

# 80 micro

the #1 magazine for Tandy users

JUNE 1987  
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On Your T1000

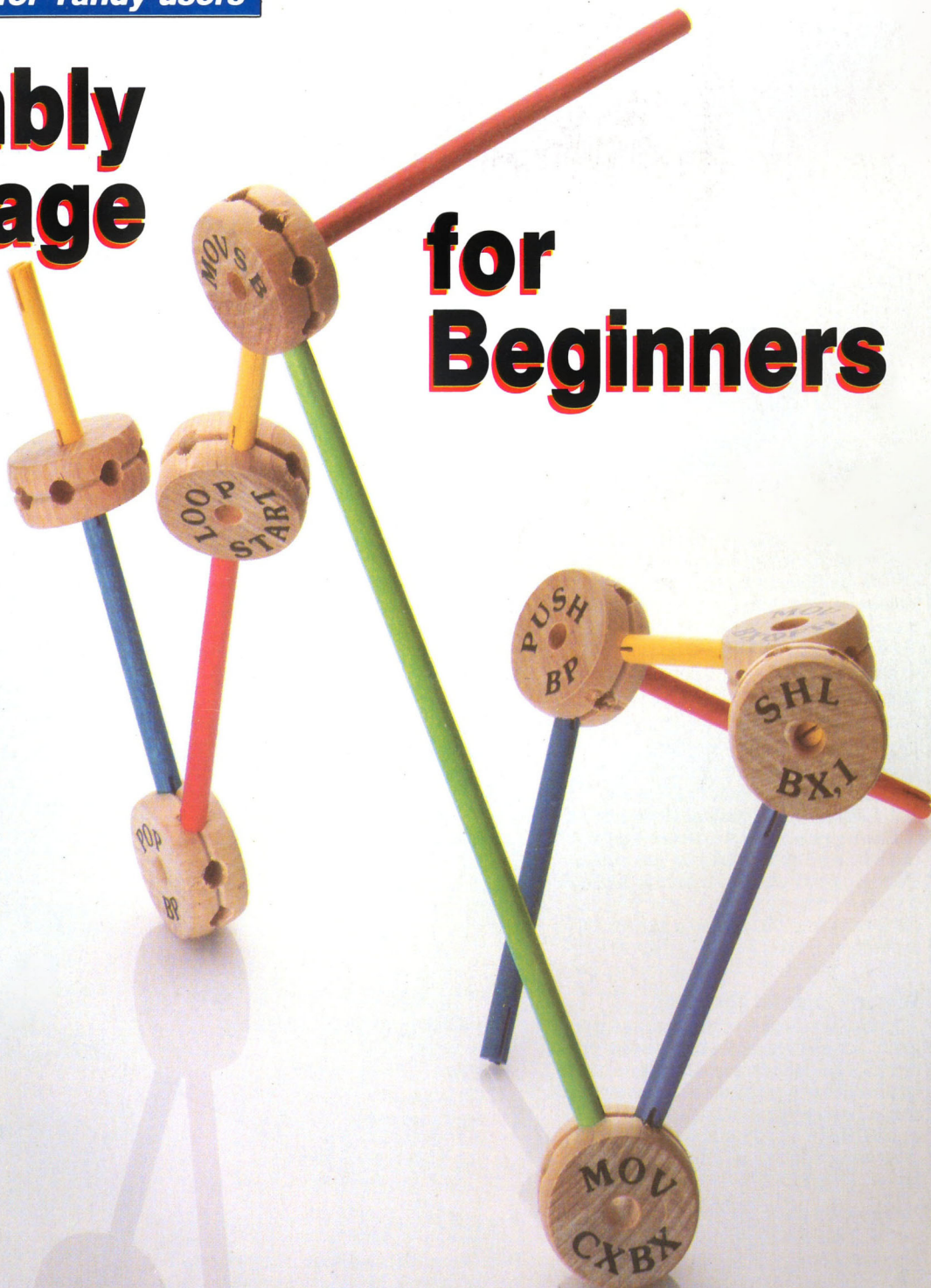
## Assembly Language

## for Beginners

Review:  
Electric Pencil  
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How to  
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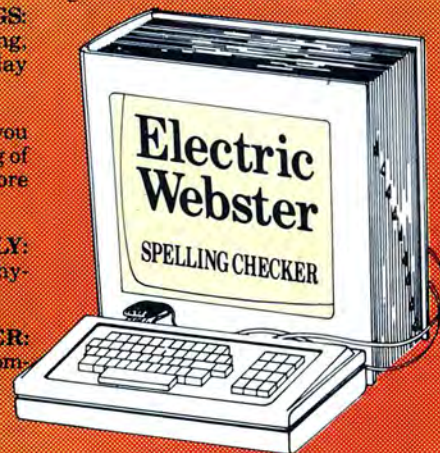
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page 22



page 27



page 38

## Features

- 38. **8088 Assembly Language: Learning the First Steps** *by Hardin Brothers*  
Get to know your 1000 more intimately by programming it at its own level.
- 51. **Memdisk III** *by Craig Chaiken*  
Get a Model 4-like Memdisk in III mode. (Disk Series)
- 58. **Tandy 1000 Custom Character Generator** *by John D. Wolfskill*  
Create a data base of custom text fonts and graphics symbols.
- 72. **The Route to DOS** *by Randall K. Wright*  
Perform DOS functions on your Model I/III/4 without leaving SuperScript. (Disk Series)
- 79. **Improve Your Backups** *by Daniel J. Fox*  
Clear or set the MOD flags of the TRSDOS 6.2 directory slots while backing up your files. (Disk Series)
- 82. **A Fine Trio of Fonts** *by Gerald Hall*  
Teach your Tandy DMP printer and Model 4 how to print three more character fonts. (Disk Series)

## Departments

- |  |  |
|--|--|
| 6. <b>The 80 Micro Disk Series (Load 80)</b>   | 93. <b>John's MS-DOS Column</b><br><i>by John B. Harrell III</i>                           |
| 8. <b>Side Tracks</b><br><i>by Eric Maloney</i>  | 96. <b>Public Works</b><br><i>by Thomas L. Quindry</i>                                     |
| 11. <b>Input</b>   | 98. <b>The Next Step</b><br><i>by Hardin Brothers</i>                                      |
| 12. <b>Feedback Loop</b><br><i>by Mercedes Silver</i>  | 106. <b>Debug</b>  |
| 19. <b>Pulse Train</b><br><i>by David Essex</i>  | 110. <b>Express Checkouts</b><br><i>edited by Mark E. Reynolds</i><br>Whoops!<br>Mergemate |
| 22. <b>Reader Forum</b><br><i>edited by Paula Noonan</i>   | 112. <b>New Products</b><br><i>compiled by Mark E. Reynolds</i>                            |
| 27. <b>Reviews</b><br><i>edited by Mark E. Reynolds</i><br>Electric Pencil PC 3.0<br>Warp Speed Lightpen<br>Dac-Easy Base<br>Deskhelp<br>LDOS 5.3<br>Trackstar | 116. <b>How to Use 80 Micro Program Listings</b>   |
|  | 128. <b>Fine Lines</b><br><i>by Harry Bee</i>  |



# 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 trans-according to simple on-screen direc-

tions. 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

### Speed Input/Output

Article: Memdisk III (p. 51).  
System: Model 4/4D, 128K  
RAM, TRSDOS 1.3

Ramdisk greatly reduces the time the computer takes to execute disk input/output (I/O) intensive programs.

Language: Assembly.  
Filespecs: RAMDISK/ASM,  
RAMDISK/CMD.

### Execute DOS

Article: The Route to DOS (p. 72).  
System: Model I/III/4, 32K RAM  
With Model 4/III Commander you can execute most DOS commands from within Super-script.

Languages: Basic and assembly.  
Filespecs: SSDSCMD3/BAS,  
SSDSCMD3/SRC, SSDSCMD4/  
BAS, SSDSCMD4/SRC.

### Back-up Model 4 Files

Article: Improve Your Backups (p. 79).  
System: Model 4/4D/4P, 64K  
RAM

Modclear and Modset are small utilities that clear or set the MOD flags of TRSDOS 6.2 directory slots.

Language: Assembly.  
Filespecs: MODCLEAR/ASM,  
MODCLEAR/CMD, MODSET/  
ASM, MODSET/CMD.

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

Editor/assembler is optional when object code is provided, except where noted.  
See page 107 for details on the quarterly disk series for the Tandy 1000/1200/3000.

### Character Sets

Article: A Fine Trio of Fonts (p. 82).  
System: Model 4/4P/4D, 64K  
RAM.

You can use these three fonts to print out Model 4 ASCII disk files or print directly from the keyboard.

Language: Basic.  
Filespecs: DMPCHAR/BAS,  
CHARSET1, CHARSET2,  
CHARSET3.

### Alternate Banks

Article: The Rules of Bank Switching (p. 98).  
System: Model 4/4P/4D, 128K  
RAM.

Learn how to write programs that save data or run in the alternate banks.

Language: Assembly.  
Filespecs: LISTING1/ASM,  
LISTING1/CMD, LISTING2/  
ASM, LISTING3/ASM,  
LISTING4/BAS.

### Checksum

Article: How to Use 80 Micro Programs Listings (p. 116).  
System: Models I/III/4, 32K  
RAM.

Use our checksum program to check the accuracy of the Basic listing you type in.

Language: Basic.  
Filespec: CHECKSUM/BAS.

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80 MICRO Review, November 1985

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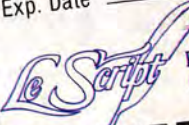
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# Tandy Feels Its Oats

Tandy doesn't like to talk openly about such topics as market share, sales volume, or product plans. So when you've covered Tandy as long as we have, you learn how to read between the lines.

Defensive attacks on the press mean times are tough in Fort Worth. For instance, several years ago Tandy withdrew its advertising from all CW Communications publications because of several comments in *Infoworld* that Tandy perceived as unflattering. The action (which was fairly mild compared to previous reprisals against *80 Micro*) came at a time when IBM and Apple were beating the crap out of Tandy.

Silence means that the company is reassessing its plans and mustering its forces for a move in the marketplace. Most of 1986 was like this, relative tranquility broken occasionally by the usual puff you get from a company's public relations people.

But lately we've been getting letters from Ed Juge, Tandy's director of marketing, that are completely outside our realm of experience. They chortle. They whistle, stomp, do cartwheels and backflips. They exude a cockiness that seems to be taken from a page of Jim McMahon's playbook. Hey, Ed—what kind of drug are you on and where can I get some?

The first letter of 1987 came in early January and referenced my February Side Tracks, which quoted a report from International Data Corp. (IDC), a market-research firm in Framingham, MA, that named Tandy as one of the seven major computer companies for the future.

"You avoided saying *where* in the top 7 we ranked," Juge wrote. He then went on to quote a report from Infocorp, a market-research firm based in Cupertino, CA, that ranked Tandy as number 3 in unit sales for the third quarter of 1986 (16 percent, behind IBM's 19 percent and Apple's 26 percent). The report also placed Tandy at the head of the clone pack with 21 percent (Compaq and Leading Edge were reported at 16 percent).

Juge concluded, "The good news is, although final figures aren't verified yet, we sold *substantially* more computers (and *substantially* more PC compatibles) in the last quarter of 1986 than we sold in the first nine months! Analysts I've talked with feel that's *substantially* better than most industry players performed."

(The operative word here seems to



be *substantially*.)

His next correspondence, dated Jan. 21 and apparently a form letter, started off, "May I do a little 'New Year horn blowing?' To say we had a good computer Christmas would be an understatement. 'How good was it?' you might ask. Well, Christmas was the shot that propelled us into an enviable position in the PC industry."

Juge then quoted Infocorp president Rick Matlack from an article in *Computer Reseller News*: "(Tandy's) total of 668,000 machines sold in 1986 ranks them as the *No. 1 supplier* in a dead heat with Apple Computer Inc. on a unit basis. . . . Furthermore, Tandy, having sold 272,000 PC-DOS clones, ranks as the *No. 1 clone manufacturer* through retail channels in the United States." (The italicized portion was marked with a yellow highlighter.)

Juge then gloats, "Eric, I've said before that Tandy's computer business is a great untold story, and suddenly we're credited with being tied for number 1!"

His most recent letter, dated March 12, is somewhat more cautious, but continues the upbeat message:

"Tandy has concentrated on supplying a total value package to the PC customer. Our American-made compatibles are differentiated from 'clones' by such features as additional speed, expandability, graphics, smaller physical size, and by Tandy's unmatched nationwide service and support. . . . Our dedication to reliability is exceptional.

"Apparently, the industry standard as we know it will not change. We have heard

of no aggressively priced, low-end products which would challenge the Tandy 1000 family. It appears most of IBM's emphasis will be in high end products, where they make additions to the standard. . . . From what we hear we should be well able to effectively compete."

So what are we to make of this unprecedented hooting and hollering?

For starters, make no mistake about it—Tandy is on one amazing roll. It has pulled off the comeback of the decade in the microcomputer industry, ram-paging like a mad elephant waking up with a hangover. The inadequacies that plagued the company for so long—obsolete equipment, poor new-product planning, and awful marketing strategies—have melted away before the charge.

Second, Tandy has done an about-face in its public relations strategy. It has committed itself to solving some of the problems that used to trigger a lot of squirming and snarling, most notably its poor image and weak customer support. Tandy has found out that defensive posturing is no substitute for acknowledging deficiencies and trying to fix them.

Third, the company is marketing itself more effectively. It is releasing sales figures to research firms that heretofore ignored Tandy for lack of information, resulting in—surprise!—more free publicity.

And finally, Tandy is at long last understanding that it is more productive to cultivate a cooperative, rather than adversarial, relationship with the press. Note, for instance, Juge's response to negative reviews of the 3000 HL, 1000 EX, and 1000 SX in *PC* magazine. He concludes his rebuttal in his March user's group newsletter with the comment, "Don't get me wrong. . . . I know the senior executives at *PC* magazine, and have great respect for them and their publication. This is a commentary on three Tandy reviews, nothing more." Three years ago Tandy would have sent the magazine letter bombs and put out a contract on the author.

In a perverse sort of way, I kind of miss Tandy's old style of doing things. I was never short of subjects to write about. But on the other hand, seeing Tandy flip the finger at IBM, Apple, and the others is a satisfying experience. Apparently, Ed Juge is getting a kick out of it, too. ■



★ ★ ★ ★ ★  
**80 MICRO**  
**JUNE, 1985**  
 Bug free: ★ ★ ★ ★ ★  
 Does the job: ★ ★ ★ ★ ★  
 Easy to use: ★ ★ ★ ★ ★  
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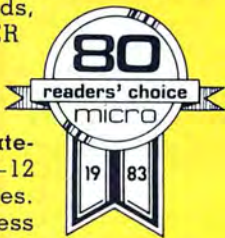
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To use DOTWRITER, just write your text with any popular TRS-80 Word Processor (such as ALLWRITE or

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Send your correspondence to *Input*, 80 Micro, 80 Elm St., Peterborough, NH 03458. We reserve the right to edit letters.

## Back to School

As a computer enthusiast, I want to congratulate you on producing an informative, educational magazine. I have every back issue and wouldn't part with a single one.

As an English teacher, may I question your February 1987 cover form? The form that we use in our school follows. If the business world has adopted a new form, please let me know.

- Use Roman numerals for main topics.
- Use uppercase letters for primary subtopics.
- Use Arabic numerals for secondary subtopics.
- Use lowercase letters for tertiary subtopics.
- Place a period after each number or letter.
- Indent subtopics. Begin each subject under the first word of the topic above.
- For a main topic or subtopic requiring more than one line, start the second line after the first letter of the first one above.
- Express topics of equal rank in the same grammatical form. If topic I is a noun, then topics II and III should be nouns. If subtopic A is a prepositional phrase, then subtopics B and C should also be prepositional phrases.
- Since division cannot create fewer than two parts, use two or more subtopics if you use any.

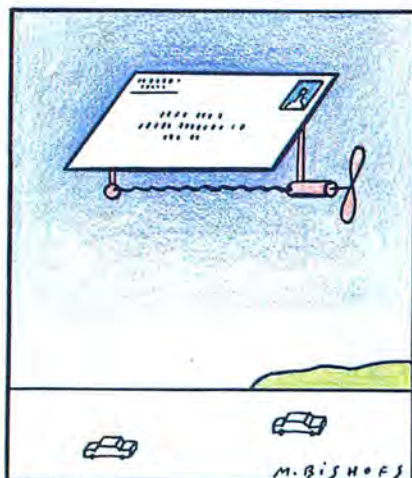
For example:

- I. Main Topic
  - A. Subtopic
  - B. Subtopic
- II. Main Topic
  - A. Subtopic
    - 1. Subtopic
    - 2. Subtopic
      - a. Subtopic
      - b. Subtopic
      - c. Subtopic
  - B. Subtopic
  - C. Subtopic

Werner Jordan  
Baltimore, MD

## New BBS

The Grand Centre Connection BBS runs on a Tandy 1000 at 300 baud, 8-bit words, 1 stop bit, no parity. The software is brand new, and we add new features daily. The BBS supports up- and down-



loading in ASCII and x-modem format, and features many public-domain programs for the Model 4, Tandy 1000, and other machines.

Call the BBS at 403-594-1525 during the following operation times (given in Mountain time).

Monday-Wednesday	6 p.m.-9 a.m.
Thursday	9 p.m.-9 a.m.
Friday	6 p.m.-9 a.m.
weekends	6 p.m. Saturday-9 a.m. Monday

*Steve Frampton, sysop*  
Grand Centre Connection BBS  
Medley, Alberta

## Whither TRSDOS?

I am concerned about *80 Micro's* increasing coverage of MS-DOS. I have nothing against MS-DOS machines, in fact I use them every day. I do not, however, have any intention of replacing my trusty Model 4 until it is no longer supported by your magazine. Please do not forsake the crowd that fed you!

G. B. Gabriel  
Sherrills Ford, NC

## The Model 4 Bible

I recently finished putting the Gospels of Matthew, Mark, Luke, and John and the Three Epistles of John, Jude, and Philemon on my Model 4. I am happy to share the files with anyone who is inter-

*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.

ested. Write to me at 124 Old York Road, Bridgewater, NJ 08807, or call me at 201-722-0878.

Rev. Paul Van Elk  
Bridgewater, NJ

## TRSDOS Upgrades

Please consider running an article on the compatibility and features of TRSDOS upgrades including 6.3. I do not fully understand the changes.

Guy Zimmerman  
Watonga, OK

*We are planning an article that describes the differences among the Model III and 4 DOSes for later in the year.—Eds.*

## Out of Date

I want to correct several inaccuracies in Bobby Ballard's review of Prodesign II (December 1986, p. 26).

Prodesign II comes on four disks rather than two. The program's manual is 380 pages long, not 125. *Contrary* to Mr. Ballard's statement, Prodesign II does have a click-and-point menu system. Also, you do not have to know the starting point of a line to erase it in Prodesign II.

The only way that I can account for the inaccuracy of Mr. Ballard's review is to assume that he has a copy of the program that is over a year old. Even so, the review is not entirely correct.

Robert Webster, author of *Prodesign II*  
Pryor, OK

## Hooked

Thank you for your continued support of TRSDOS. Some of us old dogs have no desire to learn new tricks. My TRSDOS machine is fully capable of doing the repetitive jobs that I use it for. I am, however, looking forward to getting my hands on LS-DOS 6.3.

John Arthur  
London, UK

## What Month Is It?

*You might have noticed that our April 1987 issue's table of contents listed the incorrect month, March. Unfortunately, we also put the wrong volume number on the magazine's spine. It should be 87. We apologize for any confusion this might have caused.—Eds.*



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

### A Capital Idea

**Q:** I like to boot my Model 4 up in uppercase mode. Do you know of a patch that does this? (George Stuckman, Bicknell, IN)

**A:** At TRSDOS Ready, enter:

```
PATCH SYS0/SYS.LSIDOS (D00,80 = 20:F00,
80 = 00)
```

to make the system boot in uppercase.

### Spaced Out

**Q:** I am working with a Basic program on a Model 4 that leaves 18,376 bytes of free memory. Even so, when I try to execute System commands from within the program, a "No memory space available" message appears. Something sets bit zero of CFlag\$. How can I reset it?

I would also like to know if there is a reasonable way, preferably from Basic, to strip the end-of-file (EOF) byte from an ASCII file created and edited in Disk Scripsit. (R.M. Doerr, Rolla, MO)

**A:** To ensure that bit zero of CFlag\$ is reset, use:

```
POKE 108,PEEK(108) AND 254
```

for all versions of TRSDOS 6. By using AND 254 (FE hexadecimal), you leave all set bits at that location set except for bit zero, which is masked off.

To remove the EOF byte, enter and run the Program Listing. Answer the prompt with the name of the file you want stripped and the program does the rest. Note that both buffers open the same file. Since the information that the program writes to the file does not overlap the data that it is reading, no data conflict occurs. When the program reaches



the EOF, it discards the null EOF byte and updates the EOF pointer to the diskfile entry when it closes buffer 2.

### Monitoring the CM-11

**Q:** I am thinking about buying a Tandy 1000 SX and a CM-11 monitor. I have a question about the monitor that neither the literature I have seen nor the salespeople I have talked with could answer: Just what can the monitor do?

The 640- by 200-pixel color graphics mode is not compatible with the IBM graphics modes I am familiar with. What software takes advantage of this higher resolution? Can the system emulate the IBM color graphics mode of 320 by 200 pixels? Can you access the 640- by 200-pixel color mode with GW-Basic? Is a separate video adapter required or is it built into the 1000 SX? How many colors can the monitor display simultaneously in the 640- by 200-pixel mode? (James H. Norvell, Oak Ridge, TN)

**A:** The CM-11 monitor is compatible with all IBM color graphic adapter modes. It can display 16 colors at a maximum resolution of 640 horizontal by 224 vertical pixels. The 1000 SX sets the limits of the 640- by 200-pixel mode to be compatible with GW-Basic's two-color (black and white) screen mode 2 and sets the 320- by 200-pixel mode to accommodate 16-color screen mode 5.

The 1000 SX does not require a separate video adapter for the CM-11. You

can, however, disable the on-board video adapter with DIP switch settings if you want to use standard PC-compatible color graphics cards.

### Two-Timing

**Q:** I use an IBM PC at my office and have a Tandy 1000 at home. Everything works fine between them except when I try to load an MS-DOS Tandy 1000 program into the PC. I get the message "Diskette is bootable only on the Tandy 1000." Is there any way I can get around this? (James F. Jackson, Moore Haven, FL)

**A:** The Tandy 1000 MS-DOS checks to verify that it is on a Tandy 1000 before it boots. You can, however, boot PC-DOS on your Tandy 1000. Your programs should work on both computers, unless they use system-specific features. You could use PC-DOS on both computers or have your data and programs on data disks, which you could use with PC-DOS at work and MS-DOS at home.

### Please Hold

**Q:** I have a Tandy 1000A and a CM-2 High Resolution Monitor (RGB). Ever since I put a telephone on top of the monitor, the screen has been distorted on the right side when displaying bright colors. Do you have a fix for this? (Mike Cannon, S. Boston, VA)

**A:** Putting the telephone on top of your monitor most likely did not cause the problem. However, your problem is definitely hardware-related. Be sure that your monitor cable is solidly connected to the nine-pin CPU connector. Check all of the cable's pins for breaks. Use a continuity tester to eliminate the cable as a possible cause. If all these things check out, I suggest you take it to a Radio Shack Repair Center.

### A Moving Experience

**Q:** I recently purchased Microsoft's Quick Basic 2.0 compiler. I am disappointed that I cannot use the arrow keys on my Tandy 1000 to move through the menus. Can I redefine the arrow keys to work with Quick Basic? (Frank M. Clanton, Anderson, SC)

**A:** Use the number keys on the numeric keypad as described in item 15 of Quick Basic's Readme file: 1 = end, 2 = down, 3 = page down, 4 = left, 6 = right, 7 = home, 8 = up, and 9 = page up. You cannot use ANSI/SYS to change the keys because Quick Basic accesses the basic input/output system (BIOS). Be on the

#### Program Listing. Model 4 Basic routine to strip EOF bytes from ASCII files.

```
10 INPUT "File to strip: ";FS
20 OPEN "I",1,FS:OPEN "O",2,FS
30 LINE INPUT#1,AS:IF AS>" THEN PRINT#2,AS:GOTO 30
40 IF EOF(1) THEN CLOSE 1,2 ELSE PRINT#2,AS:GOTO 30
```

End



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lookout for an update from Microsoft that will correctly access the Tandy 1000 keyboard.

## Overflow

**Q:** I have a 48K Model III with a cassette (no disk drives). I have read in *80 Micro* that it is possible to get 258 characters on a line in Basic's Edit mode. I can get only 255, as the *Operation and Basic Language Reference Manual* for the Model III states. I have to enter one-line programs, such as Wall Wars (August 1986, p. 160) on two lines. Is there a difference in line length among Model IIIs?

If I were to install two internal disk drives and controllers, would I still be able to use the cassette system?

What effect does holding down the break key have when booting the Model III? Several commercial tape programs I have tell me to do this. (*Jerry H. Hassemmer, Lakewood, CO*)

**A:** Model IIIs do not differ in allowable line length. You can sneak what appear to be extra characters into a line by using a question mark (?) instead of the Print command. When the line is listed, the question marks are replaced with Print. If you want to edit the line, you must to replace the question marks. Do not save the line in ASCII; it will be too long to load back into Basic.

You can use your cassette programs if you install disk drives. Use the computer in tape mode to load and run your cassette programs. It is possible, but not easy, to transfer tape programs to disk.

Holding down the break key when booting puts a disk-based Model III into tape mode.

## Upgrading the Model 4

**Q:** I have a 64K Model 4 with two disk drives. The Computer Center in Humble, TX, can't tell me if I have a gate-array or non-gate-array model. I need to know in order to upgrade the machine's memory.

I have seen 1-megabyte (MB) boards advertised that you can plug into your computer. Are they just for RAM-disk applications? What is the best way to upgrade my Model 4? (*Raymond Lilley, New Caney, TX*)

**A:** The difference between the two is that the gate-array Model 4 uses fewer chips and doesn't need a PAL chip installed with the upper 64K. You can tell the difference by looking at your system board. A non-gate-array Model 4 has a PAL chip socket at U72, which is at a separate location near the center of the board, adjacent to connector J9. A gate-array 4 has the U72 chip located in a bank of 16 chips on the right side of the board.

Alpha Technologies (1127 S. Patrick

Drive, Suite 24, Satellite Beach, FL 32937, 305-773-1136, \$179.95) and Seatronics (P.O. Box 4607, 6202 ZA Maastricht, Holland, \$135) both offer 1MB upgrades with installation instructions for the Model 4. Installing the boards requires some technical proficiency. The Accelerator/RAM drive board from H.I. Tech Inc. (P.O. Box 25404, Houston, TX 77265, 713-682-7317, \$299.95) is simple to install. You just plug it in.

Few commercial programs can use 1MB of memory except as a RAM disk. The LeScript word processor is available in a version that can use all the memory in your computer up to a megabyte. What is the best way to upgrade? It all depends on what you want your computer to do. Upgrading to 128K is simple; going beyond radically increases the abilities of your computer.

## Remotely Interested

**Q:** I want to remotely access my computer through a terminal link. Are there any programs like Craig Chaiken's Remote/ASM ("Remote Possibilities," January 1987, p. 73) available for the Tandy 1000 or 3000? (*Robert J. Wilkins, New York, NY*)

**A:** Remote, available from Crosstalk Communications (1000 Holcomb Woods Parkway, Suite 440, Roswell, GA 30076, 404-998-3998, \$195), can run as host on an MS-DOS computer, allowing you to access it via a terminal.

You can use a Model III/4 as a terminal if you have the proper terminal emulator program. Mlink (Corporate Microsystems Inc., P.O. Box 277, Etna, NH 03750, 603-448-5193, \$250) or Teleterm (Tel-express Inc., P.O. Box 217, Willingboro, NJ 08046, 609-877-4900, \$195) might do the trick. Remote lets you to run word-processing programs, spreadsheets, and data bases on the host computer. You see the program on your terminal screen as you would on your computer.

## Expanding the 1200

**Q:** I have a 256K Tandy 1200, a text/graphics board, VM-1 monitor, and a FX-85 printer. I want to upgrade the computer to 640K, adding a clock/calendar and other features. I am thinking of buying an AST Plus board or a Zuckerboard.

Will the AST or the Zuckerboard work in the 1200, and if so, are there clear instructions on how to install them? (*Anna B. Hillard, Hatboro, PA*)

**A:** Both boards should work fine in the 1200. The 1200 is certainly more PC-compatible than the 1000. All you have to worry about are technical support and cost. You can probably buy an AST board at a local computer store, while

you'll have to order the Zuckerboard through the mail. You will have to change the DIP switches on the 1200's main board to accommodate the memory change.

## Drive Buy

**Q:** I have an early Model 4 and am considering changing the drives. Advertisements don't give me enough information on step rates, number of sides, or track density. Can I install an 80-track drive as drive zero? Are there any hard drives that I could install in the upper slot? (*Paul Wilcox, Milwaukee, WI*)

**A:** You can install an 80-track drive as drive zero, but it would require hardware and software modification. The Model 4 should have an external hard drive. Although a Model 4 can be customized to contain a hard drive, it is not recommended. The hard drive needs an added power supply and cooling system, which are contained in the external hard drive. Aerocomp (P.O. Box 223957, Dallas, TX 75212, 214-637-5400), Hard Drive Specialist (16208 Hickory Knoll, Houston, TX 77059, 713-480-6000), and Micro Smart (200 Homer Ave., Ashland, MA 01721, 617-872-9090) all offer floppy- and hard-disk drive systems. If you call and ask for technical information, they will send you the information you need.

## Choosing a DOS

**Q:** I am purchasing a Tandy 1000 SX with a Trackstar board (Apple II emulator) for the school library. I need to order compatible software for library management as soon as possible. Do you know what is available? (*Brother Henry Mischuk, Lincroft, NJ*)

**A:** You first must decide which operating system you are going to run your software under (Apple II or MS-DOS). Most people aren't faced with that choice. If the school uses mostly Apple software, you would be wise to use a compatible Apple program such as Appleworks, Profiler, or Super Base. However, if that is not the case, you will find more capable programs under MS-DOS, such as PFS:File, Borland's Reflex, or Ansa's Paradox. Almost any data-base program will do. Choose one that fits your requirements.

## TRSDOS to Newdos/80

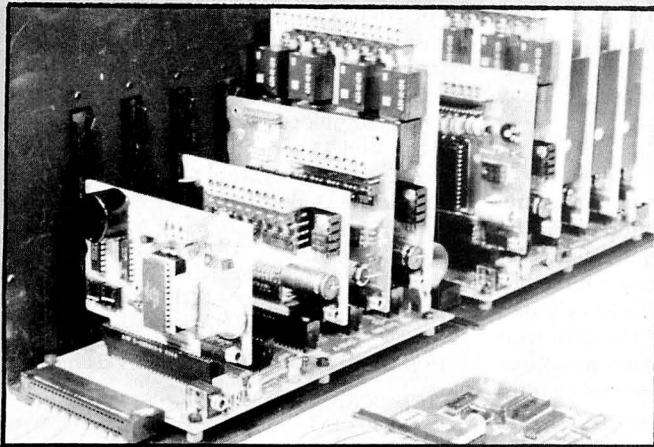
**Q:** I own Newdos/80 2.0 and TRSDOS 1.3 for the Model III. Can you tell me how to copy my old files from TRSDOS to Newdos? Are CMD files from TRSDOS compatible with Newdos? (*John Fehr, Gretna, New Brunswick, Canada*)

**A:** Most TRSDOS 1.3 CMD programs operate under Newdos/80. If one does



# The Amazing A-BUS

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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

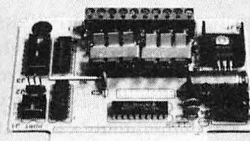
**PH-145: \$79**

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.

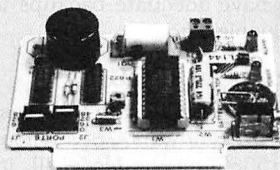
### A-BUS Prototyping Card

**PR-152: \$15**

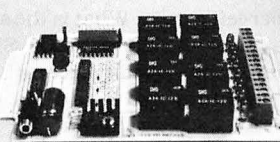
3/2 by 4/2 in. with power and ground bus. Fits up to 10 I.C.s



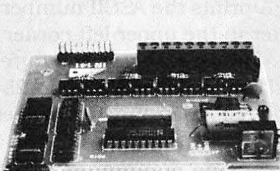
ST-143



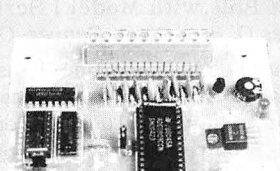
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### Smart Stepper Controller sc-149: \$299

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not, check chapter 13 of the Newdos/80 2.0 manual, which lists several commercial programs with the patches that make them operable.

In chapter 2, under PDrive, example 3 gives the specifications you need to assign a drive to TRSDOS 1.3. Although you cannot read the TRSDOS 1.3 directory, you can copy files back and forth. For example, you can copy the files from the TRSDOS 1.3 disk in drive 1 to the Newdos/80 disk in drive zero by executing the following lines:

```
PDRIVE,0,1,TI=AM,TD=E,TC=40,SPT=18,
TSR=3,GPL=6,DDSL=17,DDGA=2,ACOPY,
1,0,CBF,CFWO,NFMT
```

The first command sets up drive 1 as a TRSDOS 1.3 drive, and the second command prompts you for each file on the TRSDOS 1.3 disk. Answer "Y" to copy a file and "N" to skip it.

## Chips or a Board?

**Q:** I want to expand the memory of my Tandy 1000 SX from 384K to 640K. Since I can do this directly on the motherboard, what memory chips do I need? I don't want to add an unnecessary memory-expansion board, and I am not sure the chips I see advertised are for the 1000 SX. Also, do I need the 8087 coprocessor or the 8087-2? (Donald C. Ketter, Raleigh, NC)

**A:** To upgrade the 1000 SX from 384K to 640K, buy one set of 256K RAM chips rated for 150-nanosecond operation. The chips are normally sold in sets of nine because some microcomputers use the ninth chip for parity-error checking. Install eight of the chips in the empty bank sockets on the SX's motherboard and remove the jumper plug spanning connections E1-E2. The only difference between the Intel 8087-1 and 8087-2 math coprocessors is the quality-assurance (QA) level of each chip. The 8087-2 is "QA'd" to run at 8 megahertz (MHz). You'll need the 8087-2 for the SX.

## Eraser Head

**Q:** Long ago I discovered an annoying bug in Basic on my Model 4P. Any Print@ statement erases everything on the line (row) directly below. This bug is particularly bothersome when using block (text) graphics. Can I get around this some way other than always working from the top down? (W. Barry Knight, Maurertown, VA)

**A:** The same "bug" occurs on all Model 4's and I/IIIs. Place a semicolon (;) at the end of each Print@ statement. To avoid the possibility of the next Print statement or program end causing a problem, use an extra Print@ statement to place the cursor out of or at the end of

your screen design. The semicolon instructs the computer to print the next item immediately following. A comma instructs the computer to print the next item at the next tab stop. With no punctuation, the cursor is placed at the beginning of the next row and erases the row.

## Tracking It Down

**Q:** I was formatting a disk with TRSDOS 6.02.01 when it prompted me for "No. of cylinders." I entered 43. The format took place as normal except it included 40, 41, and 42. I took a directory of the disk and found I had a 43-cylinder, 193.5K data disk. I filled the disk with TRSDOS and other programs, so no free space is left, and I have been using it for some time. There doesn't seem to be any problem. I would like to add the extra 13.5K to all my future disks, but I thought I should check with you before I entrust valuable data to a non-standard track format. (Roger Desmarais Jr., Warwick, RI)

**A:** I also have formatted disks to 43 tracks with no problem, although I have not used them much, and I have heard of others doing this, too. Be sure you format a disk to 43 tracks before attempting to back up to it, and be sure you always have adequate backups to protect valuable data.

## Upper-Left ASCII

**Q:** I use a Model III with Disk Basic and also have a Tandy 1000 SX. When I type PEEK(15360) on the Model III, it gives me the ASCII number of the character in the upper-left corner. What is the similar command for the Tandy 1000 SX? Do you know of any good books for the SX on its memory map and its uses? (Shawn Eyster, East Berlin, PA)

**A:** The command A=SCREEN(1,1); PRINT A prints the ASCII number of the character in the upper-left corner of the screen. Tandy's *Technical Reference Manual* for the 1000 (catalog no. 25-1504) has a memory map and lists its uses.

## Busy Bit 7

**Q:** How can I use a Hewlett-Packard Laser Jet Plus with Model I Scripsit? (Charles O. Brantigan, Denver, CO)

**A:** Since I do not have the HP Laser Jet Plus available, or the spec sheet, I can only make an assumption. The most common form of incompatibility between Scripsit and non-Radio Shack printers is the printer-ready test. During initial printer testing, Scripsit checks the upper 4 bits of the printer port (address 37E8 hexadecimal [hex] on the Model I and port F8 hex on the III/4). It expects bits 4 (no fault) and 5 (device not selected) to be set

and bits 6 (out of paper) and 7 (busy) to be reset. However, some printers do not use bits 4 and 5 and always return reset values to bits 4 and 5, which Scripsit interprets as a fault. The patches below change the printer-initialization test to check only bit 7, the busy line. Whenever anything goes wrong, this bit is set. For the Model I version of Scripsit, insert the following lines into the patch program in the Debug section of the January 1987 issue of *80 Micro* (p. 87):

```
265 DATA SCRIPSIT/LC
267 DATA 14,96,04,E680FE00
269 DATA 14,A7,04,E680FE00
```

You can fix Model III Scripsit by using:

```
PATCH SCRIPSIT/CMD (ADD=6683,FIND=
E60FE30,CHG=E680FE00)
PATCH SCRIPSIT/CMD (ADD=669B,FIND=
E60FE30,CHG=E680FE00)
```

Model 4 Scripsit uses supervisory calls to check the printer readiness. To modify the readiness test, you need to install a new printer filter, or you can modify DOS to accept this format using the following patch:

For TRSDOS 6.1.x:

```
PATCH BOOT/SYS.LSIDOS (DOC,46=E6 80
FE 00:F0C,46=E6 F0 FE 30)
```

For TRSDOS 6.2.x and LS-DOS 6.3:

```
PATCH BOOT/SYS.LSIDOS (DOC,38=E6 80
FE 00:F0C,38=E6 F0 FE 30)
```

## HELP WANTED

► C. Thomas Humphrey, 1525 Ritter Blvd., Huntington, WV 25701, would like to know how to hook up a Radio Shack Daisy Wheel Printer II with an Apple IIe. He tried to interface the two with the Grappler+, but none of the switch settings worked.

► Ralph D. Benson, 423 Wolf Hill Road, Dix Hills, NY 11746, is looking for an Assembly Language Development System (ALDS) (Radio Shack catalog no. 26-2012), which has been discontinued.

► James W. Alley, 3001 Fern Drive, Greenville, NC 27858, wants to know how to print graphs using Lotus's 1-2-3 1.00.00, release 1A, a Tandy 1000 with MS-DOS 2.11.22, and an Okidata Microline 82A printer. The Printgraph program provided with the Tandy version of 1-2-3 does not list the Okidata printer among the Graphic Device selections, and his efforts to substitute one of the Tandy printer selections have not been successful.

► Karl H. Mohr, 2256-153rd St., Surrey, B.C. V4A 4R2, Canada, is looking for a terminal program for his Lobo Max-80 that runs with either the Max-80 version of LDOS or CP/M configured to the Max-80. ■

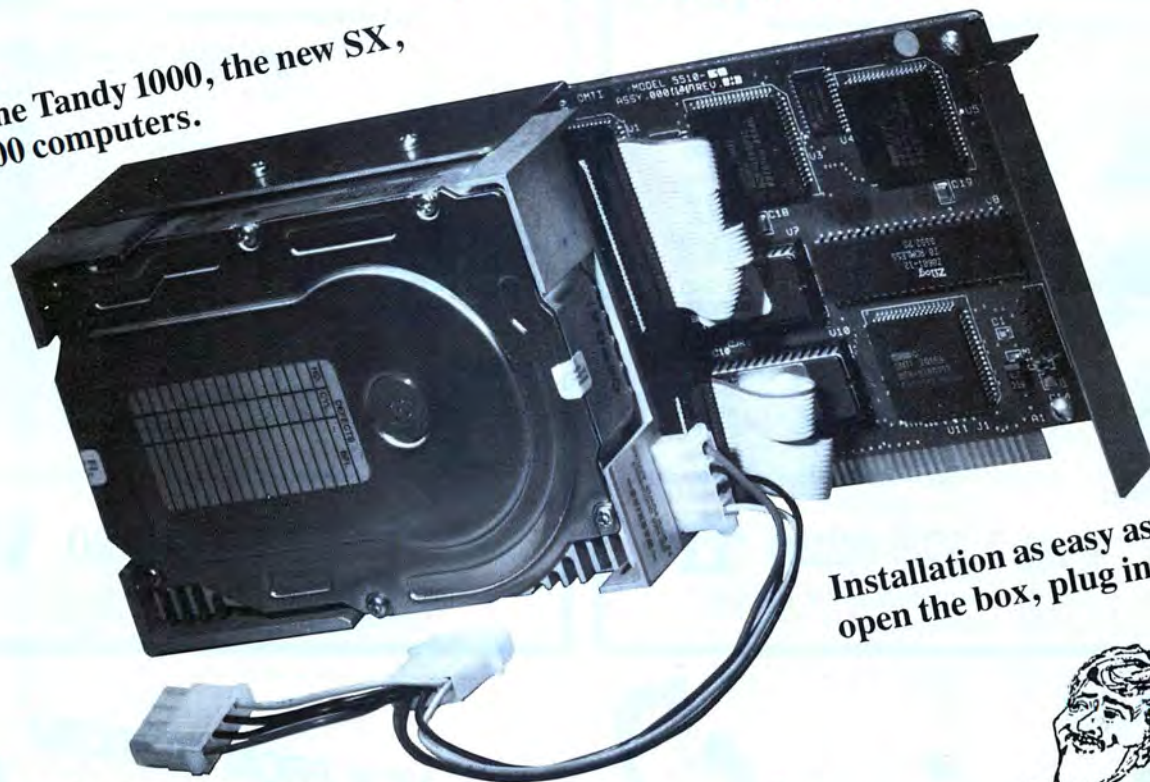


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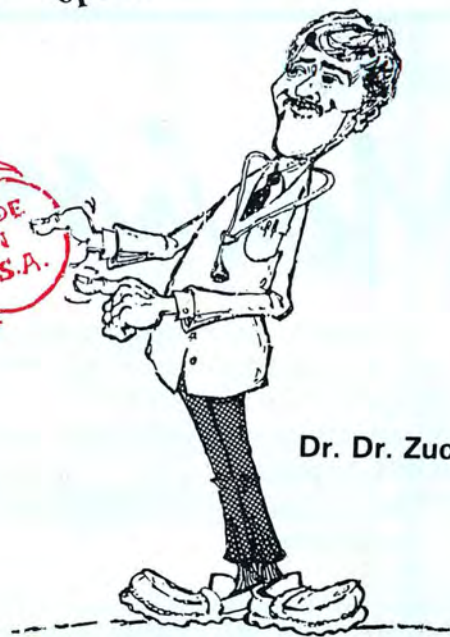
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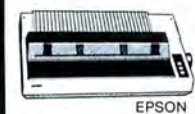
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# Tandy VP Retires

## Tandyland

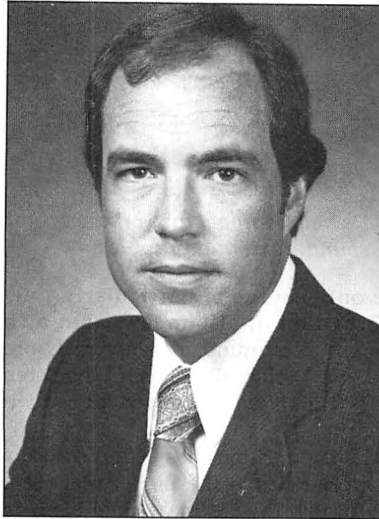
**Tandy lost a key player in its 10-year venture into the personal computer business when Ron Stegall retired April 1.** Stegall, 39, had been senior vice president of computer marketing for more than two years before leaving Tandy to "do something different" and "spend more time with his family." Something different may include helping out with his in-laws' white-water rafting business on the Colorado River.

