. It occupies 48K of system RAM and sells for \$89.95 from Softlogic Solutions Inc., 530 Chestnut St., Manchester, NH 03101, 800-272-9900 (in NH, 603-627-9900).

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## EXpansion

Advanced Transducer Devices (Zuckerboard) has developed an expanded mem-

ory board for the Tandy 1000 EX. The board comes with either 256K or 384K, and each is expandable to 640K. The 1000 EX Board costs \$149 from Advanced Transducer Devices Inc., 235 Santa Ana Court, Sunnyvale, CA 94086, 408-720-1938.

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## Riding on the Freeway

The menu-driven Freeway package is designed to automate your communication. It stores the phone numbers for up to 100 computer systems and over 20 settings for each host you call, so the software can dial the number you want and set the necessary parameters. The menus make it easy to set Freeway up.

Freeway sells for \$24.95 and comes with the interface, full terminal emulation, full file-transfer ability, support for baud rates up to 2,400, and all the settings necessary for most communications, including the phone numbers for the major bulletin boards and computer services.

Freeway Advanced sells for \$89.95 and offers all Freeway's features plus Crosstalk emulation, full command-oriented interface, a powerful script language, full control over all communications parameters, the ability to serve as a BBS, password protection, and file management.

Contact Kortek Inc., 505 Hamilton Ave., Palo Alto, CA 94301, 415-327-4555.

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## W4 Help

VMC Easyform W-4 helps employees fill out their W-4 forms. The program considers the new tax laws and calculates the numbers you should put on your W-4. The disk also contains programs that help you fill out the alternative W-4A form and that adjust your allowances and withholdings should your tax situation change during the year.

VMC Easyform W-4 comes on 5¼- or 3½-inch disk, requires 256K, and sells for \$49 (yearly updates, \$19). Two versions are available: one

that runs within Lotus's 1-2-3, and one that stands alone but has Lotus-like menus. Contact Valley Management Consultants, 3939 Bradford Road, Huntingdon Valley, PA 19006, 215-947-4610.

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## But Grampa Was a Horse Thief

Family Reunion: A Genealogy System 3.2 is a data-base management and reporting system that helps you trace your ancestors and keep track of living relatives. It produces address labels, birthday lists, pedigree charts, family group sheets, descendant charts, personal or family histories, and indexes.

The program offers search and surname index sort routines and comes with a tutorial disk. Family Reunion sells for \$165 from Personal Software Co., 1580 E. Dawn Drive, Salt Lake City, UT 84121, 801-943-6908.

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## File Conversion

Xchange converts information from any file format or data type into nearly any other file format and data type. It extracts requested information from one or more files; automatically edits, modifies, or enhances it; and presents it in a new file of any stipulated type and format.

Xchange can perform code-for-code swapping against a user-specified table (it maintains a library of previously prepared tables). It can perform pattern matching in a file and conditionally execute a replacement action, treat specified information in any of several ways as any of several field types, and include specified information at the head or foot of an output file.

The utility can read all non-proprietary data file formats, and available option packages make it compatible with popular applications and systems that use proprietary formats. It can translate up to 2,000 characters per second and an unlimited number of files as a group. It can run selected translations on selected files from its menus,



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from the command line or from a batch file, and swap one character for any other or strip specified characters.

Translation files let Xchange search for and replace as many as 512 items at once and handle search strings up to 13,000 characters long. It can restructure tabular material within running text, manipulate database files, and strip out unwanted information. It supports several field types for its manipulations and conversions and can work with up to 512 flags.

Xchange requires 320K and sells for \$495 from Emulation Technologies Inc., 1501 Euclid Ave., Cleveland, OH 44115, 216-241-1140.

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### Computer Drafting

Drafix 1 Plus is a computer-aided design (CAD) and drafting program that offers comprehensive entity drawing and editing facilities; ad-

vanced snap, grid, and object drawing aids; multiple fonts; cross-hatching, a complete automatic dimensioning system, and symbol-library management.

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Drafix 1 Plus includes two modules: Dotplotter that generates high-resolution printouts on over 100 dot-matrix and laser printers, and a General Symbols library with 450 pre-drawn symbols, including a set of professional office layout, architectural, machine

design, structural, and electronics symbols.

Drafix 1 Plus sells for \$295 and requires 256K and an IBM or compatible EGA. Contact Foresight Resources Corp., 932 Massachusetts, Lawrence, KS 66044, 913-841-1121.

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### Desktop Publishing

PFS: First Publisher is a word-processing accessory that applies a print-smoothing algorithm to dot-matrix printed characters, so people without design experience and expensive equipment can produce attractive documents. The program also produces 300 dots per inch on a laser printer.

First Publisher uses pull-down menus and a what-you-see-is-what-you-get display. It also features fat-bit editing, a magnify mode that lets you enlarge and perfect graphic images. You can resize, invert, or flip graphics.

First Publisher has its own editor so you can create and edit text on screen, or you can import files from PFS: First Choice, PFS: Write, and PFS: Professional Writer. The package supports Apple Laser Writer, Postscript, and Hewlett-Packard Laser Jet printers; includes 200 clip-art images; and samples from 14 font families. You can also buy add-on art and font portfolios.

First Publisher supports enhanced graphics adapter cards and requires 512K. It sells for \$99. Seven add-on portfolios are available, and they sell for \$39 each. Contact Software Publishing Corp., 1901 Landings Dr., P.O. Box 7210, Mountain View, CA 94039-7210, 415-962-8910.

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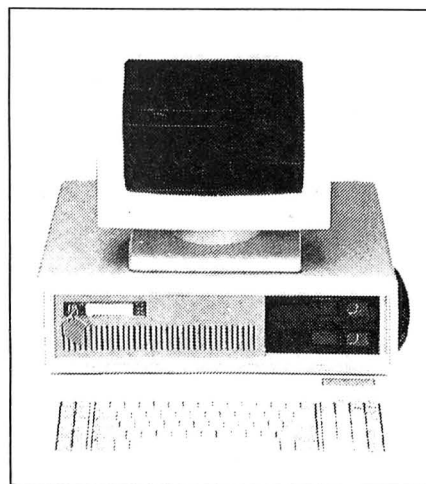
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### The Company Books

The Company Books is an accounting system for small- to medium-sized businesses. You make entries through a

set, or scratchpad, that you can check and correct before you send them to the journals and general ledger.

The general journal is standard double-entry bookkeeping, and all other journals are single entry. The program integrates all journals into the general ledger and produces standard two-sided journal entries from all journal sets. You can attach a 250-character remark to any journal entry.

A three-level general ledger chart lets you create the level of detail you want. You can add names and changes to the chart while you're making journal entries. Names can be up to 30 characters and numbers, and you can search the chart alphabetically or numerically.

The Company Books requires 320K, two disk drives (two floppies, or one hard and one floppy), and a 132-column printer. It sells for \$150.

The Company Bookkeeper is an on-line support system

for The Company Books, by which the manufacturer, Swidler Information Systems, helps you in everything from buying and installing the hardware and the program to building a chart of accounts and solving bookkeeping problems.

The Company Bookkeeper costs \$175 for 2½ hours of advice at \$1 per minute plus a \$25 setup fee. The price includes the Line Plus Remote communications package. For information on The Company Books and The Company Bookkeeper, contact Swidler Information Systems, 8825 Roswell Road, Suite 592, Atlanta, GA 30338, 800-542-6484.

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### Equation Processor

TK Solver Plus is algebraic-equation-processing software for the advanced user and the beginner. It offers a library of models, pull-down menus, tables for input and output,

complex number arithmetic, and context-sensitive help. The program supports user-defined procedure functions and 8087 or 80287 math coprocessors, and it reads and writes .WKS and .WK1 (compatible with Lotus's 1-2-3), DIF, and ASCII files.