The soft-spoken Arizona native was the highest-ranking executive in the Tandy Towers responsible for selling computers, reporting directly to company President Bernie Appel. While it may sound clichéd to say that Stegall rose through the ranks, that's exactly what he did. He joined Radio Shack in 1970 as a salesperson in Phoenix and moved on to manage a store in Salt Lake City for two years, where he later served as district manager. He then worked in Seattle as regional manager for three and a half years before moving to corporate headquarters in Fort Worth.

Stegall became division vice president for the southeast region not long after Tandy introduced the Model I. He recalled recently how different the company's expectations about the computer business were from what they are today. "The PCs were just strictly to take advantage of the consumer electronics franchises," Stegall said. "They were an offshoot of the growth of the manufacturing and research and development departments."

After a year and a half overseeing all of Radio Shack's southeastern retail operations, Stegall spent the next year and a half doing the same in the northeast, which was then the company's highest-selling computer division. He began to take a greater interest in computers and was promoted to vice president of computer marketing as Tandy prepared to start its first Radio Shack Computer Centers (RSCCs).

Although Stegall is quick to note that "no company is a one-man show," he won't deny his key role in expanding Tandy's computer line and marketing division. The initial 100 RSCCs have grown



*Photo 1. Ron Stegall, retiring vice president who was a key player in Tandy's computer-marketing strategy.*

into nearly 500, and Tandy has confidently made the transition to MS-DOS while supporting a wide range of machines, from pocket computers to multiuser systems to old TRS-80s. "Those were all things I was involved in at the drawing-board stage," Stegall said.

Now that he's on the outside looking in, what does Stegall think of Tandy's exploits in the rough-and-tumble PC market? No sour grapes here: Stegall apparently parted company on very good terms with Appel and Tandy Chairman John Roach. Stegall seems proud of Tandy's accomplishments, especially its ability to meet the challenges of a volatile business, but he isn't averse to admitting that some challenges produced less-than-great results.

The Tandy 2000, a non-IBM-compatible MS-DOS machine, "should have been more compatible," Stegall admitted. "We probably missed the target as far as issues of compatibility were concerned. . . . The market was slicker, faster, newer, and better than we thought." The executives in Fort Worth mistakenly thought graphics and speed were more important to consumers than compatibility. "I wouldn't consider it a huge mistake, but we could have been righter," Stegall said.

Tandy officials wouldn't comment on Stegall's leaving, preferring to let him

speak for himself. They did say that Graham Beachum, who came to Tandy from IBM two years ago, will take over the market-strategy part of Stegall's job as vice president of business products marketing. Bob Myers, Tandy's vice president of administration, will handle Stegall's administrative duties.

**Tandy was more than willing to brag** about an Infocorp study that had them in a virtual tie with Apple for the lead in retail sales of personal computers last year.

The study by the Cupertino, CA, market-research firm stated that the 667,500 computers Tandy sold in 1986 represented 25 percent of the U.S. retail market, just tenths of a percentage point less than the share earned by Apple, which sold 6,500 more computers than Tandy. IBM was next with 17 percent, followed by Compaq (6%), Leading Edge (4%), Epson (4%), and AT&T (3%). The figures were based on a monthly survey of 300 retail computer stores.

The results of the study are misleading, however, and are only of real interest to retailers. The Infocorp study focuses on retail sales and overstates Tandy's share of the market by not allowing for differences in accounting practices. Every Tandy computer sold is credited to a retail store or RSCC, even if the sale was handled by "outbound" sales representatives. The other companies cited in the Infocorp survey record such sales separately.

The study, nonetheless, stands as further proof of Tandy's resurgence as a major contender in the personal computer industry.

**Superscriptit, Tandy's extension of** the ever-popular Scriptit word processor, hasn't exactly been a favorite of 80 *Micro* technical editors. Some weeks last year, it was almost shocking *not* to receive a letter from a reader who was flat-out flabbergasted by some obscure bug in the big program. Superscriptit received at least two favorable reviews in these pages, but it's been no secret that the thing has more bugs than Egypt had during the plagues.

Tandy finally stopped swatting and went for full-scale fumigation in January



by releasing a remedial upgrade for the Model 4 version, now numbered 1.2. Registered Model 4 owners were sent Customer Service Bulletin 1595-10 and told that they would have to pay \$15.95 for the upgrade. Why the charge? As Tandy explained in the bulletin, "Because of the number of changes to this software, we have elected to distribute this release on a diskette." (Bugs in the Model I/III version were fixed with short patches printed in Customer Service Bulletins.) Tandy also stated that it will continue supporting only the new version, which regularly costs \$199.

According to Tandy Marketing Representative Michele Ryan, most of the corrected problems involve block actions. Following is a brief rundown of the reported bugs the upgrade is said to correct:

- The system locks up when you hyphenate blocks.
- The left-arrow and W keys lock the system when you reach the beginning of a document.
- Block or send commands in headers sometimes cause the computer to lock up.
- Using large headers and footers causes the computer to lock up.
- The display sometimes goes into reverse video when you are printing a document with a header.
- The program jumps to the end of the file while you are editing headers or footers.
- The block-print command doesn't print headers and footers.
- The program doesn't always recognize the "force end of page" command during a block print.
- An inaccurate "File access denied" message appears when you try to merge something with a document that contains a password.
- The Superscript dictionary disk sometimes can't be controlled.
- Pressing the shift or tab key sometimes causes the program to print the previous line of text.
- The compression utility doesn't work after you've edited a document.
- Block-deleted text sometimes malfunctions in version 1.1.
- Help files are sometimes deleted when you exit the program, and a menu error message appears.

**Rumors are supposed to be beneath** the dignity of serious publications. The problem is that sometimes rumors are



Photo 2. GE/RCA's new compact-disc product combines full-motion video with sound, text, and graphics.

the only source of particularly juicy information; it also follows that a rumor's interest quotient is inversely proportional to the willingness of the potentially most embarrassed person to confirm it.

That said, rumor has it that someone with close ties to the higher reaches of the Tandy Towers may have been responsible for placing the officially unreleased code for the new Tandy 2000 DOS on his bulletin board, letting it spread halfway across the country before a conscientious BBSer alerted others to the dangers of using it unedited.

Anyway, the new 2000 MS-DOS was released shortly after the alleged incident, making the question of any monetary loss to Tandy moot.

## Update

**A few months ago I reported on the** progress of CD-ROM (compact-disc read-only memory) technology, writing that you could expect to see affordable drives and applications by the end of this year. The picture changed dramatically at Microsoft's second annual CD-ROM conference in March, when General Electric/RCA wowed an audience by demonstrating a full-motion video monitor and drive system.

Digital-video interactive (DVI) is capable of producing one hour of television-quality moving images stored on a standard CD-ROM disc or magnetic hard disk, according to Elizabeth Chaney of Regis McKenna Inc., GE's public-relations firm. High-quality, multitrack audio, text, and graphics can be combined with video in a wide range of anticipated applications, including education, science imaging, simulations, sales promotions, and presentation planning.

Supporters of DVI said the proprietary technology represents a major advance over CD-ROM and CD-I (compact-disc interactive). So far, CD-ROM has mostly been sold as a peripheral for storing information from large data bases and books, with graphics sometimes being mixed with text. Still-frame video and audio are mentioned as potential applications, but no such products have been marketed.

CD-I is a joint venture of Sony and N.V. Philips that combines still-frame video, text, and sound on a single disc running with a stand-alone drive and monitor.

When the CD-I specifications were announced in 1985, full-motion video was touted as a potential application, but no CD-I product of any sort is yet available commercially.

RCA researchers at the David Sarnoff Research Center in Princeton, NJ, were faced with a formidable data-storage problem when they began working on DVI more than three years ago. Converting a single frame of a 512- by 400-pixel analog display to digital form requires about 600K of storage. Multiplying that number by 30 (the number of frames per second necessary to achieve realistic motion) shows that even a 540-megabyte (MB) compact disc can store only 30 seconds of video. To further compound problems, CD-ROM reads data too slowly for realistic video-image movement.

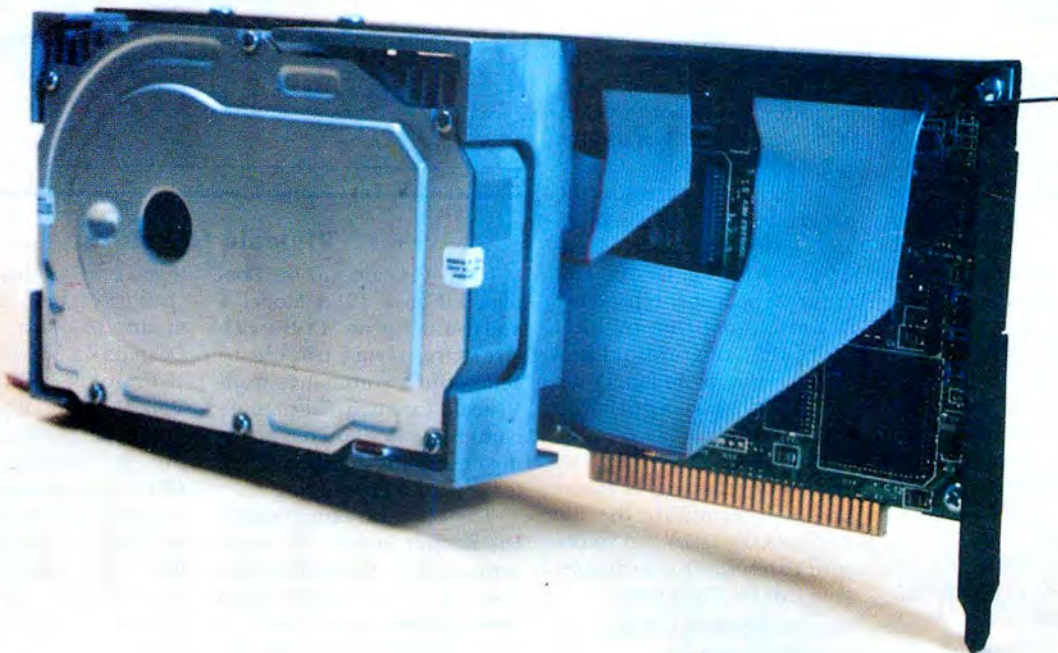
Researchers found an effective data-compression method requiring expensive programming and computer time. Two very-large-scale-integration (VLSI) chips containing decompression algorithms and pixel software allow the disc player to decompress the data. The RCA-designed chips, collectively called the video display processor (VDP), can process 12.5 million instructions per second.

A prototype DVI was the medium and the message during GE/RCA's demonstration at the Seattle CD-ROM conference. Forty-five minutes of Mozart, motion, and images were met with a standing ovation. Arthur Kaiman, RCA Laboratories' director of digital products research, told the group "many have predicted that full-motion video from CD-ROM would not be available before the mid-1990s, but we're demonstrating it to you today."

GE/RCA distributed questionnaires to potential developers, seeking input on which system configurations would have the most appeal. ■



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**Password.Password**

Sometimes I want to password-protect a file, not for intruder security reasons, but to prevent accidental erasure of the file. Rather than use a password that I might forget, I choose the name of the file itself as the password, for example, Maillist.Maillist.

Often I find I can shorten Mike Zarowitz's 1-byte patch (Reader Forum, 80 Micro, August 1986, p. 22) for controlling TRSDOS 6.2 passwords—POKE &H77, (PEEK(&H77) OR 128) and POKE &H77, (PEEK(&H77 AND 127)—by just entering POKE &H77, 128 (to turn on) or POKE &H77, 127 (to turn off).

Jerry E. Semler  
Huber Heights, OH

**Hold It Right There**

When you want to pause a listing on the DOS or Basic level using TRSDOS 6.2, the shift-@ combination is sometimes difficult to reach quickly enough. With the patch in Program Listing 1, you only have to press the spacebar. This is easy to remember since some other programs and DOSes use the same key.

As usual, after pressing the new pause key, you can press any key (except break) to continue the listing. Or you can press the spacebar repeatedly to list almost line by line. (Note that the original key combination is no longer active after you apply the patch.)

Type BUILD PAUSE/FIX and enter Listing 1. Press break to terminate the file and exit to DOS. To make sure Patch/CMD is available, type DIR (I). Then type:

```
PATCH BOOT/SYS.LSIDOS
USING PAUSE/FIX
```

You should receive a "1

patch line installed" message before returning to DOS. Now reset your computer and use the spacebar to pause. You

can remove the patch using the Remove parameter.

Jean Lussier  
McMasterville, Quebec

*Program Listing 1. Patch to use the spacebar for pause.*

```
.THIS PATCHES BOOT/SYS TO ENABLE <SPACEBAR>
.AS THE "PAUSE" KEY INSTEAD OF <SHIFT> <@>
.***** APPLY TO TRSDOS 6.2 ONLY *****
D05,E8=00 00 3A 40 F4 CB 7F
F05,E8=30 0B 3A 01 F4 CB 47
.END OF PATCH
```

End

**Visicalc to Printer**

I run Visicalc 4.0 on Dosplus 4.0 on a 128K Model 4 and use an Epson MX-80 with Graftrax. I was unable to send printer commands from Visicalc for such features as compressed character printing or sending additional line feeds for double spacing.

The Visicalc manual states the proper syntax is clear-semicolon (;) followed by an A-Z character, depending on your printer requirements. The clear-semicolon supposedly sent a caret (^) to the printer setup. This is true if you use TRSDOS 6.x but not

if you use Dosplus 4.0. I got a strange graphic character instead. To get a caret using Dosplus 4.0, press control-6.

From this point, follow the Visicalc manual to send individual printer-control codes out. For example, control-6EP sends an escape-P, which is condensed code for my printer. For double spacing (three lines per inch), I send control-6EA, control-6H18. Option A is the command for line spacing of 7/2 and H18 calculates 27/2 or 13 inch.

William E. Baker  
Independence, MO

**Marginal LList**

I like to keep printouts of my Basic programs in a loose-leaf binder for quick reference or for planning revisions. However, LList has no provision for top and bottom margins. Program Listing 2 is a JCL program that works well on my Model 4 and TRSDOS 6.2.1.

Page/JCL effectively counts lines rather than statements. A multiple-line statement can carry over to a subsequent sheet. Note that you must save the program to disk before you list it, a common procedure.

Hamilton Gaillard  
New City, NY



**Wavy Display**

Shortly after I purchased my Model 4 (1983), it developed a thermal problem. After several hours of operation, the display would shrink and waver with some smearing. The Tandy folks were no help. ("Send it in, and we'll work on it.") A friendly technical person finally passed on these gems.

In Basic, OUT 132,4 freezes

the display in Model 4 mode. OUT 132,0 freezes the display in Model III mode.

You can adjust the sweep frequency in Model 4 mode with the potentiometer on the upper-left corner of the motherboard. The problem was solved and never recurred.

E. J. Holtke  
Garland, TX

*Program Listing 2. Page/JCL for margins.*

```
. PAGE/JCL loads and lists a Basic program on printer
. Advances to top-of-form every 'L' lines
. To execute under TRSDOS ready,
. Type DO PAGE (P=programe,L=number)
. If you didn't observe syntax, reset and reDO
SET *PF TO FORMS/FLT
FILTER *PR *PF
FORMS (CHARS=80,MARGIN=0,LINES=#L#)
BASIC
LOAD "##P#"
LLIST
//STOP
```

End



**Bunched Together**

On the Model 4 using TRS-DOS 6.2, you can remove multiple files from a disk at the same time by just leaving a space between their file names, as shown below:

```
REMOVE SALES/ASC:1 PUR-
CHAS/SCR:1 BOZO/CLW:1
```

I don't know how many files you can remove this way. I've deleted as many as five.

*Bill Boggess  
Pompano Beach, FL*



**Informative Lines**

I wrote Startend/ASC for the Model III (see Program Listing 3) to display the following information for any valid Basic program line number:

- the starting address for the line number;
- the 2-byte address for the next sequential line;
- the 2-byte number representation of the selected line number;
- the tokens, alphabetic characters, and other bytes that compose the line; and
- the ending address for the line.

To use this routine, type RUN 65000 and enter the line number whose storage you want to display. On completion of output from Startend/ASC, listing the selected line number on the screen provides direct comparison between the tokens and keywords and the other bytes and characters stored with the program line. Also, you can find the address for any byte in the line.

You can use this information to renumber or alter the present program line. Another use is to poke non-keyboard characters into a print string so that you can display graphics or special charac-

ters without CHR\$( ) or concatenation of data to build up a character string. This procedure saves memory and speeds up the handling of graphics and special characters in Basic (these, however, will not print with the LList command). The following is an example for the Model III:

```
10 POKE 16420,1:PRINT"****
Test Data"
```

If you poke the addresses of the asterisks with 244, 245,246, the hand symbol will replace them when you run the program.

*Robert Hood  
Bremerton, WA*

*Program Listing 3. Startend program for Basic line numbers. See p. 116 for information on using checksums.*

```
0 CLS:GOTO 65000
65000 D1=PEEK(16548)+PEEK(16549)*256 'Beginnin
g address Basic for Model I/III
65005 'D1=PEEK(28318)+PEEK(28319)*256 'Beginnin
g address Basic for Model 4
65010 INPUT"Enter line number to be found";LN
65020 S=PEEK(D1)+PEEK(D1+1)*256:E=PEEK(16633)+
PEEK(16634)*256:IF S>E THEN PRINT"Line";L
N;"not found.":END
65025 'Use E=PEEK(29087)+PEEK(29088)*256 for M
odel 4
65030 D2=PEEK(D1+2)+PEEK(D1+3)*256:IF D2<>LN T
HEN D1=PEEK(D1)+PEEK(D1+1)*256:IF D1>3276
7 THEN D1=D1-65536:GOTO 65020 ELSE 65020
65040 D1=D1-1:LSB=D1-INT(D1/256)*256:MSB=INT(D
1/256):BA=LSB+MSB*256+1:PRINT"Start addre
ss for line";LN;"is ";BA:IF BA>32767 THEN
BA=BA-65536
65050 BB=PEEK(BA)+PEEK(BA+1)*256-1:IF BB>32767
THEN BB=BB-65536
65060 PRINT"End address for line";LN;"is ";BB:
PRINT
65070 PRINT BA:PRINT PEEK(BA);"+";PEEK(BA+1);"
* 256 =";PEEK(BA)+PEEK(BA+1)*256;"(start
address for next line)":PRINT PEEK(BA+2);
"+";PEEK(BA+3);"* 256 =";PEEK(BA+2)+PEEK(
BA+3)*256;"(requested line number)"
65080 PRINT" Statement-->";
65090 FOR J=BA+4 TO BB-1:IF (PEEK(J)>31 AND PE
EK(J)<128) THEN PRINT CHR$(PEEK(J));:GOTO
65110
65100 PRINT PEEK(J);
65110 NEXT:PRINT" ";0:PRINT BB:PRINT
```

*End*

**Hang-ups**

I discovered solutions to the following problems using Tandy Deskmate, version 01.00.00 in a Model 4P with a Modem 4P.

The Phone function would dial a phone number and then hang up as soon as it stopped dialing or it would dial a number, stay on line, and insert a carrier. I modified the Voice Dialing Definition as follows:

```
SEND: **C**M@'DDT
SEND PHONE NUMBER TO
MODEM
SEND: X
SEND: **C**@
RECEIVE: X
PAUSE: 4
```

The modem would not autoanswer incoming calls when Deskmate was in the Telecom terminal mode. Creating a terminal file (I called it "Answer") puts the modem in the answer mode:

```
SEND: **C**@
STATUS: 30,8,N,1,Y,N,Y,0
SEND: **C**MAL
SEND: X
RECEIVE: X
```

When using the Modem 4P on a phone line that was set up for rotary and tone dialing, the modem would answer when I used a rotary phone to dial out. I replaced resistor R4 (1k ohm, 1/4 watt) on the modem with a 56k-ohm, 1/4-watt resistor. Also, the modem would not disconnect when it answered a call and detected no carrier. I replaced R18 (39k-ohm, 1/4-watt resistor) with a 22k-ohm, 1/4-watt resistor.

*John B. Hemminger  
Sturgeon, MO*

**Getting Ted to Print**

The LS-DOS 6.3 and LDOS 5.3 text editor, Ted, has no print command. You can, however, get a screen print with the control-colon (: ) command without returning to DOS.

*Bruce B. Hecker  
Warwick, RI*



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9 1/2 x 11"	1	Greenbar	Yes	3500	26-1403	49.95
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9 1/2 x 11"	1	20# White	Yes	500	26-1387	10.95
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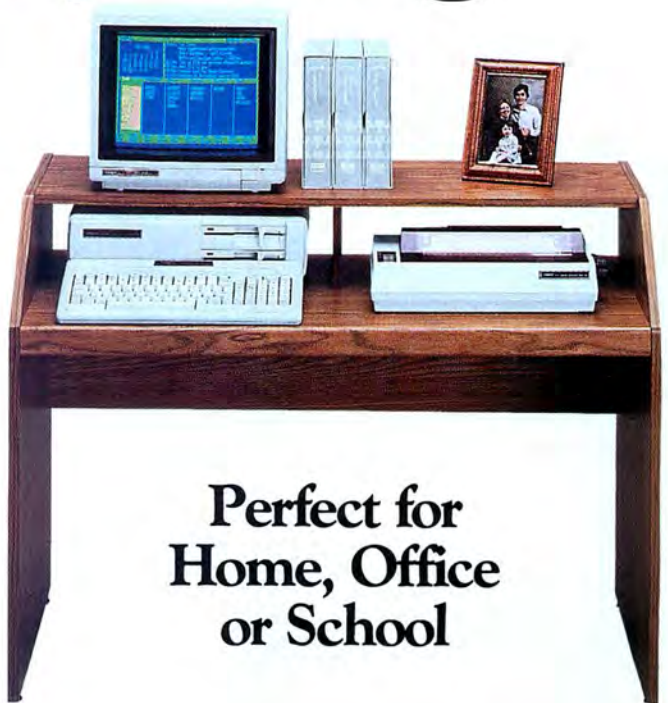
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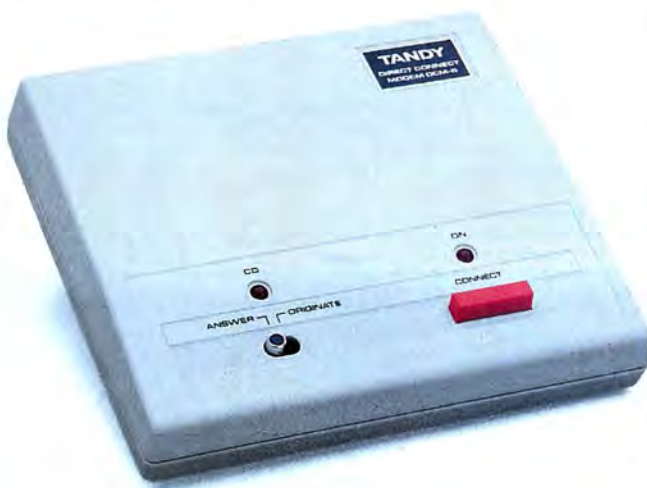
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# What a Difference A Blink Makes

by Harry Bee

★★★★

**Electric Pencil PC 3.0** runs on Tandy 1000/1200/3000 (128K) and requires one disk drive. Electric Software Corp., 9230 Markville Drive, Dallas, TX 75243, 214-234-8466. \$69.95.

Sometimes you find a treasure in an unlikely place. In Electric Pencil PC, I found an outstanding word processor in a package I was about to drop down a deep hole.

The first time I pressed the enter key to end a paragraph, the screen jumped. So did I. Though I soon stopped being surprised by it, the jarring persisted with every enter, delete, insert, and wordwrap. As documents got longer, the jerking became blanking for longer and longer periods. I had read the manual completely, several times for particulars, in testing as many of Pencil's features as I could stand to look at. Still it was by accident that I found the (yes, documented) solution.

Electric Software ships the program set for one of two video configurations. My Tandy 1000 has the other one. A simple command, Blink, switches between the two. Instead of learning about Blink during the installation process when I needed it, I found the command in two unremarked sentences two-thirds of the way through the manual. Blink, and Electric Pencil PC became quite a different program from the one I'd nearly written off.

Electric Pencil is a proud name with a long history. First written for the Altair in 1976, its association with TRS-80 computers predates Scripsit for the Model I. Yet this isn't a translation of the old program. Rather, Pencil PC is a fully developed package designed to use all the capabilities of MS-DOS and a worthy successor to its tradition. Don't let the low-ball price fool you. This is serious, feature-rich word processing.

Electric Pencil PC comes on two disks with a hefty manual and a quick-reference



card. The disks, not copy-protected, contain the main program, overlays, the proofreading program, spelling dictionaries, Dvorak and foreign-language keyboard drivers, demonstration files, and a patch program to ease future upgrades. The program overlays are well-documented so that, if yours is a minimum system, you can spread them among several disks and still use all the program's features effectively.

## Installation

Installation is straightforward. The manual guides you through the process, explaining the important options (but one) along the way. You begin at the system menu—not a menu at all, because you type rather than select—where you tailor the program for your hardware. From this "menu" you perform the functions not directly connected with

processing words.

The screen shows the current program configuration settings and the commands you need to change them. You can reconfigure the program at any time, temporarily or permanently. Also displayed are the date, time, drive, current file name, the size of the document in the buffer, and the word count. From the system screen you can use many DOS functions. You can look at directories, copy and erase files, and effectively do all your file management without leaving the program.

Here, too, is where you load and save your documents. Pencil uses the last file name you type as the default file name, maintains a default extension (initially PCL), and keeps the previous copy of a file each time you newly save it. Pencil loads and saves files in its own format or in pure ASCII. You can save a file with or without its imbedded format commands.

Pencil's most convenient file-handling function, possibly its most convenient feature, is Autosave. With this command you set the program to save the file you are working on automatically. You can vary the period between saves from every few minutes to every few hours.

## Writing and Editing

Pencil PC uses an unformatted screen for writing and editing, but any time you need to see how your printed document will look, Pencil displays it. The video tabs and tab line are for cursor movement, not for formatting. The program is paragraph oriented, rather than line oriented, so that editing and screen reconstruction are smooth and quick.

Keyboard response is excellent. (The program uses the Tandy 1000 keyboard properly.) You have a choice between using DOS's type-ahead buffer or Pencil's larger, 80-character buffer. Cursor control is also fast and accurate, with enough movement commands, I suspect, to satisfy anyone.

Pencil gives you a full arsenal of editing weapons, too. Among the usual insert/de-

### The Star Ratings

80 Micro's star ratings reflect our reviewer's impression of a product.

The stars mean:

- ★★★★ Superior
- ★★★★ Excellent
- ★★★ Good
- ★★ Fair
- ★ Poor



lete functions, you can delete by character, word, sentence and paragraph, and do it either forward or backward. A cut-and-paste buffer and block markers allow block deletes, copies, and moves, and let you undo accidental erasures.

The search-and-replace functions are particularly noteworthy. Searching, too, can be forward or backward. A one-key marker-search command lets you mark your place, jump elsewhere in the document, and instantly return to where you were. You can search for strings exactly as you type them, or ignore case differences; search for complete words, parts of words, or with wild cards for words or phrases containing partial strings.

Pencil also finds special characters such as carriage returns and form feeds. The replacement string can contain special characters, and you can replace the search string with a null (empty) string, which amounts to automatic, global deletion.

Among Pencil's nicer features, I liked the automatic scrolling in either direction. You use the number keys like a throttle to control the speed and the spacebar to pause and step a line at a time. Some (I'm not among them) may not like the way

**Electric Pencil's search-and-replace functions are particularly noteworthy.**

Pencil favors overstrike over the insert mode. Insert mode toggles off as soon as you leave the line you're working on.

**Capacities**

Pencil's 64K text buffer limits document size to about 30 double-spaced, 80-column pages. While this makes writing and editing fast, it forces you to break up large projects. On the other hand, when you print, you can include other documents within the main one or chain from one to another.

Pencil has no mid-level macro capability. You can program 10 function keys,

but you're limited to 16 keystrokes each. At the other extreme, you have what amounts to a job-control language. This, in combination with the editing and function commands and straight text, lets you write files, like batch files, to automate any process you can imagine. What you can do with these alternate-A files is impressive, but I found them too unwieldy for what I most often use a macro for: to assign a letterhead or a common editing sequence to a single key.

For the limited macro functions I use often, I settled for Pencil's ability to copy all or part of a disk file into the text buffer. It proved a satisfactory compromise. Another possibility, an alternate text buffer, didn't work for me.

The alternate text buffer is a second 64K workspace that lets you work on two documents at once and transfer text between them. It's an attractive premise, and in the limited time I used it, I was impressed by its potential. However, once I discovered Blink and stabilized the display, I was able to trace all the major problems I'd had with Electric Pencil to this alternate buffer. They included sudden reboot, system hang-up, turning text in the buffer to junk,

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and other trauma. As soon as I stopped using the alternate buffer, those troubles disappeared.

**The Proofreader**

Electric Pencil PC includes a full-featured spelling checker. There are two versions of the primary dictionary, a 50,000-word list, and a giant 100,000-word version. While the manual takes pains to explain how to implement the larger dictionary on floppy disks, I found it impractical on anything less than a fixed disk system. That's not to belittle the smaller list, which I feel is adequate to most situations.

The spelling checker uses two other dictionaries: The user dictionary is the one to which you can add the words you use frequently that are not in the main dictionary. Though you can use only one at a time, you can build several user dictionaries, each with its specialized word list. Electric Software offers a medical dictionary, not included.

The misspelling dictionary, limited in size, starts with a list of common misspellings and typos, which the proofreader uses to correct errors automatically. While you're using it, the program

"learns" your most frequent mistakes and updates the misspelling dictionary to accommodate you.

You can use the word lists from the text-entry screen to check a single word or look up a spelling you're not sure of. You use the proofreader to check all or part of a document in the buffer or a disk file. It is as fast as any I've used. Once the program has identified the words it doesn't recognize, it shows you each one, the part of the word list where it ought to be, and the part of the text where it found the word. The program doesn't highlight the word in context; you have to look hard for it.

If the word is correct, you skip it or mark it for addition to your dictionary. If you know the correction, you can type it in. If you're unsure, scroll through the list or jump to a likely spot by typing part of a word. The program shows you its automatic corrections, and you can override them. You can go through the list as many times as you want before ordering the proofreader to make the changes and return you to the editing screen.

The proofreading program also has the hyphenation rules for the words it knows. If Pencil can find the dictionaries

when it's printing, and you want hyphenation, Pencil handles it for you.

**Putting It on Paper**

Commands imbedded in the text determine the printing format and give you complete control of your printed document by letting you alter such things as margins, line spacing, and line length, as often as from line to line. The print menu displays and lets you modify your standard format. As the program finds imbedded commands, the format changes dynamically.

The toolbox of formatting commands is complete. Pencil handles pagination and page numbering, and headers and footers up to 10 lines long. A pair of headers or footers can alternate between left and right pages. You can print all or any part of a document from the buffer or a disk file.

Pencil takes a generic (strikeover) approach to attributes such as underlining and boldface. However, imbedded printer codes let you control not only those features, but type styles, fonts and sizes, and all the bells or whistles your printer will sound.

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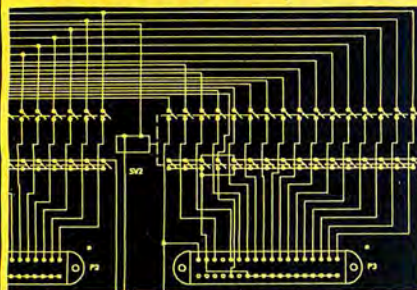
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**MICRODEX**

allel port, either serial port with its settings under your control, the video display, a null port, or one of two user drivers. The manual has sufficient technical information for a capable programmer to assemble a driver. You use the null port, a ghost port, to check for command errors. You can further tailor the printed document to your printer with character-translation tables to produce characters you can't type from the keyboard.

I have two complaints about Pencil's printing: You have to position the paper manually to account for the first top margin and the program doesn't finish off the last page; you have to put in the final form feed yourself.

***Pencil comes with enough help to accommodate any level of experience.***

**Going to School**

Electric Pencil PC comes with enough help to accommodate any level of experience. Of five levels of on-screen help, the lowest uses two-thirds of the screen to give you full command lists, status and tab lines; the highest is no help at all. For reminders of commands at all levels of operation, the quick-reference card is very good. Complex procedures are well-prompted.

Though it would benefit from better organization and a more adult tone, the manual is thorough to the point of being repetitive. It would also benefit from larger type. (Folks over 40, beware of eyestrain.) It is full of illustrations, examples, and guided tours to go with the sample files on the disk. On line, Pencil Tutor puts much of the important material from the manual on the screen.

Electric Software doesn't encourage customer-service calls. If you cannot solve a problem on your own, there's a printed form for you to fill out and mail.

**Conclusion**

By any measure, Electric Pencil PC is an outstanding word processor. There is enough help and documentation to put it within the reach of the least experienced user and enough power and features to satisfy a professional's needs. Putting aside my initial problems with the program, I feel it compares favorably with word processors costing several times its price. ■

## Warp-Speed Reading

by Thomas L. Guindry

★★★★

**Warp Speed Lightpen** runs on the Tandy 1000/1200/3000. Warp Speed Computer Products Inc., 5555 S. Inglewood Blvd., Los Angeles, CA 90230. 800-974-4315. \$199.99. (Also available through Tandy's Express Order, catalog no. 90-2069 for the 1000 and catalog no. 90-2074 for the 1200/3000).

★★★

**Controller 2.02** is included with the Warp Speed Lightpen.

★★★★

**Penmouse 2.0** is a light-pen controller for programs that require a mouse. Warp Speed Computer Products Inc. \$49.99.

★★★★

**Warpstar 1.0** is a light-pen controller and enhancement driver for Wordstar (except Wordstar 2000). Warp Speed Computer Products Inc. \$49.99.

★★★

**Conductor 2.01** is a light-pen controller and enhancement driver for all current versions of Symphony and 1-2-3. Warp Speed Computer Products Inc. \$59.99.

The Warp Speed Lightpen is well made. It comes in a stainless steel barrel, and if you buy some optional equipment, you can also use the pen for high-resolution applications. The light-pen driver, on the other hand, has some problems running on a Tandy 1000A, probably because the 1000A is not completely compatible with the IBM PC.

The light-pen package includes a file-management program called Controller, a driver for Microsoft Windows, and other associated utilities. If you order the pen through Radio Shack's Express Order catalog, you also get a driver for Tandy Deskmate, but it didn't work with my DOS 2.11 version of Deskmate.

You can use the included batch files to transfer programs to a formatted system disk or a hard drive. The batch file also runs a program called Install.EXE that calibrates your light pen to your computer's hardware. Every time you change any hardware configuration, you should recalibrate.

The light-pen driver, Lightpen.EXE, runs first to set up your computer to accept the light-pen commands. Controller program provides a DOS shell that lets you use the light pen to control many DOS functions.



After you've installed Control.EXE (Controller's filespec), a directory of several commands that you can select with the pen appears at the bottom and on the right side of the screen. The commands include such functions as Type, Copy, Delete, Abort, Select a Disk Drive, Create a Subdirectory, and Return to the Root Directory. You can also choose to page through a file or directory that is longer than one screen.

The commands on the right let you display a sprite as your light pen points to the screen, turn an audio beep on or off, pause after using the Type command, and use the keyboard to enter extra parameters for a specified program. You can also alphabetize your directory display, send the Type-command output to your printer, and display hidden files.

The Copy command asks if you want to have the current date or file date entered into the directory table for your copied file, but with the Tandy 1000A the pen-controller program can't detect your response. Therefore, you have to reboot your computer, because you can't perform another operation until the program receives the answer it's awaiting.

Though the program was supposed to display an error message if you use the pen to incorrectly select a document or non-executable file, doing so causes the computer to hang up, and you have to reboot. A company representative performed the same function on a Tandy 1000 (rather than a 1000A) and had no problems. His computer simply returned to the menu, although it didn't display the promised error message either.

The Controller program would not read a RAM-disk directory, but displayed a disk-read error message instead. It also conflicts with some other RAM-resident programs. Control.EXE would not work properly with my hard-disk file-management programs, and when I tried to exit from it, my computer crashed.

Warp Speed has written a lightpen routine into Lightpen.EXE that you can call from versions of Basic that don't include light-pen commands. However, if your version of Basic does have such commands (and Tandy's does), Lightpen.EXE disables the Basic lightpen commands. You have to use the Warp Speed Basic code with Lightpen.EXE installed as a background program.

If you do your own Basic programming, this adds a degree of complexity with other light-pen software. It also means you have to modify other Basic software to use your light pen if you use Lightpen.EXE as the background driver. Without installing Lightpen.EXE, the Basic light-pen commands function as designed, and the Basic light-pen commands work.

To use some programs in their lightpen mode, you have to install Lightpen.EXE, because the lightpen sensing in the program would otherwise be in the On state all the time. But if a program, like some versions of Sargon III, boots automatically, you don't have a chance to install the driver.

Lightpen.EXE knows when you're pushing the pen tip to make a selection from the screen and when you're just using the tip to point to a position.

**Penmouse**

Warp Speed Computer Products also sells Penmouse, a program that lets you use the light pen instead of a mouse, which means you can also use simple mouse software. Zsoft's Paintbrush worked well with a light pen instead of a mouse, but Prodesign's CAD II program did not.

As in most of Warp Speed's software packages, instructions are minimal; they simply tell you to replace the mouse software driver with the Penmouse software driver. Warp Speed assumes that you know how to use a mouse, but if you already have a mouse, why would you replace it with a light pen? It's not likely that Penmouse users will already be familiar with using a mouse.

Since Prodesign's CAD II manual doesn't cover mouse operation, I was left to my own devices and never did come up with a satisfactory way to use the light pen with this design program.

More complicated mouse-driven programs usually have mouse drivers written into them. Penmouse is not intended to be used with such programs. These programs would require special drivers for using a light pen instead of a mouse; for example, Warp Speed offers Pencad, a driver to use with Autocad, a sophisticated CAD program.

**Warpstar**

There are some good things about the light pen and its drivers, though. Warpstar is a light-pen driver for the Wordstar word processor and gives the light pen complete control over most, if not all, of Wordstar's commands. To get all commands, you have to use the help-level 3 screen option while editing and set the directory-display default to "on." To invoke a displayed command you simply touch the pen tip to the command on any Wordstar menu.

Warpstar is the most well-behaved of the Warp Speed programs, though it isn't perfect. Once you're in the Wordstar program, everything works fine, but you might have problems if you use the light pen and controller to select Warpstar and then Wordstar. A program called Vanish is supposed to eliminate Warpstar

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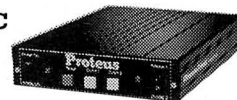
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from memory, but it didn't always work: Sometimes residue from the Warpstar menu would appear on the screen.

As with the other light-pen driver programs, once you're through with a program that uses the driver, it is best to reboot the entire system.

### Conductor

A light-pen driver called Conductor.EXE provides light-pen control of Lotus's 1-2-3 or Symphony, though it isn't as useful as the one for Wordstar. As in Warpstar, Conductor lets you invoke any command displayed in the different menus by touching it with the tip of the light pen. Among the available options is a keypad command that displays a keypad that you can use to enter numbers. A FNCT command displays a table of @ functions that you can enter.

Though the light-pen driver is supposed to vanish from memory once you exit the spreadsheet, sometimes it did not. I found it better not to load the Controller program when using a driver program. I even set up a batch file to eliminate the drivers after exiting the program I used it with, but unexplained things still happened when I used the controller. I attributed this to the combination of drivers and controller.

### Summary

I have mixed feelings about the light-pen packages. I like the functions the light pen gives, but it can cause problems with other computing tasks that don't use the light pen. I'd rather have the pen than not, and the drivers will certainly benefit handicapped users, especially those limited to one-hand operation.

It does become a nuisance to make sure no other RAM-resident programs are present when you run any of these light-pen programs. This is especially apparent when everything boots off my hard disk, and my autoexec file loads in its specified RAM-resident programs. To use the light pen, I have to rename my autoexec file, reboot the system, then jump to the light-pen subdirectory, and call in the programs.

The Warp Speed company owns a Tandy 1000, but couldn't duplicate my 1000A-based system. Therefore, they weren't much help in solving some of the problems I encountered.

Warp Speed's ads state that you must have the proper display adapter or light-pen converter card to use the pen with a Tandy 1200 or 3000. Contact Radio Shack to see what you need: The Warp Speed manual doesn't offer much information about special equipment necessary to use the light pen. The programs performed the same on both Tandy DOS 2.11 and 3.2. ■

## Dac-Easy Base by Wynne Keller

★★★★

**Dac-Easy Base** runs on the Tandy 1000/1200/3000 (256K) and requires one disk drive and MS-DOS 2.x. Dac Software Inc., 4801 Spring Valley Road, Building 110-B, Dallas, TX 75244, 800-992-7779. \$49.95.

**D**ac-Easy Base is a full-featured data-base language that emulates Dbase II from Ashton-Tate, for a fraction of the price. At \$49.95, it is a genuine bargain. Novices might find it a little tough, but it's a program that can grow with you, ready to give you more power when you understand how to use it. Dac has added some useful features to the Dbase II command set; they've also deleted a few.

Dac-Easy Base comes on a single unprotected disk with a 202-page manual that doesn't tell the whole story.

The manual is excellent as far as it goes, but it leaves a lot unsaid, particularly if you want to set up your data base to meet special needs. To get the most from the Dac-Easy program, you'll also need one or more books on Dbase II programming.

### Using Dac-Easy Base

Dac-Easy Base comes up on screen with a helpful menu, a far cry from Dbase II's infamous dot prompt. If you prefer the dot prompt, it is available at any time from the menu by pressing the slash (/) key. The setup options also let you turn the menu system off once you know the program.

Dac-Easy Base has two menu types: partial and whole. The partial menu contains the most commonly used commands. From it you can jump to most options by hitting the first letter of the option. Using the whole menu requires two keystrokes—one to select a sub-menu, one to select the option. The whole menu contains all the program commands.

As in any data base, the first task is to set up the file structure. This process involves naming the file to hold the data and the subdivisions (fields) of the data. Some nice field options include one that automatically uses the system date to mark when the data is first entered or subsequently changed. Dac-Easy Base supports formula fields with an option to recalculate the formula after any modification of the data. A field cannot contain more than 255 characters.

Once you've set the structure, you begin entering the data on the program's screen, which lists all the fields down the

**Novices  
might find  
it a little tough,  
but it's a program  
that can grow  
with you.**

left side, or on one you've designed. Dbase II requires that you write a program for custom screens, but with Dac-Easy Base, it is easy. You select the fields you want and use the arrow keys to place them on the screen, writing text to go with them if you desire. This arrangement is not quite as flexible as Dbase II (you cannot, for example, force an entry to be uppercase), but the simplicity of the task more than makes up for the lost flexibility. The entry screen can span two screens.

You have several special options for entering data. You can append a memo of 10 or fewer lines to any item in the file. One of the problems with a data base is the rigidity of its structure. The memo option gets around that by letting you add extra data whenever necessary to one item in the file, without changing the structure of the file as a whole. Once you have added a memo, the screen displays "Memo" at the top whenever it displays that particular item. To see the memo, select the Memo option from the list at the bottom of the monitor screen.

Another aid to data entry is the abbreviations option. You can set combinations of letters to signify an abbreviation. When you type those letters, the program automatically inserts the full word.

If you are already using another program and want to transfer your data to Dac-Easy Base, you can import it as an ASCII or Dbase II file. With either type, you must know the file structure before you begin so that you can set up a Dac-Easy Base file to receive the data. Some people might not know their file structures if someone else had set up the files.

### Working with the Data

Once you've entered the data, the most important parts of the data base come into use: the search, edit, and report features. To rapidly find information, the data must be either sorted or indexed on the search fields. Dac-Easy Base supports a sort on multiple fields in one operation; however, in a sorted data



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IBM Standard Bus:	150 WATT	63.5 WATT	54 WATT	130 WATT
Operating System:	YES	YES	NO	YES
Disk BASIC:	MS-DOS 3.2	EXTRA	MS-DOS 2.11 (3.2)	MS-DOS 3.1
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
	YES	NO	NO	YES

Cost Ready-to-Run	\$699	\$3,063	\$1,398 + (\$1,683 +)	\$1,295
8mHz Option	\$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.

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.

\*The above prices are list prices as best we could determine. Both the IBM and Tandy are available at a discount.

## CLONE OPTIONAL EQUIPMENT AND FEATURES

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80286 SpeedKit. Makes XT faster than AT	399	5339 Accounting Keyboard	89
300-1200 Internal Modem & Software	149	300 Watt Uninterruptable Power Supply	299

## 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.

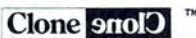
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## The Find function, the means of locating any data with an index, is not available from Edit.

base, you must re-sort the data each time you make a change or addition.

Unfortunately, Dac-Easy Base has made it awkward to use an index in some sections. It is easy to open a file with an active index, but the program doesn't display the index in use along with the file name. If you cannot remember whether you have the zip-code index or the last-name index open at the moment, Dac-Easy Base isn't going to help you remember.

### Locating Data

Worse, the Find function, which is the primary means of locating any data with an index, is not available from the Edit screen. Therefore, you can't find an item, edit it, and proceed to find another as one continuous operation; you must return to the menu after each edit. If you know the commands, you can streamline this somewhat by using the dot prompt instead of the menu. Nonetheless being forced to return to the menu seriously cuts down on speed and convenience.

On the plus side, the program has some convenient new features for data comparisons. For example, to search for a match regardless of uppercase incompatibility, use two equal signs (= =) instead of one. Use two string signs (\$\$) to search within an expression for specific data, regardless of case. Dac-Easy Base has also tried to simplify expression searches by taking you through it a step at a time: Select the number of items to search, the field to use, then write the expression.

When data is marked for deletion, it shows up in color on a color monitor. Like Dbase II, Dac-Easy Base does not remove deleted items until it has packed the file. Until that time, you can change your mind and retrieve them.

Unlike Dbase II, it has no option to set that lets you keep deleted records out of reports. This could be a disadvantage with large data files, because packing and reindexing are time-consuming operations.

### Report Generator

Dac-Easy Base includes a fine report-generator program. You select the fields you want to include in either a one-item-per-page format or a columns format. To design a mailing label, for example, you select one item per page and set the page length to six. The report generator prints only one label across; if you want more, you must write your own program. With the columns format, you can have a title, page numbers, column headings, and so on, at the center, left, or right.

### Extra Features

If you aren't familiar with Dbase II, you might not discover all of Dac-Easy Base's features. Dac-Easy Base understands several commands that the manual doesn't mention. For example, you can get the program to send printer control codes to create compressed print.

You'll have to write your own program if you want to produce reports that use more than one file. Dac-Easy Base can have three files open at once. Each is assigned to a work area, and you can change work areas to move between files. The report generator let me request fields from more than one file, but the actual report failed to bring in the secondary file data. This discovery is disappointing, because it isn't unusual to need two files for a single report, and writing your own report is difficult.

To write a Dac-Easy Base program, you need either a word processor or text editor. You type the necessary commands, one per line, save them as a program file, and then load Dac-Easy Base and run the program. It crashes, of course, and you must then exit Dac-Easy Base, reload the word processor, fix the offending line, return to Dac-Easy Base, and try again.

Complex? Absolutely, and the fact Dac-Easy Base doesn't include a Dbase II function called Modify Command, which allows Dbase II users to fix an offending line from within the data base, makes it even worse. I would not even consider trying to program in Dac-Easy Base without a memory-resident word processor.

Dac-Easy Base's lack of nested macros might annoy veteran Dbase II users, and so might the absence of the Browse function, which lets you edit records while they scroll on the screen. Dac-Easy Base lets you display fields of your choice in the same format as Browse, but you can't edit them.

On the whole, the differences between the two programs' command structures are minor. Dac-Easy Base has to be an easy choice over Dbase II in both the ease-of-use and value-for-the-money categories. ■

## Putting Deskmate To Work by Bob Keller

★★★★

**Deskhelp** runs on the Tandy 1000/1200/3000 (384K) and requires one disk drive, a color or monochrome monitor, and MS-DOS 2.10 or higher. Atmospheres, 1207 Eighth Ave., Brooklyn, NY 11215, 718-788-6799. \$59.95.

Given the fact that every Tandy 1000 owner has a copy of Deskmate, what better product could you come up with than a supplement that makes Deskmate truly productive? Atmospheres seems to have the answer in its Deskhelp program.

Now Deskmate users can easily perform mail merges; print formatted labels, checks, and forms; and even use imbedded printer codes in text files. Furthermore, you can now convert Deskmate Text files to make them DOS compatible.

Deskhelp is compatible with the original Deskmate and Deskmate 2 for Tandy's newer-generation machines. Deskhelp doesn't support Personal Deskmate and won't run on the Tandy 2000.

Atmospheres' original version 1.0 had some compiler bugs, but the current version 1.01 corrects them. The package includes the unprotected software and an 80-page manual, which nicely explains the easy installation procedures and also includes instructions for hard-disk installation.

When you begin, Deskhelp's main menu gives you seven options: Text Filtering, Mail Merge, Printer Codes, Disk Directory, Set Up System, Help, and Atmospheres. The Atmospheres option merely displays the company address and phone number. Set Up System lets you change a few system specs, such as monitor type, printer port, default drive, tone, and blink.

Text Filtering permits you to convert Deskmate files to DOS-compatible files for typing to the screen or for use in other programs. Text Filtering's subfunctions let you add line feeds, double-space text, and convert from upper- to lowercase or vice versa.

Disk Directory gives you a file listing of a specified directory.

Mail Merge is the major part of Deskhelp. Basically, Deskhelp lets you print a Deskmate Text file over and over, each time inserting specific fields of information from a Deskmate Filer file record. Although you usually use such a merge to produce customized letters or labels based on a mailing list, there are many

*Continued on p. 108*





# 8088

## Assembly Language:

### *Learning The First Steps*

Take charge of your Tandy 1000 on a new level.

by Hardin Brothers

**A**fter learning to program in Basic, you may begin to wonder what is happening inside your computer and how to write programs that go beyond Basic's capabilities. If you want to have more control over your computer, to write the shortest and fastest programs possible, or just add machine-language subroutines to Basic, you need assembly language.

Assembly is no more difficult to learn than other languages, but it requires more patience. Your efforts will be rewarded with a better understanding of your computer and DOS, and you will feel that you are in complete control of your machine.

#### **Picking Your Tools**

If you are serious about learning assembly, you need three basic tools. First and

most obvious, you need an assembler. The standard assembler for MS-DOS and PC-DOS computers is Microsoft's macroassembler, MASM. Although other assemblers are available, most books and magazine articles assume you are using MASM (as does this article).

The second tool you need is a text editor. Don't try to use the DOS program Edlin unless you are a masochist. Your present word processor is acceptable if it can create pure ASCII files (perhaps in a "non-document" mode). To test your word processor, try typing in a short file and pressing the enter key at the end of each line. Then return to DOS and use the Type command to display the file. If it looks normal on your screen, with no extra or strange characters added, the word processor probably works as a text editor.

Third, you need a good tracing and debugging utility. DOS's Debug is much too limited; the Symdeb debugger that comes with MASM 4.0 is a better choice. If you get serious about assembly programming, you will eventually want to upgrade to something even more powerful.

You need two reference books in addition to the MASM/Symdeb manual: a programmer's reference to DOS (for example, the *Tandy 1000 Programmer's Reference Manual*, catalog no. 25-1503) and a book that explains all of the 8088/86 machine instructions in detail. The simple list of instructions that comes with MASM is fine for experienced programmers but doesn't help beginners at all. Look through the shelves of your local computer book store for a reference guide that will help you.

You also need to be familiar with hexadecimal (hex) numbers and the logical operators And, Or, and XOR. You can read about hex numbers and logical operators in many general-purpose computing books. The Basic manual briefly explains the logical operators. You will become more comfortable with these concepts as you learn to program in assembly.

#### **Working Habits**

An assembler like MASM is a special-purpose compiler. If you are only familiar with interpreters like Basic, you need to

---

#### **System Requirements**

**Tandy 1000/1200**  
**MASM**  
**Text editor**

---



learn new work habits to write assembly programs.

Writing an assembly-language program involves several steps:

- Create or edit the source-code ASM file with a text editor.
- Save the file to disk and return to DOS.
- Assemble the program with MASM.
- Return to the editor and fix any errors that MASM reports.
- Re-assemble the program with MASM.
- Run Link to change MASM's output into an executable file.
- Use a trace utility to find logic bugs in the program.
- Return to the first step to fix any bugs you find.

This process is more complicated than writing a program in Basic, but you can automate much of it with batch files (see Fig. 1).

You should take one more step before beginning to program. MASM 4.0 prints errors only on the screen. Patch MASM as shown in Fig. 2 to make it behave normally. Once you apply the patch, you can use the DOS redirection symbol (>) to send errors to your printer or, if your text processor supports windows, to an error file.

## Registers and Memory

In Basic, you store data in memory by creating a variable and assigning information to that variable. You usually don't need to know the details of how Basic allocates memory to variables and stores information. Basic handles those details itself.

In assembly, you are in charge of all the details of storing and manipulating data in memory. You can store data in specific memory locations or inside the 8088 CPU.

The 8088 has 14 internal memory locations, each 16 bits long, called "registers" (see the Table). Each register has a specific purpose. Some can also serve as general-purpose registers, which means you can store almost anything in them. One of the great arts of assembly programming is deciding what information to keep in registers and what to keep in memory locations. Using data that is already in a register is much faster than manipulating data in the computer's memory, but the number of registers is limited.

The AX, BX, CX, and DX registers are called general purpose, though you cannot always use them interchangeably. You can use each of these registers as one 16-bit register or as two 8-bit registers. When your program needs to refer to

them as 8-bit registers, it simply addresses the "high" or "low" portion of each. For example, AH is the top 8 bits of AX, and BL is the lower 8 bits of BX.

Programmers usually use SI and DI as "index" registers to hold the addresses of data in memory. Their names are abbreviations for "source index" and "destination index."

The IP (instruction pointer) register always contains the address of the next instruction to be executed. You can't directly alter its contents.

The SP register is the stack pointer. The stack is a special data structure that holds the return addresses of Call instructions (similar to Basic's Gosub) and any other data you want to store temporarily. When you address it through the SP register, the stack always operates as a last-in, first-out line: The last piece of data placed on the stack is the first one retrieved.

Programmers usually use the BP (base pointer) register to give themselves more flexibility in using the stack. They often use it to create a "stack frame," a temporary data structure with access to any value in a portion of the stack. Since most programmers consider stack frames an advanced concept, they seldom use them in simple programs.

Next are the "segment" registers: CS, DS, ES, and SS. Each holds the segment address (described below) of some part of

a program. The code segment, CS, contains the address of the current section of program code being executed. The data segment, DS, usually contains the segment address of the program's data structures. The stack segment, SS, holds the segment address of the stack. You can use the "extra" segment, ES, for anything you want.

The segment registers are normally associated with other registers. The CS and IP registers always work together; the SS and SP registers are always associated. The BP register is usually associated with the SS register.

If you use the DI register to hold the address of a string of bytes, it is always associated with the ES register. In the same context, the SI register is usually associated with the DS register although you can change that association.

Finally, there is the flag register. Each bit of that register is an on/off flag that indicates either the current state of the 8088 or something about the result of a recent operation. Programs can change some of the flag bits directly; other flag bits are generally left unchanged.

It is usually easy to use registers and remember what you are storing in each one. When I started writing 8088 code, I sometimes got the five "D" registers (DS, DX, DH, DL, and DI) confused. The chart in the Table should help you keep them straight.

```
echo off
REM This file assumes that MASM, LINK, MAPSYM and SYMDEB
REM are either in the current directory or accessible
REM through the Path settings.
REM
REM Substitute the name of your text processor for WP.
REM Save this file as ASM.BAT and invoke it with a command
REM like ASM TEST
REM Do NOT include an extension on the file name.
:start
if "%1"==" " goto use
wp %1.asm
cls
echo Be sure your printer is on
pause
masm %1,, > prn
if errorlevel 1 goto start
cls
link %1,,/map;
if errorlevel 1 goto stop
mapsym %1
symdeb /"x*;r;" %1.sym %1.exe
echo Press ctrl-c to stop, any other
echo key to return to the text editor
pause
goto start
:use
echo Use this program by typing
echo %0 filename
echo "filename" is the name of the program you are writing.
echo Do NOT include an extension at the end of the file name
:stop
```

Fig. 1. Batch files to automate setup procedures for writing assembly programs.



## Addressing Memory

Each byte of a computer's memory must have a unique address. The addresses are merely numbers the computer's electronics use to find specific memory locations and are normally indistinguishable from other number values stored in memory. If you want to address 64K of memory, you need 16-bit address numbers because every value from zero-65535 can be stored in 16 bits. Therefore, almost all CPUs for 64K computers have address registers that are 16 bits wide.

The 8088 in the Tandy 1000 and all other PC-compatible computers also has 16-bit address registers, partly because it

```
X>rename masm.exe masm.bin
X>symdeb pmasm.bin
-rds=ds+1000
-eb ds:4c08 06 02
-eb ds:4c10 02 01
-w
Writing 14E3E bytes
-q
X>rename masm.bin masm.exe
```

*Fig. 2. Patch to MASM to send error messages to a printer or file. The prompts stay on the screen. Apply this patch to MASM 4.0 only and only to a copy of your original program.*

was developed from older chips like the 8080 found on many CP/M computers (the Z80 found in the TRS-80 Models I, III, and 4 was also developed from the same chip). However, the 8088 can access up to 1 megabyte (MB) of memory.

Fully addressing a megabyte of memory requires a 20-bit address. Since the 8088 has no 20-bit registers to hold such an address, it must use two registers to generate an address, one for an address "segment" and the other for an address "offset." The computer then combines the two parts of the address electronically to form a 20-bit address.

To define a memory address, write the segment and follow it with a colon and the offset. For example, 0040:0049 means offset 0049 hex of segment 0040 hex. Address CS:102A means the memory location at offset 102A hex from the current value in the CS (code segment) register.

Note that the 8088 is using 32 bits to generate a 20-bit address. Representing an address as an absolute 20-bit number requires five hex digits. To find the "real" address (expressed in hex form) that a segment:offset address refers to, simply add a zero to the end of the segment value and then add the offset value. For example, to convert 3050:2222 to 20-bit form, change the segment to 30500 and add 2222 to get 32722 hex.

If you experiment with addresses, you soon realize that almost any 20-bit address can have many different segment:offset representations. For example, 5000:8000, 5800:0000, 5400:4000, 51FF:6010, and 5125:6DB0 all refer to exactly the same location in memory. There are 64K possible segments in the 8088's memory space, each 64K (the offset value) long. These segments overlap each other.

If you think of the segment as a pointer to the start of a logical 64K block of memory, the confusion about addresses soon disappears. Once you select a segment value, you can then address 64K of memory beginning at that segment simply by changing the offset value. You rarely have to worry about absolute (20-bit) addresses when you write a program for the 8088. If the code, data, and stack sections of your program are each less than 64K, you only need to set the segment registers once. Most programs never need to know the actual values in the segment registers, as you'll soon see.

## A First Program

It is time to start writing some simple programs. Start with Program Listing 1, the simplest (and most useless) program you can write. Listing 1 loads into memory and then returns to DOS without doing anything at all.

You can, however, learn several things from Listing 1. Once you get the program assembled and working correctly, you should begin to feel comfortable with your assembler (and the ASM.BAT program from Fig. 1, if you are using it).

The first four lines of Listing 1 and the comments at the end of most of the program's other lines all begin with a semicolon. In assembly, a semicolon marks the beginning of a remark, as the apostrophe does in Basic, and tells the assembler to ignore the rest of the line.

You may have noticed that most of Listing 1 is written in lowercase letters. Unless given specific instructions to the contrary, MASM is case-insensitive. You can write assembly programs in uppercase, lowercase, or mixed case. I write everything in lowercase because I find it easy to read.

Each line (except comment lines) of an assembly command has four parts. Anything that starts in column 1 is a label. The assembler uses labels to refer to storage areas, subroutines, and program segments. Labels are usually optional.

The next item on a line is either an instruction to the assembler (called a pseudo-op) or the name of an 8088 machine instruction (called a mnemonic, or "memory word"). Unless a line is completely empty, it must contain either a mnemonic or a pseudo-op (the semicolon marking a remark is, technically, a pseudo-op).

**General Purpose:** All can hold general data and perform addition, subtraction, shifts, and rotates.

AX: | AH | AL | Results of multiplication & division  
BX: | BH | BL | Multi-register indexing  
CX: | CH | CL | Loop, shift, and rotate counting  
DX: | DH | DL | High-order word results of multiplication & division

### Index Registers

SI: | | Normally associated with DS  
DI: | | Always associates with ES for string commands, normally with DS otherwise

### Stack Registers

SP: | | Primary stack address—always associates with SS  
BP: | | As stack frame marker, associates with SS; as part of multi-register indexing, normally associates with DS

### Instruction Pointer

IP: | | Always associates with CS

### Segment Registers

CS: | | Always used for current instruction or code segment  
DS: | | Normally used for data segment and source of string commands  
ES: | | Usually used for destination of string commands, and for data references as needed  
SS: | | Always used for stack segment

### Flag Register

Flags: | | Flags defined: Zero, Carry, Sign, Aux. Carry (for BCD arithmetic), Direction (for string commands), Overflow, Parity, Interrupt Enable, Trap (single-step). Seven bits are not defined.

*Table. 8088 registers, their uses and associations.*



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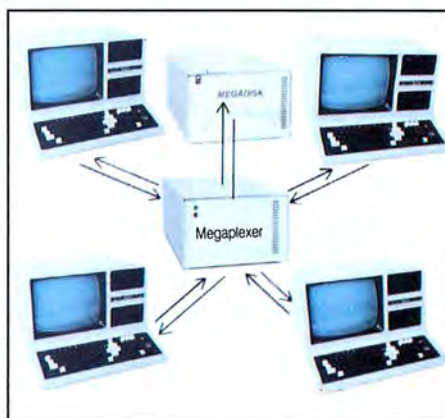


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Following the mnemonic or pseudo-op is a list of one or more operands (the items on which the instruction is to operate). The number of operands needed, and whether or not the operands are required, depends on the instruction on that line.

The first line of real code in Listing 1 defines a segment named SEG\_A. The word Segment here is a pseudo-op telling the assembler that a segment of the program is beginning, and the word SEG\_A is a label identifying that segment. Segment definitions can be much more complex than this one. In this case there is no reason to add any optional information; SEG\_A will be the name of the segment that contains this program's instructions.

The second line uses the pseudo-op Assume to tell the assembler that the CS register should be associated with SEG\_A and that any time an assembly instruction refers to the CS register, either explicitly or implicitly, it is referring to something in this segment.

Next, I use the pseudo-op Public to tell the assembler that a label called Start should be made public. The concept of public and private labels and variables is familiar to Pascal and C programmers but is often foreign to Basic programmers because everything in a Basic program is public.

In this short program, the label Start is made public so that the Symdeb debugger or any other symbolic debugger can read it. In many programs you make labels public so that separately written and assembled modules can share data and routines. The assembler automatically makes anything not declared public "private," meaning that it is invisible to all outside programs and program modules.

The next line has the word Start in the label field, followed by a colon. The colon tells the assembler that it should associate the instructions that follow with the label Start.

So far, this short program has had four lines of comments and four lines of instructions to the assembler, but it has not produced any assembly code. The MASM assembler is powerful and has many different options. The price of this power is that you must explicitly tell MASM what you expect from it—a process that can take up a significant portion of a short assembly program.

On the next line, you come to a true assembly mnemonic and begin writing some working code. The instruction MOV tells the 8088 to move a piece of data from one location to another. It is always followed by two operands: a destination and then a source (similar to the LET A = 5 instruction in Basic). This first real instruction tells the assembler to take the value 4C hex and put it in the AH register.

The next line is similar, moving the

### Program Listing 1. Program that returns to DOS.

```
;Listing 1 -- This program simply returns to DOS
;           You will know it works if the disk drive
;           turns briefly and then the DOS prompt
;           reappears.

seg_a      segment                ;Define our instruction segment
            assume cs:seg_a        ;Associate CS with this segment

            public start

start:     mov     ah,4ch           ;DOS Call: Exit
            mov     al,0           ;Show there's no error
            int     21h           ;Call DOS exit routine

seg_a      ends

seg_b      segment stack          ;Define a segment for the stack
            db      20 dup ("stack ") ;Create room for the stack
seg_b      ends

            end     start         ;Tell the program where to start
```

End

### Program Listing 2. Program that prints a string until a key is pressed.

```
comment *
Listing 2 -- This program prints a string on the video
            continuously until a key is pressed
*

code       segment                ;Define our instruction segment
            assume cs:code,ds:data ;Associate CS & DS with their segments

            public start,lp,exit

start:     mov     ax,data          ;Get segment address of data area
            mov     ds,ax          ;Put in data segment register
            mov     cx,200         ;Maximum number of times to repeat

lp:        mov     dx,offset string ;Now DS:DX has address of the string
            mov     ah,09h        ;DOS Call: print string at DS:DX
            int     21h          ;Let DOS print the string
            mov     dl,0ffh       ;Signal "scan keyboard"
            mov     ah,06h        ;DOS Call: direct I/O
            int     21h          ;Is there a key waiting?
            jnz     exit          ;Yes -- leave the program
            loop   lp            ;Else loop back CX times

exit:      mov     ah,4ch         ;DOS Call: Exit
            mov     al,0         ;Show there's no error
            int     21h         ;Call DOS exit routine

code       ends

data       segment
string     db      "Hello, World ", "$"
data       ends

stack     segment stack          ;Define a segment for the stack
            db      20 dup ("stack ") ;Create room for the stack
stack     ends

            end     start         ;Tell the program where to start
```

End

### Program Listing 3. Program that creates a chart.

```
comment *
Listing 3 -- This program creates a chart of all possible
            character attributes on a 80-column color
            text display.
*

code       segment
            assume cs:code, ds:data

            public set_scr, chart, wait_key
            public set_curs, wrt_ln, chrt_1
            public mov_curs

start:     mov     ax,data          ;Get segment address of data area
            mov     ds,ax          ;Associate with DS register

            call   set_scr         ;Set mode, page, and clear screen
            call   chart          ;Fill in the chart
            call   wait_key       ;Wait for a keystroke
            call   set_scr         ;Clear the screen again

            mov     ah,4ch         ;DOS Call: Exit
```

Listing 3 continued



value zero into the AL register. As a first example of how to make a program more efficient, notice that these two lines have the same effect as MOV AX,4C00H. The two separate lines make the logic clearer (no real relationship exists between the values 4C hex and zero) but require an extra byte of memory and take an extra microsecond to execute.

The third instruction tells the program to call interrupt 21 hex. An interrupt call is a special kind of subroutine available to all programs running on the computer. Interrupt 21 hex is a call to most of the public functions of DOS. Your *Programmer's Reference Manual* contains a complete list of those instructions.

Once you see that the program is going to make an interrupt 21 hex call, you can go back and understand the logic of the program. Many functions are available through interrupt 21 hex. A program selects a function by loading the function number into the AH register and loading information into other registers as required. Function 4C hex of interrupt 21 hex is a request to DOS to terminate the current program and return to the program that loaded and called it (in this case, DOS's Command.COM). The value in the AL register sends back a "completion code" (or error code) to the calling program. This program returns the value zero to show that it ran without meeting any errors.

## Using Ends

The program's next line uses the EndS pseudo-op to tell the assembler that it has come to the end of segment SEG\_A. Three lines contain all the code for this segment and produce 6 bytes of machine-language instructions when you complete the program.

You're not done with the program yet, however. Even though the program doesn't use a stack, ignoring the stack completely is bad programming practice. While a program is running, it can be interrupted at any time by a resident program such as the short DOS routine that updates the system clock. Such programs usually have a stack area of their own but always use some space on the current stack when they begin.

The next line creates a new segment called SEG\_B and gives an attribute called Stack. Because the program attaches this attribute to this segment, DOS automatically sets the SS and SP registers correctly when the program loads and runs.

The program's only working line uses the DB pseudo-op to define the use of memory bytes. The number 20 and the pseudo-op DUP tell the assembler to "repeat the following definition 20 times." The section of the line in parentheses tells the assembler that, for each of those 20 definitions, it must place the ASCII bytes for the string

Stack into memory. In other words, this line creates 20 copies of the 6-byte string Stack and places them in memory.

The final line of every assembly program must include the pseudo-op End and normally the location at which the program is to begin. In Listing 1, to begin the program at the label Start, the last line of the program must be End Start.

To create an executable program from Listing 1, use your word processor to type in the program and save it as Listing1.ASM. Then return to DOS and type MASM LISTING1; to tell the assembler to create an object file from the program. An object file is not directly executable. It is a mostly assembled form of the program that must be run through Link (perhaps along with other object files or library files) to create an executable (EXE) file. Type LINK LISTING1; and within a few seconds you will have a version of the program you can actually run.

At this point, you can either try to run the program directly from the DOS prompt

or trace through it with a debugging utility. I am rarely confident that an assembly program will run correctly, so I trace through it (or at least through parts of it) before I try to run it. Type SYMDEB LISTING1.EXE if you want to trace the program with the Microsoft Symdeb debugger.

A much easier way is to use the batch file in Fig. 1 (but first patch MASM as shown in Fig. 2). Then you merely need to type ASM LISTING1, and the entire process from text processor to debugger, including returns to the text processor if there are any errors, will be automated for you.

Once you are in Symdeb with the program loaded, you can use the T or P command to trace through the program one instruction at a time and the D command to look at the contents of memory. You might be interested to see how much of the stack has actually been used and if 20 copies of the word "stack" are still in memory.

## A Second Program

Granted, Listing 1 was not very exciting. Program Listing 2 builds on it to cre-

Listing 3 continued

```

        mov     al,0           ;Show there's no error
        int     21h           ;Call DOS exit routine

;-----
; Select mode and clear the screen
;-----

set_scr proc near
        mov     ah,0           ;BIOS Call: set screen mode
        mov     al,3           ;Pick mode 3: 80 x 25 color
        int     10h           ;Call BIOS video routine

        mov     ah,5           ;BIOS Call: select page
        mov     al,0           ;Pick page 0
        int     10h           ;Select page

        mov     ah,6           ;BIOS Call: Scroll up
        mov     al,0           ;Do entire window
        mov     bh,07h         ;Attrib: white on black
        mov     cx,0           ;Top of screen is 0,0 in CH,CL
        mov     dh,24          ;Bottom row of screen
        mov     dl,79          ;Right-hand column
        int     10h           ;Clear the screen

        ret                   ;Return to calling routine
set_scr endp

;-----
; Create chart on the screen
;-----

chart proc near
        mov     cx,16          ;Ready to loop for 16 lines
        push    cx             ;Save the counter
        call   set_curs        ;Set the cursor
        call   wrt_ln          ;Write one line
        pop     cx             ;Recover counter
        loop   chrt_1          ;Loop back until done
        ret                   ;Return to caller
chart endp

;-----
; Set cursor to CRS_ROW and column 5
;-----

set_curs proc near
        mov     dh,crs_row     ;Get the row number
        mov     dl,5           ;And the column
        mov     bh,0           ;Select page 0
        mov     ah,2           ;BIOS Call: set cursor
        int     10h           ;Move the cursor
        ret
set_curs endp

;-----
; Write one line to video,
; incrementing attribute for each position
;-----

wrt_ln proc near

```

Listing 3 continued



ate a program with visible results, and it should not be difficult to understand now that you know the technique of creating an assembly program.

The program begins with the pseudo-op Comment, which tells MASM to ignore everything between the two asterisks (you can use any other symbol instead, as long as you place the same symbol at the beginning and end of the comment). Then, as in the last program, you name a segment. This time, you need to tell MASM that the CS register is associated with the segment named Code and that the DS register is associated with the segment named Data in the assume statement.

## To Access Data

The actual program begins, as before, with the label Start. To access anything in the data segment, the program must load the correct segment address into the DS register. Unfortunately, the 8088 doesn't allow a direct command like MOV DS, DATA, so you must place the appropriate address in the AX register and then move

it to the DS register.

After you set the DS register up properly, you place a repeat value in the CX register. I'll show you how the program uses that value soon.

The real fun begins at the label LP. You load the DX register with the offset address of the string you want to display, then use function 9 of the DOS interrupt 21 hex to display that string.

Next, you load the value OFF hex into the DL register and use DOS function 6 to scan the keyboard. If you look at your *Programmer's Reference Manual*, you'll see that you can use function 6 to either scan the keyboard or display a single character, depending on the value in register DL. Only when the DL register contains OFF hex can this function scan the keyboard.

There are two ways to find out if function 6 found a key down when it scanned the keyboard. Your program can check the AL register, which contains a zero if no key was pressed, or it can check the condition of the zero flag, which is set to NZ if a key was pressed.

In either case, the program must jump to the label Exit if a key was pressed. The 8088 supports 16 different kinds of conditional jumps (MASM recognizes many synonyms for some of them). The JNZ command in Listing 2 says "jump if the zero flag is not set" or "jump if not zero." Following it on the same line is the label to which you want to jump.

The last line of the LP section of the program uses the instruction Loop, which tells the 8088 to subtract 1 from the CX register and branch to the following label if CX is not zero. Setting CX at the beginning of the program and then using the Loop instruction is much like constructing a For . . . Next loop in Basic.

The three instructions at the label Exit should look familiar. This program terminates in the same way as Listing 1.

The second segment of the program is called Data and contains the string you want to print. You define the string with the DB (define byte) pseudo-op, since you want the assembler to change each character into its ASCII-equivalent byte. Since DOS function 9 does the printing, the string must end with the only terminator DOS recognizes: a dollar sign. I've never understood why DOS uses a dollar sign instead of a control or graphics character. Since DOS sees the dollar sign as a string terminator, you cannot use function 9 to display any string that contains a dollar sign.

Experiment with Listing 2. It is simple enough that you should be able to make minor adjustments and see how they work. For example, try displaying two strings during each loop iteration before checking the keyboard, or adding a carriage return and a line feed to the string. A carriage return is ASCII character 13, and a line feed is ASCII character 10. If you want a carriage return at the end of the string, simply define it this way:

```
STRNG DB "Hello, World",13,10,"$"
```

The assembler adds the necessary bytes to the string.

## A Useful Program

You probably noticed that the screen display in Listing 2 was quite slow (much slower than the fabled speed of assembly programs). The slowness isn't the fault of the program, but of DOS's function 9, which prints one character at a time and checks the keyboard for control-C and control-break after each character.

Program Listing 3 doesn't use DOS for the screen display. Instead, it makes direct calls to the video basic input/output system (BIOS, one of your computer's ROM routines). Calling the BIOS is a little more complicated than calling DOS function 9, but it is much faster and allows a program to use color and other video attributes, which DOS does not permit.

Listing 3 displays every possible com-

Listing 3 continued

```

mov     bh,0           ;Pick page 0
mov     bl,attrib      ;Get attribute
mov     al,'!'        ;Character to print
mov     cx,16         ;Loop counter
wrt_1:  push    cx      ;Save loop counter
        call   mov_curs ;Set the cursor
        mov   cx,3     ;Write three times
        mov   ah,9     ;BIOS Call: write char & attr.
        int  10h      ;Do it
        inc  bl       ;Get next attribute
        pop  cx       ;Recover counter
        loop wrt_1    ;Do 16 times

        mov   attrib,bl ;Save next attribute
        inc  crs_row   ;Move to next row
        ret                    ; and return
wrt_ln  endp

;-----
; Move the cursor four
; positions forward
;-----

mov_curs proc near
mov     bh,0           ;Be sure we're on page 0
mov     ah,3          ;BIOS Call: Get Cursor Position
int     10h          ;Call BIOS Video
add     dl,4          ;Add 4 to column
mov     ah,2          ;BIOS Call: Set Cursor Position
int     10h          ;Call BIOS Video
ret
mov_curs endp

;-----
; Wait for a keystroke
;-----

wait_key proc near
mov     ah,07h        ;DOS Call: Keyboard input
int     21h          ;Get key from user
ret
wait_key endp

code    ends
data    segment
public crs_row,attrib

crs_row db 2           ;Starting cursor row
attrib  db 0           ;First attribute to use

data    ends

stack  segment stack
db     20 dup ('stack ')
stack  ends

end     start

```

End



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bination of foreground and background video attributes. It creates a chart of the 16 possible character attributes across the screen and the 16 possible background attributes down the screen. It also gives you many opportunities to experiment with a simple, working program.

Before you start working with Listing 3, you must understand how the video BIOS routines work. You call the video routines the same way you call DOS functions: by invoking a software interrupt, in this case interrupt 10 hex. There are 16 "PC-compatible" video functions (numbers 0-15) plus some other functions supported by individual computers. The *Programmer's Reference Manual* explains the video routines in detail.

Listing 3 begins as the others have, defining a code segment, associating the CS and DS registers with their segments, and creating a list of public labels for the debugger. It then moves the segment address of the data area into the DS register so that the data is accessible while the program is running.

## Subroutines

Because Listing 3 is much longer than the first two programs, it is organized differently. Instead of just charging ahead in a straight line, it calls subroutines to perform each of the major program functions. A Call is very similar to a Basic Gosub statement: the program saves the current IP register address on the stack and then control jumps to a given label. Inside a subroutine, the instruction RET sends the program back to the next instruction after the original Call.

There are two kinds of calls and returns. A routine is either "near," meaning that it is in the same segment as the call instruction, or "far," meaning that you must save and change both the CS and IP registers to invoke the routine. The assembler assumes that all called routines are near unless you instruct it otherwise.

The pseudo-op PROC Near introduces each subroutine to the assembler as a near procedure. Because the assembler has been told that the procedure is near, it creates the correct Near Return instruction when it encounters the RET at the end of the procedure. Just as you must close all segments with an EndS pseudo-op, you must close all procedures with an EndP so that the assembler can keep track of the program's structure.

## Video Functions

The first subroutine, Set\_SCR, is simple. If you look at the video functions in your reference manual and the comments in the program, you should have no trouble following how it sets the video mode, selects pages zero, and clears the screen.

The second routine, Chart, is more complicated. It begins by setting up to loop 16

times for the 16 lines of the desired display. Inside the loop, it saves the CX register value on the stack with a Push instruction and then calls two other subroutines. Next, the routine retrieves the loop counter from the stack and completes the loop.

You can save register values either in memory locations or on the stack. Programmers often use memory locations for values that they need only occasionally or use for different routines. Saving a register on the stack with a push instruction is much faster, but you must remember to retrieve the stack values, whether or not you are going to use them again.

Remember that the necessary address for the RET instruction is also on the stack. The 8088 assumes that the top stack value is the return address when it sees the RET instruction. If you leave other values on the stack, your program jumps to an arbitrary location in memory and your computer will probably freeze.

The next routine, Set\_CURS, puts the cursor in column 5 of some specific screen row. It gets the row number from a memory location in the data segment, CRS\_Row. Unless you give the 8088 specific commands to the contrary, it always assumes that it can address data locations through the DS register. Since you set the DS register to the data segment at the beginning of the program, the computer looks there for the CRS\_Row storage location.

The WRT\_LN routine is the most complex subroutine in the program. It begins by setting up some registers for calling video function 9, then sets up the CX register as a loop counter and enters a loop.

## Inside the Loop

Inside that loop, the program calls a subroutine to move the cursor, then prints the character in the AL register three times with a specific attribute. For the next iteration of the loop, you must increase the attribute in the BL register by 1. Since adding and subtracting 1 are such common operations, special instructions perform them: INC, which is short for increment, and DEC, which is short for decrement. In the WRT\_LN procedure, the INC instruction creates the next attribute value in the BL register.

At the end of the loop, you must store the attribute for the next line. You can't put it on the stack, since the routine is about to end with a RET instruction. Therefore, you move it into a memory location called Attrib in the data segment. Also, you increase the row number stored in the data segment so that the next call to Set\_CURS puts the cursor in the correct location.

The MOV\_CURS routine moves the cursor four positions forward after every print operation. It does so by getting the current cursor position with a call to the

BIOS video routines and using another new instruction, Add, to add 4 to the current column.

Another call to the video routines sets the cursor to a new location. Notice that just like the MOV instruction, the Add instruction expects to find the destination as the first operand. ADD DL,4 is similar to the Basic command DL = DL + 4. If you think of it that way, you should have little trouble remembering how it works.

The last subroutine, Wait\_Key, uses DOS function 7 to wait for a keystroke. The actual key pressed is returned in the AL register, but Listing 3 has no interest in what key was pressed. It just waits until any key is pressed.

Listing 3's data segment only uses two storage locations. Each is defined as a single byte, since each holds a value for an 8-bit register. If you want to hold a value for a 16-bit register, you must use the DW pseudo-op to define a storage "word" instead of a byte.

Listing 3 provides many opportunities for modification. You might want to print labels for the chart, so that you can quickly read the value of any attribute. You can change other features as well, such as the character that prints in each attribute block and the background color.

## Final Notes

Learning assembly is a three-step process. First, find as many example programs as you can and try to understand what is happening in each. Type each one in (don't just copy it from a source-code disk or bulletin board) to make yourself think about the purpose of each instruction.

Second, once you get a program running, modify it. Experiment with the program, add new features, try making it work differently. If you can make small changes, you can add those changes together to make major modifications.

Third, keep going back to your reference list of 8088 instructions. Some of them will seem pretty arcane at first, but as you write and modify programs, you will see that each has a specific use.

Don't get discouraged. You didn't learn to program in Basic the first day you tried. The more you work with a language, the better you get. If you make yourself write short programs in assembly instead of using a language you already know, you will soon become proficient.

Have fun understanding and using the full power of your computer. Only assembly programmers fully appreciate what their computers are doing and why. ■

---

Write to 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 WESIG (PCS-117).



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# Memdisk III

Create a 75K Memdisk on your Model 4 in III mode.

One of the most exciting features of TRSDOS 6.x is Memdisk, with which a 128K Model 4 can simulate a disk in RAM. The utility greatly reduces the time the computer takes to execute disk input/output (I/O) intensive programs such as data bases and compilers. I wrote Ramdisk (see the Program Listing) to provide TRSDOS 1.3 users with an equivalent feature. Like Memdisk, Ramdisk requires a 128K Model 4.

TRSDOS 6.x requires the operating system to reside in the bottom 16K of RAM. TRSDOS 1.3, however, leaves that area free (except on the Model 4P). Thus, while Memdisk can only offer a 57K formatted or 63K unformatted RAM disk, Ramdisk provides one that holds 75.75K formatted and 80K unformatted.

You can install and format your TRSDOS 1.3 RAM disk by entering RAMDISK or one of the following at TRSDOS Ready.

- **RAMDISK\*** installs the utility but does not format the disk. It restores a RAM disk that you installed and have not overwritten any time after booting the computer.

- **RAMDISK S = filespec** allows you to save the RAM-disk image to a floppy-disk file. Although this command is meant for saving RAM disks between sessions, you are wise to use it during sessions as well if you are in an area that is prone to power failures or fluctuations. Each RAM disk requires 108 granules of floppy-disk space. Two such files fit on an empty data disk and one fits on a nearly empty system disk.

- **RAMDISK L = filespec** allows you to call a saved RAM-disk image from a floppy

disk. The utility does not check to see if the file you name is a RAM-disk image, so if you enter something like RAMDISK L = MAILLIST/BAS, your RAM disk ceases to function until you reformat it by entering either RAMDISK or RAMDISK L = filespec, where "filespec" designates a RAM-disk-image file.

The RAM-disk driver resides in the top 256 bytes of memory until you reboot. On a Model 4P, which uses the bottom 16K of RAM to hold its boot image, it must use the top 16K of user RAM instead. Thus, on Model 4P, the RAM-disk driver resides in the top 16.25K of memory. Model 4P users must make the changes listed in lines 100 and 4010-4030.

You can access the RAM disk by selecting drive 2. All DOS library functions, except Format and Backup, treat the RAM disk as a floppy disk. For example, to copy a file from drive zero to the RAM disk, enter COPY filespec/ext:0 :2.

TRSDOS treats the RAM disk as a standard 40-track floppy disk, but the RAM disk only has 17.66 tracks (106 granules). I placed 3F hexadecimal (hex), which signifies that a track is full, in the granule-allocation-table entries for tracks 18-39 to prevent TRSDOS from trying to write to the non-existent tracks.

Since the directory is on track 17, of which only two-thirds exist, I modified the directory hash table. A full track can hold 80 directory entries, while two-thirds of a track can only hold 50. I placed OFF hex, which signifies that a directory is in use, in the hash-table entries for directory entries 51-80 to keep TRSDOS from writing too large a directory. ■

*Craig Chaiken teaches TRS-80 assembly-language programming at the University of Hartford. Write to him at 32 Beverly Drive, Avon, CT 06001 or contact him via Compuserve (72275,362).*

## Program Listing. Ramdisk.

```

00010 ;*****
00020 ;* TRSDOS 1.3 Ramdisk          (RAMDISK/ASM, RAMDISK/CMD) *
00030 ;* by Craig Chaiken          *
00040 ;* 12/30/86                  *
00050 ;* Requires 128K Model 4 (Model 4P with Documented Mods)*
00060 ;*****
00070 ;
00080 ;*** Constants ***
00090 ;
00100 START EQU 0F170H ;Change to 0B170H for Model 4P
00110 READSC EQU 4675H
00120 WRITSC EQU 45F7H
00130 BANCTL EQU 84H
00140 BANRES EQU 00H
00150 BANK0 EQU 03H
00160 BANK2 EQU 63H
00170 BANK3 EQU 73H
00180 RAMDRV EQU 02H
00190 PRINT EQU 021BH
00200 DBUFF1 EQU 4300H
00210 ERROR EQU 4409H
00220 HIMEM EQU 4411H
00230 HIDISK EQU 4413H
00240 ENDMEM EQU 4415H
00250 INIT EQU 4420H
00260 OPEN EQU 4424H
00270 CLOSE EQU 4428H
00280 READ EQU 4436H
00290 WRITE EQU 4439H
00300 TRKLEN EQU 4608
00310 ARBBYT EQU 6000H
00320 ;
00330 ORG START

```

Listing continued

## System Requirements

**Model 4/4D (4P with changes)**

**Assembly language**

**128K RAM**

**Editor/assembler**

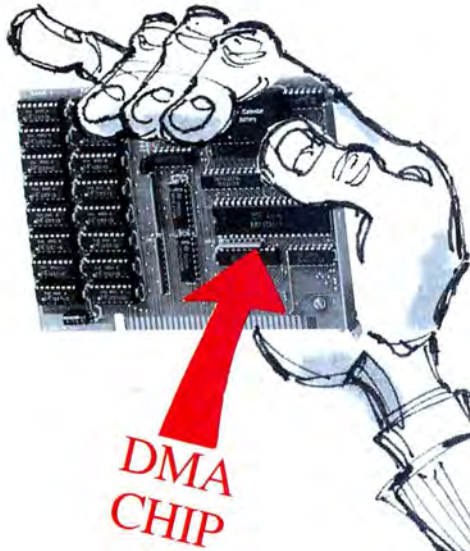
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June 1986 Issue

**PCM**

Magazine



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with 512K	\$149	\$519.90
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Clock/Calendar	\$49	\$ 99.95*
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# Price List

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Tandy 1000		
2002	Memory Expansion With 256K	\$109
2003	Memory Expansion With 512K	\$149
2004	Clock/Calendar Option	\$ 49
2006	Secondary Expansion Memory With 256K	\$109
2007	Secondary Expansion Memory with 384K	\$125
2009	Multifunction Board With 512K, Serial, And Clock	\$279
2016	Hard Disk Card	\$599
Tandy 1000SX		
2006	Memory Expansion With 256K	\$109
2027	Multifunction Board With 256K, Serial, And Clock	\$199
2016	Hard Disk Card	\$599
Tandy 3000HD and HL		
2017	Hard Disk Card For HL	\$599
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2034	Second Serial Port For 2033	\$ 79
2036	Multifunction Board For HL With 128K, Serial, And Clock	\$199
Tandy 1000, 1000SX, and 3000HL		
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2031	Clock/Calendar Board With Software	\$ 59
2029	Serial Port Board	\$ 99
2030	Second Serial Port For 2029 And 2027	\$ 49
2035	MS DOS 3.2 With GW BASIC	\$ 89

Model	Qty.	Unit Price	Ext. Price
<b>TANDY 1000</b>			
2002	_____	\$109	_____
2003	_____	149	_____
2004	_____	49	_____
2006	_____	109	_____
2007	_____	125	_____
2009	_____	279	_____
2016	_____	599	_____

<b>TANDY 1000SX</b>			
2006	_____	109	_____
2027	_____	199	_____
2016	_____	599	_____

<b>TANDY 3000</b>			
2017	_____	599	_____
2033	_____	139	_____
2034	_____	79	_____
2036	_____	199	_____

<b>TANDY 1000, 1000SX, 3000</b>			
2004	_____	49	_____
2031	_____	59	_____
2029	_____	99	_____
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2027	_____	199	_____
2016	_____	599	_____

<b>TANDY 3000</b>			
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2034	_____	79	_____
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Listing continued

```

00340 ;
00350 ;*** Save Command Line Parameters ***
00360 ;
00370 LD DE,PARAM
00380 LD BC,64
00390 LDIR
00400 ;
00410 ;*** Test for Existence of Extra Memory ***
00420 ;
00430 DI ;Test for Existence of
00440 LD HL,ARBBYT ; Banks 2 and 3
00450 LD A,BANK2 ; By Writing to Bank 2
00460 OUT (BANCTL),A ; And Checking that
00470 LD (HL),0FFH ; Bank 3 was not
00480 LD A,BANK3 ; Modified in the
00490 OUT (BANCTL),A ; Process.
00500 LD (HL),00H
00510 LD A,BANK2
00520 OUT (BANCTL),A
00530 LD B,(HL)
00540 LD A,BANRES
00550 OUT (BANCTL),A
00560 EI
00570 LD A,B ;Bank 2 Modified by
00580 OR A ; Write to Bank 3?
00590 JP NZ,INSTAL ;Install if not
00600 ;
00610 LD HL,ERRMES ;Else ERROR
00620 JP PRINT
00630 ;
00640 ;*** Install Patches and Drivers ***
00650 ;
00660 INSTAL LD A,RAMDRV ;Last Drive=Ramdrive
00670 LD (HIDISK),A
00680 ;
00690 LD HL,NEWRD ;Install New Read Sector
00700 LD (READSC+4),HL ; Handler
00710 ;
00720 LD HL,NEWWR ;Install New Write Sector
00730 LD A,0C3H
00740 LD (WRITSC),A
00750 LD (WRITSC+1),HL
00760 ;
00770 LD HL,DPVCHK ;Bypass Drive Check
00780 LD (4C75H),A ; on RAMDISK
00790 LD (4C76H),HL
00800 ;
00810 LD HL,NEWRD ;Protect RAMDISK Driver
00820 DEC H
00830 LD L,0FFH
00840 LD (HIMEM),HL
00850 LD (ENDMEM),HL
00860 ;
00870 ;*** Process Command Line Parameters ***
00880 ;
00890 LD A,(PARAM)
00900 CP '*' ;Warm Start?
00910 RET Z
00920 CP 'S' ;Save RAMDISK to file
00930 JP Z,SAVE
00940 CP 'L' ;Load RAMDISK file
00950 JP Z,LOAD
00960 ;
00970 ;*** Format Ramdrive (Cold Start) ***
00980 ;
00990 LD HL,GAT ;Clear 12 Sectors
01000 LD DE,GAT+1 ; of Track Buffer
01010 LD BC,3071
01020 LD (HL),0
01030 LDIR
01040 ;
01050 LD A,1 ;Protect Bootstrap Gran
01060 LD (GAT),A
01070 ;
01080 LD HL,GAT+17 ;Protect Tracks 17-39
01090 LD DE,GAT+18
01100 LD BC,39-17
01110 LD (HL),'?'
01120 LDIR
01130 ;
01140 LD HL,0FD3H ;Master Password=PASSWORD
01150 LD (GAT+0CEH),HL
01160 ;
01170 LD HL,IDENT ;Store Disk Name, Date
01180 LD DE,GAT+0D0H
01190 LD BC,17
01200 LDIR
01210 ;
01220 LD HL,GAT+256+50 ;Fill Phantom Directory
01230 LD DE,GAT+256+51
01240 LD BC,80-50-1
01250 LD (HL),0FFH
01260 LDIR
01270 ;
01280 LD HL,DBUFF1 ;Copy Boot Sector
01290 LD BC,0 ; to Ramdrive
01300 LD DE,1
01310 CALL READSC
01320 LD HL,DBUFF1
01330 LD BC,RAMDRV
01340 LD DE,1
    
```

Listing continued

## New for MS-DOS from Hypersoft! PCXZ 1.0 Cross-Zap Utility for PC/MS-DOS

Now, from the Author that brought you HyperCross, Hyperzap and SuperCross comes an amazing new program for owners of Tandy 1000,1200, 3000 and true PC compatibles. PC Cross-Zap allows you to read all double density TRS-80 type disks on your PC. Not only that, PCXZ offers many of the features that TRS-80 owners have long enjoyed with HyperCross and HyperZap.