TK Solver Plus can do hi-res 3-D, contour, log, and scatter plots and zoom, rotate, scale, and rubber-stamp graphics. It draws line, bar, and pie charts and supports multiple plots and tables within a model. The program can solve one or more linear or nonlinear equations simultaneously and equations with complex numbers. It can numerically interpret relational operations and uses Boolean variables and functions for logical or conditional computation.

TK Solver Plus sells for \$395 and requires 512K. Contact Universal Technical Systems Inc., 1220 Rock St., Rockford, IL 61101, 815-963-2220.

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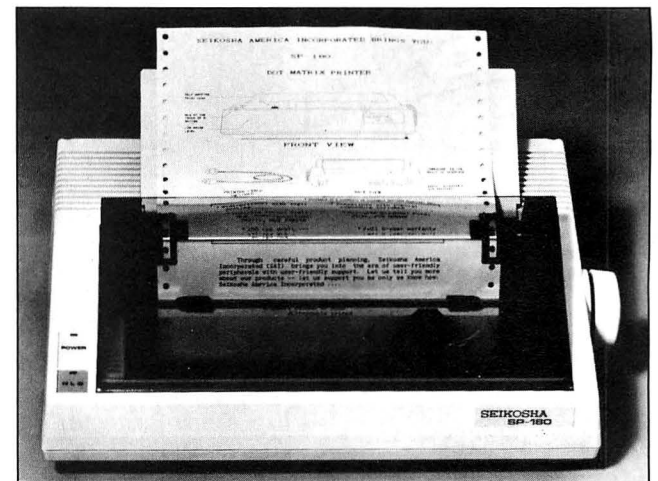
The Auto Modem 1200 sells for \$275 from Black Box Corp., P.O. Box 12800, Pittsburgh, PA 15241, 412-746-5500.

Circle 573 on Reader Service card.

### Seikoshia Printer Series

Seikoshia's SP-180AI dot-matrix printer prints 100 characters per second (cps) in draft mode and 20 cps in near-letter-quality mode. It is capable of 129 characters and 68 graphic elements and has tractor and friction feed and built-in margin and line-space designation. The SP-180AI costs \$249.

The SP-1200AI (parallel) and SP-1200AS (serial) are 9-pin dot-matrix printers that include front-panel controls for six print modes, tractor feed, and automatic single-sheet loading. Each sells for \$319.



Seikoshia's SP-180 features graphics and NLQ print.

For more information, contact Seikoshia America Inc., 1111 Macarthur Blvd., Mahwah, NJ 07430, 201-529-4655.

Circle 572 on Reader Service card.

### Education On TRSDOS And MS-DOS

Gamco Industries recently released three educational programs for the MS-DOS market.

Whole Numbers consists of an Addition and Subtraction disk and a Multiplication and Long Division disk that combine drill in whole numbers, an arcade-style game (as a reward for successfully answering the problems), and a program/student management system. Students can choose their skill and difficulty level and pace the presentation. The program randomly generates problems and leads students step by step while it checks each response.

After a student has given three incorrect tries to a problem, Whole Numbers displays the correct response. At the end of each run, the program shows the student a summary of his performance and puts him at the appropriate difficulty level.

The program management system lets the teacher choose the number of problems in a run, turn the sound and the arcade game on or off, and choose the percent a student must get correct to play the arcade game. The



## NEW PRODUCTS



Olympia's NP 30 dot-matrix printer has 95 characters.

system holds up to 200 student names in alphabetical order.

Each disk, Addition and Subtraction or Multiplication and Long Division, sells for \$49.95 and comes in MS-DOS or TRSDOS (Model III/4) versions.

Parts of Speech comes on one disk and is set up much the same as Whole Numbers, except that this program randomly generates sentences and asks students to identify a given part of speech (noun, verb, pronoun, adjective, adverb, and preposition).

The MS-DOS and TRSDOS (Model III/4) versions of Parts of Speech sell for \$44.95 each.

States and Capitals also follows a similar format and drills students in U.S. geography skills. Students choose from four regions and eight lessons that test state location, capital cities, and two-letter state abbreviations.

The MS-DOS and TRSDOS (Model III/4) versions of States and Capitals sell for \$44.95 each. For more information, contact Gamco Industries Inc., Box 1911, Big Spring, TX 79721, 800-351-1404 (in TX, call 915-267-6327 collect).

Circle 571 on Reader Service card.

### Dot-Matrix Printer

The Olympia NP 30 dot-matrix printer has 95 downloadable characters and eight international character sets. It prints at 130 cps in draft mode and 26 cps in near-letter-quality mode. The NP 30 has a parallel interface; a serial interface is optional.

The parallel NP 30 costs

\$299; the serial version is \$349. For more information, contact Olympia USA Inc., Box 22, Somerville, NJ 08876-0022, 201-722-7000.

Circle 577 on Reader Service card.



The Smart Speaker converts text to speech.

### Smart Speaker

The Smart Speaker is a text-to-speech converter that connects to a standard parallel or serial port of any printer and converts ASCII text. It spells out numbers and text separated by spaces or periods.

The unit uses advanced text-to-speech algorithms, so no special software is required. The Smart Speaker costs \$229.95 and comes with a parallel printer cable, DC power adapter, and manual. Contact Swisscomp Inc., 5312 56th Commerce Park Blvd., Tampa, FL 33610, 813-628-0906.

Circle 576 on Reader Service card.

*New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.*

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Continued from p. 116

bet is persistence; try early morning or late evening hours. We are looking into ways to allow greater access.—Eds.

## Down on the Farm

Eric Maloney sizes up Tandy quite well in his June 1987 Side Tracks column (see "Tandy Feels Its Oats," p. 8). Tandy has good products. However, it doesn't know how to market them to anyone except hobby and game users. How can it compete with Big Blue when it doesn't advertise neck and neck with them in business publications?

Tandy sends me literature that says, "Lookee Daddy, see what I am doing." How can big business swallow that—or even read it? I buy my Tandy products from the pages in your magazine, because when I drive my farm truck to a Tandy Computer Center, and I wear my work clothes, I can't get the time of day from Tandy representatives. Tandy has the hobby and game market. Maybe that is all it really wants.

Elmer Pinkerton  
Elmwood, NE

## LDOS Chaos

I am compelled to correct several inaccuracies in Jack Feldman's review (see "LDOS 5.3," June 1987, p. 108) of a Misosys product. He said that Logical Systems Inc. (LSI) most recently updated LDOS and added some new features. It is true that LSI originally developed LDOS, but since March 1986, LDOS has been a Misosys product; the entire 5.3 update was designed and prepared by Misosys.

Mr. Feldman also seems to think that the major change with LDOS is in the time-stamping introduced into the directory structure. Misosys developed version 5.3 primarily to extend the directory dating to 1999. Time-stamping is only a supplemental feature. There would not be a 5.3 release without the need to extend directory dating past 1987.

Mr. Feldman also said the new directory structure poses a potential danger to an LDOS 5.1.4 disk. "The problem is that the individual directory entry, being longer, puts your old disks at risk," he said. This just isn't true. The directory is exactly the same size—32 bytes per directory entry. There are no dangers posed to 5.1.4 disks. LDOS 5.3 can read from or write to these disks without any corruption to the files or the directory. Of course, after Dec. 31, 1987, the directory date of a 5.1.4 disk file is incorrect if the file was modified while running 5.3, but that's the whole reason for updating. Misosys went to considerable length to design a date-extension environment that

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.

is as transparent as possible. When you update a 5.1.4 disk file while under 5.3, the extended date and time fields are not touched on the 5.1.4 directory. It is quite safe.

You only need the Dateconv utility when converting a 5.1.4 disk to the 5.3 extended dating mode. This issue is moot after Dec. 31, 1987, if you use LDOS. You'll need 5.3.