**PC Cross-Zap** is a utility program that runs on your PC or PC-compatible. With it you can copy files to or from TRS-80 disks at will. You can also format a disk, copy disks, explore, read and write sector data, repair bad directories and much more. Long after your TRS-80 is gone you will still be able to read your old disks. Even when your TRS-80 disks are gone you can continue to use PCXZ to read, fix and modify MS-DOS and other disks so your investment will never be lost.

**Formats Supported:** Model I mixed density: DOS+ 3.4, DoubleDOS, LDOS (SOLE), MultiDOS, NEWDOS 80 V2, TRSDOS 2.7/8, Model I/III Double Density: DOS+ 3.5, LDOS 5.1, Model III: DOS+ 3.4, MultiDOS, NewDOS 80, TRSDOS 1.3 Model 4/4P: MultiDOS, DOS+ 4, TRSDOS 6. Max-80: LDOS 5.1. All formats also supported in double sided, 35, 40 and 80 tracks where appropriate. For 80 track formats you must have an 80 track (720K or 1.2M High Density) drive on your PC.

**Main Features:** With PCXZ you can format a TRS-80 disk (not the mixed density Model I types). You can copy files from a TRS-80 disk **error free**, without losing any data. Just like **HyperCross 3.0** you can instruct PCXZ to convert your BASIC files on the fly as they are copied. ASCII and word processor text files are converted so they are in the correct format for your PC. Copying can be by file or using wild cards. You can also copy files from PC format back to your TRS-80 disks.

**The Disk Zap**, fix and copy features are perhaps the most exciting feature in any program ever offered in support of TRS-80 and MS-DOS disk formats. For the first time when you examine a disk the program tells you what you are looking at. For instance if you are inspecting a directory entry you will be told what each byte means as you move your cursor over it. This makes repair and modification a snap because you see the results of the change as you make it. Among the many things you can do are: remove passwords, rename, delete and undelete files. All is easy with the helpful prompts and action keys of **PC Cross-Zap**. The program comes with a manual that, also for the first time in one place, explains TRS-80 and MSDOS disk formats for all the different DOS versions.

**Constant improvements** and generous upgrade policy. We are constantly improving our programs, adding new features and increasing performance. Ask, we may have already added the feature you need.

**System Requirements:** PC, XT, AT or compatible, Tandy 1000 or 1000EX (needs DMA), 1000 SX, 12000, 3000 with at least one **360K or 1.2M** drive and **256K** minimum memory. PCXZ can read, write and format 40 or 80 track TRS80 disks on a High Density drive.

**An original program from Hypersoft: Get PCXZ** ..... \$79.95 ppd.  
Call for special price for registered HyperCross owners.

## Also for your PC: XENOCOPY II and MatchPoint

**XenoCopy II** runs on your PC and lets you read, write and format up to 275 different non TRS-80 formats. Includes many CP/M formats, CoCo, P-System disks and others.

**XenoCopy II** file transfer program for the PC ..... \$81.95

**Matchpoint—PC** is the hardware solution to reading and writing Apple disks on your PC. A half-size card plugs in your PC and does the job software alone cannot. Reads **Apple DOS, PRODOS, SOS, CP/M**, also **NorthStar CP/M** and many other CP/M formats. Requires installation. Some disk drives need a minor modification.

**Matchpoint**, the answer to an Apple Lover's prayer ..... \$195.00

## TRS-80 Model I/III/4/4P Programs

### HyperCross 3.0 - The Proven Standard in File Transfer.

Using **HYPERCROSS 3** you can **COPY** files between TRS-80 disks and those from many **CP/M** and **IBM-PC** type computers on your own TRS-80 Model I, III, 4/4P or Max-80. If you have access to more than one kind of computer, or you are changing to a new machine then you need **HYPERCROSS** to transfer your text files, BASIC, FORTRAN PASCAL or C programs. Viscalc files, general ledger and accounting files, data bases and even binary files. You can **FORMAT** alien disks, read their directories, copy files to and from them, even copy directly from one alien disk to another.

**Formats supported:** IBM-PC and MS-DOS compatibles include DOS 1.1, 2.0-3.2 Tandy 2000, single and double sided, 3.5 and 5 inch. CP/M from Aardvak to Zorba, including all popular TRS80 formats such as Holmes, Montezuma, and Omikron. TRS-80 Color Computer format also supported.

**HyperCross converts Basic files!** Now HyperCross includes a feature to automatically change the tokens in a TRS-80 file to the correct format for CP/M or MSDOS. As you copy, HyperCross automatically converts the Basic file, putting in spaces, changing PRINT @, correcting syntax errors and flagging parts needing manual modification.

**Tried and Tested** in 1000s of installations world wide, by Industry, Universities, Government Institutions and nice TRS-80 owners everywhere. Prices include disk, manual, and shipping. Upgrades from any version of HyperCross or SuperCross for old disk+\$5+price difference (\$15 min).

**HyperCross 2.0 CoCo** reads CoCo format (No Basic convert) ..... \$49.95

**HyperCross 3.0 CP/M** reads 40 single sided CP/M formats ..... \$49.95

**HyperCross 3.0 PC** reads popular MSDOS 1.1-3.2 formats ..... \$49.95

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**HyperCross XT/3.0-Plus.** Reads over 220 formats inc CoCo ..... \$129.95  
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Listing continued

```

01350          CALL    WRITSC
01360 ;
01370          LD      B,12          ;Write Directory
01380          LD      C,RAMDRV
01390          LD      D,17
01400          LD      E,1
01410          LD      HL,GAT
01420 DIROUT  PUSH    BC
01430          PUSH    DE
01440          PUSH    HL
01450          CALL    WRITSC
01460          POP     HL
01470          POP     DE
01480          POP     BC
01490          INC     E          ;Next Record
01500          INC     H
01510          DJNZ   DIROUT
01520          RET
01530 ;
01540 ;*** Load Stored RAMDISK Image from File ***
01550 ;
01560 LOAD     CALL    IOINIT
01570          CALL    OPEN
01580          JP      NZ,BADPAR
01590 LLOAD   LD      DE,(DCB)      ;Read Floppy Till EOF
01600          CALL    READ
01610          JR      Z,L2LOAD
01620          CP      1CH          ;EOF?
01630          JR      Z,EXITLS
01640          JP      ERROR
01650 L2LOAD  CALL    NXTSEC        ;Copy Record to RAMDISK
01660          LD      HL,BUFFER
01670          CALL    WRITSC
01680          JR      LLOAD
01690 ;
01700 ;*** Save RAMDISK Image to File ***
01710 ;
01720 SAVE    CALL    IOINIT
01730          CALL    INIT
01740          JP      NZ,BADPAR
01750 LSAVE   CALL    NXTSEC        ;Write Entire RAMDISK
01760          LD      HL,BUFFER      ; to Floppy File
01770          CALL    READSC
01780          LD      DE,(DCB)
01790          CALL    WRITE
01800          JP      NZ,ERROR
01810          LD      A,(LAST)
01820          OR      A
01830          JR      NZ,LSAVE
01840 ;
01850 EXITLS  LD      DE,(DCB)
01860          CALL    CLOSE
01870          JP      NZ,ERROR
01880          RET
01890 ;
01900 ;*** Calculate Next Sector ***
01910 ;
01920 NXTSEC  PUSH    HL
01930          LD      C,RAMDRV
01940          LD      HL,(CURSEC)
01950          LD      D,-18
01960          LD      E,D
01970          XOR     A
01980          SBC    HL,DE
01990          EX     DE,HL
02000          INC    DE
02010          LD      HL,(CURSEC)
02020          INC    L
02030          JR      NZ,ENXT
02040          LD      L,-18
02050          INC    H
02060          JR      NZ,ENXT
02070          LD      (LAST),A
02080          POP     HL
02090          RET
02100 ENXT   DEC     A
02110          LD      (LAST),A
02120          LD      (CURSEC),HL
02130          POP     HL
02140          RET
02150 ;
02160 ;*** Build DCB and Reset Sector Counter ***
02170 ;
02180 IOINIT   PUSH    HL
02190          LD      H,-18
02200          LD      L,H
02210          LD      (CURSEC),HL
02220          POP     HL
02230          LD      DE,PARAM+1
02240 LDCB   LD      A,(DE)
02250          INC    DE
02260          CP      13
02270          JP      Z,BADPAR
02280          CP      ' '
02290          JR      Z,LDCB
02300          CP      '='
02310          JR      Z,LDCB
02320          DEC    DE
02330          LD      (DCB),DE
02340          LD      HL,BUFFER
02350          LD      B,0          ;LRL=256
02360          RET
02370 ;
    
```

Listing continued



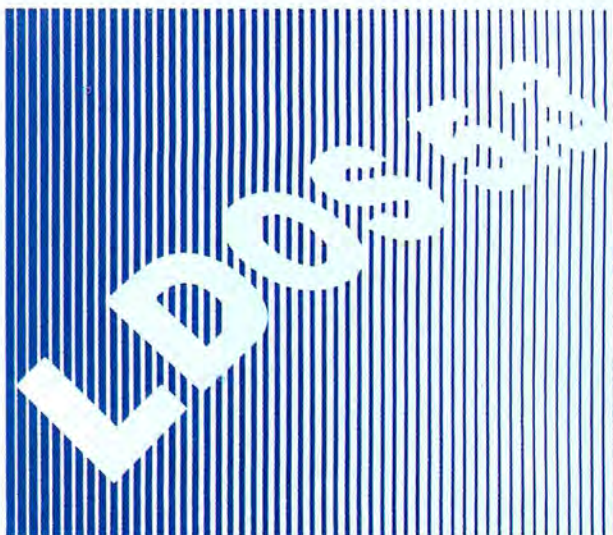
## Listing continued

```

02380 BADPAR LD      A,11+40H      ;Illegal Command Param.
02390          JP      ERROR
02400 ;
02410 ;*** Message Area ***
02420 ;
02430 IDENT  DEFM    'Ram Disk12/30/86'
02440          DEFB    13
02450 ;
02460 ERRMES DEFM    '*** Memory Banks 2 and 3 Not Found ***'
02470          DEFB    13
02480 ;
02490 ;*** Install Time Buffer Area ***
02500 ;
02510 LAST   DEFS    1
02520 CURSEC DEFS    2
02530 DCB   DEFS    2
02540 PARAM EQU     $
02550 BUFFER EQU    $+100H
02560 GAT   DEFS    3072
02570 ;
02580 ;*****
02590 ;* High Memory Drivers *
02600 ;*****
02610 ;
02620 ;*** New Read Sector Driver ***
02630 ;
02640 NEWRD  LD      A,RAMDRV      ;Drive = RAMDRIVE?
02650          CP      C
02660          JR      NZ,FLOPRD   ;No, then floppy driver
02670 ;
02680          PUSH   HL            ;Trk 17, Sec 12 or Lower?
02690          LD      HL,110CH
02700          XOR   A
02710          SBC   HL,DE
02720          POP   HL
02730          JR      NC,LEGSEC
02740 ;
02750          PUSH   HL            ;If not, Zero Buffer
02760          PUSH   DE            ; and Return
02770          PUSH   BC
02780          PUSH   HL
02790          POP   DE
02800          INC   DE
02810          LD   BC,255
02820          LD   (HL),0
02830          LDIR
02840          JR      ENEWRD
02850 ;
02860 LEGSEC PUSH   HL            ;Else Attempt to Read
02870          PUSH   DE
02880          PUSH   BC
02890          CALL  CALC          ;Calculate Sector Address
02900          LD   B,0
02910          EX   DE,HL
02920          LD   HL,(SECADD)
02930          DI
02940 SECIN  LD   A,(BANK)        ;Copy Sector to Buffer
02950          OUT  (BANCTL),A
02960          LD   C,(HL)
02970          LD   A,BANRES
02980          OUT  (BANCTL),A
02990          LD   A,C
03000          LD   (DE),A
03010          INC  HL
03020          INC  DE
03030          DJNZ SECIN
03040          EI
03050 ENEWRD POP   BC
03060          POP   DE
03070          POP   HL
03080          POP   AF            ;Return to READSC caller
03090          XOR   A
03100          RET
03110 ;
03120 FLOPRD JP      4C6BH        ;Return to floppy driver
03130 ;
03140 ;*** New Write Sector Handler ***
03150 ;
03160 NEWWR  LD      A,RAMDRV      ;Drive = RAMDRV
03170          CP      C
03180          JR      NZ,FLOPWR   ;No, then floppy driver
03190 ;
03200          PUSH   HL            ;Legal Sector?
03210          LD   HL,110CH
03220          XOR   A
03230          SBC   HL,DE
03240          POP   HL
03250          RET   C            ;If not, return
03260 ;
03270          PUSH   HL            ;Else Attempt to Write
03280          PUSH   DE
03290          PUSH   BC
03300          CALL  CALC          ;Calculate Sector Address
03310          LD   DE,(SECADD)
03320          LD   B,0
03330          DI
03340 SECOUT LD   C,(HL)        ;Dump Buffer to Sector
03350          LD   A,(BANK)
03360          OUT  (BANCTL),A
03370          LD   A,C
03380          LD   (DE),A

```

Listing continued



The LDOS 5.3 upgrade kit is now available to take your Model III or 4 (in 3 mode) to the year 2000. LDOS 5.3 provides complete media compatibility with LS-DOS 6.3, the newest Model 4 DOS released by Logical Systems, Inc. With LDOS 5.3, you can add 12 years to the life of your software. Just look at these improvements over version 5.1.4!

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- DATECONV has been added to convert older disks to the new date convention.

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- Improvement to line editing with the addition of line COPY and MOVE.
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Listing continued

```

03390 LD A,BANRES
03400 OUT (BANCTL),A
03410 INC HL
03420 INC DE
03430 DJNZ SECOUT
03440 EI
03450 POP BC
03460 POP DE
03470 POP HL
03480 XOR A
03490 RET
03500 ;
03510 FLOPWR LD A,0FFH ;Return to floppy driver
03520 CP C
03530 JP 45FAH
03540 ;
03550 ;*** Bypass Test of Ramdrive ***
03560 ;
03570 DRVCHK LD A,C
03580 CP RAMDRV
03590 JR Z,NOERR
03600 IN A,(0FH)
03610 AND 80H
03620 JP 4C79H
03630 NOERR XOR A
03640 RET
03650 ;
03660 ;*** Calculate Bank # and Offset of Sector ***
03670 ;
03680 CALC PUSH HL
03690 PUSH DE
03700 PUSH BC
03710 LD C,0 ;Clear Bank Overflow Flag
03720 LD (TRKSEC),DE
03730 LD HL,0 ;Track Start Address
03740 LD A,D
03750 OR A
03760 JR Z,ADDOFF ;Track 0?
03770 ;
03780 LD B,D
03790 LD DE,TRKLEN
03800 MULTRK ADD HL,DE
03810 RL C
03820 DJNZ MULTRK
03830 ;
03840 ADDOFF LD DE,(TRKSEC) ;Offset = Sector * 256
03850 DEC DE
03860 LD D,E
03870 LD E,0
03880 ADD HL,DE ;Add Sector Offset
03890 RL C
03900 LD A,C ;Bank 2 and 3 Overflow?
03910 OR A
03920 JR NZ,B0 ; then Use Bank 0
03930 BIT 7,H ;Bank 2 Overflow?
03940 JR NZ,B3 ; then Use Bank 3
03950 JP B2 ;Else Use Bank 2
03960 ;
03970 B0 LD A,BANK0 ;Use Bank 0
03980 ;***-----***
03990 ;*** Insert Following Lines for Model 4P ***
04000 ;***-----***
04010 ;*** LD DE,4000H ***
04020 ;*** AND A ***
04030 ;*** SBC HL,DE ;Use Bank 1 ***
04040 ;***-----***
04050 JR ECALC
04060 ;
04070 B2 LD A,BANK2 ;Use Bank 2
04080 JR ECALC
04090 ;
04100 B3 RES 7,H ;SECADD = HL - 8000H
04110 LD A,BANK3 ;Use Bank 3
04120 ;
04130 ECALC LD (BANK),A ;Save Bank #
04140 LD (SECADD),HL ; and Sector Address
04150 POP BC
04160 POP DE
04170 POP HL
04180 RET
04190 ;
04200 ;*** Run-Time Variables ***
04210 ;
04220 SECADD DEFS 2
04230 TRKSEC DEFS 2
04240 BANK DEFS 1
04250 ;
04260 END START

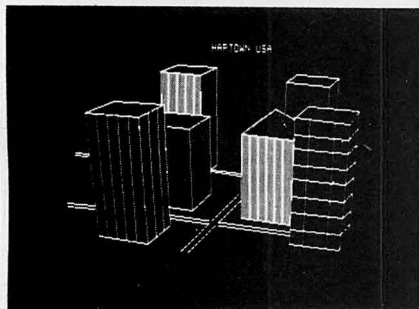
```

End

Circle 464 on Reader Service card.

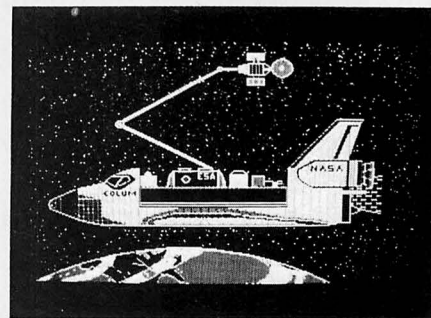
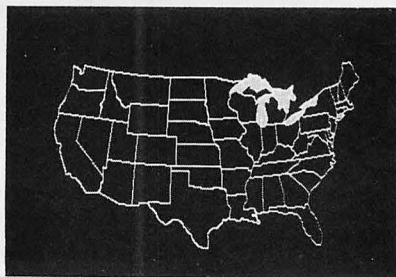
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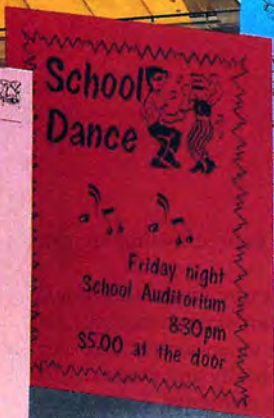
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Tandy 1000

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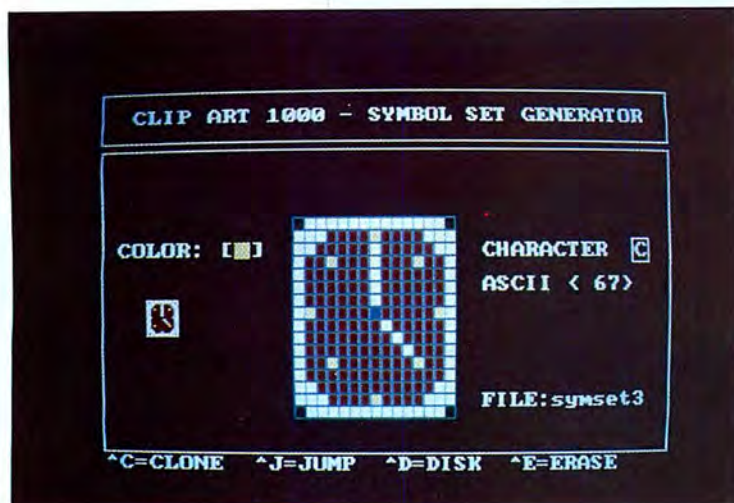


Photo 1. A sample symbol on Clip Generator's design screen.

**A** recent inventory of my Tandy 1000 library revealed all manner of software. But one program I always seem to need—a simple but powerful utility to design graphics screens—was missing.

Paint and CAD are fine for serious artwork and large projects. However, these expensive, complicated programs seemed like overkill. I decided to write Clipper.

Clipper is a pair of Basic programs, Clipgen (see Program Listing 1) and Clipart (see Program Listing 2), that turn your keyboard into a graphics macroprocessor. It gives you the capabilities of a paint program and also allows you to develop a data base of custom text fonts and graphics

symbols to add to your drawings at the touch of a key.

A symbol can occupy an area as small as four pixels and can expand to cover an area larger than the video screen. You can join symbols horizontally and vertically to form larger picture elements. Each symbol corresponds to an ASCII keyboard character from 32 to 127.

You can design symbols with your Tandy 1000's 16-color palette. The largest symbol that the magnified design grid can accommodate produces a 15- by 16-pixel matrix that is about  $\frac{1}{16}$ -inch square (see Photo 1). After you've carefully designed a symbol set and assigned each symbol to a macro key, you can save the file to disk for later use.

Listing 2 provides a canvas on which you can develop graphic video-page files. You can build custom screens by guiding the window-frame cursor around the display and placing the individual symbols onto the page with the macro keys. You can pick and choose among your library of fonts and symbols by loading the files selectively as you develop your custom screen pages.

You can use most symbols for more than one purpose. For example, you can instantly transform a text character into a continuous, multicolored graphic border by manipulating the X and Y steps of the frame cursor as it travels across the video page.

The Capture function allows you to grab a pattern beneath the frame cursor and duplicate it repeatedly as the cursor travels across the page. The Edit option enables you to cut, copy, flip, and mirror-image portions of the video page. When you complete your picture, the program saves it as a PIC file, which you can add to your Basic programs. Photos 2 and 3 show examples of PIC files ready for insertion.

## Getting Started

Enter Listings 1 and 2 and save them to disk as Clipgen.BAS and Clipart.BAS, respectively. I use a dual-drive 1000 and prefer that these programs reside on drive B. You can, however, assign them to another drive by changing all of their drive references. Clipgen's drive references are on lines 780, 1430, 1640, 1750, and 1890. Clipart's are on lines 400, 530, 2210.

## System Requirements

**Tandy 1000**  
**128K RAM**  
**One disk drive**  
**MS-DOS 2.11 or higher**  
**GW-Basic 2.02 or higher**  
**Printer (optional)**







## The frame cursor automatically stops when it reaches a boundary.

the same as that of the grid originally assigned to your symbols in the SYM-SET1.SET file. You can move the cursor around the page by pressing the directional arrows. The frame cursor automatically stops when it reaches a display boundary.

You can change the number of discrete steps that the frame cursor moves horizontally and vertically by pressing shift-arrow-key combinations. The shift-left-arrow and shift-right-arrow combinations lower and raise X-axis steps, respectively, and the shift-up-arrow and shift-down-arrow combinations do the same for Y-axis movements. The program initially sets the X and Y step values for text display, allowing one vertical and one horizontal character space for each step of the frame cursor.

Press the key corresponding to the symbol with which you want to fill the area within the frame cursor. You can adjust both horizontal and vertical symbol spacing by adjusting the X and Y step values. After you've placed a few symbols on the page, position the frame cursor over one of them and press control-C. Notice that on the command line "release" changes to "capture."

Clipart picks up the group of picture elements that were located within the frame cursor when you entered the Capture option. You can duplicate the group by simply pressing an arrow key. To change the captured information first press control-R to release the old pixels; then press control-C to capture a new group of pixels within the cursor.

Experiment with various X and Y step values as you move the frame cursor across the screen. You can transform a symbol into a multicolored paint brush, and you can place the symbols associated with any other key onto the page without altering the pixels that the frame cursor has captured.

By pressing the delete key, you can erase pixels lying within the frame cursor, which changes them to the current background color. You can choose another page background color by pressing the escape key to cycle through all colors in the color palette. Due to the way in which Tandy 1000 Basic operates, you might have to turn off the frame cursor during certain operations to

Key(s)	Action
<b>Cursor movement</b>	
left arrow	move left
right arrow	move right
up arrow	move up
down arrow	move down
shift-left arrow	decrease X step
shift-right arrow	increase X step
shift-up arrow	increase Y step
shift-down arrow	decrease Y step
<b>Screen control</b>	
ASCII 32-127	symbol macro keys
control-A	cursor on/off toggle
control-C	capture block
control-R	release block
control-D	disk I/O menu
control-E	edit option
control-H	horizontal-grid ruler
control-V	vertical-grid ruler
control-Z	clear video page
tab	increase magnification
escape	change background color
delete	blank frame cursor
break	load/run Clipgen.BAS
home	change the color palette
<b>Edit commands</b>	
<b>Block capture</b>	
shift-left arrow	expand left
shift-right arrow	expand right
shift-up arrow	expand top
shift-down arrow	expand bottom
left arrow	contract left
right arrow	contract right
up arrow	contract top
down arrow	contract bottom
left bracket ([)	decrease step scale
right bracket (])	increase step scale
enter	select function
<b>Special functions</b>	
1	copy, then cut source block
2	duplicate source block
3	copy, then invert source block
4	copy, then flip source block
5	quit Edit option
enter	move block
<b>Move block</b>	
left arrow	move left
right arrow	move right
up arrow	move up
down arrow	move down
left bracket ([)	decrease step scale
right bracket (])	increase step scale
enter	replace block

Table 2. Command summary for Clipart.



ensure proper color duplication. You can switch the cursor frame from visible to invisible and back again by pressing the control-A cursor toggle.

Press the control-R combination when you're ready to resume normal operation. The program disregards pixels that have a color value of zero (black on the original design grid). Therefore, only pixels with a color other than the background are actually set with the PSet command. This arrangement allows you to superimpose one symbol over another and provides a way to mix symbol sizes within a set. For example, you might print a word onto the page, then later decide that you want to underline it. You can position the frame cursor so that you can add the underline symbol without erasing any portion of the text.

Symbols are not restricted to their original size. Press control-Z to clear the screen. Now press the tab key a few times. Note that the value adjacent to the letter M on the command line increases. This value is called the magnifier scale, and it is initially set to a one-to-one ratio. You can expand a symbol to fill the entire screen by increasing the scale.

When you press an assigned macro key, its associated symbol is drawn in expanded form, but in proportion to the magnifier scale. Symbols can occupy a space larger than the actual video page, but you can only use the portion of the symbol that lies within the page. Don't be alarmed if the program takes a while to draw the symbol. Keep in mind that large symbols might cover the command line. Portions of symbols that fall below the command line are usually unusable.

## Clip Editing

A critical part of screen design is word and pixel alignment. The Edit option contains features that make this job easy. The editing commands function much like those of a word processor.

Press control-E to enter the Edit option. Note that the frame cursor diminishes to a single flashing dot. Think of the dot as a very small four-sided block. You can expand the block to capture a portion of the screen by pressing the appropriate shift-arrow-key combinations.

The arrow keys alter the block's four sides. Pressing arrow keys or shift-arrow-key combinations determines whether the side you select shrinks or enlarges in that direction.

As an example, press shift-up arrow several times. Note that the topmost side of the block expands. Now press shift-right arrow. The right side expands. Shift-left arrow and shift-down arrow produce similar results on the remaining sides. You can make any side of the block smaller by pressing an arrow key without pressing the shift key. You can adjust the expansion-step increment by pressing the



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*Program Listing 1. Clipgen.*

```

40 ' *****
50 ' *
60 ' * CLIP ART 1000 *
70 ' * SYMBOL SET GENERATOR *
80 ' *
96 ' *****
100 '
110 '
120 ' ** INITIALIZATION **
130 CLEAR,,32768:SCREEN 5,,0,0:CLS:KEY OFF ** 2615
140 DEFINT A-Z:DIM X,Y,XX,YY,XMAX,YMAX,A,BG ** 2841
150 DIM LMENU!(5200),CHARSET$(95),BL!(50) ** 2324
160 ON ERROR GOTO 1050 ** 1341
170 LINE(0,15)-(319,40),15,B:LINE(0,44)-(319,190),15,B ** 2806
180 LOCATE 4,3:PRINT"CLIP ART 1000 - SYMBOL SET GENERATOR"; ** 3728
190 FG=15:COLOR FG,0 ** 1196
200 LOCATE 12,2:PRINT"COLOR: [";CHR$(219);"]" ** 2703
210 GOSUB 1710:PRINT"New File Y/N?"; ** 2465
220 X$=INKEY$:IF X$="" THEN 220 ** 1786
230 IF X$="Y" OR X$="y" THEN GOSUB 2020:GOSUB 1710:GOTO 260 ** 3506
240 IF X$="N" OR X$="n" THEN GOSUB 1390:GOTO 260 ** 2819
250 GOTO 220 ** 676
260 GOSUB 1710:PRINT"Initializing File.."; ** 3150
270 INIT=XSIZE*YSIZE ** 1403
280 FOR J=0 TO 95 ** 969
290 CHARSET$(J)=STRING$(INIT,48) ** 2009
300 NEXT J ** 604
305 FE$="NEW":GOSUB 1630 ** 1398
310 IF CHARSET$(0)="" THEN 2410 ** 1737
320 GOSUB 1710:LINE(103,76)-(193,172),0,BF ** 2287
330 LINE(25,115)-(142,133),0,BF ** 1601
340 LINE(25,115)-(25+XSIZE+1,115+YSIZE+1),15,B ** 2615
350 XMAX=103+(XSIZE-1)*6 ** 1509
360 YMAX=76+(YSIZE-1)*6 ** 1473
370 ' ** SET UP GRID **
380 FOR X=103 TO XMAX STEP 6 ** 1726
390 FOR Y=76 TO YMAX STEP 6 ** 1690
400 LINE(X,Y)-(X+6,Y+6),3,B ** 1524
410 NEXT Y ** 621
420 NEXT X ** 621
430 CH=32:FG=1 ** 793
440 GOSUB 870:GOSUB 1230 ** 1431
450 X=104:Y=77:XX=26:YY=116 ** 1649
460 LOCATE 12,27:PRINT"CHARACTER"; ** 2141
470 LINE(295,86)-(305,97),15,B ** 1568
480 LOCATE 12,38:PRINT CHR$(CH); ** 1933
490 LOCATE 14,27:PRINT"ASCII <";:PRINT USING"###";CH;:PRINT">"; ** 3897
500 GOSUB 1710:PRINT"C=CLONE ^J=JUMP ^D=DISK ^E=ERASE"; ** 3822
510 IF FE$="" THEN FE$="New" ** 1630
520 LOCATE 21,32:PRINT STRING$(8,32); ** 2234
530 LOCATE 21,27:PRINT"FILE:";FE$; ** 2066
540 ' ** PROCESS LOOP **
550 X$=INKEY$ ** 791
560 IF X$="" THEN GOSUB 1980:GOTO 550 ** 2165
570 K=ASC(RIGHT$(X$,1)) ** 1336
580 IF K=133 AND Y>82 THEN YY=YY-1:Y=Y-6:GOSUB 820 ** 3085
590 IF K=134 AND Y<109 THEN YY=YY+1:Y=Y+6:GOSUB 820 ** 3294
600 IF K=135 AND X>109 THEN XX=XX-1:X=X-6:GOSUB 820 ** 3121
610 IF K=136 AND X<XMAX THEN XX=XX+1:X=X+6:GOSUB 820 ** 3281
620 IF K=144 AND Y>82 THEN YY=YY-1:Y=Y-6:GOSUB 840 ** 3084
630 IF K=150 AND Y<YMAX THEN YY=YY+1:Y=Y+6:GOSUB 840 ** 3289
640 IF K=115 AND X>109 THEN XX=XX-1:X=X-6:GOSUB 840 ** 3125
650 IF K=116 AND X<XMAX THEN XX=XX+1:X=X+6:GOSUB 840 ** 3285
660 IF K=91 THEN FG=FG-1:GOSUB 1330 ** 2082
670 IF K=93 THEN FG=FG+1:GOSUB 1330 ** 2083
680 IF K=72 AND Y>82 THEN YY=YY-1:Y=Y-6 ** 2412
690 IF K=80 AND Y<YMAX THEN YY=YY+1:Y=Y+6 ** 2619
700 IF K=75 AND X>109 THEN XX=XX-1:X=X-6 ** 2449
710 IF K=77 AND X<XMAX THEN XX=XX+1:X=X+6 ** 2610
720 IF K=5 THEN GOSUB 970:GOTO 450 ** 2048
730 IF K=3 THEN GOSUB 2190:GOTO 450 ** 2091
740 IF K=10 THEN GOSUB 2380:GOTO 450 ** 2139
750 IF K=46 OR K=62 THEN GOSUB 2240:CH=CH+1:GOSUB 860:GOSUB 1230
:GOTO 450 ** 4402
760 IF K=44 OR K=60 THEN GOSUB 2240:CH=CH-1:GOSUB 860:GOSUB 1230
:GOTO 450 ** 4401
770 IF K=4 THEN GOSUB 1390:GOTO 310 ** 2092
780 IF K=0 THEN LOAD"B:CLIPART.BAS",R ** 2310
790 GOTO 550 ** 691
800 LOCATE 14,34:PRINT USING"###";CH;:RETURN ** 2749
810 ' ** FILL GRID CELL **
820 LINE(X,Y)-(X+4,Y+4),FG,BF:PSET(XX,YY),FG:RETURN ** 3262
830 ' ** ERASE GRID CELL **
840 LINE(X,Y)-(X+4,Y+4),0,BF:PRESET(XX,YY):RETURN ** 3137
850 ' ** DISPLAY EXPANDED SYMBOL **
860 IF CH>127 THEN CH=32 ELSE IF CH<32 THEN CH=127 ** 2945
870 BG=0 ** 437
880 GOSUB 1710:PRINT"Updating Grid.."; ** 2733
890 FOR X=104 TO XMAX+6 STEP 6 ** 1830
900 FOR Y=77 TO YMAX+6 STEP 6 ** 1785
910 BG=BG+1:A=ASC(MID$(CHARSET$(CH-32),BG,1)):A=A-48 ** 3028
920 LINE(X,Y)-(X+4,Y+4),A,BF ** 1611
930 NEXT Y ** 628
940 NEXT X ** 628
950 GOSUB 1710:RETURN ** 1345
960 ' ** ERASE GRID **
970 FOR X=104 TO XMAX+6 STEP 6 ** 1829

```

Listing 1 continued



Listing 1 continued

```

980 FOR Y=77 TO YMAX+6 STEP 6          ** 1793
990 LINE(X,Y)-(X+4,Y+4),0,BF          ** 1601
1000 NEXT Y                            ** 665
1010 NEXT X                            ** 665
1020 LINE(26,116)-(26+(XSIZE-1),116+(YSIZE-1)),0,BF ** 2845
1030 RETURN                             ** 708
1040 ' ** ERROR HANDLER **
1050 IF ERR>52 THEN GOSUB 1710:GOSUB 1110:GOSUB 1090:RESUME 1390 ** 3892
1060 GOSUB 1710:PRINT"Program Error";ERR;" in line";ERL;" ** 4154
1070 GOSUB 1090:RESUME 450             ** 1558
1080 ' **
1090 FOR TD=1 TO 4000:NEXT:RETURN      ** 2097
1100 **                                 ** 310
1110 GOSUB 1710:PRINT"Disk Error or no files on disk.."; ** 4252
1120 GOSUB 1090:GOSUB 1600:GOSUB 2410:RETURN ** 2730
1130 ' ** READ GRID DATA **
1140 CHARSET$(CH-32)=" "              ** 1283
1150 FOR X=104 TO XMAX+6 STEP 6       ** 1868
1160 FOR Y=77 TO YMAX+6 STEP 6       ** 1832
1170 A=POINT(X,Y):A=A+46              ** 1455
1180 CHARSET$(CH-32)=CHARSET$(CH-32)+CHR$(A) ** 2589
1190 NEXT Y                            ** 675
1200 NEXT X                            ** 666
1210 RETURN                             ** 708
1220 ' ** DISPLAY SYMBOL **
1230 BG=0                              ** 476
1240 FOR XX=26 TO 26+(XSIZE-1)        ** 1787
1250 FOR YY=116 TO 116+(YSIZE-1)     ** 1887
1260 BG=BG+1                          ** 660
1270 A=ASC(MID$(CHARSET$(CH-32),BG,1)):A=A-40 ** 2591
1280 PSET(XX,YY),A                    ** 1139
1290 NEXT YY                          ** 765
1300 NEXT XX                          ** 755
1310 RETURN                             ** 709
1320 ' ** COLOR CHANGE **
1330 IF FG=BG THEN FG=FG+1            ** 1547
1340 IF FG>15 THEN FG=1 ELSE IF FG<1 THEN FG=15 ** 2787
1350 COLOR FG,0                       ** 881
1360 LOCATE 12,10:PRINT CHR$(219);   ** 1986
1370 RETURN                             ** 715
1380 ' ** DISK I/O **
1390 GOSUB 1710:PRINT" 1=LOAD 2=SAVE 3=KILL 4=EXIT"; ** 3503
1400 GET(0,44)-(319,154),LMENU1:LINE(0,44)-(319,154),0,BF ** 3057
1410 PSET(0,44):DRAW"C15"+"R319BD110L319" ** 2283
1420 LOCATE 8,1:PRINT"RESIDENT .SET FILES:"; ** 2815
1430 LOCATE 9,1:FILES"B:*.SET"        ** 1799
1440 X$=INKEY$:IF X$="" THEN 1446     ** 1892
1450 IF X$="1" THEN IO$="LOAD":GOSUB 1500:GOSUB 1730:RETURN ** 3570
1460 IF X$="2" THEN IO$="SAVE":GOSUB 1500:GOSUB 1620:RETURN ** 3585
1470 IF X$="3" THEN IO$="KILL":GOSUB 1500:GOSUB 1880:RETURN ** 3592
1480 IF X$="4" THEN 1930              ** 1289
1490 GOTO 1440                        ** 784
1500 GOSUB 1710:PRINT"Filename ? .....";:LOCATE 25,12:FES="" ** 3863
1510 X$=INKEY$:IF X$="" THEN 1510     ** 1888
1520 K=ASC(RIGHT$(X$,1))              ** 1380
1530 IF K=75 AND ASC(LEFT$(X$,1))=0 THEN 1500 ** 2530
1540 IF K>32 AND K<127 THEN FES=FES+X$:LOCATE 25,12:PRINT FES; ** 3653
1550 IF LEN(FES)>8 THEN 1500          ** 1572
1560 IF K=13 OR K=27 THEN GOSUB 1710:RETURN ** 2635
1570 IF K=8 THEN 1500                 ** 1169
1580 GOTO 1510                        ** 782
1590 ' ** RESTORE WINDOW **
1600 PUT(0,44),LMENU1,PSET:RETURN     ** 2117
1610 ' ** SAVE SYMBOL FILE **
1620 GOSUB 1820:IF FL=1 THEN FL=0:GOTO 1930 ** 2571
1630 GOSUB 1710:PRINT"SAVING ";FES; ** 2155
1640 OPEN"O",1,"B:"+FES+".SET"        ** 1628
1650 FOR J=0 TO 95                    ** 1019
1660 WRITE #1,CHARSET$(J)             ** 1505
1670 NEXT J                            ** 663
1680 WRITE #1,XSIZE:WRITE #1,YSIZE   ** 2214
1690 CLOSE 1:RETURN                   ** 1233
1700 ' ** CLEAR COMMAND LINE **
1710 LOCATE 25,1:PRINT STRING$(40,32);:LOCATE 25,1:RETURN ** 3544
1720 ' ** LOAD SYMBOL FILE **
1730 GOSUB 1820:IF FL=1 THEN FL=0:GOTO 1930 ** 2573
1740 GOSUB 1710:PRINT"LOADING ";FES; ** 2211
1750 OPEN"1",1,"B:"+FES+".SET"        ** 1624
1760 FOR J=0 TO 95                    ** 1021
1770 INPUT#1,CHARSET$(J)              ** 1480
1780 NEXT J                            ** 665
1790 INPUT#1,XSIZE:INPUT#1,YSIZE     ** 2162
1800 CLOSE 1:RETURN                   ** 1226
1810 ' ** VERIFY I/O **
1820 PRINT IO$;" ";FES;" Y/N?";      ** 1772
1830 X$=INKEY$:IF X$="" THEN 1830    ** 1898
1840 IF X$="Y" OR X$="y" THEN FL=0:GOSUB 1600:GOSUB 1710:RETURN ** 3861
1850 IF X$="N" OR X$="n" THEN FL=1:RETURN ** 2493
1860 GOTO 1830                        ** 788
1870 ' ** KILL FILE **
1880 GOSUB 1820:IF FL=1 THEN FL=0:GOTO 1930 ** 2579
1890 KILL"B:"+FES+".SET"              ** 1345
1900 GOSUB 1710:PRINT FES;" DELETED.."; ** 2326
1910 FOR TD=1 TO 2000:NEXT:RETURN     ** 2096
1920 ' ** ABORT I/O **
1930 GOSUB 1710:PRINT"ABORTING DISK I/O"; ** 2596
1940 GOSUB 1600:RETURN                ** 1391
1950 ' ** CURSOR BLINK DELAY **
1960 FOR TD=1 TO 100:NEXT:RETURN     ** 2052

```

Listing 1 continued

## You can make multiple copies and inversions of the same block.

left ([) or right (]) bracket keys. For example, a setting of S:5 enlarges the side you select by five steps with each shift-arrow-key combination.