Mr. Feldman's statements concerning "the lengthy routine to set those parameters" of the serial port and forms also puzzle me. Setcom uses an identical set of parameters as the Set command that originally installed the RS-232T serial driver. The serial driver defaults to 71E (7-bit words, 1 stop bit, even parity, DTR=ON), a common setting for most people, by typing the command SET \*CL RS232T. This is lengthy? Most users keep a few JCL files around to automate their device setups. MS-DOS users have found this batch language extremely useful. It's been this way with LDOS since 1980.

Even without a hardware clock to keep accurate time, relative time is just as important. Keeping a time stamp allows you to check which file written on a certain day is the most recent, when a file is written more than once. One week's use of time-stamping turns anyone into a convert. TRS-80 timekeeping is not that inaccurate.

Mr. Feldman gave LDOS 5.3 a favorable rating. However, his inaccurate statements might cause people to needlessly shy away from this important release of LDOS. And, I can't imagine how the update was attributed to LSI.

Roy Soltoff  
Misosys, Inc.  
Sterling, VA

As I understand Mr. Soltoff, his main complaint concerns two issues: my statements about the danger of mixing LDOS versions and the unnecessary complexity of LDOS. Regarding the former, perhaps I was too emphatic, but I still feel that mixing directory entries on a disk can cause enough confusion to render the disk useless. I said "You can still read disks from all versions of LDOS..." The files are not lost, but the mixed directories will surely cause con-

fusion. Most likely the user ends up with a mixture of 5.1.4, 5.1.4 converted, and 5.3 versions. This mixture forces users into an impossible task of finding and converting all of their disks or marking the specific DOS on each disk. Keeping the versions straight is complicated. This leads to the second issue, that LDOS is unnecessarily complicated.

The review as submitted had three examples of LDOS's unnecessary complexity. One example was properly deleted by an 80 Micro editor. I thank Mr. Soltoff for allowing me the opportunity to use this expurgated example as an illustration of the editor's wisdom. It has been a pet peeve of mine since I got my first copy of LDOS.

"One utility that is particularly irksome is the Repair feature," the undited version said. "It is used to convert disks made on other systems so that they can be read by LDOS. It is a handy feature, but to invoke it you must use the command REPAIR :n (ALIEN).

"It is irritating to think that all my good disks formatted with another system are considered damaged and must be repaired. That's a bit insulting to the creators and users of other systems.

"The other abomination is that there is no command REPAIR :n (FRIENDLY). In other words, you must always use the redundant (ALIEN), even though the utility has no other parameters. Having to add it to the command line seems strangely hostile." This is almost as repulsive as selling a DOS that can't be used after a specific date.

Mr. Soltoff suggests that Forms and Setcom make things easier. Even with Forms and Setcom, you must first use the Set or Filter command and then correctly enter a string of parameters to set your computer. One mistake and you must start all over. Multidos has had the same features for years, but the parameters are easy to remember and easy to enter without error. LDOS's complicated command structure leads to a necessity for creating and storing the innumerable JCL files to which Mr. Soltoff refers.

LDOS 5.3 got its rating because of its power, not because the developers created an easy-to-use system. LDOS is the most powerful DOS written for TRS-80 computers, but it is truly a DOS that only a programmer's mother could love.

—Jack Feldman

Send your correspondence to Input, 80 Micro, 80 Elm St., Peterborough, NH 03458. We reserve the right to edit letters.



## A Lack of Resistance

I read John Wolfskill's review of the Tandy 1000 EX (May 1987, p. 28) with great interest. I am a proud owner of a 1000 EX and I consider it superb. However, I must take exception with Mr. Wolfskill regarding keyboard resistance.

He said keyboard feel and response is good and that all the keys provide adequate resistance and solid tactile feedback. I disagree. The keys on my keyboard do not provide anything remotely resembling adequate resistance. I type by resting my fingers on the "home" keys; when I try this with my 1000 EX I end up spelling "cat" with 13 letters. I am constantly editing, and my typing speed is cut in half.