Press enter when you've captured the area you want to edit. Choose the function that you want the program to perform. Clipper executes the command after moving the block to its new screen position. You have the following options: Cut, which erases information at the original screen position after the block has been copied to a new location; Copy, which duplicates the information at the new position, leaving the original area intact; Mirror, which produces an inverted image of the block at the new position; Flip, which creates a vertical inversion (upside-down image) of the original area at the new screen position; and Quit, which returns to the command line and cancels the Edit option.

The Flip and Mirror options do not buffer information before they perform their intended functions but merely move pixels from one screen location to another. Therefore, to ensure an accurate inversion, make sure that the destination area lies entirely outside the bounds of the source block before you invoke the operation.

When you press enter, the area you selected begins to flash in reverse video. Don't be surprised to find that colors you assigned to the pixels within the block change during this operation. This is a normal part of 1000's reverse-video operation.

Move the image to any point on the screen by pressing the arrow keys. Set the scale as before (using the left or right bracket key) so that you can move the block in larger steps. If the block refuses to move all the way to a display boundary, the step scale is probably set too high. To correct this, lower the step scale to an increment that allows the block to move the remaining distance to the edge of the display.

Since the XOR logical operator moves the block, the block does not destroy the background over which it passes. Press enter when the block is where you want it. What happens next depends on which option (1-4) you've chosen. You can capture and move approximately half of the display to an alternate position. The maximum number of pixels that you can move



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80287 Numeric coproc. fast	339
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Using Super Utility Plus 3.x	16

See more books on the opposite page.

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Using Wordperfect 4.1	13
Nortons Programmer's Guide	15

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in one operation depends on the size of the MN!(nnnn) array, which line 180 in the program dimensions. Adjusting the size of this array allows you to move more or less of the screen.

Another symbol-alignment tool is the X,Y alignment grid, which consists of a flashing ruler line spanning the vertical and horizontal planes of the display at the current topmost frame-cursor coordinates. Press control-H to see the horizontal ruler and control-V to see the vertical ruler. You can display the alignment rulers any time while placing symbols or moving blocks of pixels using the Edit option.

You can make multiple copies and in-versions of the same block by answering "Y" to the prompt "Move again y/n?". When you're finished editing, answering "N" to the prompt returns you to the command line.

### Pixel Editor

In addition to the block editor just described, you need the versatility of a pixel editor for detailed work. Press control-P to enter the sketch mode. As before, the frame cursor becomes a single blinking dot. The arrow keys guide the cursor around the screen. The bracket keys allow you to increase the scale factor to move quickly or decrease it to get close to a boundary.

Press the left shift key to begin sketching. You can select a different drawing color by pressing the home key to cycle through the color palette. Press control to erase unwanted pixels. Press the right shift key when you want to return to the Move option. Escape exits sketch mode.

### Permanent Pics

You can make a permanent disk record of your screen pages by saving them as a PIC file. Press control-D to view the file-control menu. As before, a window opens to display resident PIC files on the target drive. Press the 2 key to invoke the Save option. If you confirm the operation and file name by answering "Y" to the next prompt, the directory closes and your screen is saved to disk. You can move from Clipart to Clipgen by pressing break from either program's command line.

### Parting Clips

Remembering the symbol for each macro key is not easy, as you will find out when you begin to build a library of specialized files. One way to remember which file to load to retrieve a symbol is to keep macro-key and symbol names mnemonically associated when constructing files that contain symbols other than the standard keyboard text characters. You might use the F key to produce a flag and the H key to produce a small house, for example. You can assign a sequence of keys, such as zero-9, to multipart symbol pictures.

#### Listing 1 continued

```

1970 ' ** PIXEL CURSOR **
1980 GET(X,Y)-(X+4,Y+4),BL!:LINE(X,Y)-(X+4,Y+4),3,BF:GOSUB 1960
1990 PUT(X,Y),BL!,FSET:GOSUB 1960
2000 RETURN
2010 ' ** SET GRID SIZE **
2020 GOSUB 1710:PRINT"X-Axis Size (02-15) ..":GOSUB 2130
2030 XSIZE=T
2040 IF XSIZE<2 OR XSIZE>15 THEN 2020
2050 GOSUB 1710:PRINT"Y-Axis Size (02-16) ..":GOSUB 2130
2060 YSIZE=T
2070 IF YSIZE<2 OR YSIZE>16 THEN 2050
2080 GOSUB 1710:PRINT"XSIZE =",XSIZE;" YSIZE =",YSIZE;" OK Y/N
?";
2090 X$=INKEY$:IF X$="" THEN 2090
2100 IF X$="Y" OR X$="y" THEN GOSUB 1710:RETURN
2110 GOTO 2020
2120 ' **
2130 X$=INKEY$:IF X$="" THEN 2130
2140 IF X$<CHR$(48) OR X$>CHR$(57) THEN 2130
2150 T$=T$+X$:LOCATE 25,22:PRINT T$;
2160 IF LEN(T$)=2 THEN T=VAL(T$):T$="":RETURN
2170 GOTO 2130
2180 ' ** GLOBAL/SELECTED DUPLICATION **
2190 GOSUB 1710:PRINT"Global 2=Selected 3=Exit";
2200 X$=INKEY$:IF X$="" THEN 2200
2210 IF X$="1" THEN GOSUB 2240:GOSUB 2260:RETURN
2220 IF X$="2" THEN GOSUB 2240:GOSUB 2330:RETURN
2230 IF X$="3" THEN GOSUB 1710:RETURN
2240 GOSUB 1710:PRINT"Reading Grid..":GOSUB 1140:GOSUB 1710:RET
URN
2250 ' ** GLOBAL SYMBOL DUPLICATION **
2260 GOSUB 1710:PRINT"Duplicating Key: ";CHR$(CH);" as Key:";
2270 FOR DUP=32 TO 127
2280 LOCATE 25,31:PRINT CHR$(DUP);
2290 CHARSET$(DUP-32)=CHARSET$(CH-32)
2300 NEXT
2310 GOSUB 1710:RETURN
2320 ' ** SELECTED SYMBOL DUPLICATION **
2330 GOSUB 1710:PRINT"Target Character ? ";TC$=INPUT$(1)
2340 IF TC$<CHR$(32) OR TC$>CHR$(127) THEN 2330
2350 CHARSET$(ASC(TC$)-32)=CHARSET$(CH-32)
2360 GOSUB 1710:PRINT"Key: ";CHR$(CH);" duplicated as Key: ";TC$;
2370 FOR TD=1 TO 3000:NEXT:GOSUB 1710:RETURN
2380 GOSUB 1710:PRINT"Target Jump Key ?":JP$=INPUT$(1):GOSUB 17
10
2390 IF JP$>CHR$(127) OR JP$<CHR$(32) THEN 2380
2400 GOSUB 2240:CH=ASC(JP$):GOSUB 870:GOSUB 1230:RETURN
2410 GOSUB 1710:PRINT"Cannot proceed: 1=New File 2=File Menu ";
2420 X$=INKEY$:IF X$="" THEN 2420
2430 IF X$="1" THEN GOSUB 2020:GOSUB 1710:GOTO 260
2440 IF X$="2" THEN GOSUB 1390:GOTO 310
2450 CLS:STOP

```

End

#### Program Listing 2. Clipart.

```

30 ' *****
40 ' * CLIP ART 1000 *
50 ' * MACRO GRAPHICS UTILITY *
60 ' * *****
120 '
130 '
140 '
150 ' ** INITIALIZATION **
160 CLEAR,,,32768:SCREEN 5,0,,,0:CLS:KEY OFF
170 DEFINT A-Z:DIM GG,A,J,JJ,AA:ON ERROR GOTO 2080
180 DIM CHARSET$(95),LDOT!(200),CSR!(200),MN!(5300),AGRID!(200)
190 MENU$="1=LOAD 2=SAVE 3=KILL 4=SYMBOL FILES"
200 BG=0:COLOR 15,BG:INIT=1
210 LOCATE 7,13:PRINT"CLIP ART 1000";
220 LOCATE 9,9:PRINT"MACRO GRAPHICS UTILITY";
230 LINE(0,22)-(319,190),15,B:LINE(34,61)-(273,74),15,B
240 COLOR 14,BG:LOCATE 14,11:PRINT"SELECT FILE OPTION:";
250 COLOR 2,BG:LOCATE 19,3:PRINT MENU$;
260 GOSUB 2190:COLOR 15,BG
270 GOSUB 2940:IF SF=1 THEN SF=0:GOSUB 2180
280 CLS
290 ' ** PROCESS LOOP **
300 BX=0:BY=0:MAG=1:BX1=XSIZE+1:BY1=YSIZE+1
310 GET(BX,BY)-(BX1,BY1),LDOT!:GOSUB 800
320 GOSUB 1110:DPL=0:PRINT"X= Y= M= RELEASE "E=EDIT "D=DIS
K";
330 SCALE=XSIZE+1:LOCATE 25,3:PRINT USING"###",SCALE;
340 BRUSH=YSIZE+1:LOCATE 25,8:PRINT USING"###",BRUSH;
350 LOCATE 25,13:PRINT USING"###",MAG;
360 X$=INKEY$
370 IF X$="" THEN GOSUB 800:GOTO 360
380 K=ASC(RIGHT$(X$,1)):IF LEN(X$)>1 THEN 520
390 IF K=5 THEN GOSUB 1130:GOTO 310
400 IF K=0 THEN LOAD"B:CLIPGEN.BAS",R
410 IF K=1 THEN IF CR=0 THEN CR=1 ELSE CR=0
420 IF K=4 THEN GOSUB 830:GOSUB 2180:GOTO 300
430 IF K=27 THEN GOSUB 750:GOTO 360
440 IF K=26 THEN CLS:GOTO 320
450 IF K=22 THEN XX=BX:GOSUB 2080

```

Listing 2 continued



Listing 2 continued

```

460 IF K=8 THEN YY=BY:GOSUB 2130
470 IF K=3 THEN DPL=1:DPL$="CAPTURE":GOSUB 1000:GOTO 690
480 IF K=9 THEN GOSUB 640:GOTO 360
490 IF K=18 THEN DPL=0:DPL$="RELEASE":GOTO 690
500 IF K=16 THEN GOSUB 3010:GOTO 300
510 IF K>31 THEN GOSUB 830:GOSUB 1020:GOTO 360 ELSE 360
520 IF K=83 THEN GOSUB 710:GOTO 360
530 IF K=0 THEN LOAD"B:CLIPGEN,BAS",R
540 IF K=77 THEN GOSUB 830:BX=BX+SCALE:BY=BY+SCALE:GOSUB 840
550 IF K=75 THEN GOSUB 830:BX=BX-SCALE:BY=BY-SCALE:GOSUB 840
560 IF K=80 THEN GOSUB 830:BY=BY+BRUSH:BY1=BY1+BRUSH:GOSUB 860
570 IF K=72 THEN GOSUB 830:BY=BY-BRUSH:BY1=BY1-BRUSH:GOSUB 860
580 IF K=133 THEN BRUSH=BRUSH+1:GOSUB 960
590 IF K=134 THEN BRUSH=BRUSH-1:GOSUB 960
600 IF K=136 THEN SCALE=SCALE+1:GOSUB 920
610 IF K=135 THEN SCALE=SCALE-1:GOSUB 920
620 GOTO 360
630 ' ** KEY MAGNIFY SCALE **
640 MAG=MAG+1
650 IF MAG>15 THEN MAG=1
660 LOCATE 25,13:PRINT USING"###";MAG;
670 RETURN
680 ' ** CAPTURE KEY PROMPT **
690 LOCATE 25,16:PRINT DPL$;:GOTO 360
700 ' **** BLANK CURSOR ROUTINE ****
710 LINE(BX,BY)-(BX1,BY1),0,BF
720 GET(BX,BY)-(BX1,BY1),LDOT!
730 RETURN
740 ' ** BACKGROUND COLOR **
750 BG=BG+1
760 IF BG=FG THEN BG=BG+1
770 IF BG>15 THEN BG=0
780 COLOR ,BG:RETURN
790 ' ** CURSOR SCALING **
800 IF CR=1 THEN RETURN
810 GET(BX,BY)-(BX1,BY1),CSR!:LINE(BX,BY)-(BX1,BY1),15,B
820 PUT(BX,BY),CSR!,PSET:RETURN
830 PUT(BX,BY),LDOT!,OR:RETURN
840 IF BX-SCALE<0 THEN BX=0:BX1=XSIZE+1
850 IF BX1+SCALE>319 THEN BX1=319:BX=319-(XSIZE+1)
860 IF BY-BRUSH<0 THEN BY=0:BY1=YSIZE+1
870 IF BY1+BRUSH>191 THEN BY1=191:BY=191-(YSIZE+1)
880 IF DPL=1 THEN PUT(BX+1,BY+1),MN!,OR
890 GET(BX,BY)-(BX1,BY1),LDOT!
900 RETURN
910 ' ** X-SCALE UPDATE **
920 IF SCALE>99 OR SCALE<1 THEN SCALE=1
930 LOCATE 25,3:PRINT USING"###";SCALE;
940 RETURN
950 ' ** Y-SCALE UPDATE **
960 IF BRUSH>99 OR BRUSH<1 THEN BRUSH=1
970 LOCATE 25,8:PRINT USING"###";BRUSH;
980 RETURN
990 ' ** KEY REPEAT CAPTURE **
1000 GET(BX+1,BY+1)-(BX1-1,BY1-1),MN!:RETURN
1010 ' **** KEY WRITE ROUTINE ****
1020 IF MAG>1 THEN GOSUB 1900:GOTO 1090
1030 GG=0:AA=ASC(X$)
1040 FOR J=BX+1 TO BX1-1
1050 FOR JJ=BY+1 TO BY1-1
1060 GG=GG+1:A=ASC(MID$(CHARSET$(AA-32),GG,1))
1070 IF A=48 THEN 1080 ELSE A=A-48:PSET(J,JJ),A
1080 NEXT JJ:NEXT J
1090 GET(BX,BY)-(BX1,BY1),LDOT!:RETURN
1100 ' ** COMMAND LINE CLEAR **
1110 LOCATE 25,1:PRINT STRING$(40,32);:LOCATE 25,1:RETURN
1120 '*** EDIT OPTION **
1130 AX=BX:AY=BY:AX1=BX1:AY1=BY1
1140 GOSUB 830:GOSUB 1150:GOTO 1220
1150 LX=BX:LY=BY:RX=BX:RY=BY:TX=BX:TY=BY:XF=1
1160 GET(LX,TY)-(RX,BY),MN!:MVB=0
1170 GOSUB 1110:PRINT"[ARROW]"[SHIFT/ARROW]";
1180 LOCATE 25,23:PRINT"S:";
1190 LOCATE 25,25:PRINT USING"###";XF;
1200 LOCATE 25,33:PRINT"[ENTER]";:RETURN
1210 ' ** BLOCK MOVE SCALE LOOP **
1220 X$=INKEY$
1230 IF X$="" THEN PUT(LX,TY),MN!,PRESET:PUT(LX,TY),MN!,PSET:GOT
O 1220
1240 K=ASC(RIGHT$(X$,1))
1250 IF K=91 THEN XF=XF-1:GOSUB 1420:GOTO 1220
1260 IF K=93 THEN XF=XF+1:GOSUB 1420:GOTO 1220
1270 IF K=27 THEN 2030
1280 IF K=13 THEN 1450
1290 IF K<72 OR K>136 THEN 1220 ELSE GOSUB 1300:GOTO 1220
1300 IF K=72 AND TY<BY THEN TY=TY+XF
1310 IF K=75 AND LX<RX THEN LX=LX+XF
1320 IF K=77 AND RX>LX THEN RX=RX-XF
1330 IF K=134 AND BY+XF<192 THEN BY=BY+XF
1340 IF K=133 AND TY-XF>-1 THEN TY=TY-XF
1350 IF K=80 AND BY>TY THEN BY=BY-XF
1360 IF K=135 AND LX-XF>-1 THEN LX=LX-XF
1370 IF K=136 AND RX+XF<320 THEN RX=RX+XF
1380 IF RX<LX OR LX>RX OR TY>BY OR BY<TY THEN RETURN
1390 GET(LX,TY)-(RX,BY),MN!:PUT(LX,TY),MN!,PRESET
1392 PUT(LX,TY),MN!,PSET
1400 RETURN
1410 ' ** EDIT SCALE UPDATE **
1420 IF XF<1 OR XF>99 THEN XF=1
1430 LOCATE 25,25:PRINT USING"###";XF;:RETURN

```

Listing 2 continued

If you have a graphics printer driver, you can display all the symbols in a file (along with their associated macro-key assignments) on your screen, then dump the screen to your dot-matrix printer. Although the output is not in color, this simple procedure maintains a permanent record of the contents of each file.

## Addenda

You can display the PIC files that Clipper produces by loading them directly onto the screen from disk. This allows you to develop longer Basic programs, since you don't have to take up valuable work space with coded graphics routines.

I often load PIC files into extended video pages 1-3 while my Basic program is busy displaying a different PIC file on video page zero. I then rapidly sequence the extra screens onto the display using the PCopy n,0 command. The switch is fast enough (about four frames per second) to produce reasonably convincing full-screen animated effects.

You can use the following subroutine within your Basic programs to load PIC files directly to page zero (the displayed portion) of video memory:

```

DEF SEG = &HB800;
BLOAD"B:PICTURE1.PIC",0:RETURN

```

The segment:offset addresses for extra video pages 1-3 depend on which version of Basic you're using and the amount of memory in your computer. The machine must have at least 256K of memory to use additional video pages. Clipper uses screen mode 5 for storing PIC files, in which each video page uses 32,768 bytes of memory. Therefore, for each additional video page that you assign within your program, you must increase a corresponding amount of allocated video-memory space in the Clear statement at the beginning of your program.

I use GW-Basic 2.02 with 512K additional memory installed on a Tandy Memory Plus expansion board. This version of Basic allows up to four assigned video-memory pages. Video-page segment addresses for this configuration are:

```

Page 0 = &HB800
Page 1 = &H5000
Page 2 = &H4800
Page 3 = &H4000

```

To load PIC files directly from disk into the extra video-page memory area, substitute the above addresses immediately after the DEF SEG statement as the sample routine shows. The offset into the segment is always zero. ■

John Wolfskill is a technical writer for PC Resource. Write to him c/o 80 Micro, 80 Elm St., Peterborough, NH 03458. Enclose a self-addressed, stamped envelope if you want a reply.



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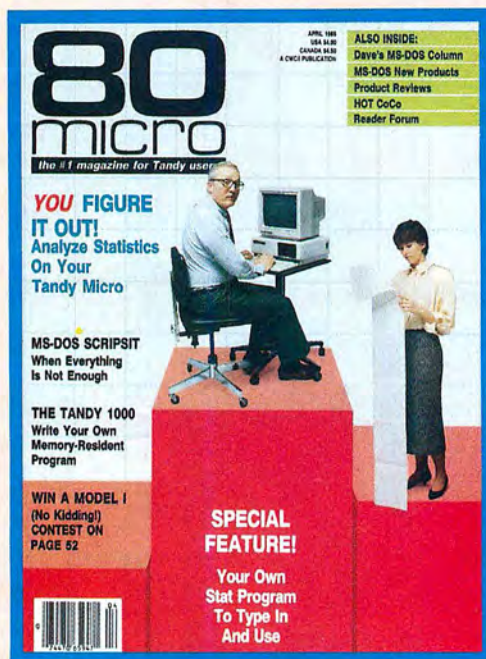
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```

1440 ! ** SPECIAL FUNCTIONS **
1450 GOSUB 110:PRINT"LCUT 2=COPY 3=MIRROR 4=FLIP 5=QUIT";
1460 TEMLX=LX:TEMTY=TY:TEMRX=RX:TEMEY=EY
1470 X$=INKEY$:IF X$="" THEN 1470
1480 IF X$="1" THEN MVB=1:GOSUB 1560:GOSUB 1580:GOTO 2030
1490 IF X$="2" THEN MVB=0:GOSUB 1560:GOSUB 1580:GOTO 2030
1500 IF X$="3" THEN MVB=0:GOSUB 1560:GOSUB 1580:GOTO 2030
1510 IF X$="4" THEN FLIP=1:GOSUB 1560:GOSUB 1580:GOTO 2030
1520 IF X$="5" THEN GOSUB 1110:GOTO 2030
1530 IF X$="6" THEN GOSUB 1560:GOSUB 1580:GOTO 2030
1540 GOTO 1470
1550 ** BLOCK MOVE **
1560 GOSUB 110:GOSUB 1570:RETURN
1570 PRINT"MOVE BLOCK: KEYS=ARROWS";GOSUB 1430:RETURN
1580 X$=INKEY$
1590 IF X$="" THEN PUT(LX,TY),MNI,XOR:PUT(LX,TY),MNI,XOR:GOTO 15
1600 K=ASC(RIGHT$(X$,1))
1610 IF K=91 AND XF>1 THEN XF=XF-1:GOSUB 1430
1620 IF K=93 AND XF<320 THEN XF=XF+1:GOSUB 1430
1630 IF K=13 AND MVB=1 THEN GOSUB 1760:RETURN
1640 IF K=13 AND MVB=0 THEN PUT(LX,TY),MNI,OR:RETURN
1650 IF K=22 THEN XX=BX:GOSUB 2080:GOTO 1580
1660 IF K=8 THEN YY=BY:GOSUB 2130:GOTO 1580
1670 IF K=27 THEN 2030
1680 IF K<72 OR K>80 THEN 1580
1690 IF K=77 THEN IF RX+XF<320 THEN LX=LX+XF:RX=RX+XF
1700 IF K=75 THEN IF LX-XF>-1 THEN LX=LX-XF:RX=RX-XF
1710 IF K=80 THEN IF BY+XF<192 THEN BX=BX+XF:TY=TY+XF
1720 IF K=72 THEN IF TY-XF>-1 THEN TY=TY-XF:EY=EY-XF
1730 GOTO 1580
1740 PUT(LX,TY),MNI,XOR:PUT(LX,TY),MNI,XOR:RETURN
1750 ! **
1760 LINE(TEMLX,TEMTY)-(TEMRX,TEMEY),BG,BF
1762 LINE(LX,TY)-(RX,EY),BG,BF
1770 PUT(LX,TY),MNI,PSET:RETURN
1780 ! ** MIRROR IMAGE **
1790 GG=TEMLX:IF FLIP=1 THEN FLIP=0:GOTO 1850
1800 FOR J=TY TO BY
1810 FOR JJ=RX TO LX STEP-1
1820 A=POINT(TEMLX,TEMTY):PSET(JJ,J),A:TEMLX=TEMLX+1
1830 NEXT:TEMLX=GG:TEMTY=TEMTY+1:NEXT:RETURN
1840 ! ** FLIP IMAGE **
1850 FOR J=BY TO TY STEP-1
1860 FOR JJ=LX TO RX
1870 A=POINT(TEMLX,TEMTY):PSET(JJ,J),A:TEMLX=TEMLX+1
1880 NEXT:TEMLX=GG:TEMTY=TEMTY+1:NEXT:RETURN
1890 ! ** MAGNIFY KEY **
1900 B=ASC(X$)-32:C=0:GG=YSIZE*WAG
1910 FOR J=1 TO XSIZE
1920 FOR AA=1 TO MAG
1930 FOR JJ=1 TO YSIZE
1940 C=C+1:A=ASC(MID$(CHARSET$(B),C,1)):A=A-48
1950 IF A=0 THEN DRAW"BD"+STR$(MAG):GOTO 1970
1960 DRAW"C"+STR$(A):DRAW"D"+STR$(MAG)
1970 NEXT JJ
1980 DRAW"BU"+STR$(GG):DRAW"BR":C=C+YSIZE
1990 NEXT AA
2000 C=C+YSIZE
2010 NEXT J:RETURN
2020 ! ** MULTI-MOVE PROMPT **
2030 GOSUB 110:PRINT"MOVE AGAIN Y/N ?"
2040 X$=INKEY$:IF X$="" THEN 2040
2050 IF X$="Y" OR X$="y" THEN MVB=0:GOSUB 1110:GOTO 1450
2060 BX=AX:BY=AY:BX1=AX1:BY1=AY1:RETURN
2070 ! ** HORIZONTAL ALIGN RULER **
2080 FOR J=1 TO 7
2090 GET(XX,0)-(XX,191),AGRIDI:LINE(BX,0)-(XX,191),15,BF

```

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```

1100 PUT (XX,0),AGRIDI, PSET
1110 NEXT:RETURN
1120 ** VERTICAL ALIGN RULER **
1130 FOR J=1 TO 7
1140 SET (0,YY)-(319,YY),AGRIDI:LINE(0,YY)-(319,YY),15,BF
1150 PUT(0,YY),AGRIDI,PSET
1160 NEXT:RETURN
1170 ** DISK I/O **
1180 GOSUB 1110:PRINT MENU$;
1190 X$=INKEY$:IF X$="" THEN 2190
1200 K=ASC(RIGHT$(X$,1))
1210 IF K=0 THEN LOAD"B:CLIPGEN.BAS",R
1220 IF K=49 THEN GOSUB 2340:GOSUB 2280:GOTO 2620
1230 IF K=50 THEN GOSUB 2340:GOSUB 2280:GOTO 2590
1240 IF K=51 THEN GOSUB 2340:GOSUB 2280:GOTO 2650
1250 IF K=52 THEN CSET=1:GOSUB 2340:GOSUB 2280:GOSUB 2810:CSET=0
1260 :RETURN
2260 GOTO 2180
2270 ** **
2280 IF FE$>" THEN GOSUB 2410:RETURN
2290 GOSUB 1110:PRINT"Filename?";
2300 LOCATE 25,14:PRINT STRING$(6," ");
2310 LOCATE 25,25:PRINT"<ENTER>";
2320 GOTO 2470
2330 ** **
2340 IF INIT=1 THEN INIT=0
2350 GET(0,44)-(319,154),MNI:LINE(0,44)-(319,154),0,BF
2360 PSET(0,44):DRAW"CL1"+R319BD110L319"
2370 LOCATE 8,1:PRINT"RESIDENT FILES:";
2380 IF CSET=1 THEN LOCATE 9,1:FILES"B:*.*.SET":RETURN
2390 LOCATE 9,1:FILES"B:*.*.PIC":RETURN
2400 ** **
2410 GOSUB 1110:PRINT"File: ";FE$;" Y/N";
2420 X$=INKEY$:IF X$="" THEN 2420
2430 IF X$="Y" OR X$="y" THEN RETURN
2440 GOSUB 1110:PRINT"NEW NAME? ";
2450 LOCATE 25,14:PRINT STRING$(6," ");
2460 LOCATE 25,14:FE$="";
2470 X$=INKEY$:IF X$="" THEN 2470
2480 K=ASC(RIGHT$(X$,1))
2490 IF K=27 THEN RETURN
2500 IF K=75 AND ASC(LEFT$(X$,1))=0 THEN FE$="":GOTO 2440
2510 FE$=FE$+X$:LOCATE 25,14:PRINT FE$;
2520 IF K=13 AND LEN(FE$)<10 AND CSET=1 THEN EXT$=".SET":GOSUB 2
570:RETURN
2530 IF K=13 AND LEN(FE$)<10 THEN EXT$=".PIC":GOSUB 2570:RETURN
2540 IF LEN(FE$)>8 THEN 2440
2550 GOTO 2470
2560 ** FILE EXTENT **
2570 FE$=LEFT$(FE$,LEN(FE$)-1)+EXT$:RETURN
2580 ** **
2590 IO$="SAVE":GOSUB 2740:IF FL=1 THEN FL=0:RETURN
2600 PRINT"SAVING:";FE$;GOSUB 2800:GOSUB 2700:RETURN
2610 ** **
2620 IO$="LOAD":GOSUB 2740:IF FL=1 THEN FL=0:RETURN
2630 PRINT"LOADING:";FE$;GOSUB 2800:GOSUB 2680:RETURN
2640 ** **
2650 IO$="DELETE":GOSUB 2740:IF FL=1 THEN FL=0:RETURN
2660 PRINT"DELETING:";FE$;GOSUB 2800:KILL "B:";FE$:RETURN
2670 ** PAGE LOAD **
2680 DEF SEG=&HB800:LOAD"B:";FE$;0:RETURN
2690 ** PAGE SAVE **
2700 DEF SEG=&HB800:SAVE"B:";FE$;0,32768:RETURN
2710 ** RESTORE WINDOW **
2720 PUT(0,44),MNI,PSET:RETURN
2730 ** **
2740 GOSUB 1110:PRINT IO$;" ";FE$;" Y/N?";
2750 X$=INKEY$:IF X$="" THEN 2750
2760 IF X$="Y" OR X$="y" THEN GOSUB 1110:GOSUB 2720:RETURN

```

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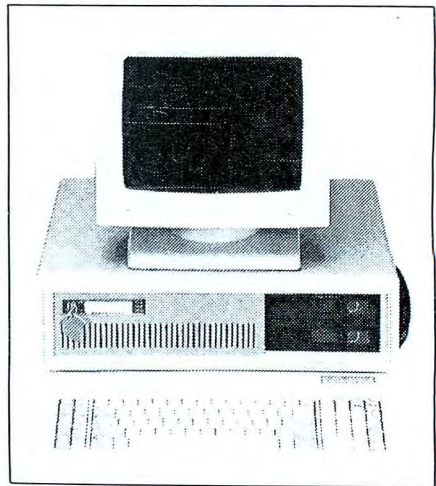
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```

2770 GOSUB 1110:PRINT"disk I/O Aborted..";
2780 GOSUB 2720:GOSUB 1110:FL=1:RETURN
2790 *** SYMBOL FILE I/O ***
2800 FOR TD=1 TO 2000:NEXT:GOSUB 1110:RETURN
2810 IO$="LOAD":GOSUB 2740:IF FL=1 THEN FL=0:RETURN
2820 CSET=:GOSUB 1110:PRINT>Loading:":FE$;
2830 OPEN "I",I,"B":+FE$
2840 FOR J=0 TO 95:INPUT#1,CHARSET$(J):NEXT J
2850 INPUT#1,X$IZE:INPUT#1,Y$IZE
2860 CLOSE 1:GOSUB 2720:RETURN
2870 *** ERROR HANDLER ***
2880 IF ERL=1390 THEN 2920
2890 GOSUB 1110:PRINT"Error ";ERR;" in line ";GOSUB 2800
2895 IF ERL=2380 OR ERL=2390 THEN GOSUB 2995:GOSUB 2720:RESUME 2
440
2900 IF ERR>50 AND ERR<78 THEN GOSUB 2720:CSET=:RESUME 2180
2910 RESUME 300
2920 GOSUB 1110:PRINT"Block too Large..";
2930 GOSUB 2800:GOSUB 2030:RESUME 1130
2940 IF CHARSET$(0)>" THEN RETURN
2950 GOSUB 1110
2960 FOR J=1 TO 2
2970 PRINT"No Symbol File .";
2980 GOSUB 2800
2990 NEXT:SF=1:RETURN
2995 LOCATE 15,1:PRINT"NO FILES IN DIRECTORY...";
2996 FOR TD=1 TO 4000:NEXT:RETURN
3000 *** SKETCH MODE ***
3010 LOCATE 25,1:PRINT"SKETCH: [ ] COLOR [ ] SCALE [ ]"
3020 X=BX:Y=BY:SC=1:GOSUB 3380:FG=0:GOSUB 3340:OP=1:GOSUB 3280
3030 X$=INKEY$
3040 DEF SEG=0:K1=PEEK(&H417):DEF SEG
3050 IF K1 AND 1 THEN OP=1:GOSUB 3280
3060 IF K1 AND 2 THEN OP=2:GOSUB 3280
3070 IF K1 AND 4 THEN OP=3:GOSUB 3280
3080 IF X$=" " THEN GOSUB 3220:GOTO 3030
3090 K=ASC(BRIGHT$(X$,1))
3100 IF K=27 THEN RETURN
3110 IF K=91 THEN SC=SC-1:GOSUB 3380
3120 IF K=93 THEN SC=SC+1:GOSUB 3380
3130 IF K=72 THEN IF Y-SC<0 THEN Y=Y-SC
3140 IF K=80 THEN IF Y+SC<191 THEN Y=Y+SC
3150 IF K=75 THEN IF X-SC<0 THEN X=X-SC
3160 IF K=77 THEN IF X+SC<319 THEN X=X+SC
3170 IF K=71 THEN GOSUB 3340
3180 IF OP=1 THEN 3030
3190 IF OP=2 THEN PSET(X,Y),FG ELSE PSET(X,Y),0
3200 GOTO 3030
3210 *** FLASH PIXEL CURSOR ***
3220 GET(X,Y)-(X,Y),LDOT:PSET(X,Y),3
3230 FOR TD=1 TO 75:NEXT
3240 PSET(X,Y):PUT(X,Y),LDOT:PSET
3250 FOR TD=1 TO 75:NEXT
3260 RETURN
3270 *** DISPLAY MODE PROMPT ***
3280 LOCATE 25,11
3290 IF OP=1 THEN PRINT" MOVE ";
3300 IF OP=2 THEN PRINT" DRAW ";
3310 IF OP=3 THEN PRINT"ERASE ";
3320 RETURN
3330 *** CHANGE DRAW COLOR ***
3340 FG=FG+1:IF FG>15 THEN FG=1
3350 LINE(208,192)-(216,198),FG,BF
3360 RETURN
3370 *** PIXEL SCALE ADJUST ***
3380 IF SC>50 THEN SC=1 ELSE IF SC<1 THEN SC=1
3390 LOCATE 25,38:PRINT USING"###";SC;
3400 RETURN

```

End

3000 HL



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# The Route to DOS

Execute DOS commands from within Superscriptsit.

If having to leave Superscriptsit to perform DOS commands drives you crazy, my patches can restore your sanity. After running the appropriate program (Model III Commander or Model 4 Commander), you can view directories in any format available to DOS and execute most DOS commands from within Superscriptsit. Each Commander program consists of a patch installer and the corresponding decimal code. I also provide the source code for reference.

Back up Superscriptsit before running either patch. A typographical error in a patch can seriously damage Superscriptsit.

## Model 4 Commander

After booting your favorite Model 4 DOS, type Program Listing 1 into Basic and check for errors. Be sure that your backup copy of Superscriptsit is in one of the drives. When you run the program, it modifies Model 4 Superscriptsit file SCR17/CTL. You will see DOS Command instead of Disk Directory on the menu the next time you use Model 4 Superscriptsit. After performing DOS commands, press the break key to return to Superscriptsit's main menu.

Program Listing 2 is the source code for the Model 4 patch. You do not need it to run Listing 1, but you will find it helpful if you make modifications. After DOS COMMAND in line 130, 11 spaces blank out Superscriptsit's "Directory" message.

## Model III Commander

After booting your favorite Model III DOS, type Program Listing 3 into Basic and check for errors. Be sure that your backup copy of Model III Superscriptsit is in one of the drives.

## System Requirements

**Model I/III/4**  
**TRSDOS 1.3, LDOS 5.1.3, or**  
**Newdos/80 2.0**  
**Basic**  
**Superscriptsit (1.2.0 for the**  
**Model III, 1.0.1 or 1.1.0 for the**  
**Model 4)**  
**Available on The Disk Series**

Program Listing 1. Model 4 Commander. See p. 116 for information on using checksums in Listings 1 and 3.

```

5 CLS:PRINT TAB(22)"Super Scripsit Dos Command Installer":PRINT
  TAB(30)"by Randall K. Wright"
10 OPEN"R",1,"SCR17/CTL":FIELD#1,37 AS A$,138 AS AS
20 FOR A=1 TO 46:READ B:U$=U$+CHR$(B):NEXT
30 U$=U$+***** Super Scripsit Dos Command
  *****+CHR$(10)+"Command? "+CHR$(14)+CHR$(
  3)
40 GET 1,1:LSET A$=U$:PUT 1,1
50 FIELD#1,241 AS A$,15 AS A$:GET 1,2:LSET A$="Dos Command":PUT
  1,2
60 FIELD#1,7 AS A$:GET 1,3:LSET A$=" ":PUT 1,3
99 CLOSE:PRINT:PRINT"Done"
100 DATA 62, 101, 239, 253, 203, 18, 166, 33, 123, 142, 62, 10
110 DATA 239, 33, 205, 142, 239, 1, 0, 79, 33, 217, 142, 62
120 DATA 9, 239, 56, 7, 62, 25, 239, 62, 10, 24, 234, 62
130 DATA 2, 14, 15, 239, 195, 38, 48, 28, 31, 42

```

End

Program Listing 2. Source code for Model 4 Commander's patch.

```

00100 ; Model 4 Super Scripsit Dos Command patch
00110 ; By Randall K. Wright
00120 ORG 9018H
00130 DEFM 'Dos Command',11 SPACES
00140 ORG 8E50H
00150 COMAND LD A,101
00160 RST 28H
00170 RES 4,(IY+10) ;ENABLE BREAK KEY
00180 LD HL,TITLE
00190 LD A,10 ;@DSPLY
00200 RST 28H
00210 REDO LD HL,CMDMSG
00220 RST 28H
00230 LD BC,4F00H
00240 LD HL,BUFFER
00250 LD A,9 ;@KEYIN
00260 RST 28H
00270 JR C,RETURN
00280 LD A,25 ;@CMNDR
00290 RST 28H
00300 LD A,10
00310 JR REDO
00320 RETURN LD A,2
00330 LD C,15
00340 RST 28H
00350 JP 3026H
00360 TITLE DEFW 1F1CH
00370 DEFM ***** Super Scripsit Dos Command *
*****
00380 CMDMSG DEFB 10
00390 DEFM 'Command? '
00400 DEFW 030EH
00410 BUFFER DEFS 80
00420 PRGEND EQU $-1
00430 END 8B2BH

```

End

Program Listing 3. Model III Commander.

```

1 ' Model 1/3 Super Scripsit Dos Command Installer.
2 ' Lines 10-50 create overlay file.
3 ' Lines 60-130 install DOS Command code into Super Scripsit.
4 ' By Randall K. Wright
5 ' Check lines 1140 - 1170 for DOS type.
10 CLEAR 1000:CLS:PRINT TAB(25)"Overlay Creator":OPEN "R",1,"SCR
  IPSIT/CMD":OPEN "R",2,"S/OVL"
20 FIELD #1,124ASAS,132ASBS:FIELD #2,124ASXS,132ASYS

```

\* 6199  
 \* 2955

Listing continued



# EXPANSIONS!!!



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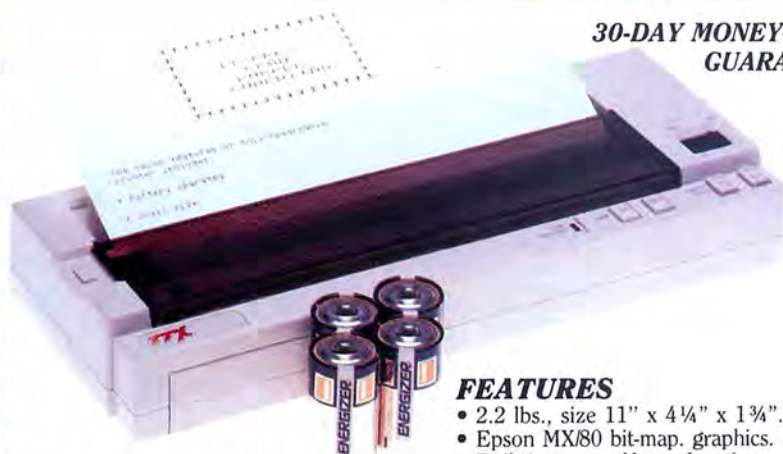


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in one of the drives.

The Model III version of Commander operates in two stages. In the first stage, it copies part of the Scripsit/CMD file into an overlay file called S/OVL.

Model III DOSes use memory locations 5200-6FFF hexadecimal (hex), which also happens to be the area of memory that Superscript uses. The overlay file contains the code necessary to restore the Model III Superscript program to memory after a DOS command.

After performing a DOS command, Model III Commander loads the overlay into memory before returning to Superscript's main menu. Without the overlay, Model III Superscript goes haywire after performing DOS commands, so you should make sure that S/OVL is on your Superscript disk after you run the patch.

In the second stage, Model III Commander modifies Superscript file SCR17/CTL. Pay attention to lines 1060-1090 of Listing 3, which provide the code to call the DOS command function of your DOS. Remove the REM marker (!) on the line corresponding to your DOS and ensure that the other three lines either are deleted or have REM markers in front of them.

After you run Model III Commander, Superscript is ready to execute DOS commands. Those of you who, like me, swear by LDOS will be pleased to find that directories you call from Superscript are sorted in alphabetical order as if called from LDOS ready.

### Model III Patch in Depth

Program Listing 4 is the source code for the Model III Commander patch. You do not need the code to run Listing 3; I include it for those of you who want to study the patch in depth. Notice that 12 spaces in line 130 blank out the previous Superscript directory message.

Lines 260-380 and 430-490 of Listing 4 change the DOS's @EXIT and @ABORT DOS call vectors. Originally used to make the Model III DOS-command patch work on LDOS 5.1.3., these lines allow you to use any program that loads and uses memory from 5200-6FFF hex and exits via either the @EXIT or @ABORT DOS call vectors from within Superscript.

### Model I Commander

You can run Commander on your Model I by changing the two sequences of 27, 2 in line 1000 of Listing 3 to 103, 68. ■

*Randall K. Wright is a co-sysop of the Great American Dream Machine BBS's TRS-80 section in Hayward, CA. (You can reach the BBS at 415-581-3019, 8-bit words, 1 stop bit, no parity.) He programs TRS-80s in Basic, assembly, and Fortran. Write to him at 2228 Lincoln Ave., Apt. J, Alameda, CA 94501.*

#### Listing 3 continued

```

30 FOR A=1 TO 30:PRINT @128,"Copying record number":A:GET 1,A:LSE
   T X$=A$:LSET Y$=B$:PUT 2,A:NEXT
40 GET 1,31:Z$=A$:MID$(Z$,2,1)=CHR$(122):LSET X$=Z$:Z$=CHR$(2)+C
   HR$(2)+CHR$(45)+CHR$(64):LSET Y$=Z$:PUT 2,31
50 CLOSE
60 CLS:PRINT @29,"INSTALL"
70 OPEN "R",1,"SCR17/CTL":FIELD #1,2@2ASAS$,22ASAS$
80 GET 1,2:LSET A$="Dos Command":PUT 1,2
90 FIELD #1,37ASAS$,2@3ASAS$
100 FOR A=1 TO 112:READ B:U$=U$+CHR$(B):NEXT
110 U$=U$+***** Super Scripsit Dos Command *****
   *****+CHR$(13)+CHR$(10)+"Command? "+CHR$(3)+"S/OVL"+CH
   RS(13)
120 GET 1,1:LSET A$=U$:PUT 1,1
130 CLOSE:PRINT:PRINT "DONE":END
1000 DATA 33, 190, 141, 205, 27, 2, 33, 0, 142, 205, 27, 2
1010 DATA 6, 63, 33, 0, 82, 205, 64, 0, 120, 254, 0, 40
1020 DATA 68, 235, 42, 45, 64, 34, 184, 141, 42, 47, 64, 34
1030 DATA 186, 141, 42, 49, 64, 34, 188, 141, 237, 115, 182
1040 DATA 141, 62, 195, 33, 149, 141, 50, 45, 64, 34, 46, 64
1050 DATA 50, 48, 64, 34, 49, 64, 235
1060 'Use one of the following 3 lines according to your DOS
1070 'DATA 205, 156, 66 'TRSDOS 1.3
1080 'DATA 195, 153, 66 'LDOS 5.1.3 MODEL III
1085 'DATA 195, 5, 68 'LDOS 5.1.3 MODEL I
1090 'DATA 205, 25, 68 'NEWDOS 80 V.2
1100 DATA 237, 123, 182, 141, 42, 184, 141, 34, 45, 64, 42, 186
1110 DATA 141, 34, 47, 64, 42, 188, 141, 34, 49, 64, 24, 169
1120 DATA 17, 11, 142, 205, 48, 68, 195, 33, 82, 0, 0, 0
1130 DATA 0, 0, 0, 0, 0, 28, 31

```

End

#### Program Listing 4. Source code for Model III Commander's patch.

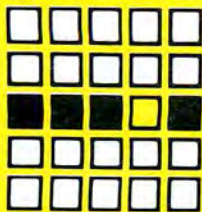
```

00100 ; Model 3 Super Scripsit Dos Command patch
00110 ; By Randall K. Wright
00120 ORG 8EF1H
00130 DEFM 'Dos Command ',12 SPACES
00140 ORG 8D50H
00150 COMAND LD HL,TITLE
00160 CALL 021BH ;VDLINE
00170 REDO LD HL,CMDMSG
00180 CALL 021BH
00190 LD B,63
00200 LD HL,5200H
00210 CALL 64 ;Get command line input
00220 LD A,B
00230 CP 0
00240 JR Z,RET
00250 EX DE,HL
00260 LD HL,(402DH)
00270 LD (STRG1),HL
00280 LD HL,(402FH)
00290 LD (STRG2),HL
00300 LD HL,(4031H)
00310 LD (STRG3),HL
00320 LD (STACK),SP
00330 LD A,0C3H
00340 LD HL,RETURN
00350 LD (402DH),A
00360 LD (402EH),HL
00370 LD (4030H),A
00380 LD (4031H),HL
00390 EX DE,HL
00400 ; CALL 429CH ;TRSDOS 1.3
00410 JP 4299H ;LDOS 5.1.3
00420 ; CALL 4419H ;NEWDOS 80 V.2
00430 RETURN LD SP,(STACK)
00440 LD HL,(STRG1)
00450 LD (402DH),HL
00460 LD HL,(STRG2)
00470 LD (402FH),HL
00480 LD HL,(STRG3)
00490 LD (4031H),HL
00500 JR REDO
00510 RET LD DE,MODULE
00520 CALL 4430H ;M.L. loading routine
00530 JP 5221H ;Re-enter Super Scripsit
00540 STACK DEFW 0
00550 STRG1 DEFW 0
00560 STRG2 DEFW 0
00570 STRG3 DEFW 0
00580 TITLE DEFW 1F1CH
00590 DEFM '***** Super Scripsit Dos Command *****'
*****
00600 DEFB 13
00610 CMDMSG DEFB 10
00620 DEFM 'Command? '
00630 DEFB 3
00640 MODULE DEFM 'S/OVL'
00650 DEFB 13
00660 PRGEND EQU $-1
00670 END 8B2BH

```

End





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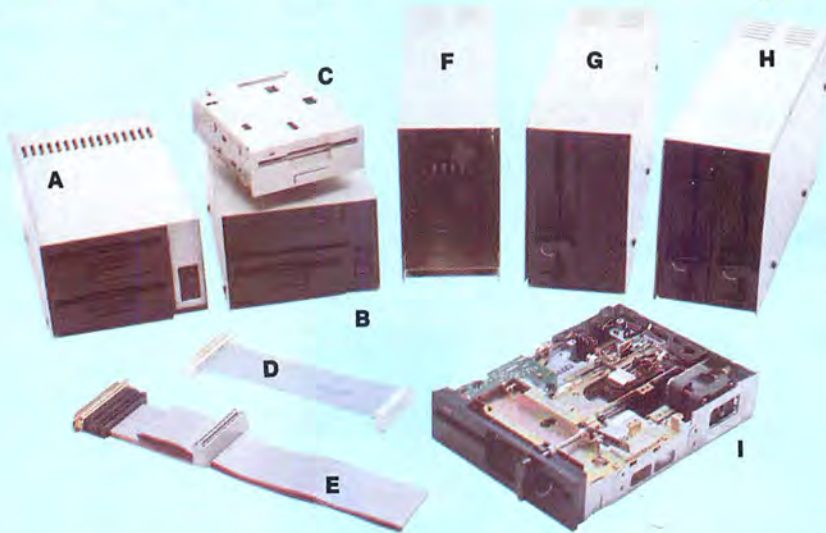
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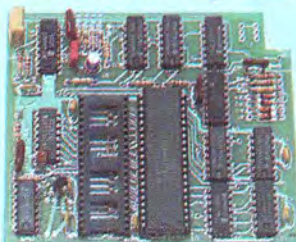
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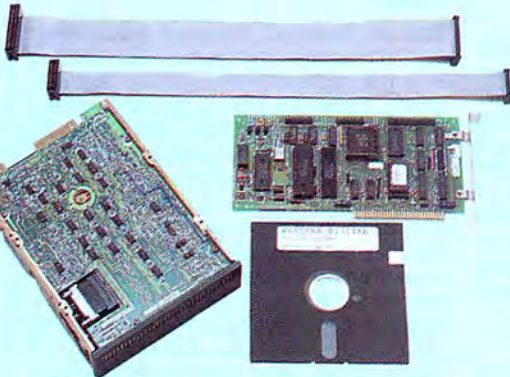
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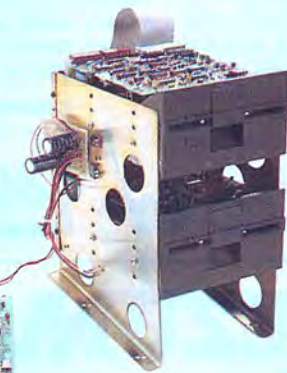


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# Can we talk? CP/M vs TRSDOS

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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### Why use Montezuma CP/M?

We have already told you why our CP/M is the best for the Radio Shack Model 4 computer. The only question left to answer is "Why buy CP/M at all?" Radio Shack has abandoned TRSDOS — all of their new machines use MS-DOS. Most of the software producers have followed, leaving no new software development and saddling the TRSDOS user with whatever software "left-overs" he can find. Which DOS do you want to head into the future with: the one originally written for the Model I or the one that served as the basis for MS-DOS? Make the right choice right now for just \$169.

### If I need support?

We don't forget you after the sale. If you have a problem you will find our phones are answered by people, not answering machines or hold buttons. Our philosophy is very simple — we want you to be happy and satisfied with your purchase. If you have a problem then we have a problem, and we'll do whatever we can to resolve it.

### Cost to update?

Our owners are protected against instant obsolescence by our lifetime upgrade policy. At any time you can return your original CP/M disk to be upgraded to the latest version free of charge, except for a small shipping and handling fee. Periodically we publish **NEW STUFF**, a newsletter for registered users of Montezuma Micro CP/M. This publication carries news about new products, tips for getting more out of CP/M, and other valuable information for our users. It is sent free of charge to registered owners.

### 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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Unlike the high-priced, underpowered backup utilities available for backup of TRSDOS hard drives, our CP/M **HARDBACK** utility makes the backup of a hard disk to floppies quick and painless. Only **HARDBACK** gives you the choice of backing up the entire drive or only those files which it knows have been changed since the last backup. Daily backup is no longer a chore, since only new data must be copied. With **HARDBACK** you can quickly restore an entire drive, or only a single file if necessary. Only **HARDBACK** will perform a complete check of the hard disk drive and lock out tracks which have become flawed to prevent the use of those tracks for later data storage. Add this supreme program to your hard disk for just \$49. Isn't your time and data worth it?

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# Improve Your Backups

Reset the MOD flags when you back up floppy- or hard-drive Model 4 files.

**M**odclear and Modset are small utilities that clear or set the MOD flags of TRSDOS 6.2 directory slots. Modclear is especially useful when you use it with Powersoft's Backrest hard-disk backup utility.

Because Backrest does not reset the MOD flags when you back up a hard disk, you cannot easily tell which files you modified after the backup. By running Modclear after Backrest is finished, you can clear the MOD flag of each file on the drive.

The Modset utility ensures that every file is copied when you use the TRSDOS 6.2 command Backup. Running Modset before Backup sets a MOD flag on each file, which clears when the file is copied.

## Modclear

Type in the Program Listing and assemble it as Modclear/CMD. Since Modclear loads at the DOS overlay area (2600 hexadecimal [hex]), you can call it from other programs. Use the SYSTEM "RUN MODCLEAR :d" command to call Modclear from Basic, where "d" specifies the drive.

Modclear displays a title line and then checks the drive parameters. If the first character Modclear finds is not a colon, the utility aborts. Otherwise, the utility reads the second byte and strips high bits with the AND 7 instruction to convert the drive number from ASCII to binary.

Modclear checks the drive with the @CKDRV supervisory call (SVC). If it finds a non-write-protected disk in the drive, it proceeds.

The utility sets up a loop in which it reads a directory entry with the @DIRRD SVC, tests whether byte zero is active and primary, and then checks the next byte. Bit 6 of the second byte is the MOD flag. If the flag is set (indicating that you have modified the file), Modclear resets the bit with the RES 6, (HL) instruction and rewrites the entry to the directory with the

@DIRWR SVC. Modclear then displays a period on the screen, indicating activity.

Modclear repeats the loop for each directory slot. If the utility tries to read a non-existent directory entry, the @DIRRD SVC returns error code 16 and jumps to a short routine that displays the "Finished" message.

## Modset

To create Modset, type in the Listing with the changes in the Figure. Modset works like Modclear, except that it sets a zero bit to indicate a modified file. The proper syntax is MODSET :d.

If you want to use Backup to make file-by-file copies of your hard disk, one way to do this is to group the files on floppy by extension. Modset ensures that you do not miss any files.

By running Modset before Backup, you can set the MOD flags of all your files. For example, enter MODSET :d, and then BACKUP /CMD:s :d to move all files hav-

ing the CMD extension (where "s" specifies the source drive and "d" the destination drive). Backup clears each file's MOD flag as it is copied. To see which files remain to be copied, simply type CAT :s (M). Modset then displays all the files that still have set MOD flags.

## Variations

You can easily write variations of Modclear and Modset utilities. You could, for example, write a variation to change file passwords. Consult the *Model 4/4P Technical Reference Manual* or *Roy Soltoff's Programmer's Guide to TRSDOS 6.2* (available from Diskcount Data, 2701-C W. 15th, Suite 612, Plano, TX 75075) for further information. ■

*Daniel J. Fox is an insurance agent and has written several programs for use in the insurance business. You can write to him at P.O. Box 481, Columbus, IN 47202.*

## System Requirements

**Model 4/4D/4P**  
**TRSDOS 6.2**  
**Assembly language**  
**Editor/assembler**  
**Available on the Disk Series**

### Program Listing. Modclear.

```

00100 ;
00110 ;*****
00120 ;*
00130 ;*      MODCLEAR/cmd
00140 ;*      Clears the MOD flag from all files on
00150 ;*      the specified drive
00160 ;*      Syntax:
00170 ;*      MODCLEAR :d
00180 ;*
00190 ;*****
00200 @LOGOT EQU 12
00210 @CKDRV EQU 33
00220 @DIRRD EQU 87
00230 @DIRWR EQU 88
00240 @DSP EQU 2
00250 @DSPLY EQU 10
00260 @ERROR EQU 26
00270 @ABORT EQU 21
00280 SVC MACRO #AA$
00290 LD A,#AA$
00300 RST 28H
00310 ENDM
00320 IF @@1
00330 ORG 5200H
00340 ELSE
00350 ORG 2600H ;Overlay area
00360 ENDF
00370 START PUSH HL ;Save parameters
00380 LD HL,HELLO$ ;Point to message
00390 SVC @LOGOT ;Show the message
00400 POP HL ;retrieve parameters
00410 JR NZ,ERROR ;if error
00420 LD A,':' ;Indicates drive spec.
00430 CP (HL) ;1st character?
00440 JR NZ,PARMERR ;No - parameter error
00450 INC HL ;Point to drive specified
00460 LD A,(HL) ;get drive number
00470 AND 7 ;Strip high bits
00480 LD C,A ;move to C
00490 LD B,0 ;start with DEC=0

```

Listing continued



Listing continued

```

00500 SVC ;is drive ready?
00510 JR ;if not
00520 JR ;if write protected
00530 READ ;if error
00540 SVC ;get byte 0
00550 LD A,(HL) ;see if active &
00560 AND 10010000B ;primary entry
00570 CP 00100000B ;if not
00580 JR ;point to next byte
00590 INC ;mod flag set?
00600 BIT Z,OK ;if not set
00610 JR ;reset MOD flag
00620 RES 6,(HL) ;rewrite DEC
00630 SVC ;error trap
00640 JR ;Save
00650 PUSH BC ;registers
00660 PUSH DE ;display a period
00670 LD C,'.' ;when modified
00680 ;Restore
00690 POP BC ;registers
00700 POP DE ;registers
00710 JR ;error trap
00720 OK ;point to next DEC
00730 INC A ;zero A
00740 CP ;see if finished
00750 JR ;if not finished
00760 LD HL,DONES ;point to message
00770 SVC ;show it
00780 LD HL,0 ;no error exit
00790 RET
00800 NOTRDY LD HL,RDYS
00810 DB ;Dummy argument
00820 FARMERR LD HL,FARMS ;parameter error message
00830 SVC ;log error
00840 LD HL,0FFFFH ;error exit
00850 RET
00860 ERROR CP 16 ;illegal file # error
00870 JR ;Short message
00880 OR 01000000B
00890 SVC ;ERROR
00900 SVC ;ABORT
00910 ;
00920 ;***** Messages *****
00930 ;
00940 ;*****
00950 HELLOS DB ;AH,MODCLEAR - Clears out MOD flag'
00960 DB ;AH,Copyright (c) 1986 by Daniel J. Fox',0DH
00970 FARM$ DB ;Needs drive specification:',0AH
00980 DB ; MODCLEAR:d',0DH
00990 DONES DB ;AH,'Finished.',0DH
01000 RDYS DB ;AH,'Drive is not available.',0DH
01010 END START

```

End

```

00130 ;* MODSET/cmd *
00140 ;* Sets the MOD flag on all files on *
00150 ;* the specified drive *
00160 ;* MODSET:d *
00170 ;*
00610 ;* JR N,Z,OK ;if set
00620 ;* SET 6,(HL) ;set MOD flag
00630 ;* DB ;AH,'MODSET - Sets MOD flag'
00980 ;* MODSET:d',0DH

```

Figure. Changes to the Listing that create Modset.

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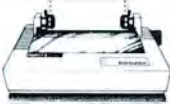
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The symbols listed in the Table are printer-control codes and cannot be printed. You can use all of the available printer fonts by placing control codes in your text. The codes in the Table are for the DMP 105; you can easily change them to fit other DMP printers.

To use DMP Character, type Program Listing 1 into Basic and save it to disk. Then type in Program Listings 2, 3, and 4 and save them to disk in ASCII format as Charset1, Charset2, and Charset3, respectively.

Since lines 5020-5410 of Charset1 and Charset2 are identical, you do not have

to type them in twice. After entering Listing 2 and saving it to disk, delete all lines except 5020-5410. You can then use the lines in Listing 3. Be sure to save the Charset listings in ASCII so they can be chained to DMP Character.

## A Test of Character

Enter the DMP Test file (see Fig. 1) with a text editor or word processor and save it to disk. When you load and run DMP Character, it asks you which character set you want to use. When you enter "1," the program loads Charset1 and asks you if you want to print a disk file or print di-

rectly from the keyboard. Choose "1" for disk file and enter DMP Test in response to the "File name" prompt.

DMP Character then prints out the DMP Test file using character set 1. Repeat the process to print the file in character sets 2 and 3. You should get the results shown in Figs. 2, 3, and 4. After experimenting with each character set, choose the print from keyboard option to make sure that everything works correctly. ■

*Gerald Hall is a computer hobbyist. Write to him at Box 465, Atikokan, Ontario POT 1C0.*

```

}DMPCHAR/BAS TEST FILE{

}LETTERS{

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

}DIGITS{

0 1 2 3 4 5 6 7 8 9

}SYMBOLS{

! " # $ % & ' ( ) * : - =
@ + ; ± ^ / ? \ . , < >

[TEST OF BOLD NORMAL SIZE
~TEST OF BOLD CONDENCED
]TEST OF BOLD COMPRESSED
}ELONGATED{
    
```

Fig. 1. DMP Test.

Symbol	Tells printer
clear-shift- (})	Start elongated (normal-size) lettering. CHR\$(30);CHR\$(27);CHR\$(19);CHR\$(27); CHR\$(14);CHR\$(18);
clear-shift- ({{)	End elongated (normal-size) lettering. CHR\$(30);CHR\$(27);CHR\$(15);CHR\$(18); Note: Characters are set to normal size after elongation.
clear- (())	Start bold lettering. CHR\$(30);CHR\$(27); CHR\$(31);CHR\$(18);
clear- ( )	End bold lettering. CHR\$(30);CHR\$(27); CHR\$(32);CHR\$(18);
shift-@ (')	Normal-size lettering. CHR\$(30);CHR\$(27); CHR\$(19);CHR\$(18);
clear-shift- (/)	Compressed lettering. CHR\$(30);CHR\$(27); CHR\$(23);CHR\$(18);
clear-shift- (~)	Condensed lettering. CHR\$(30);CHR\$(27); CHR\$(20);CHR\$(18);

Table. Printer-control codes.

```

D M P C H A R / B A S   T E S T   F I L E
L E T T E R S
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

D I G I T S
0 1 2 3 4 5 6 7 8 9

S Y M B O L S
! " # $ % & ' ( ) * : - =
@ + ; ± ^ / ? \ . , < >

T E S T   O F   B O L D   N O R M A L   S I Z E
T E S T   O F   B O L D   C O N D E N C E D
T E S T   O F   B O L D   C O M P R E S S E D
E L O N G A T E D
    
```

Fig. 2. Character set 1 test.

## System Requirements

**Model 4/4P/4D**  
**64K RAM**  
**Basic**  
**DMP printer**  
**Available on The Disk Series**



```

DMPCHAR/BAS TEST FILE
LETTERS
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z
DIGITS
0 1 2 3 4 5 6 7 8 9
SYMBOLS
! " # $ % & ' ( ) * : ; - =
@ + , - ^ / ? \ . , < >
TEST OF GOLD NORMAL SIZE
TEST OF GOLD CONDENCED
TEST OF GOLD COMPRESSED
ELONGATED

```

Fig. 3. Character set 2 test.

```

DMPCHAR/BAS TEST FILE
LETTERS
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z
DIGITS
0 1 2 3 4 5 6 7 8 9
SYMBOLS
! " # $ % & ' ( ) * : ; - =
@ + , - ^ / ? \ . , < >
TEST OF GOLD NORMAL SIZE
TEST OF GOLD CONDENCED
TEST OF GOLD COMPRESSED
ELONGATED

```

Fig. 4. Character set 3 test.

Program Listing 1. DMP Character.

```

10 REM *****
20 REM **** DMPCHAR/BAS ****
30 REM *****
40 REM **** by GERALD HALL ****
50 REM **** BOX 465 ****
60 REM **** ATIKOKAN, ONT ****
70 REM **** CANADA ****
80 REM **** P8T-1C0 ****
90 REM *****
100 CLS:DEFSTR A,C-E,N,P,Q-S,Z
110 ZO=CHR$(16):ZF=CHR$(17)
120 Y=0:X=0:O=0:PRINT CHR$(15);
130 PRINT@(2,31),ZO;" DMPCHAR/BAS ";ZF;
140 PRINT@(4,31),ZO;" 3 NEW Character SETS ";ZF;
150 PRINT@(5,31),ZO;" for your DMP Printer ";ZF;
160 PRINT@(7,34),ZO;" by Gerald Hall ";ZF;
170 PRINT@(10,26),ZO;" Press <ENTER> to Continue --> ";:INPUT M:
CLS
180 PRINT@(4,32),ZO;" Character Set Menu ";ZF;
190 PRINT@(5,32),ZO;" ----- ";ZF;
200 PRINT@(8,22)," <1>----- Character Set #1 -----<1> ";
210 PRINT@(9,22)," <2>----- Character Set #2 -----<2> ";
220 PRINT@(10,22)," <3>----- Character Set #3 -----<3> ";
230 PRINT@(11,22)," <4>--- Ignore SET Already Loaded ---<4> ";
240 PRINT@(12,22)," <5>----- END PROGRAM -----<5> ";
250 IF O=0 THEN PRINT@(16,34)," NO SET ACTIVE ";
260 IF O=1 THEN PRINT@(16,34)," SET #1 ACTIVE ";
270 IF O=2 THEN PRINT@(16,34)," SET #2 ACTIVE ";
280 IF O=3 THEN PRINT@(16,34)," SET #3 ACTIVE ";
290 PRINT@(14,29),ZO;" What Character Set ----> ";ZF;
300 FOR I=1 TO 200:NEXT I
310 PRINT@(4,32)," Character Set Menu ";

```

Listing 1 continued

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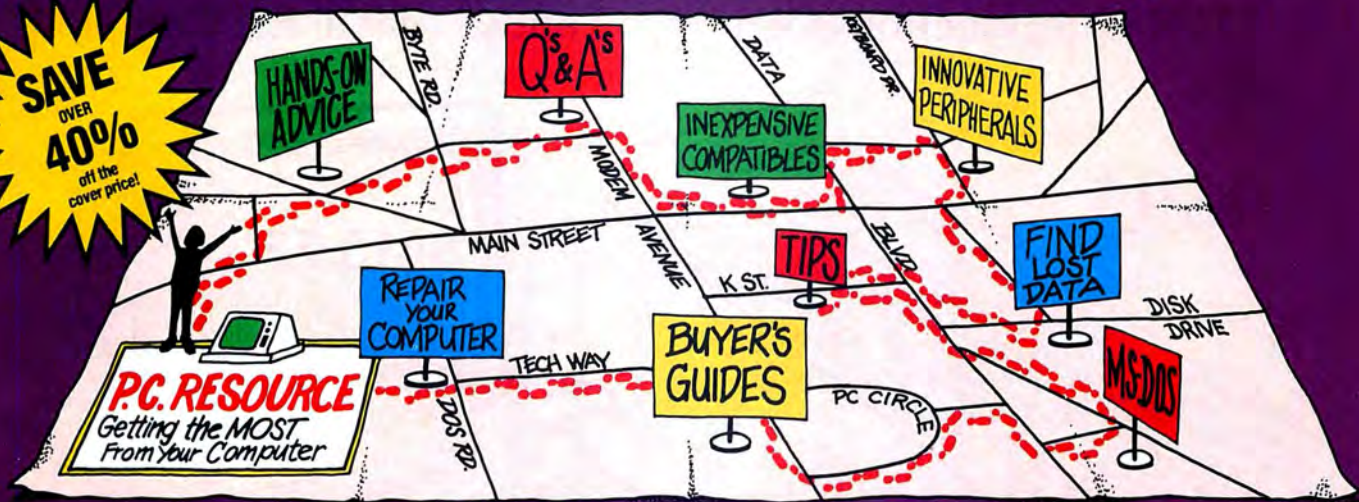






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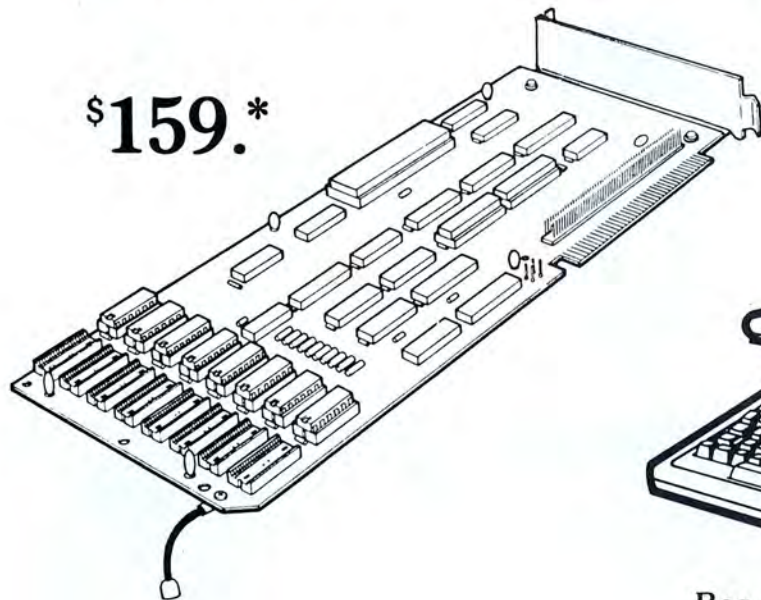
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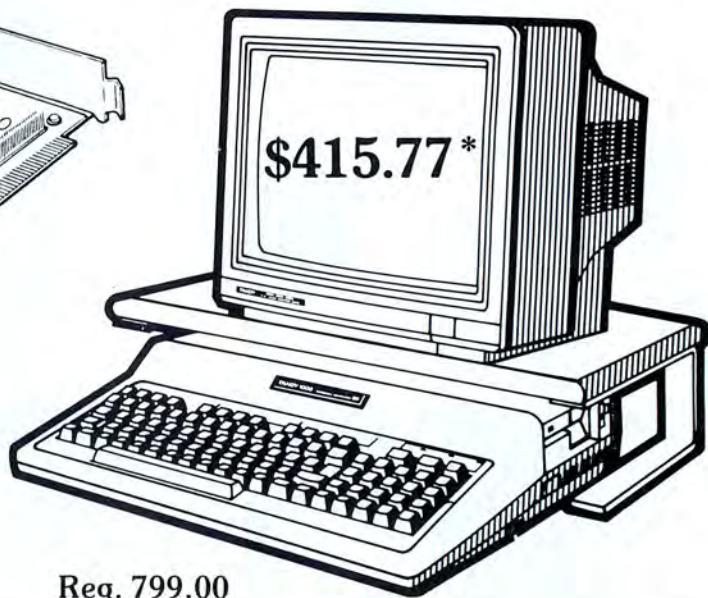
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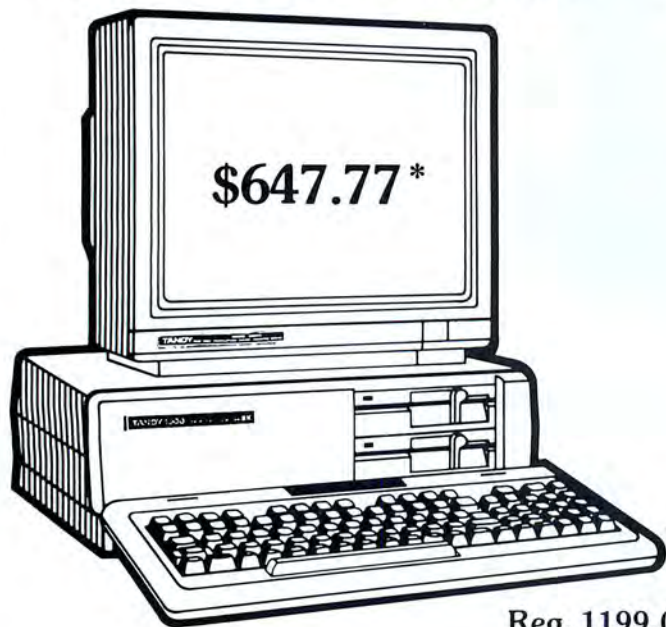


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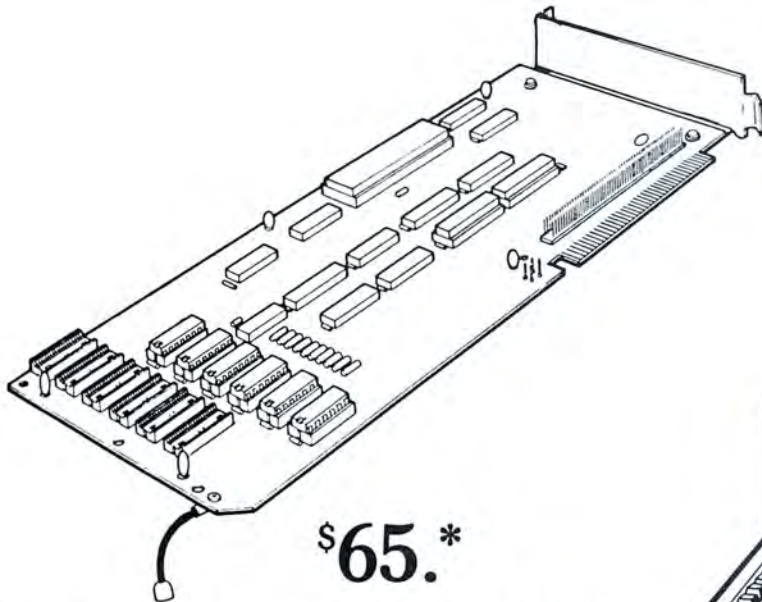
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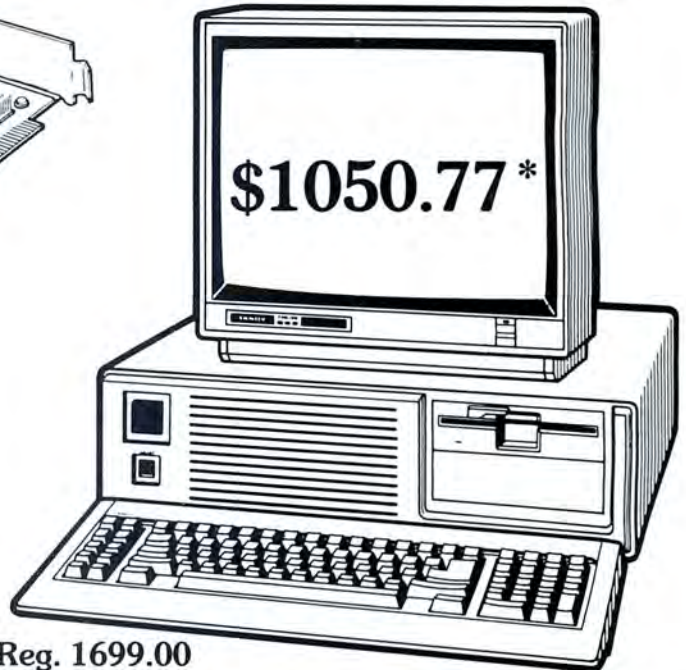
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```

5590 AO=CHR$(190)+CHR$(193)+CHR$(221)+CHR$(227)+CHR$(193)+CHR$(2
01)+CHR$(205)+CHR$(190)+CHR$(192)+CHR$(128)
5600 AR=CHR$(255)+CHR$(193)+CHR$(255)+CHR$(137)+CHR$(153)+CHR$(1
69)+CHR$(201)+CHR$(198)+CHR$(207)+CHR$(207)+CHR$(2,201)+C
5610 AS=CHR$(196)+CHR$(202)+CHR$(201)+CHR$(207)+CHR$(2,201)+C
HR$(169)+CHR$(145)+CHR$(255)+CHR$(193)+CHR$(255)+CHR$(3,1
29)+CHR$(128)
5620 AT=STRINGS(3,129)+CHR$(255)+CHR$(193)+CHR$(255)+CHR$(3,1
29)+CHR$(128)
5630 AU=CHR$(159)+CHR$(161)+CHR$(223)+CHR$(224)+CHR$(2,192)+C
HR$(192)+CHR$(191)+CHR$(2,128)
5640 AV=CHR$(143)+CHR$(145)+CHR$(175)+CHR$(208)+CHR$(224)+CHR$(1
60)+CHR$(144)+CHR$(143)+CHR$(2,128)
5650 AW=CHR$(255)+CHR$(193)+CHR$(255)+CHR$(2,192)+CHR$(252)+C
HR$(192)+CHR$(255)+CHR$(2,128)
5660 AX=CHR$(193)+CHR$(255)+CHR$(162)+CHR$(148)+CHR$(136)+CHR$(1
48)+CHR$(162)+CHR$(2,193)+CHR$(128)
5670 AY=CHR$(131)+CHR$(133)+CHR$(251)+CHR$(196)+CHR$(248)+CHR$(1
32)+CHR$(130)+CHR$(129)+CHR$(2,128)
5680 AZ=STRINGS(2,193)+CHR$(225)+CHR$(223)+CHR$(201)+CHR$(197)+C
HR$(195)+CHR$(193)+CHR$(2,128)
5690 RETURN

```

End

Program Listing 3. Character set 2.

```

5000 REM ***** CHARACTER SET 2 *****
5010 REM ***** SYMBOLS AND DIGITS *****
5020 C1=STRINGS(3,128)+STRINGS(3,174)+STRINGS(4,128):REM (1)
5030 C2=CHR$(128)+CHR$(142)+CHR$(128)+CHR$(142)+STRINGS(2,128)+C
HR$(142)+CHR$(128)+CHR$(142)+CHR$(128):REM (**)
5040 C3=STRINGS(2,128)+CHR$(148)+CHR$(196)+STRINGS(2,148)+CHR$(1
96)+CHR$(148)+STRINGS(2,128):REM (#)
5050 C4=CHR$(128)+CHR$(164)+CHR$(128)+CHR$(2,176)+CHR$(255)+STRINGS(3,1
76)+CHR$(146)+CHR$(128):REM ($)
5060 C5=STRINGS(2,128)+CHR$(134)+CHR$(166)+CHR$(144)+CHR$(136)+C
HR$(132)+CHR$(178)+CHR$(176)+CHR$(128):REM (8)
5070 C6=CHR$(128)+CHR$(180)+CHR$(170)+CHR$(180)+CHR$(176)+C
HR$(152)+CHR$(166)+CHR$(160)+CHR$(128):REM (6)
5080 C7=STRINGS(3,128)+STRINGS(2,142)+CHR$(174)+CHR$(158)+STRING
$(3,128):REM (')
5090 C8=STRINGS(3,128)+CHR$(156)+CHR$(162)+STRINGS(2,193)+STRING
$(3,128):REM (())
5100 C9=STRINGS(3,128)+STRINGS(2,193)+CHR$(162)+CHR$(156)+STRING
$(3,128):REM (())
5110 D1=CHR$(128)+CHR$(136)+CHR$(170)+CHR$(156)+CHR$(255)+CHR$(1
56)+CHR$(170)+CHR$(136)+STRINGS(2,128):REM (*)
5120 D2=CHR$(128)+STRINGS(3,136)+CHR$(255)+STRINGS(3,136)+STRING
$(2,128):REM (+)
5130 D3=STRINGS(10,128):REM (.)
5140 D4=STRINGS(3,128)+STRINGS(2,152)+CHR$(216)+CHR$(184)+STRING
$(3,128):REM (,)
5150 D5=STRINGS(2,128)+STRINGS(6,140)+STRINGS(2,128):REM (-)
5160 D6=STRINGS(3,128)+STRINGS(3,184)+STRINGS(4,128):REM (.)
5170 D7=STRINGS(2,128)+CHR$(160)+CHR$(176)+CHR$(152)+CHR$(140)+C
HR$(134)+CHR$(130)+STRINGS(2,128):REM (/)
5180 D8=STRINGS(4,128)+STRINGS(2,182)+STRINGS(4,128):REM (:)
5190 D9=STRINGS(4,128)+CHR$(214)+CHR$(182)+STRINGS(4,128):REM (;)
5200 E1=STRINGS(3,128)+CHR$(136)+CHR$(148)+CHR$(162)+CHR$(193)+S
TRINGS(3,128):REM (<)
5210 E2=STRINGS(3,128)+CHR$(193)+CHR$(162)+CHR$(148)+CHR$(136)+S
TRINGS(3,128):REM (<)
5220 E3=STRINGS(2,128)+STRINGS(6,182)+STRINGS(2,128):REM (=)
5230 E4=STRINGS(2,128)+CHR$(132)+CHR$(130)+CHR$(242)+STRINGS(2,1
38)+CHR$(132)+STRINGS(2,128):REM (?)
5240 E5=STRINGS(2,128)+CHR$(156)+CHR$(162)+CHR$(202)+CHR$(210)+C
HR$(204)+STRINGS(3,128):REM (8)
5250 E6=STRINGS(2,128)+CHR$(136)+CHR$(132)+CHR$(130)+CHR$(132)+C
HR$(136)+STRINGS(3,128):REM (8)
5260 E7=STRINGS(3,128)+CHR$(164)+CHR$(174)+CHR$(164)+STRINGS(4,1
28):REM (plus or minus)

```

Listing 3 continued

```

5270 E8=STRINGS(2,128)+CHR$(130)+CHR$(134)+CHR$(140)+CHR$(152)+C
HR$(176)+CHR$(160)+STRINGS(2,128):REM (N)
5280 E9=STRINGS(2,128)+CHR$(8,176)+CHR$(128):REM (.)
5290 N8=STRINGS(2,128)+CHR$(196)+CHR$(209)+CHR$(201)+CHR$(197)+C
HR$(195)+CHR$(190)+STRINGS(2,128):REM (8)
5300 N1=STRINGS(2,128)+CHR$(192)+CHR$(196)+CHR$(194)+CHR$(255)+S
TRINGS(2,192)+STRINGS(2,128):REM (1)
5310 N2=STRINGS(2,128)+CHR$(242)+STRINGS(4,201)+CHR$(198)+STRING
$(2,128):REM (2)
5320 N3=STRINGS(2,128)+CHR$(162)+CHR$(193)+STRINGS(3,201)+CHR$(1
82)+STRINGS(2,128):REM (3)
5330 N4=STRINGS(2,128)+CHR$(143)+STRINGS(2,136)+CHR$(255)+STRING
$(2,136)+STRINGS(2,128):REM (4)
5340 N5=STRINGS(2,128)+CHR$(207)+STRINGS(4,201)+CHR$(177)+STRING
$(2,128):REM (5)
5350 N6=STRINGS(2,128)+CHR$(190)+STRINGS(4,201)+CHR$(177)+STRING
$(2,128):REM (6)
5360 N7=STRINGS(2,128)+CHR$(135)+CHR$(129)+CHR$(241)+CHR$(137)+C
HR$(133)+CHR$(131)+STRINGS(2,128):REM (7)
5370 N8=STRINGS(2,128)+CHR$(182)+STRINGS(4,201)+CHR$(182)+STRING
$(2,128):REM (8)
5380 N9=STRINGS(2,128)+CHR$(134)+STRINGS(4,137)+CHR$(254)+STRING
$(2,128):REM (9)
5390 N10=CHR$(30)+CHR$(27)+CHR$(19)+CHR$(18):CP=CHR$(30)+CHR$(27)
+CHR$(23)+CHR$(18):CD=CHR$(30)+CHR$(27)+CHR$(20)+CHR$(18):R
EM NM=NORMAL SIZE ( ), CP=COMPRESSED (1) CD=CONDENSED (7)
5400 SEL=CHR$(30)+CHR$(27)+CHR$(19)+CHR$(27)+CHR$(14)+CHR$(18):E
PI=CHR$(30)+CHR$(27)+CHR$(15)+CHR$(16):REM SEL (1)=START EL
ONGATION, BEL (1)=END ELONGATION
5410 SBO=CHR$(30)+CHR$(27)+CHR$(31)+CHR$(18):EBO=CHR$(30)+CHR$(2
7)+CHR$(32)+CHR$(18):REM SBO (1)=START BOLD, EBO (1)=END BO
LD
5420 LE ***** CHARACTER SET 2 - LETTERS A-Z *****
5430 AA=CHR$(254)+CHR$(255)+CHR$(143)+STRINGS(4,139)+CHR$(254)+S
TRINGS(2,128)
5440 AB=CHR$(190)+CHR$(255)+CHR$(199)+CHR$(195)+STRINGS(3,203)+C
HR$(182)+STRINGS(2,128)
5450 AC=CHR$(190)+CHR$(255)+CHR$(231)+STRINGS(5,195)+STRINGS(2,1
28)
5460 AD=STRINGS(2,255)+STRINGS(4,195)+CHR$(166)+CHR$(156)+STRING
$(2,128)
5470 AE=STRINGS(2,255)+STRINGS(3,203)+STRINGS(3,195)+STRINGS(2,1
28)
5480 AF=STRINGS(2,255)+STRINGS(3,139)+STRINGS(3,131)+STRINGS(2,1
28)
5490 AG=CHR$(190)+CHR$(255)+CHR$(231)+CHR$(195)+STRINGS(3,203)+C
HR$(243)+STRINGS(2,128)
5500 AH=STRINGS(2,255)+STRINGS(5,136)+CHR$(255)+STRINGS(2,128)
5510 AI=STRINGS(3,195)+CHR$(255)+STRINGS(3,195)+STRINGS(3,128)
5520 AJ=STRINGS(2,243)+STRINGS(2,195)+CHR$(191)+STRINGS(3,131)+S
TRINGS(2,128)
5530 AK=STRINGS(2,255)+CHR$(136)+CHR$(132)+CHR$(138)+CHR$(147)+C
HR$(163)+CHR$(195)+STRINGS(2,128)
5540 AL=STRINGS(2,255)+STRINGS(6,192)+STRINGS(2,128)
5550 AM=CHR$(254)+CHR$(255)+CHR$(135)+CHR$(131)+CHR$(158)+CHR$(1
31)+CHR$(135)+CHR$(254)+STRINGS(2,128)
5560 AN=CHR$(254)+CHR$(255)+CHR$(135)+CHR$(131)+CHR$(135)+C
HR$(254)+STRINGS(2,128)
5570 AO=CHR$(190)+CHR$(255)+CHR$(227)+STRINGS(4,195)+CHR$(190)+S
TRINGS(2,128)
5580 AP=STRINGS(2,255)+STRINGS(5,139)+CHR$(134)+STRINGS(2,128)
5590 AQ=CHR$(190)+CHR$(255)+CHR$(227)+CHR$(195)+CHR$(211)+CHR$(1
98)+STRINGS(2,192)+STRINGS(2,128)
5600 AR=STRINGS(2,255)+STRINGS(3,139)+CHR$(155)+CHR$(171)+CHR$(1
98)+STRINGS(2,128)
5610 AS=CHR$(198)+CHR$(207)+STRINGS(5,203)+CHR$(179)+STRINGS(2,1
28)
5620 AT=STRINGS(3,131)+CHR$(255)+STRINGS(3,131)+STRINGS(3,128)
5630 AU=CHR$(191)+CHR$(255)+CHR$(224)+STRINGS(4,192)+CHR$(191)+S
TRINGS(2,128)
5640 AV=CHR$(143)+CHR$(159)+CHR$(176)+CHR$(224)+CHR$(160)+CHR$(1
44)+CHR$(143)+STRINGS(3,128)

```

Listing 3 continued



5650 AW=CHRS(191)+CHRS(255)+CHRS(224)+CHRS(192)+CHRS(188)+STRING  
 \$(2,192)+CHRS(191)+STRING\$(2,128)  
 5660 AX=CHRS(227)+CHRS(182)+CHRS(156)+CHRS(136)+CHRS(148)+CHRS(1  
 62)+CHRS(193)+STRING\$(3,128)  
 5670 AY=CHRS(131)+CHRS(134)+CHRS(140)+CHRS(248)+CHRS(132)+CHRS(1  
 30)+CHRS(129)+STRING\$(3,128)  
 5680 AZ=CHRS(128)+CHRS(195)+CHRS(227)+CHRS(211)+CHRS(203)+CHRS(1  
 99)+CHRS(195)+CHRS(193)+STRING\$(2,128)  
 5690 RETURN

End

Program Listing 4. Character set 3.