This is my first Tandy computer. Did I get a keyboard with weak springs or is keyboard sensitivity a brand characteristic?

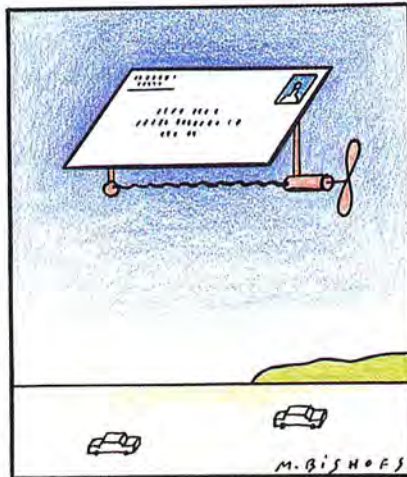
Allen McKeen  
Gray, ME

*I prefer a keyboard with a light touch. For my typing style, the 1000 EX provides adequate keystroke resistance. Perhaps you are used to pounding an Underwood manual or an IBM Selectric typewriter. I learned to type on a computer. Like any other keyboard, you have to accustom yourself to the 1000 EX.—John Wolfskill*

## The Brand-Loyalty Debate Endures

After reading Eric Maloney's Side Tracks column (see "Is Brand Loyalty Dead?" April 1987, p. 8), I wondered if he ever tried to rent or buy a video in one format (VHS or Beta) only to be frustrated that the tape was only available in the other format. I doubt he would think twice before playing a 33 1/3-rpm record on an RCA phonograph, or a 45-rpm record on a Columbia machine, yet both were once proprietary systems.

I have no doubt that the TRS-80, including the Model 4, is the standard of the industry. There is and will continue to be plenty of software for it. But in this information age, compatibility and program/data transportability are increasing in importance. The above examples of incompatibility are not nearly as frustrating as seeing a piece of software you've been dreaming about come out on somebody else's DOS!



I switched jobs last year, and I had to learn a considerably different version of the same programming language because I now work with a Tandy and not an Apple. Much of my previous work was not useful to me until I bought a Trackstar board.

I like and support Tandy because of its merits, not because I am locked by investment into a proprietary family.

John C. Reimer  
Boonville, MO

## Old Tricks?

I am happy to see that Tandy has finally seen the light and is marketing a Universal Keyboard Adapter for use with a standard IBM PC, AT, or Enhanced keyboard on the Tandy 1000 (see the 1987 Tandy Computer Catalog in the April 1987 issue of *80 Micro*, p. 92). This adapter is long overdue for people who use more than one computer.

I did not expect to see that Tandy is back to its old habit of advertising equip-

## Tell Your Story

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ment that is not yet in production. I am reminded of the light-pen port that is standard on the 1000, but with no light pen available.

I thought only mail-order companies made a habit of taking the buyer's money and holding it indefinitely until the product is available.

I am a longtime subscriber to your publication and did not think that you allow companies to practice this deception. You have run articles concerning this problem in the past. Please practice what you preach in the future.

Thomas Kearney  
Brooklyn, NY

## Word Games

Eric Maloney states in his article on TRS-80 games (see "Games That Once Were," May 1987, p. 8) that Eliminator is from Big Five Software. I believe the game is actually from Adventure International.

Michael W. Ecker  
Clarks Summit, PA

*Oops!—E.M.*

## Still Computing After All These Years

I am 81 years old and use a Model 4P at home for pleasure. I am very glad to see that you still address TRSDOS when it looks like the whole world is turning to MS-DOS. I would think there are thousands of subscribers with the same equipment and interests as myself who need information from *80 Micro*.

Please keep in mind that there are thousands of TRSDOS users who have no intention of switching to MS-DOS, even if they could afford it.