5000 REM \*\*\*\*\* CHARACTER SET 3 \*\*\*\*\*  
 5010 REM \*\*\*\*\* SYMBOLS AND DIGITS \*\*\*\*\*  
 5020 C1=STRING\$(3,255)+STRING\$(3,209)+STRING\$(4,255)+REM (1)  
 5030 C2=CHRS(255)+CHRS(241)+CHRS(255)+CHRS(241)+STRING\$(2,255)+C  
 HRS(241)+CHRS(255)+CHRS(241)+CHRS(255)+REM (\*)  
 5040 C3=STRING\$(2,255)+CHRS(235)+CHRS(193)+STRING\$(2,235)+CHRS(1  
 93)+CHRS(235)+STRING\$(2,255)+REM (#)  
 5050 C4=CHRS(255)+CHRS(219)+STRING\$(2,213)+CHRS(128)+STRING\$(3,2  
 13)+CHRS(237)+CHRS(249)+REM (\$)  
 5060 C5=STRING\$(2,255)+CHRS(209)+CHRS(217)+CHRS(239)+CHRS(247)+C  
 HRS(251)+CHRS(205)+CHRS(207)+CHRS(255)+REM (#)  
 5070 C6=CHRS(255)+CHRS(201)+STRING\$(2,213)+CHRS(203)+CHRS(207)+C  
 HRS(231)+CHRS(217)+CHRS(223)+CHRS(255)+REM (6)  
 5080 C7=STRING\$(3,255)+STRING\$(2,241)+CHRS(209)+CHRS(225)+STRING  
 \$(3,255)+REM (4)  
 5090 C8=STRING\$(3,255)+CHRS(227)+CHRS(221)+STRING\$(2,190)+STRING  
 \$(3,255)+REM (1)  
 5100 C9=STRING\$(3,255)+STRING\$(2,190)+CHRS(221)+CHRS(227)+STRING  
 \$(3,255)+REM (1)  
 5110 D1=CHRS(255)+CHRS(247)+CHRS(213)+CHRS(227)+CHRS(128)+CHRS(2  
 27)+CHRS(213)+CHRS(247)+STRING\$(2,255)+REM (\*)  
 5120 D2=CHRS(255)+STRING\$(3,247)+CHRS(193)+STRING\$(3,247)+STRING  
 \$(2,255)+REM (+)  
 5130 D3=STRING\$(10,255)+REM ( )  
 5140 D4=STRING\$(3,255)+STRING\$(2,231)+CHRS(167)+CHRS(199)+STRING  
 \$(3,255)+REM ( )  
 5150 D5=STRING\$(2,255)+STRING\$(6,243)+STRING\$(2,255)+REM (-)  
 5160 D6=STRING\$(3,255)+STRING\$(3,199)+STRING\$(4,255)+REM (.)  
 5170 D7=STRING\$(2,255)+CHRS(223)+CHRS(207)+CHRS(231)+CHRS(243)+C  
 HRS(249)+CHRS(253)+STRING\$(2,255)+REM (/)  
 5180 D8=STRING\$(4,255)+STRING\$(2,201)+STRING\$(4,255)+REM (:)  
 5190 D9=STRING\$(4,255)+CHRS(169)+CHRS(201)+STRING\$(4,255)+REM (;  
 5200 E1=STRING\$(3,255)+CHRS(247)+CHRS(235)+CHRS(221)+CHRS(190)+S  
 TRING\$(3,255)+REM (<)  
 5210 E2=STRING\$(3,255)+CHRS(190)+CHRS(221)+CHRS(235)+CHRS(247)+S  
 TRING\$(3,255)+REM (<)  
 5220 E3=STRING\$(2,255)+STRING\$(6,201)+STRING\$(2,255)+REM (=)  
 5230 E4=STRING\$(2,255)+CHRS(251)+CHRS(253)+CHRS(205)+STRING\$(2,2  
 45)+CHRS(251)+STRING\$(2,255)+REM (?)  
 5240 E5=STRING\$(2,255)+CHRS(227)+CHRS(221)+CHRS(181)+CHRS(173)+C  
 HRS(179)+STRING\$(3,255)+REM (8)  
 5250 E6=STRING\$(2,255)+CHRS(247)+CHRS(251)+CHRS(253)+CHRS(251)+C  
 HRS(247)+STRING\$(3,255)+REM (~)  
 5260 E7=STRING\$(3,255)+CHRS(219)+CHRS(209)+CHRS(219)+STRING\$(4,2  
 55)+REM (plus or minus)  
 5270 E8=STRING\$(2,255)+CHRS(253)+CHRS(249)+CHRS(243)+CHRS(231)+C  
 HRS(207)+CHRS(223)+STRING\$(2,255)+REM (\)  
 5280 E9=CHRS(255)+STRING\$(8,207)+CHRS(255)+REM (\)  
 5290 N0=STRING\$(2,255)+CHRS(193)+CHRS(174)+CHRS(182)+CHRS(186)+C  
 HRS(188)+CHRS(193)+STRING\$(2,255)+REM (0)  
 5300 N1=STRING\$(2,255)+CHRS(191)+CHRS(187)+CHRS(189)+CHRS(128)+S  
 TRING\$(2,191)+STRING\$(2,255)+REM (1)

5310 N2=STRING\$(2,255)+CHRS(141)+STRING\$(4,182)+CHRS(185)+STRING  
 \$(2,255)+REM (2)  
 5320 N3=STRING\$(2,255)+CHRS(221)+CHRS(190)+STRING\$(3,182)+CHRS(2  
 01)+STRING\$(2,255)+REM (3)  
 5330 N4=STRING\$(2,255)+CHRS(240)+STRING\$(2,247)+CHRS(128)+STRING  
 \$(2,247)+STRING\$(2,255)+REM (4)  
 5340 N5=STRING\$(2,255)+CHRS(176)+STRING\$(4,182)+CHRS(206)+STRING  
 \$(2,255)+REM (5)  
 5350 N6=STRING\$(2,255)+CHRS(193)+STRING\$(4,182)+CHRS(206)+STRING  
 \$(2,255)+REM (6)  
 5360 N7=STRING\$(2,255)+CHRS(248)+CHRS(254)+CHRS(142)+CHRS(246)+C  
 HRS(250)+CHRS(252)+STRING\$(2,255)+REM (7)  
 5370 N8=STRING\$(2,255)+CHRS(201)+STRING\$(4,182)+CHRS(201)+STRING  
 \$(2,255)+REM (8)  
 5380 N9=STRING\$(2,255)+CHRS(249)+STRING\$(4,246)+CHRS(129)+STRING  
 \$(2,255)+REM (9)  
 5390 N0=CHRS(30)+CHRS(27)+CHRS(19)+CHRS(18)+CP=CHRS(30)+CHRS(27)  
 +CHRS(23)+CHRS(18)+CD=CHRS(30)+CHRS(27)+CHRS(18)+R  
 EM NM=NORMAL SIZE ( ) CP=COMPRESSED (1) CD=CONDENSED (~)  
 5400 SE=CHRS(30)+CHRS(27)+CHRS(19)+CHRS(27)+CHRS(14)+CHRS(18)+E  
 L=CHRS(30)+CHRS(27)+CHRS(15)+CHRS(18)+REM SEL (1)=START EL  
 ONGATION,SEL (1)=END ELONGATION  
 5410 SBO=CHRS(30)+CHRS(27)+CHRS(31)+CHRS(18)+EBO=CHRS(30)+CHRS(2  
 7)+CHRS(32)+CHRS(18)+REM SBO (1)=START BOLD, EBO (1)=END BO  
 LD  
 5420 REM \*\*\*\*\* CHARACTER SET 3 - LETTERS A-Z \*\*\*\*\*  
 5430 AA=CHRS(255)+CHRS(195)+CHRS(237)+STRING\$(5,237)+CHRS(195)+C  
 HRS(255)  
 5440 AB=CHRS(255)+CHRS(193)+STRING\$(3,221)+STRING\$(3,213)+CHRS(2  
 35)+CHRS(255)  
 5450 AC=CHRS(255)+CHRS(193)+STRING\$(7,221)+CHRS(255)  
 5460 AD=CHRS(255)+CHRS(193)+STRING\$(5,221)+CHRS(235)+CHRS(247)+C  
 HRS(255)  
 5470 AE=CHRS(255)+CHRS(193)+STRING\$(4,213)+STRING\$(3,221)+CHRS(2  
 55)  
 5480 AF=CHRS(255)+CHRS(193)+STRING\$(4,245)+STRING\$(3,253)+CHRS(2  
 55)  
 5490 AG=CHRS(255)+CHRS(227)+STRING\$(2,221)+STRING\$(4,213)+CHRS(2  
 57)+CHRS(255)  
 5500 AH=CHRS(255)+CHRS(193)+STRING\$(6,247)+CHRS(193)+CHRS(255)  
 5510 AI=CHRS(255)+STRING\$(3,221)+CHRS(193)+STRING\$(3,221)+STRING  
 \$(2,255)  
 5520 AJ=CHRS(255)+CHRS(231)+STRING\$(6,223)+CHRS(225)+CHRS(255)  
 5530 AK=STRING\$(2,255)+CHRS(193)+CHRS(247)+CHRS(245)+CHRS(245)+C  
 HRS(237)+CHRS(221)+STRING\$(2,255)  
 5540 AL=CHRS(255)+CHRS(193)+STRING\$(7,223)+CHRS(255)  
 5550 AM=CHRS(255)+CHRS(195)+STRING\$(3,253)+CHRS(227)+STRING\$(2,2  
 53)+CHRS(195)+CHRS(255)  
 5560 AN=CHRS(255)+CHRS(193)+STRING\$(6,253)+CHRS(195)+CHRS(255)  
 5570 AO=CHRS(255)+CHRS(227)+STRING\$(6,221)+CHRS(227)+CHRS(255)  
 5580 AP=CHRS(255)+CHRS(193)+STRING\$(6,245)+CHRS(251)+CHRS(255)  
 5590 AQ=CHRS(255)+CHRS(243)+STRING\$(4,237)+CHRS(229)+CHRS(237)+C  
 HRS(221)+CHRS(255)  
 5600 AR=CHRS(255)+CHRS(193)+STRING\$(3,245)+CHRS(229)+STRING\$(2,2  
 13)+CHRS(219)+CHRS(255)  
 5610 AS=CHRS(255)+CHRS(219)+STRING\$(6,213)+CHRS(237)+CHRS(255)  
 5620 AT=CHRS(255)+STRING\$(3,253)+CHRS(193)+STRING\$(3,253)+STRING  
 \$(2,255)  
 5630 AU=CHRS(255)+CHRS(225)+STRING\$(6,223)+CHRS(225)+CHRS(255)  
 5640 AV=CHRS(255)+CHRS(249)+CHRS(247)+CHRS(239)+STRING\$(2,223)+C  
 HRS(239)+CHRS(247)+CHRS(249)+CHRS(255)  
 5650 AW=CHRS(255)+CHRS(241)+CHRS(239)+CHRS(223)+CHRS(227)+CHRS(2  
 23)+CHRS(239)+CHRS(241)+STRING\$(2,255)  
 5660 AX=CHRS(255)+STRING\$(2,221)+CHRS(237)+CHRS(247)+CHRS(237)+S  
 TRING\$(2,221)+STRING\$(2,255)  
 5670 AY=CHRS(255)+STRING\$(2,253)+CHRS(251)+CHRS(199)+CHRS(251)+S  
 TRING\$(2,253)+STRING\$(2,255)  
 5680 AZ=STRING\$(2,255)+CHRS(221)+CHRS(205)+CHRS(213)+CHRS(217)+S  
 TRING\$(2,221)+STRING\$(2,255)  
 5690 RETURN



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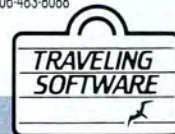
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# Avoiding the Backslash

Last month, I began exploring MS-DOS's undocumented features. This month, I will continue and demonstrate another feature of the system. My small utility might ease the pain of a lot of Tandy 1000 users, so pay attention.

I like the keyboard layout on the Tandy 1000. As always, some features could be implemented in a more desirable way. Placement of the backslash (\) key used extensively as a subdirectory separator is one of those features. In the standard IBM configuration, this key is located centrally on the main keyboard. The Tandy 1000 keyboard locates this key on the keyboard's far right, in the numeric keypad. I have to take my right hand completely off the main key rows to reach this key.

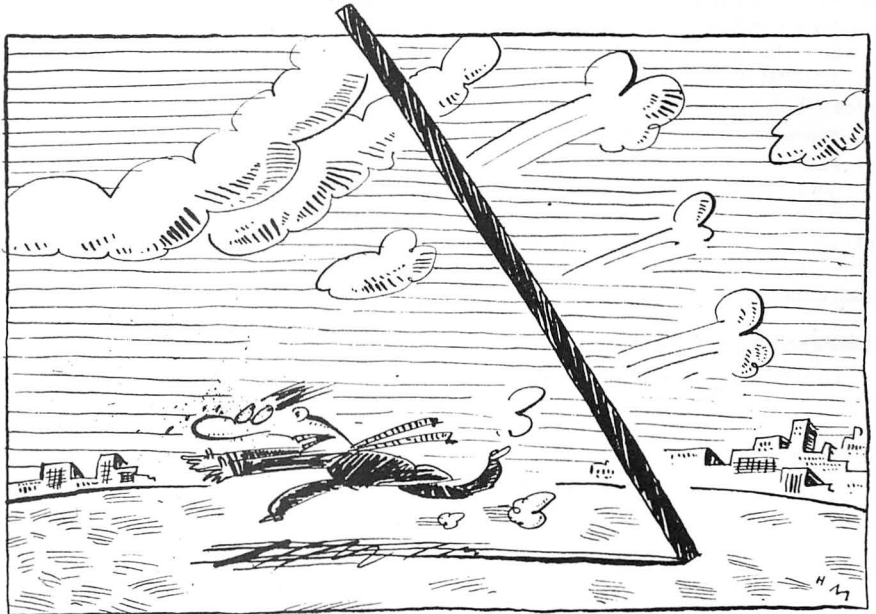
MS-DOS implements a flexible parameter-switch designator, and DOS version 2 contains an undocumented command you could use in the configuration file to set the switch character to something other than the default slash (/). Why do this? For example, if you change the switch character to a hyphen (-), you can then use the / character for subdirectories, as in C:/DOS/UTIL versus the normal format C:\DOS\UTIL.

This is much more convenient, as you no longer have to move your fingers from the home row while typing DOS commands. Unfortunately, this is not the total answer—Microsoft removed this configuration command from version 3. Also, any simple changes to the switch character requires rebooting the system to install the new configuration commands.

The short assembly-language Program Listing furnishes a simple solution. It uses an undocumented MS-DOS function call to manipulate this DOS parameter switch. The operating system uses this function call to determine the current switch character setting for each of its commands. This function also provides an entry point for setting the switch character to a new value.

You can build SWITCHAR.COM in two ways. Type in the assembly source code from the Listing and assemble it using the following commands (for Microsoft's MASM assembler):

```
MASM SWITCHAR;
LINK SWITCHAR;
EXE2BIN SWITCHAR SWITCHAR.COM
```



Don't worry about the error message warning you of the missing stack segment when you perform the link phase. This is normal for creating a binary-image COM file.

The other alternative is to enter the statements from the Figure into a script file using any text editor or word processor that can save the commands in a DOS text file or ASCII format. Make sure that you type the commands as listed—even the blank line is critical. Save the commands to disk using the file name of SWITCHAR.SCR. Next, load Debug and issue the following command to create SWITCHAR.COM:

```
DEBUG <SWITCHAR.SCR
```

Operation of SWITCHAR is simple. If you include a character following the command name, the DOS switch character is changed to this character. If no command tail is present or the length indicates more than one character, the tail is ignored and the current value of the switch character is listed to the video screen. Not bad for 85 bytes of program space.

The only cryptic part of the Listing is the processing of the command line. DOS creates an area preceding each program called the program segment prefix. Among other items, this area includes the character string representing the remainder of the command line after removing the program name. It is commonly referred to as the "command tail."

This area begins at offset address

0080 hexadecimal (hex) in the code/data space for a COM file, and this byte contains a count of the characters in the command tail. This byte count is immediately followed by the character string from the remainder of the command line, and this string ends with a carriage return. Since a single blank usually separates the tail from the command name, the byte count will be 2 if a character is present for SWITCHAR to process.

## Assemblers and Mysticism

Two deterrents prevent many people from learning assembly. Some find the language overwhelming and mystical, while others do not want to invest the money to experiment with the assembler. Most public-domain alternatives are limited and often hinder more than they help.

However, I have located an astounding assembler called A86 by Eric Isaacson. It implements the 8086/186/286 instruction set (no protected mode) and provides the many other features contained in MASM, such as macroinstruction definition and conditional assembly. Best of all, it is a shareware program. It costs you nothing to experiment and a modest fee (\$40) if you want to register and support the author.

It supports a great deal of the "other" assembler's language and is fast. Isaacson claims that it assembles at approximately 1,000 lines per second on an IBM



PC/AT, and I believe it. It includes many language extensions that add overwhelming versatility.

It does have some limitations. A86 does not support the protected operating environment on the 80286 chips and does not have the floating-point instructions to support the 8087/80287 coprocessors. A86 is also limited to small memory model COM files and cannot produce OBJ files to link to other programs.

Isaacson appears eminently qualified to produce such an assembler. He worked for Intel and has been involved with its microprocessors since the days of the 8080. He was part of a two-man team that implemented the first ASM86 assembler.

## Learning Assembly

The only way to learn assembly is to study good code examples and under-

stand the explanations provided. Then you must jump in and try your hand at it. Many reference works are on the market, and I want to discuss those that are most useful for getting started.

*The Assembly Language Primer for the IBM PC and XT*, by Robert Lafore (The Waite Group, 1984), is an excellent work. The style is clear and concise with good explanations of the hardware features and well-positioned demonstration programs that work. I like this book because it introduces you to both the machine-language environment and the computer architecture that you will need to work with the IBM compatibles.

On both topics, this introduction is easy and understandable. More to the point, the book is packed with little assembly routines that you always need but never want to write. Lafore's style contributes an easy learning environment

while tackling most of the complexities of the Intel 80xxx architectures.

*The MS-DOS Developer's Guide*, by John Angemeyer and Kevin Jaeger (The Waite Group, 1986), sounds somewhat ominous. These authors also have an easy writing style that leads you rapidly through structured coding techniques to programming in an MS-DOS environment, memory-resident programs, device drivers, and programming for the math coprocessors.

This book has exquisite programming examples and is one of the best works I have seen to illustrate structured programming features and macros. Again, these programming examples reinforce the material and develop working programs that you can run and experiment with.

Angemeyer and Jaeger also treat topics that you cannot find adequately documented elsewhere. They provide working examples of device drivers with detailed explanations, complete discussions of terminate-and-stay-resident (TSR) programs and methods for removing them, and a complete discussion of disk structure. This section contains a detailed utility for recovering files on floppy disks that you could easily extend to work with hard disks.

*The Peter Norton Programmer's Guide to the IBM PC*, by Peter Norton (Microsoft Press, 1985), is a necessity for anyone who writes software in the IBM-compatible environment. Norton's book doesn't provide the wealth of programming examples in the former references. In fact, many examples are code fragments written in a program design language based heavily on Basic. This book does provide complete reference of MS-DOS functions, basic input/output system (BIOS) functions, hardware programming features, low-memory data-communication areas, and much more.

Norton presents a well-organized discussion of all facets of the IBM architecture. His book adequately documents the frequently used areas in the BIOS communication memory page. It is also the only reference that documents the features of the IBM PC, XT, AT, and PCjr. Tandy 1000 users should appreciate this, as that machine's graphics behave almost identically to the jr's.

## Conclusion

I hope you find the parameter-switch character routine useful. It has helped me.

Am I justified in letting you know of all these undocumented features in MS-DOS? I think so—version 3.2 continues these features, and this is probably the last release for a single-user operating system, particularly where the 8088 chip is involved. This system is relatively stable,

### Program Listing. Get/Set parameter switch character.

```

;*****
;*
;* Print or Set the DOS "switch" character using an undocumented
;* function call in MS-DOS.
;*
;* Syntax:
;* SWITCHAR [c]
;*
;* where "c" specifies an optional character to set for the DOS
;* switch character. If no parameter is present or it is not a
;* single character, SWITCHAR returns the current value of the DOS
;* switch character.
;*
;*****
PAGE      ,132
CODE      SEGMENT
ORG       0080H
PSPCnt    DB      ?
CmdLine   DB      ?

ORG       0100H
ASSUME    DS:CODE, CS:CODE, ES:CODE, SS:CODE

SwitchChar:
JMP      Start

Message    DB      'The switch character is now "'
MsgChar    DB      ?
           DB      ' ",',13,10,'$'

Start:
MOV       AH,PSPCnt           ;Get command tail char count
CMP       AH,2                ;Test for char present
JNZ       PrintOutChar

MOV       DL,CmdLine+1       ;Get new switch char
PUSH     DX
MOV       AH,37H             ;Get/Set switch char
MOV       AL,1                ;Sub-function to set switch char
INT      21H                 ;Execute DOS function
POP       DX                  ;Retrieve character
JMP      PrintOut2

PrintOutChar:
MOV       AH,37H             ;Get/Set switch char
MOV       AL,0                ;Sub-function to return switch char
INT      21H                 ;Execute DOS function

PrintOut2:
MOV       BYTE PTR MsgChar,DL ;Store character in message
MOV       AH,9                ;DOS Write String
MOV       DX,OFFSET Message
INT      21H                 ;Write out message
MOV       AH,4CH              ;Terminate Process
MOV       AL,0                ; .. with no error
INT      21H

CODE      ENDS
END       SwitchChar

```

End



```

a0100
JMP 0126
NOP
DB 'The switch character is now " .',d,a,'$'
MOV AH,[0080]
CMP AH,02
JNZ 013E
MOV DL,[0082]
PUSH DX
MOV AH,37
MOV AL,01
INT 21
POP DX
JMP 0144
NOP
MOV AH,37
MOV AL,00
INT 21
MOV [0120],DL
MOV AH,09
MOV DX,0103
INT 21
MOV AH,4C
MOV AL,00
INT 21

n SWITCHAR.COM
rcx
0055
w
q
    
```

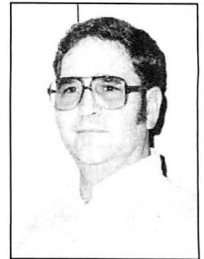
Figure. This Debug script creates SWITCHAR.COM. Enter the text using any word processor or program editor that can save the file in ASCII. Make sure you enter it just as it appears, including the blank lines.

and I do not think that it will change except for minor version releases.

I spoke about the A86 assembler, and I have an offer to make. Send me a disk in a self-addressed mailer with the correct return postage, and I'll return it with a copy of the assembler. Take a few additional minutes and drop me a note to tell me what your continued interests are or use Easyplex on Compuserve. (My number is 73016,1326 and I frequent the TRS80PRO SIG.)

Send your disks and mailers to LCDR John B. Harrell III, 1519-A Carswell Circle, Bolling Air Force Base, Washington, DC 20336. I'll be looking forward to next month when I explore some more areas of your DOS. ■

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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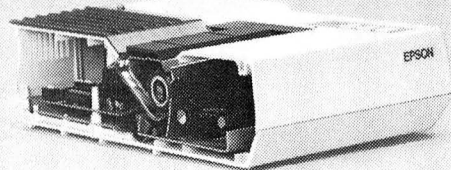
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# More Word-Processing Goodies

Last month I discussed some of the larger, professional-quality word-processing programs in the public domain. Those programs were PC-Write, PC-Type+, New York Word, and Wordplan. This month, I will continue where I left off with a few other word processors and also tell you about a few public-domain word-processing tools. The Table tells you where to order by mail those programs whose authors request donations.

## Galaxy

Like Wordplan described last month, Galaxy 1.3 has Framework-type pull-down menus and Wordstar-like commands, and it can use Borland's Turbo Lightning as a spelling checker.

Omniverse, the company that produces Galaxy, doesn't consider its program as being in the public domain or free. Though non-registered users can use Galaxy on a trial basis, they are expected to fork over either \$25 for registration or \$35 for complete registration, which includes 20 printer drivers and a reference manual on disk.

Omniverse also sells Galaxy 2.0, which is not distributed on the shareware concept, for \$49.95. This enhanced version allows headers, footers, justification, and column blocks. It comes with a printed reference guide. Apparently, Galaxy 1.3 is just a tickler to get you interested in 2.0.

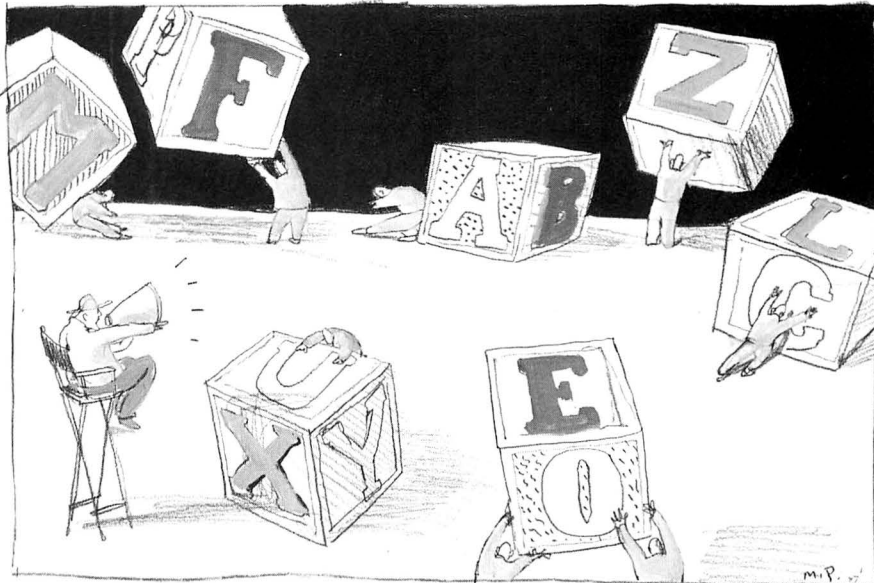
Other than its word-processing controls, menus, and the ability to interface with Turbo Lightning, no similarity exists between Wordplan and Galaxy. Where Wordplan is better suited as a report generator, Galaxy is better suited as a word processor, with more commands and a help menu. Galaxy also provides a quick-reference guide on disk.

You can execute commands or get help on non-Wordstar commands from the menu. There are sometimes three ways to perform a function. To mark the beginning and end of a block, for example, you can use the Wordstar control commands, select the tasks from the pull-down menu, or press the F7 and F8 function keys.

Galaxy has a fast search command, and it is logically structured and easy to use.

## Edwin

Though not a full-function word processor, Edwin is the text editor I like best



## Word Processing for Kids is designed for simplicity.

for creating disk text files. Edwin is a programmer's editor written by Kim Kokkonen of Turbopower Software and fashioned after Borland International's Editor Toolbox. Turbopower asks for no donation, but if you want the latest version of the program, send \$10. The documentation states that if you ask for support, expect to donate enough to cover costs.

Edwin offers no pull-down menus or spelling checker; it's just a plain text editor. It has Wordstar-like commands and allows windows, block moves, and undeleting. On-line help is also available. The current version of Edwin is 1.5B. I prefer a previous version, 1.4. Its help file is easier to read. Version 1.4 doesn't include a provision for printing as version 1.5B does. However, you can fool Edwin 1.4 into printing your text by marking all or part of the text and writing it to a file called PRN.

If you program in a compiled language

such as Pascal, C, assembly, or Quick Basic, Edwin can be useful in creating your files for compilation. Edwin is also handy if you need to use a text editor with your communications program. I use Edwin to compose messages from my terminal program before sending them by batch mode to a bulletin-board system (BBS).

## Word Processing for Kids

Sidney D. Nolte had a novel idea of writing a word processor that is a teaching tool for children. Word Processing for Kids (WPK) has a limited command set, but it was designed that way for simplicity. Young children will feel right at home with WPK with its larger-than-life alphanumeric characters. Although WPK usually displays only 20 characters to the line, you can select up to 40 characters per line.

The program even has a musical opening and a graphic menu. Nothing is complicated or fancy with WPK. Kids won't get discouraged using the program and can even print out their efforts. You can save and load files by menu selection. The author asks for a \$10 donation if you like the program.

## Other Word-Processing Tools: CP2

CP2 stands for "cut and paste." This is a background utility written by Stephen R. Davis, Gerry Boyd, and Larry



Weiss. You can call CP2 from within other programs.

Easy-to-use commands let you select text from the screen to place a copy of it in a paste buffer. You can then go to any location on the screen, either in the same program or another, and paste the text there.

CP2 is small and unobtrusive. It works with many existing public-domain and commercial word processors. It doesn't work with programs that do not use the normal DOS function calls. For example, it doesn't work with many versions of the LeScript word processor, though it might work with the latest version. This utility is in the public domain with no donation asked.

### E88

The E88 text editor, by Emery D. Wooten Jr., is a short text editor that, like Edwin, you can also use for programming. E88 has a master command menu that you call with the F1 function key. You can select commands for saving files or setting the default parameters, for example. E88 also has a help screen. It has no formatted printing function, however.

Though simple, this text editor offers a lot. The author requests a \$10 contribution.

### EZSpell

EZSpell, by Samuel H. Smith, is a spelling checker for use with ASCII files. The dictionary isn't very efficient, as it doesn't store words in compressed format. You can add your own words to its dictionary or create a customized dictionary and either merge it with EZSpell's or replace it. No contribution is asked for this program.

### Letrhead

Letrhead, by Technical Service Associates, creates customized letterheads using your dot-graphics Epson or IBM printer or compatible. You also need a text editor or word processor to create an enlarged version of the design you wish to create.

Letrhead prints your letterhead design on printer paper or on envelopes, if they fit properly in your printer. Technical Service Associates requests a contribution of \$5 or else \$10 for a disk holding the Turbo Pascal source code and the latest version.

### Perfskip

Perfskip, by David Ray, is a printer utility to let you skip over perforations using the appropriate Epson-compatible command. You can specify the number of lines you want to skip. This program

works well with Edwin 1.4 to print text using the method I described. No contribution is requested.

### Textcon

Textcon, by Chris Wolf, is an interesting utility. Many times I've had to transfer a file from one word processor to another. Most word processors can save a file in ASCII format, but in doing so add hard carriage returns to the file. On another word processor, the transferred text requires some cleanup to eliminate these carriage returns. Textcon does this task automatically.

## Letrhead creates customized letterhead designs using dot-graphics printers.

Textcon analyzes the file to ensure that it doesn't remove too many carriage returns and thus preserves paragraphs. I've used Textcon successfully to download long text files from message services. In some cases, I've had to run Textcon twice on the file because of an idiosyncrasy in the number of carriage returns put into the file by the message service. Textcon automatically identifies Wordstar files and converts them to ASCII format.

The author requests a \$25 donation from those who try and like Textcon. In return, he will send an additional

program to convert programs to a DCA/RFT format used by many PC word-processing programs, but I am not sure which ones.

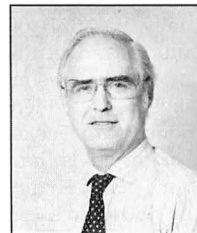
### Next Month

Word processing is a primary use for home computers these days. Though this and last month's selections covered a large variety, many more word processors and tools are available for download on BBSes around the country. Next month, I'll hit upon how you can access these boards, what equipment and software you need, and what you do after you get on.

All programs from this month's Public Works are available for downloading on the 80 Micro BBS. As a convenience, I again offer disks for 80 Micro readers. The cost is \$6 plus \$2 shipping for each disk. The disks are Galaxy and WPK, Edwin (both 1.4 and 1.5B on one disk), and the other word-processing tools. Please don't ask for anything other than what I offer. I urge you to write me, but please do so separately.

### The 80 Micro BBS

All public-domain software discussed in the Public Works column is available for downloading from the 80 Micro BBS for a period of time. The phone number is 603-924-6985 (300/1,200 baud, 8-bit words, no parity, 1 stop bit). ■



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Columbia, SC 29210

Textcon  
1521 Greenview Ave.  
East Lansing, MI 48823

Word Processing for Kids  
13858 Peyton Drive  
Dallas, TX 75240

Table. Addresses for ordering by mail the shareware programs mentioned this month.



# The Rules of Bank Switching

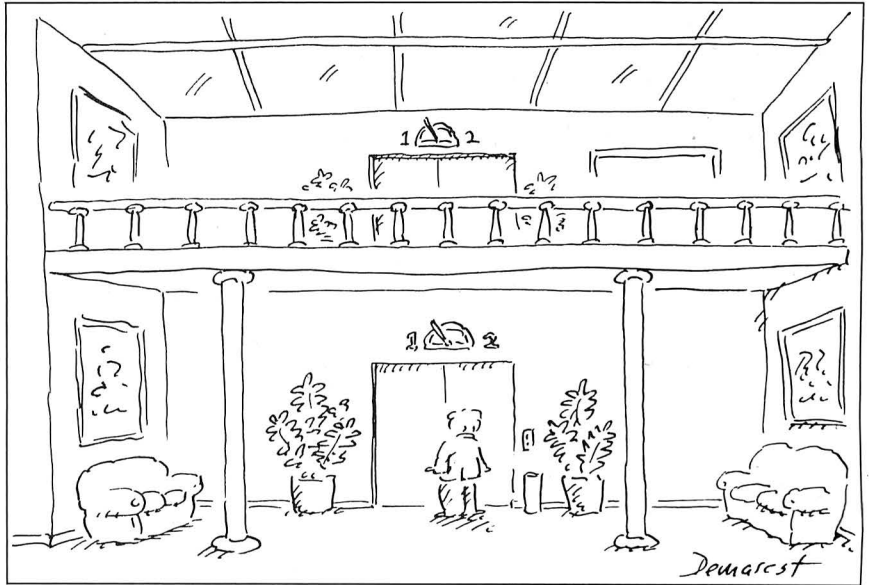
The warnings in the *Model 4/4P Technical Reference Manual* sound ominous: "This section on bank switching is intended for the professional." If you heed the warnings, you might never use the alternate banks of memory in your Model 4 for more than a RAM disk or print spooler.

Actually, the alternate memory banks are easier to use than some of the Model 4's other features, at least from assembly language. If you understand how the Model 4's memory is organized and observe a few simple precautions, you should have no trouble writing programs that save data or run in the alternate banks.

The Model 4's Z80 CPU can address only 64K bytes of memory. As far as the CPU is concerned, your Model 4 can't have any more memory. Whether you've added memory chips that upgrade to 128K or plugged in add-on boards that increase the Model 4's memory to 256K, 512K, or 1,024K of RAM, the Z80 only "sees" 64K of memory at a time.

A 64K Model 4 actually has 66K of RAM: 64K of "main memory" and an additional 2K of video memory. The reason that you can't directly access the video memory in Model 4 mode (with Peeks and Pokes in Basic, for example) is that the 2K video memory isn't generally included in the 64K that the Z80 addresses. Like the memory you've added past 64K, it is normally invisible to the Z80.

Electronic hardware switches inside the Model 4 can change the addressing of various parts of memory. If you set one switch, the Model 4 "bank-switches" the 2K video RAM and 1K of memory space dedicated to the keyboard into addressable memory from 0F400 to 0FFFF hexadecimal (hex). Simultaneously, the



memory that is normally at that location becomes invisible to the Z80. Once you set the bank switch, it is as trivial a matter to write to screen memory as it is to write to any other memory address.

## Sets Switch

When you ask TRSDOS to put a character on the screen with the @DSP supervisory call (SVC), it sets the video-banking switch, writes to the banked video memory, and resets the switch so the video memory "disappears." Other circuitry translates the contents of video memory into the characters and graphics that you see on the screen. Since bank switching is almost instantaneous, the entire operation requires very little time.

If you have more than 64K of general RAM, TRSDOS switches banks in and out of the Z80's address space as they are needed. Because the Model 4's internal circuitry insists on seeing RAM as 32K banks of memory, with each RAM-bank switch one-half of the Z80's normal address space swaps with a normally invisible bank.

If a program handles the details of setting and resetting the switches itself, it can switch the alternate banks into memory either from address 0000 to 7FFF hex or from 8000 to 0FFFF hex. Working at this low level, however, is tricky, and a minor bug can cause catastrophic results. Your program becomes

responsible for all interrupt handling, device input/output (I/O), and linking to TRSDOS and high-memory drivers.

Using the TRSDOS @BANK SVC to do the low-level work is safer, allows your software to be compatible with other programs, and lets you concentrate your programming efforts on the higher-level logic of using banked memory intelligently. TRSDOS does all bank switching in the upper half of memory (address range 8000-0FFFF hex) so that TRSDOS is always available in low memory.

If you use TRSDOS to control banking, it automatically brings the "normal" bank back during I/O processing and interrupt handling so that all resident drivers are present in both low and high memory. TRSDOS restores the current bank before returning control to your program. TRSDOS can perform many bank switches that are invisible to your program and that happen fast enough that they do not slow your computer down noticeably.

## Rules to Use SVC

You must follow only a few rules to use the @BANK SVC. Although you can run programs in alternate banks, all device drivers and filters, all disk sector buffers, and all interrupt handlers must be either in the lower half of memory or in bank zero (the "normal" resident bank).

You must ensure that the stack is in the

## System 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. Demonstration program.*

```

00100 ;-----
00110 ; Alternate Bank Demonstration Program
00120 ;
00130 ; Uses an alternate bank as a cache for video screens
00140 ; See Listing 2 for bank routines, Listing 3 for macros,
00150 ; Listing 4 for Basic program to generate simple screens
00160 ;
00170 ; Written by Hardin Brothers
00180 ;-----
00190 *LIST OFF
00200 *GET LISTING3/ASM ;This is the macro file
00210 *LIST ON
00220 CR EQU 0DH
00230 ;
00240 ORG 2700H ;Put buffers
00250 VIDBUF DS 80*24 ; into library overlay area
00260 DSKBUF DS 256
00270 ;
00280 ORG 3000H ;Put program at normal address
00290 START LD SP,START ;Put stack below program
00300 @@CLS ;Clear the screen
00310 CALL RSVBANK ;Reserve a bank
00320 JP NZ,ERROR1 ;Go if no bank available
00330 LD A,C ;Get bank number
00340 AND 7FH ;Be sure high bit is off
00350 LD (OURBANK),A ; and save it
00360 @@FSPEC FNAME,FCB ;Move file name to FCB
00370 JP NZ,ERROR2 ;Go if bad file name
00380 @@OPEN DSKBUF,80 ;Open file with LRL = 1 screen line
00390 @@DSPLY WORKING ;Explain the delay
00400 LD A,(OURBANK) ;Get our bank number
00410 LD C,A ;Put in C for @BANK
00420 LD B,0 ;Function: bring in bank
00430 SVC @BANK ;Perform bank swap
00440 PUSH BC ;Save restore instructions
00450 LD BC,17*24 ;Get 17 screens
00460 LD HL,8000H ;Starting bank memory addr.
00470 INPUT1 PUSH BC ;Save screen counter
00480 @@READ ;Read one row
00490 LD BC,80 ;One row
00500 ADD HL,BC ;HL=> next UREC address
00510 POP BC ;Recover counter
00520 DEC BC ;We've finished one screen
00530 LD A,B ;Get count
00540 OR C ;Merge B with C
00550 JR NZ,INPUT1 ;Repeat for entire screen
00560 ;
00570 POP BC ;Recover bank restore instruction
00580 SVC @BANK ;Bring back original bank
00590 @@CLOSE ;Then close the file
00600 ;
00610 DISPLAY LD HL,8000H ;Start at bank bottom
00620 LD B,17 ;Do 17 screens
00630 LOOP PUSH BC ;Save count
00640 LD BC,80*24 ;Move one screen of data
00650 LD DE,VIDBUF ; to video buffer
00660 LD A,(OURBANK) ;Get bank number
00670 CALL BNKMEM ;Move it
00680 ADD HL,BC ;Point to next screen block
00690 PUSH HL ;Save bank address
00700 LD HL,VIDBUF ;HL=> screen data
00710 @@VDCTL 5 ;Transfer data to screen
00720 POP HL ;Recover address
00730 POP BC ;Recover counter
00740 DJNZ LOOP ;And do another screen
00750 ;
00760 @@KBD ;Look for keystroke
00770 JR NZ,DISPLAY ;Loop until key is pressed
00780 JR RELEASE ;Release bank and leave
00790 ;-----
00800 ; Error if no bank available
00810 ;-----
00820 ERROR1 @@DSPLY NOBANK ;Report error
00830 @@EXIT -1 ;And leave
00840 ;-----
00850 ; Error after bank reserved
00860 ;-----
00870 ERROR2 @@DSPLY BADFNM ;Report bad file name
00880 ;-----
00890 ; Release bank then exit
00900 ;-----
00910 RELEASE LD A,(OURBANK) ;Get bank number
00920 CALL RELBANK ;Release the bank
00930 @@EXIT ;And leave
00940 ;-----
00950 ; Data and messages
00960 ;-----
00970 FCB DS 32 ;File control block
00980 OURBANK DB $-$ ;Our bank number
00990 NOBANK DB 'No memory banks available',CR
01000 BADFNM DB 'Bad file name',CR
01010 FNAME DB 'BANKDEMO/DAT',CR
01020 WORKING DB 'Loading screen data file ... ',CR
01030 ;
01040 *GET LISTING2/ASM ;These are the bank routines
01050 END START

```

End

lower half of memory before TRSDOS does any bank switching. TRSDOS checks the stack location before it allows bank switching, and if the stack would be lost as it banked memory, TRSDOS refuses to make the bank switch.

The final rule is that your program must rely completely on the @BANK SVC to handle memory. Mixing hardware manipulation with TRSDOS services is a sure road to disaster. (TRSDOS loses track of which banks are in use and of what bank is presently available in the top half of memory.)

If you follow these rules, you should not have any problem using one bank for a print spooler, another for a RAM disk, another for Pro-Wam, and still others for a currently running application program. The @BANK SVC should keep all the programs running smoothly. Luckily, @BANK is easy to use, despite the warnings in the *Technical Reference Manual*.

## Memory Organization

Before I explain this month's demonstration program, which shows how to use alternate banks for data storage, a quick review of the Model 4 memory map might be helpful.

The memory from 0000 hex to the byte just before the \$KI keyboard driver (the address of which you can find with the @GTMOD SVC) is reserved for the core of TRSDOS. A few scattered bytes in the first page of memory are available to application programs, but otherwise programs should not write to any memory location in this range.

\$KI-12FF hex is the low-memory area reserved for device and disk drivers and filters. You can load such a program here if a call to @HIGH\$ shows that room is available.

The resident portion of TRSDOS (SYS1/SYS) resides from 1300 to 1DFF hex. An application program should never write to this area.

System files SYS2/SYS-SYS5/SYS and SYS9/SYS-SYS12/SYS run from the system overlay area, which extends from 1E00 to 23FF hex. TRSDOS uses the last page of this area (2300-23FF hex) as an overlay buffer. If your program is not a memory-resident background task, and if you are not using Debug, you can usually store information in this buffer temporarily.

The TRSDOS library commands (the commands you see when you enter LIB at the DOS prompt) run in the memory space from 2400-2FFF hex. If your program does not invoke any of these commands with the @CMNDI or @CMNDR SVCs, it can use this area freely.

All application programs can use the



area from 3000 hex-HIGH\$. Therefore, most assembly programs start with an ORG 3000H command and load into this region.

Memory-resident programs, filters, drivers, and background tasks load from HIGH\$-OFFF hex. Application programs generally do not write to this area unless they are communicating with specific high-memory routines.

## Using Alternate Banks

To use @BANK, you must follow a simple, logical order of operations:

- Determine if the banks you need are available.
- Reserve those banks for your program.
- Call @BANK to switch memory banks as needed.
- Bring the bank that was resident when you started back to main memory before your program ends.
- Release the banks you reserved for other programs before your program ends.

This month's program shows how to perform each of these steps. The overall demonstration program, Listing 1, reads a data file into a memory bank, then transfers that data, one screen at a time, to the video display. This transfer looks like a fast slide show or a simple animation. Listing 1 runs until you press a key.

Program Listing 2 contains three general-purpose bank routines that are useful in many programs. The first, RSVBANK, finds an unused bank of memory, reserves it, and returns the bank number to the calling program.

The @BANK SVC can find an unused and unreserved bank of memory two ways: one using function 2 and the other with function 3. Unfortunately, @BANK cannot directly tell a program how many unreserved banks of memory exist, nor can it provide the number of an unused bank. Instead, a program must go through a loop and test every possible bank.

If you merely want to find out which banks are unused, @BANK function 2 is the most useful. When it returns, the status of the Z flag indicates whether a particular bank is available.

The *Technical Reference Manual* suggests that a program use @BANK function 2 to determine whether a bank is available and then function 3 to reserve that bank. However, there is no reason to use both steps. The RSVBANK routine in Listing 2 tries to reserve a bank without testing it.

If the routine is successful, it knows that the bank exists and is unused. If it is unsuccessful, it knows that the bank either does not exist or is already in use, and it tries another bank. Since function 3 returns the same error codes as func-

tion 2, the routine uses function 3 until it either finds an open bank or concludes that no free banks are available.