D. A. Crossley  
Brownsville, TX

## Operator, Can You Help Me?

I want to tap into that wealth of knowledge known as the *80 Micro* BBS, but I can't get onto it. I tried for many hours on two consecutive days without any luck. What gives? Are you busy or is the phone left off the hook? Please tell me the secret to getting into your system.

Donald E. Morse  
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*Our BBS is just plain busy. Your best  
Continued on p. 115*



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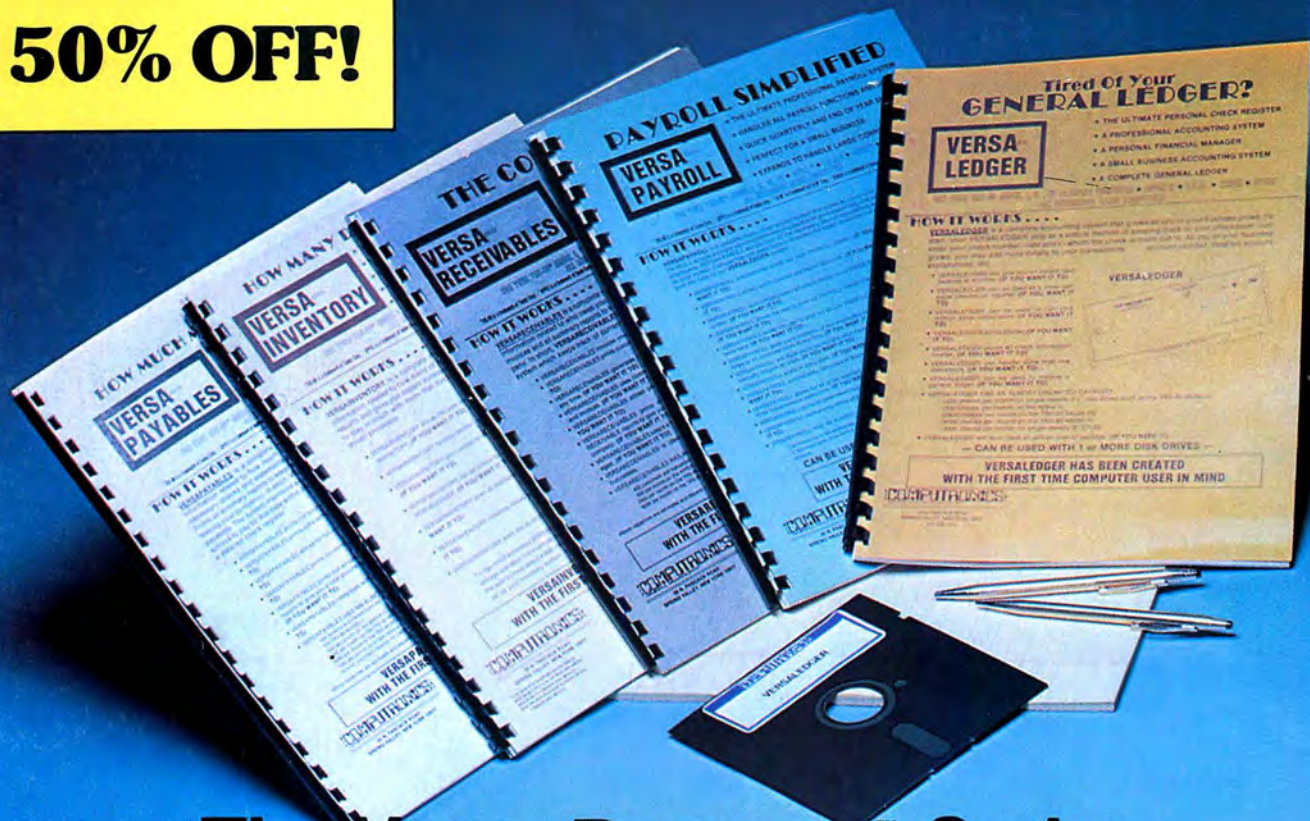
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