The second routine in Listing 2 brings a specific bank into addressable memory and then moves a block of memory with an LDIR instruction. This routine calls up a bank with @BANK function zero. Function zero of @BANK, if successful, returns with B and C set correctly to

undo the bank switch. If you swap banks with the code:

```
LD    B,0      ;Select function 0
LD    C,BANK   ;Select bank to use
SVC   @BANK    ;Swap banks
PUSH  BC       ;Save return value

; all you have to do to return to the previous bank is use the code:
POP   BC       ;Recover bank & function
SVC   @BANK
```

*Program Listing 2. Three bank routines.*

```
00100 ;-----
00110 ; RSVBANK
00120 ; This routine will reserve one bank of memory
00130 ; for use by a program. It will pick the highest-numbered
00140 ; bank available
00150 ;
00160 ; Exit: Z = success, bank reserved is in C
00170 ;      NZ = failure.
00180 ;
00190 ; Uses: AF, BC
00200 ;-----
00210         DEFINE @BANK,66H
00220 ;
00230 RSVBANK:
00240         LD      BC,3<8+32      ;Start at bank 31 (1 meg)
00250 RSVBANK1 DEC  C                ;Try the next bank
00260         JR      Z,RSVBANKF    ;Go if failure
00270         PUSH   BC              ;Else save counter
00280         SVC   @BANK            ;Try to reserve bank
00290         POP    BC              ;Recover counter
00300         RET     Z              ;Success -- leave
00310         JR      RSVBANK1      ;Else try again
00320 ;-----
00330 ; Here if no bank available
00340 ;-----
00350 RSVBANKF INC  A                ;Set NZ flag
00360         RET                    ;And leave
00370 ;
00380 ;-----
00390 ;BNKMEM
00400 ; This routine will call up a bank and move data within the
00410 ; bank or between the bank and low memory.
00420 ; The only error checking is the bank number, not the buffer
00430 ; addresses or buffer length.
00440 ;
00450 ; Entry: A = BANK number
00460 ;        HL = Source address
00470 ;        DE = Destination address
00480 ;        BC = Bytes to move
00490 ;
00500 ; Exit: NZ = failure, no data moved.
00510 ;        Z = success
00520 ; Uses: AF
00530 ;-----
00540 BNKMEM:
00550         RPUSH  BC,DE,HL        ;Save registers
00560         EXX                    ;Move to alternate registers
00570         RPUSH  BC,DE,HL        ;And save them
00580         AND    7FH            ;Be sure high bit isn't set
00590         LD    C,A              ;Copy bank number to C
00600         LD    B,0              ;Ready to call bank
00610         SVC   @BANK            ;Call up the bank
00620         JR    NZ,BNK2MX       ;Go if error
00630         EXX                    ;Bring back reg. registers
00640         LDIR                   ;Move the memory
00650         EXX                    ;Back to alternate set to clean up
00660         SVC   @BANK            ;Bring back original bank
00670         XOR    A                ;Set Z-flag -- success
00680 BNK2MX  RPOP  HL,DE,BC        ;Restore alternate registers
00690         EXX                    ;Recover regular registers
00700         RPOP  HL,DE,BC        ;Restore them
00710         RET
00720 ;
00730 ;-----
00740 ; RELBANK
00750 ; Releases a bank for use by other programs.
00760 ;
00770 ; ENTRY: Bank number in A
00780 ; EXIT: Success always
00790 ; USES: AF
00800 ;-----
00810 RELBANK:
00820         PUSH   BC                ;Save registers
00830         LD    C,A                ;Put bank number in C
00840         LD    B,1                ;Bank function: reset BUR
00850         SVC   @BANK            ;Do it
00860         POP   BC                ;Recover registers
00870         RET
```

End



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# THE NEXT STEP

Program Listing 3. Macro commands.

```

00100 -----
00110 ; @CLOSE -- Close a file or device
00120 ; #FCB defaults to value in DE
00130 ; AF is altered
00140 -----
00150 @CLOSE MACRO #FCB
00160 DEFINE @CLOSE,3CH
00170 IFEQ %% ,1
00180 PUSH DE
00190 LD DE,#FCB
00200 ENDIF
00210 SVC @CLOSE,CHECK
00220 IFEQ %% ,1
00230 POP DE
00240 ENDIF
00250 ENDM
00260 ;
00270 -----
00280 ; @CLS -- Clears the screen
00290 -----
00300 @CLS MACRO
00310 DEFINE @CLS,69H
00320 SVC @CLS,CHECK
00330 ENDM
00340 ;
00350 -----
00360 ; DEFINE -- Define a label unless it
00370 ; is already defined.
00380 -----
00390 DEFINE MACRO #LABEL,#VALUE
00400 IFNDEF #LABEL
00410 EQU #VALUE
00420 ENDIF
00430 ENDM
00440 ;
00450 -----
00460 ; @DSDPLY -- Displays line of text
00470 ; LINE defaults to value in HL
00480 -----
00490 @DSDPLY MACRO #LINE
00500 DEFINE @DSDPLY,0AH
00510 IFEQ %% ,1
00520 RPUSH DE,HL
00530 LD HL,#LINE
00540 SVC @DSDPLY,CHECK
00550 RPOP HL,DE
00560 ELSE
00570 PUSH DE
00580 SVC @DSDPLY,CHECK
00590 POP DE
00600 ENDIF
00610 ENDM
00620 ;
00630 -----
00640 ; @EXIT -- Exits program
00650 ; #RETCOD defaults to 0 (no error)
00660 -----
00670 @EXIT MACRO #RETCOD
00680 DEFINE @EXIT,16H
00690 IFEQ %% ,1
00700 LD HL,#RETCOD
00710 ELSE
00720 LD HL,0
00730 ENDIF
00740 SVC @EXIT
00750 ENDM
00760 ;
00770 -----
00780 ; @FSPREC -- Move filespec or devspec
00790 ; to an FCB or DCB
00800 ; Test Z / NZ after using!
00810 ; #Fname and #FCB are both required.
00820 ; If #Fname is already in HL, use HL as filename
00830 ; DE is set to #FCB
00840 ; AF is altered.
00850 -----
00860 @FSPREC MACRO #FNAME,#FCB
00870 DEFINE @FSPREC,4EH
00880 RPUSH BC,HL
00890 IFNES #FNAME,HL
00900 LD HL,#FNAME
00910 ENDIF
00920 LD DE,#FCB
00930 SVC @FSPREC
00940 RPOP HL,BC
00950 ENDM
00960 ;
00970 -----
00980 ; @GET -- Get one byte from file
00990 ; or device
01000 ; No error checking included
01010 ; #FCB defaults to current value of DE
01020 ; AF is altered
01030 -----
01040 @GET MACRO #FCB
01050 DEFINE @GET,03H
01060 IFEQ %% ,1
01070 PUSH DE
01080 LD DE,#FCB
01090 ENDF
01100 SVC @GET
01110 IFEQ %% ,1
01120 POP DE
01130 ENDF
01140 ENDM
01150 ;
01160 -----
01170 ; @KBD -- Checks keyboard buffer for waiting
01180 ; keystroke
01190 -----
01200 @KBD MACRO
01210 DEFINE @KBD,08H
01220 PUSH DE
01230 SVC @KBD
01240 POP DE
01250 ENDM
01260 ;
01270 -----
01280 ; @OPEN -- Opens an existing file
01290 ; or device
01300 ; Aborts on all errors except changed LRL
01310 ; #Buffer is required.
01320 ; #LRL defaults to 0 (256)
01330 ; #FCB defaults to current value in DE
01340 ; AF is altered.
01350 -----
01360 @OPEN MACRO #BUFFER,#LRL=0,#FCB
01370 DEFINE @OPEN,3BH
01380 RPUSH BC,HL
01390 LD HL,#BUFFER
01400 LD B,#LRL
01410 IFEQ %% ,3
01420 LD DE,#FCB
01430 ENDIF
01440 SVC @OPEN
01450 RPOP HL,BC
01460 JR Z,$!?
01470 CP 2AH
01480 JR Z,$!?
01490 LD C,A
01500 LD A,1AH
01510 RST 28H
01520 $!? EQU $
01530 ENDM
01540 ;
01550 -----
01560 ; @READ -- Reads a record from an open file
01570 ; #UREC defaults to HL
01580 ; #FCB defaults to DE
01590 -----
01600 @READ MACRO #UREC,#FCB
01610 DEFINE @READ,43H
01620 IFEQ %% ,2
01630 PUSH DE
01640 LD DE,#FCB
01650 ENDF
01660 IFGT %% ,0
01670 PUSH HL
01680 LD HL,#UREC
01690 ENDF
01700 SVC @READ,CHECK
01710 IFGT %% ,0
01720 POP HL
01730 ENDF
01740 IFEQ %% ,2
01750 POP DE
01760 ENDF
01770 ENDM
01780 ;
01790 -----
01800 ; RPOP -- Version 2
01810 ; Pops 0 to 6 registers from the stack
01820 ; Example: RPOP BC,DE,HL,IX
01830 RPOP MACRO #R1,#R2,#R3,#R4,#R5,#R6
01840 IFGT %% ,0
01850 POP #R1
01860 ENDF
01870 IFGT %% ,1
01880 POP #R2
01890 ENDF
01900 IFGT %% ,2
01910 POP #R3
01920 ENDF
01930 IFGT %% ,3
01940 POP #R4
01950 ENDF
01960 IFGT %% ,4
01970 POP #R5
01980 ENDF
01990 IFGT %% ,5
02000 POP #R6
02010 ENDF
02020 ENDM
02030 ;
02040 -----

```

Listing 3 continued



## THE NEXT STEP

The final routine in Listing 2 releases a bank to TRSDOS with @BANK function 1, so that another program can use the bank. If you do not call this routine when the program ends, TRSDOS reserves the bank until you reboot the computer.

Listing 1 brings all these ideas to-

gether into a simple demonstration program. It assumes that you have already run Program Listing 4, a Basic program, to create a file of 17 video screens called Bankdemo/DAT. Do not try to run Listing 1 until you have created that file.

The demonstration program starts by reading in a macro file (see Program List-

ing 3 for the necessary macro commands). It then uses the library overlay area for two buffers: a 1,920-byte buffer for one screen's worth of material and a 256-byte buffer for disk transfers. It also puts the stack at the top of the overlay area to ensure that the bank routines do not fail because of a misplaced stack.

### Listing 3 continued

```
02050 ; RPU$H -- Version 2
02060 ; Pushes 0 to 6 registers onto the stack
02070 ; Example: RPU$H BC,DE,HL,IX
02080 ; -----
02090 RPU$H MACRO #R1,#R2,#R3,#R4,#R5,#R6
02100 IFGT %%,0
02110 PUSH #R1
02120 ENDIF
02130 IFGT %%,1
02140 PUSH #R2
02150 ENDIF
02160 IFGT %%,2
02170 PUSH #R3
02180 ENDIF
02190 IFGT %%,3
02200 PUSH #R4
02210 ENDIF
02220 IFGT %%,4
02230 PUSH #R5
02240 ENDIF
02250 IFGT %%,5
02260 PUSH #R6
02270 ENDIF
02280 ENDM
02290 ;
02300 ; -----
02310 ; Invoke a TRSDOS 6 SVC
02320 ; If "check" is specified, exit
02330 ; through @ERROR if NZ flag is returned
02340 ; from TRSDOS.
```

```
02350 ; -----
02360 SVC MACRO #NUM,#CHECK
02370 LD A,#NUM ;;A = SVC number
02380 RST 28H ;;Perform SVC
02390 IFGT %%,1 ;;More than one argument?
02400 JR Z,$! ? ;;Go if no error
02410 LD C,A ;;Put error code in C
02420 LD A,1AH ;;@ERROR SVC number
02430 RST 28H ;;Exit through @ERROR
02440 $! ? EQU $ ;;Here if no error
02450 ENDIF
02460 ENDM
02470 ;
02480 ; -----
02490 ; @@VDCTL -- Calls one of the @VDCTL functions
02500 ; #FNC is required
02510 ; -----
02520 @@VDCTL MACRO #FNC
02530 DEFINE @VDCTL,@FNC
02540 IFEQ %%,0
02550 ERR "MISSING PARAMETER"
02560 ENDIF
02570 PUSH BC
02580 LD B,#FNC
02590 SVC @VDCTL
02600 POP BC
02610 ENDM
02620 ;
```

End

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After displaying a simple sign-on message, the program reserves a bank. It then opens the data file and reads it into banked memory. Next it switches to its alternate bank and loads the file into it. Because TRSDOS always switches to bank zero during all I/O including disk access, the disk-transfer area must be either in the lower half of memory or in bank zero. The code in Listing 1 looks like it violates that requirement.

Remember that there is a 256-byte disk buffer in the library overlay area. Whenever the program reads a file that has a record length of less than 256 bytes, it requires two buffers: a sector buffer that it defines when the file opens and a buffer called UREC that receives the data after TRSDOS unblocks it.

The 256-byte disk buffer must be accessible when TRSDOS switches to bank zero. If the UREC buffer is in an alternate bank, TRSDOS can still perform the data transfer correctly. Keep in mind, however, that TRSDOS only uses UREC if it opens a file that has a record length of less than 256 bytes.

The rest of Listing 1 is straightforward. After reading the file into the alternate bank, the program goes through a loop using the @VDCtrl SVC block transfer to move one screen of data at a time from the bank to the low-memory video buffer and then from the buffer to the screen.

After displaying all 17 screens, the program scans the keyboard to see if you are pressing a key. If you are not, the program displays another cycle of 17 screens.

### Final Comments

This month we've looked at how to use banks to hold data, but not how to use them to hold program code. Getting a program to run in an alternate bank requires some tricks, which I will cover in a future column.

If your Model 4/4P/4D only has 64K of memory, you can easily upgrade it to 128K yourself if you're willing to open the case and insert some chips. You have to also solder a wire in some versions of the Model 4 and insert a special PAL chip if you have an old-style Model 4, but none of these procedures are difficult.

I know of three memory add-on boards for the Model 4. The XLR8er board (H.I. Tech Inc., P.O. Box 25404, Houston, TX 77265, 713-682-7317, \$299.95), which can speed up your computer appreciably, comes with 256K of RAM and software that allows the @BANK SVC to access all of it. My XLR8er arrived just as I was finishing this column, so I haven't had time to install and test it yet.

The Alpha Technology Supermem board (Alpha Technology Inc., 1127 S.

## Using an alternate bank requires some tricks.

Patrick Drive, Suite 24, Satellite Beach, FL 32937, 305-773-1136, \$179.95) comes with either 512K or 1,024K of RAM. If you want to access its back banks with the @BANK SVC, you must patch TRSDOS. The patches are both in the second volume of the *Misosys Quarterly* (Misosys Inc., P.O. Box 239, Sterling, VA 22170-0239, 703-450-4181 or 800-647-6797, \$25 per year in the U.S., \$30 per year in Canada) and on disk in the Disknotes for that volume. You can also get them from the LDOS Forum on CompuServe. The patches are specifically for TRSDOS 6.2.1 and LS-DOS 6.3. I have been using the 512K version of this board with the Misosys patches for quite a while with no problems.

By the way, if you are serious about programming your Model 4, you should subscribe to the *Misosys Quarterly*, which, except for *80 Micro*, is the best source of programming information for the Model 4.

Anitek (Anitek Software Products, P.O. Box 361136, Melbourne, FL 32935, 305-259-9397) offers another add-on memory board for \$159 that, I understand, does not support the @BANK SVC. As far as I know, nobody has developed patches for it.

Basic is restricted to bank zero regardless of how much memory you install in your Model 4. I do not know a way to make Basic grow into an alternate bank, although you might be able to use a memory bank to hold data for a Basic program.

The simplest way to do this is to install a RAM disk in an alternate bank and simply use it to hold files for the Basic program. In any case, don't buy an add-on memory board expecting to write large Basic programs. The results would not justify the extra assembly programming involved. ■

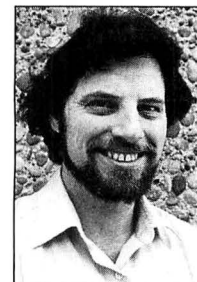
Program Listing 4. Basic program to create video screens.

```

1 ' Banked Memory Demonstration          ** 49
2 ' This program creates the (primitive) graphics file ** 50
3 '   for Listing 1 to use.              ** 51
4 '                                     ** 123
100 DIM A$(23,79)                        'One screen image ** 866
110 DEFINT A-Z                            ** 852
120 B$ = CHR$(191)                        ** 899
130 OPEN "O",1,"BANKDEMO/DAT"           ** 1711
140 FOR SCREEN = 1 TO 17                  'Room for 17 screens in 32K ** 1397
150   CLS                                 ** 504
160   PRINT "Creating screen"; SCREEN; "of 17"; ** 3367
170   FOR X = 0 TO 23                      ' "Clear" the screen ** 1132
180     FOR Y = 0 TO 79                    ** 1241
190       A$(X,Y) = " "                   ** 1102
200     NEXT Y                             ** 810
210   NEXT X                               ** 714
220   VIEW = SCREEN: IF VIEW > 9 THEN VIEW = 18 - VIEW ** 3263
230   TOP = 12 - VIEW                      ** 1168
240   BOTTOM = 13 + VIEW                   ** 1362
250   LEFT = 3 + VIEW * 2                  ** 1300
260   RIGHT = 78 - 2 * VIEW                ** 1446
270   FOR X = LEFT TO RIGHT               ** 1633
280     PRINT @(TOP,X),B$;                 ** 1500
290     PRINT @(BOTTOM,X),B$;             ** 1727
300     A$(TOP,X) = B$                     ** 1123
310     A$(BOTTOM,X) = B$                 ** 1350
320   NEXT X                               ** 684
330   FOR X = TOP TO BOTTOM                ** 1661
340     PRINT @(X,LEFT),B$;                ** 1553
350     PRINT @(X,RIGHT),B$;              ** 1637
360     A$(X,LEFT) = B$                    ** 1185
370     A$(X,RIGHT) = B$                   ** 1269
380   NEXT X                               ** 690
390   FOR X = 0 TO 23                      ' Save screen to disk ** 1104
400     FOR Y = 0 TO 79                    ** 1204
410       PRINT #1,A$(X,Y);                ** 1456
420     NEXT Y                             ** 782
430   NEXT X                               ** 686
440 NEXT SCREEN                            ** 983
450 CLOSE                                  ** 559
460 CLS                                     ** 412

```

End

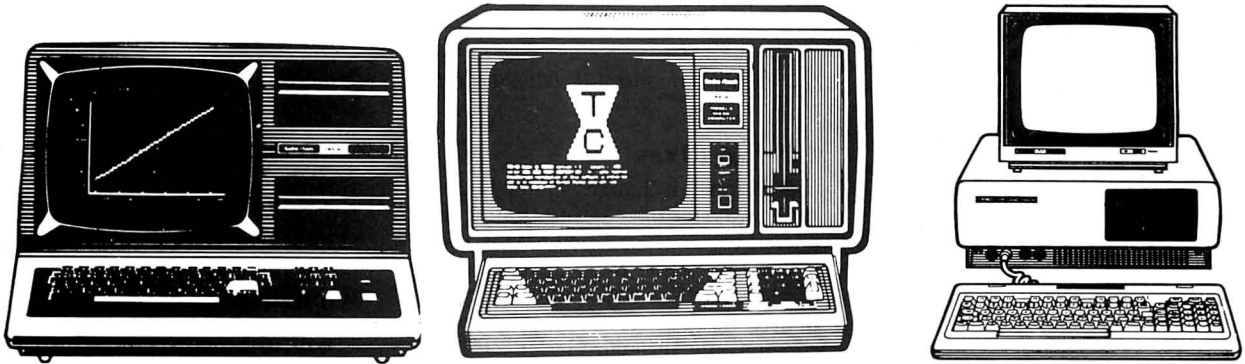


Write Hardin Brothers at 280 N. Campus Ave., Up-land, CA 91786. Enclose a stamped, self-addressed envelope for a reply. You can also contact Hardin on CompuServe's WE-SIG (PCS-117).



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## Edit SCREDIT

The Program Listing shows changes to be made to the assembly-language listing of my program SCREDIT, originally published in "The Mean Screen Editing Machine" (80 Micro, December 1986, p. 46).

These changes correct a small failure to abide by the TRSDOS 6 filter rules, as kindly pointed out by George Deluca of Burlington, Ontario, and add two new features as documented in lines 181 and 182. You should enter these lines in your editor/assembler, between—and in some cases replacing—existing lines in the original SCREDIT listing.

*John Ratzlaff  
Candler, NC*

## Reader Forum Bugs

I have found errors in two items in the March 80 Micro Reader Forum (p. 24). First, because Swap is not supported by Model III Basic, Robert M. Doerr's ripple sort will not run on this machine. Two bugs appear in Daniel Baright's Model III keyboard-entry routine using Inkey\$ in an infinite loop. In line 10, delete the colon before STEP; it causes a syntax error. In line 20, change IN to IF.

*Henry H. Herrdegen  
Windsor, Ontario*

## Fixing That Thinking Feeling

I would like to point out some gremlins in Bruce Tonkin's "That Thinking Feeling" in the February 80 Micro (p. 42). I have yet to get F1 or control-B to function. In line 3820 I believe TEST\$ should read TEXT\$. Also, as the program listing stands, accidentally pressing F8 could cause an emotional problem; it sounds a beep, flashes some letters on the screen, and kills the disk file. By adding 7335 GOSUB 8850 you are given a choice.

*Jimmy O. Webb  
Golden, CO*

*Inserting characters into a line as you edit will eventually push the characters at the end of the line off the screen. If this happens, an asterisk appears at the end of the line. Pressing*

*the F1 key or control-B will then reformat the area.—Eds.*

## Payroll Fixes

A number of changes should be made to the Payroll/BAS listing that accompanied my article "Payday Made Easy" in the April issue of 80 Micro (p. 56). I would also like to point out that the withholding tax tables in this program are current only through March 1987 and must be modified if tax laws change or if your state laws differ from those of the state of Missouri.

First, you should change line 1240 to

prevent an occasional problem that occurs in month-to-date payroll totals. This change initializes current and month-to-date payroll totals for a new (added) employee and precludes any need to use the "Change employee record" menu option to do the same thing. Change line 1240 to read:

```
1240 B$(13)=" ":B(14)=0:B(15)=0:B(16)=0:
      B(17)=0:B(18)=0:B(19)=0:B(20)=0:
      B(21)=0:B(22)=0:B(23)=0:B(24)=0:
      B(25)=0:B(26)=0:B(27)=0:B(28)=0:
      B(29)=0:B(30)=0:GOSUB 170
```

Line 2310 is repeated.

Line 2460 is missing. This line should

### Program Listing. Changes for SCREDIT.

```
00110 ;by JMR 5-25-86 revised 3-3-87
00181 ; <F1> moves cursor to right of last non-blank char on line
00182 ; <shift-F1> clears to end of line
00721 LD (U6+1),HL
00722 LD (SAME+1),HL
01960 OR 1 ;return empty
01961 LD A,0
02780 OR 1
02781 LD A,0
03031 VDCTL 2
03032 DONE1 OR 1 ;return empty
03033 LD A,0
03034 RET
03035 ;
03036 SKIP6 CP 81H ;<F1>? skip to end of line
03037 JR NZ,SKIP6A
03038 VDCTL 4 ;get current cursor position
03038 LD E,L ;save column number
03040 LD L,80 ;start at last column
03041 LOOP5 DEC L ;move backward
03042 LD A,E ;compare this place with where cursor was
03043 CP L
03044 JR Z,SAME ;if same place, need to test further
03045 JR NC,DONE1 ;left of cursor--do nothing
03046 VDCTL 1 ;get char in this column
03047 CP ' ' ;is it a space?
03048 JR Z,LOOP5 ;if space, keep looking
03049 DONE4A INC L ;move to next column
03050 DONE4 LD A,I
03051 CP 80 ;are we in fact off the screen?
03052 JR C,SKIP6C ;no
03053 DEC L ;yes--go left one
03054 SKIP6C VDCTL 3 ;place cursor here
03055 JR DONE1 ;done!
03056 SAME LD A,(0000) ;get char under cursor
03057 CP ' ' ;if space, done
03058 JR Z,DONE1
03059 JR DONE4A ;if not space, move right one
03060 ;
03061 SKIP6A CP 91H ;<shift-F1>? clear to end of line
03062 JR NZ,SKIP6B
03063 LD A,' '
03064 U6 LD (0000),A ;put space under cursor
03065 VDCTL 4 ;get cursor position
03066 LOOP4 INC L ;next column
03067 LD A,L
03068 CP 80 ;last column yet?
03069 JR NC,DONE1 ;done!
03070 LD C,' ' ;place a space
03071 VDCTL 2
03072 JR LOOP4
03073 ;
03080 SKIP6B CP 08H ;check for arrows (08-0BH)
03150 OR 1 ;but return empty
03151 LD A,0
03420 OR 1
03421 LD A,0
```

End



read as follows:

```
2460 W=B(20): B(20)=FNR(W) '---ROUND
      OFF FED TX
```

Regarding lines 2730 and 2740, Social Security deductions for any employee are presently withheld only on the first \$43,800 in taxable annual wages. Since the program does not maintain year-to-date totals and does not recognize when this amount has been exceeded, you must keep such records and ensure that FICA deductions conform to the current annual limits. Thus, if you use the program to calculate paychecks for employees making in excess of \$43,800 (1987 law), the following changes will facilitate entry of correct FICA values into the paycheck records for those employees whose wages have exceeded the current limit. You should change lines 2730 and 2740 and add lines 2742 and 2744 as follows:

```
2730 PRINT: INPUT "ENTER (C) to make
      changes--(F) to change FICA only--(P)
      to print paystub"; E$
2740 IF E$="C" THEN CLS: GOTO 2170
2742 IF E$="F" THEN INPUT "Enter FICA
      amount"; B(19): GOTO 2600
2744 IF E$="P" THEN 2750 ELSE 2730
```

Finally, a number of lines have extra

characters and need to be changed as follows:

- Line 170: Add a closing parenthesis to the end of the fourth line; delete the fifth line.
- Line 180: Delete the fifth line.
- Line 2750: Delete the fifth line.
- Line 4130: Add a closing parenthesis to the end of the fourth line.
- Line 4330: Add the characters (12) to the end of the fourth line. Delete the fifth line.
- Line 4420: Delete the fifth line.

G.S. Bradshaw  
Branson, MO

### In Search of . . .

I read with great interest "In Search of Lost Superscript Files" by David Goblen

in the April 80 Micro (p. 114). What a lifesaver! In fact, I had a disk crash (sector lost) the same day the issue arrived. The program saved several important documents I had been working on.

I made a few small changes (see the Figure) so I could recover the printer control codes after getting back to a new Superscript document. Instead of just ignoring the F5 or clear code that precedes these controls, I convert it to a 3-byte group not likely to be seen in any document: #&#. Any other combination would work. Note the remark sent to the screen if an F5 is encountered; with a global search and replace you have every control code back.

Jay M. Sheppard  
Laurel, MD

*Figure. Changes to recover printer control codes.*

240 ON ERROR GOTO 0:IF J THEN 480 ELSE END	* 2596
410 PRINT#2,"#&#";:PRINT"#&#";:J=1:GOSUB 100:GOTO 310	* 3044
480 PRINT:PRINT" FINAL NOTE -- after conversion back to Superscr ipsit"	* 5786
482 PRINT"from ASCII, make a GLOBAL Search-and-Replace:"	* 4319
484 PRINT" Search for <#&#> Replace with <CLEAR>"	* 3821
486 END	* 409
	* 1824
	End

## The 80 Micro Disk Series 1000/1200/3000

80 Micro has come to the rescue of the Tandy 1000, 1200, and 3000 owners. Now you don't have to type in the MS-DOS program listings that appear in 80 Micro. They are now available on a quarterly basis. We have two disks covering the first two quarters for 1987.

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### January-March 1987

*January*  
Checking References, p. 48  
REFLIB.BAS  
Hidden Attributes, p. 66  
SECURE.ASM  
SECURE.EXE  
*February*  
That Thinking Feeling, p. 42  
OUTLINE.BAS  
Taking Measure, p. 49  
AREA.BAS  
Changing of the Guard, p. 60  
FILEIT.ASM  
FILEIT.COM  
*March*  
So, You Want to Buy a House?,  
p. 54

HOUSE.BAS  
Disk Repair 101, p. 42  
DISKINFO.PAS  
DISKINFO.COM  
*Bonus Program*  
September 1986  
Making the Grade, p. 68  
MARK.BAS  
  
*April-June 1987*  
*April*  
Payday Made Easy, p. 56  
PAYROLL.BAS  
*May*  
Quick Boot, p. 46  
REBOOT.BAS  
Leave the Printing to Spooli,  
p. 58

SPOOLI.ASM  
SPOOLI.COM  
Data-Statement generator, p. 80  
DATAPOKE.BAS  
*June*  
Tandy 1000 Custom Character  
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Send your letter or proposal to Submissions Committee, 80 Micro, 80 Elm St., Peterborough, NH 03458. No phone calls, please.



## **Deskhelp allows Tandy owners to expand the uses of Deskmate.**

*Continued from p. 37*

other ways to use this mail merge. You can create your Deskmate Text file to specially format the output to print custom forms, such as checks.

In performing the merge, Deskhelp looks for the bar (|) character as a delimiter within the Text file to specify the locations at which to insert Filer data. The ties between Text and Filer files are the field names you assign to the Deskmate Filer fields. Deskhelp replaces the delimiter with the specified field of Filer data, record by record, as it produces the output. Consequently, you'll have to do a certain degree of advance planning when you create Deskmate Text and Filer files to use later in Deskhelp.

For instance, you must press enter at the end of each Deskmate Text line, rather than waiting until the end of a paragraph. Additionally, if you're inserting a Filer field into the line, you must consider the maximum number of characters the line can hold; otherwise Deskhelp might give you an error message when it attempts the merge.

### **Filer File**

Similarly, when you create a Deskmate Filer file, you must avoid any blank lines between fields, as this too can cause problems for Deskhelp. However, the manual explains these and other constraints, which are easy enough to live with.

You can direct Mail Merge output to the printer or to a disk file, perhaps to use in another program. You can produce up to five copies of each output document, and you can request a pause after each one. If you have only one drive, then both Text and Filer source files must be on the same disk, in addition to the disk output, if specified.

In the course of preparing for the merge, you must provide some specifications about your desired output, such as lines per page, margins, and so on. Deskhelp offers a default list of sample output pages, thus saving you time for a majority of print formats. You can modify the samples or specify the output format to meet your exact needs.

The nicest part of Mail Merge is its ability to use indexing to select records from your Filer file for output. By choosing one of three toggle settings, you can get Deskhelp to print all records automatically, print selected records automatically, or let you specify which records to print, all or selected, one by one.

The selection process in Indexing lets you specify one field of the Filer file for comparison, and checks it against a relational comparison (<, >, or =) that you provide. For instance, if you want to send a sales letter to zip codes in the 90000s, just specify the Deskmate Filer field name for the zip code field and the comparison >89999.

While this selection capability is useful, the ability to specify multiple selection criteria would be better. In the case of the zip-code example, Deskhelp doesn't let you select within a range. However, considering Deskmate's limitations, a one-field/one-value select will probably be adequate in most cases.

I appreciated Mail Merge's feature that displays a progress report telling you what is currently taking place during a merge. There's no mysterious dark screen to cause concern. In the case of manual record selection, the screen even displays the record image for your review before printing.

While Deskmate lists Filer records in a sorted order (of your choice), Deskhelp's Mail Merge outputs records in sequential order, as they are physically recorded in the Filer file. This is Deskhelp's biggest shortcoming.

The Printer Codes option lets you modify the printer-code table in memory to use specific printer options. Deskhelp lets you easily modify specific characters so that LPDRVR.SYS can convert them to control codes your printer uses to produce such features as bold print, underline, and elongation. Deskhelp's instructions are simple, and the program provides a clear and easy method of entering the new code data.

From there, Deskhelp compiles the new codes into a file that LPDRVR uses, and that you can specify with a single keystroke in your Deskmate Text file. This option adds some text capabilities to Deskmate, and you can also use it with other systems because the printer codes remain in memory until you change them or reset the computer.

I use Deskmate primarily for writing and storing correspondence. However, Deskhelp allows me new ways to use Deskmate. Deskhelp is easy to use, well-documented, and fairly priced. Those Tandy owners who have given up on Deskmate might find Deskhelp to be the key that opens up Deskmate's potential. ■

## **LDOS 5.3 by Jack Feldman**

★★★★

**LDOS 5.3** Upgrade Kit runs on the Model III/4/4P (in Model III mode). Miso-sys, P.O. Box 239, Sterling, VA 22170-0239. 800-697-6747. \$24.95.

When arguments start over which Model III DOS is best, LDOS is usually the yardstick against which other systems are measured. It certainly is the most powerful operating system available for TRSDOS machines. Logical Systems Inc., the company that developed LDOS, has once again updated LDOS and added some new features.

The LDOS 5.3 Update Kit comprises a disk containing the full DOS and supplemental documentation. If you are starting from scratch and don't have the 5.1.3 manual with the 5.1.4 supplement, then you have to buy the full manuals, which brings the total cost to \$55.

The major change is that the directory structure now includes time-stamping of individual files. Programmers who want to time-stamp their files will appreciate this feature. LDOS 5.3 will date files through Dec. 31, 1999. If you don't need the feature, you can eliminate it with the System command. Unfortunately, the new directory structure poses a potential danger to your LDOS 5.1.4 disks.

### **Take Care**

The problem is that the individual directory entry, being longer, puts your old disks at risk. The supplemental documentation has several warnings about booting in 5.3 and switching to an earlier version without rebooting. The documentation doesn't tell you that you can destroy your disk if you don't follow instructions. You can read disks formatted in all versions of LDOS, but you must use Dateconv to change the directories to make all your old disks compatible.

The most important 5.3 upgrade is the new Help feature. Typing HELP DOS (library command) or HELP BASIC (Basic command) gives you one or two screens full of information on how to use the command. Even some of the utilities and filters are listed under the Help DOS command. It is the most complete Help file I've seen for any DOS. If you have even a vague idea of what you want to do, you no longer need the manual.

### **Additions**

Two other additions make LDOS easier to use. When you want to format a printout or set parameters on the RS-232C port, you have to use the Filter or Set commands. In the past when you



wanted to change any of the format or serial-port parameters, you had to do a reset and then start all over and install the new parameters. Now you can change any of the parameters simply by invoking the command followed by the change.

If you are not sure of the parameters, entering Forms or Setcom lists them. If you don't remember the abbreviation for the parameter, the Help feature reminds you. Forms is particularly important to me, because my printer is not set to automatically line-feed when it receives a carriage return (enter). The 5.3 upgrade eliminates this tedious process: A simple FORMS (A) takes care of the problem.

The new LDOS also includes Ted, the full-screen text editor. It lets you create an ASCII file but won't let you format or print a file. You can print the file you create, but you cannot format your printout.

The editor has all the features necessary to create your patch files or object code for assembly language. It contains a full range of cursor-control, search, search-and-replace, and all the block commands you could want. It is a welcome addition to the package.

You can now page through listed files more slowly, so the list doesn't scroll up the screen faster than you can read. LCOMM lets you access the library commands without leaving the program, and Basic has several new enhancements.

When you enter or edit a Basic program, you can copy or move a Basic line to another part of the program. Input@ works like the Print@ command to let you position the cursor at a specific place on the screen, but it also lets you define the location, the kind, and the size of the requested response. You can dump a list of the active variables and their values.

So far, so good. By now you should be sold on the LDOS upgrade kit as a necessity for your Model III or 4. But I'm not saying that LDOS is perfect.

LDOS 5.3 doesn't always make life easier for you. It is wonderful to have the flexibility of controlling print parameters and the RS-232C port, but the lengthy routine necessary to set those parameters is a good example of how LDOS can also be difficult to use. (Thank goodness for Setcom and Forms.)

### Conclusion

On the whole, though, LDOS's new features are great, and no other operating system can match the control LDOS gives you. While it is unfortunate that 5.3 is not totally backward-compatible, some time spent with Dateconv will take care of that. Although the time-stamping doesn't do much for me on my Model 4, it is great on my Max-80, which has a built-in clock that automatically tells the DOS the time and date. ■

## The Apple Polisher by John McCormick

★ ★ ★ ★

**Trackstar and Trackstar 128K** run on the Tandy 1000/1200/3000 and are available from the manufacturer or from Radio Shack's Express Order Service (EOS). Diamond Computer Systems Inc., 1225 Tiros Way, Sunnyvale, CA 94086, 408-736-2000. Trackstar 128K (EOS catalog no. 26-2590), \$375. Trackstar 128K (EOS catalog no. 25-1028), \$395.

*Eds. note—Diamond Computers Systems states that it is only shipping the Trackstar 128K. The 64K board is available through special order.*

**T**rackstar is an expansion board that lets IBM PCs and compatibles run most Apple II+ programs and still gives you complete MS-DOS compatibility. It allows parents with a Tandy 1000 at home to run the Apple software their kids use at school, or it lets the ex-Apple owner who has now moved on to MS-DOS save all his or her Apple software.

The 64K Trackstar makes your disk drives operate like Apple drives. As a result, your Tandy machine can run about 65 percent of Apple II+ software. Half of these programs run using Trackstar's Basic, and half require Apple FPBasic. About the only software Trackstar can't handle are those that employ special copy-protection schemes that are configured to specifics of Apple drive operation.

The Trackstar package includes the main expansion board, a smaller disk controller, a floppy interface cable, an RGB video cable, a composite video cable, two capacitors for the Tandy disk drives, and two utility disks. You plug the disk controller into the motherboard behind the disk drives. It has a connector into which you can plug an Apple drive, which will let you run about 97 percent of all Apple II+ software.

### Installation

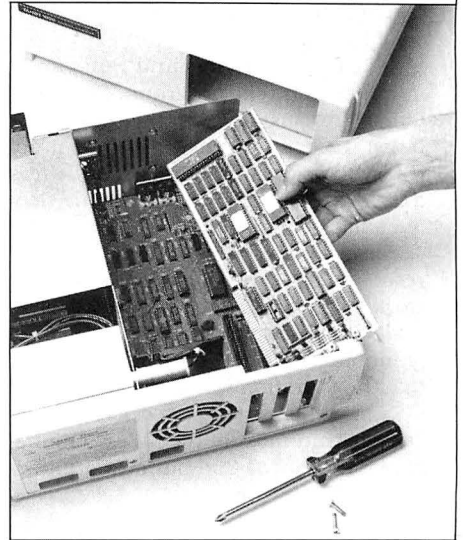
Installing Trackstar isn't a job for the fainthearted. Besides plugging the board in, you have to remove the disk drives to install a capacitor in each and remove the drive-controller cable from the motherboard. Then you install the smaller controller board and plug the disk drives into it. Another cable goes from the main Trackstar board to the smaller one, passing under the disk drives.

A few discrepancies exist between the step-by-step directions and the insides of my Tandy 1000. The instructions don't mention the shield that covers the disk drives. You don't need to remove it; if you take out three screws and unplug the power and controller cables, you can

slide the top drive out and carefully reach in to plug the capacitor into the top of the bottom drive.

When installing the capacitors, which just plug in on the outside of the drives, make sure that the pins don't touch each other, shorting out the capacitor. These connectors are very close together and easy to bend. Once they are installed, just pry them a bit apart. Sliding the top drive back in place and replacing the screws is a simple job.

Actually, two screwdrivers are all you need to accomplish the installation, but, unless you are comfortable with remov-



*Installing Trackstar is a difficult job.*

ing the rather delicate connectors used in computer electronics, you probably should let a technician install Trackstar.

The software installation is simple: You put the MS-DOS system files onto a backup copy of the Trackstar utility disk.

### Operation

Once you've installed Trackstar, you can switch between the MS-DOS and Apple operating systems by pressing the alternate and escape keys. You can't, however, switch to MS-DOS while you're running an Apple program. Trackstar also lets you choose between a 40- and an 80-column screen to accommodate various software.

Trackstar supports two Apple game ports; unfortunately, the joystick ports on the front of the 1000 won't operate in the Apple mode. On the back of the Trackstar board are the color monitor port, 40-column video out, and a game port that emulates the Apple IIe or IIc game ports exactly. An internal port lacks two of the signal lines of the true Apple IIe game port but will work for most purposes. Both ports are set up to receive a standard Apple-joystick plug.

The F9 and F10 keys on the Tandy



1000 act like the open apple and solid apple keys found on the II+.

Trackstar never interfered with the MS-DOS programs I ran.

Once you've installed Trackstar, it's unlikely that you'll want to remove it. Diamond Computer evidently thinks so too, because its manual doesn't offer any instructions for taking the board out. If you ever need to, though, just reverse installation procedure.

## Compatibility

After I installed Trackstar, I put a copy of Blue Chip Software's Millionaire in my 1000's drive and started it up. The copy-protected program opened but wouldn't run.

Next I tried Broderbund Software's graphics and text program, The Print Shop. It ran just fine, but the color was a bit off. In fact, I noticed this same problem with several programs: The letters and lines seemed to be clear but they often had color fringes.

The other programs I ran had similar results: Those without copy protection worked fine and most with copy protection didn't. I also tried a bit of Basic programming and had no trouble, except that the operation was slow.

Even without the Apple drives, Trackstar will run most of the MECC (Minnesota Educational Computing Corp.) educational software.

## Appleworks

The Appleworks integrated word-processing/spreadsheet/data-base/utility software doesn't run on the Apple II+, so it didn't surprise me that it wouldn't work with the 64K Trackstar. But, for an extra \$25, Diamond will include the Plus-Works-XMT utility that not only modifies Appleworks to run on the 64K Trackstar, but also expands the program's capabilities. The largest of the Tandy machine lets Appleworks handle more files.

When I was installing this software, I encountered a "Relocation/configure" error that the people at Diamond could not explain. So, I ignored the error message, inserted the Appleworks start-up disk, and proceeded. The program ran properly, and I suspect the error message was itself an error.

## Enhanced Version

Trackstar 128K runs Appleworks without the Plus-Works-XMT modification. It also runs IIe programs. To use the 128K board in a Tandy 3000 HL, you must add a 360K disk drive or an Apple drive.

## Documentation

The spiral-bound Trackstar manual is printed on only one side of each page,

and the type is smaller than I like to read. But, since Trackstar is relatively simple to operate once it's installed, you shouldn't need to refer often to the documentation.

## Conclusion

The installation is a bit beyond plug-and-play. You will have to know how to work with delicate connectors, but those with patience, small hands, and a controlled sensitive touch should have no problems.

I did have minor problems running

some of the programs, but these problems stemmed from my lack of familiarity with Apple programming and Apple's operating systems. When a friend of mine with Apple experience talked me through some operations, every program ran just as it should. After all, this board is an Apple emulator, and to run it you need Apple, not MS-DOS, skills.

I would not buy Trackstar so I could start buying Apple software, but if I already owned or had access to Apple programs, I would order one immediately. ■

# EXPRESS CHECKOUTS

## Whoops!

★ ★ ★

**Whoops! 3.2d** runs on the Tandy 1000/1200 (256K) and requires two disk drives. Cornucopia Software, Inc., P.O. Box 6111, Albany, CA 94706. 415-528-7000. \$49.95.

Whoops!, a memory-resident spelling checker and thesaurus, is an unpredictable beast. Because it is intended to work with "almost all word-processing programs," it's likely that some of its features will be useful no matter what combination of hardware and software you're running, and that the conditions under which it will work perfectly will be rare. Like the nursery rhyme's little girl with the curl, when Whoops! is good, it's very, very good, but when it's bad. . . .

## What You See

Whoops! has a 50,000-word spelling list to which you can add words easily while you use it. (Removing them takes a separate program, included, and a word processor.) Ideally, Whoops! loads its word list into RAM and doesn't need its disk files to check spelling. The thesaurus has a separate list and uses it from disk. You get two versions of the synonym list: The super-fast, indexed version needs 100K of disk space. For floppy-disk systems running large applications, the slower, less useful version, sans index, uses half the space.

The 28-page manual has a misspelling on page 9. Regardless, the manual's main feature is its vagueness. I was often convinced it had outlined a specific action, only to find the language obscure enough to cover any circumstance.

No matter. Whoops! is easy to install. A configuration program, which adjusts Whoops! to various conditions, works so simply that finding the best configuration for your system, even for each different application, is little trouble.

To use its spelling list in RAM,

Whoops! needs 200K more than DOS and your other programs use. If all you have is 256K, Whoops! won't consider loading its word list. Above that, simple arithmetic tells you if it's possible. If you can't fit the spelling list into memory, not only is Whoops! slower, but much of the reason for using it disappears.

Whoops! has two spelling-checker modes that run in the background. Its real-time mode monitors what you type or otherwise put on the screen. It beeps at you when it doesn't recognize a word. Whoops! kept up with my typing and didn't appear to slow down any of the applications I used it with. The program doesn't mark suspected misspellings as you type, except audibly. If you don't correct errors immediately, there's no reason to use the real-time mode.

The second mode, Screen Proofing, examines the current screen of text and highlights words it doesn't know. With the word list in memory, it's impressively fast.

When Whoops! points out a real misspelling, you can retype it or ask for help. Point to the word and Whoops! displays its word list where the suspect word ought to appear. You can scroll the list in both directions. If the correction is not nearby, type another spelling and jump to another part of the list. In addition, Whoops! might suggest corrections, and they are often uncannily accurate. If you find the correct spelling, you highlight it. Whoops! returns to the text screen and makes the correction. It adjusts for the length of the new word and maintains your capitalization.

The thesaurus is available any time Whoops! is resident, provided its synonym file is in the right drive and directory. Point to the word you don't like, and Whoops! shows you a list of words (not all of them direct synonyms) related in meaning to your word. Whoops! uses the other words to locate other word groups. In that way you can follow



shades of meaning until you find the right word.

In the foreground, the Proof program proofreads and corrects text files on disk. Proof stops at each unrecognized word, and the correction takes the same form as its original in the background version. When the program reaches the end of the file, it goes back and makes the changes all at once. You get one pass. If you make a mistake, you have to run the program again. Proof does not maintain capitalization. Finally, the manual claims that Proof "self-configures to recognize the documents of most word processors." Proof worked with the ASCII and near-ASCII files that any application might produce, but I can't report that it works reliably with any other format.

### What You Get

The manual lists a dozen word-processing programs. At first I assumed that Whoops! is certified to work with those word processors. The manual makes no such promise.

I tried Whoops! with five word processors, two of them on the list. With one of them, not on the list, Whoops! worked perfectly. It was a pleasure to use and a valuable addition to the word processor. With two of the others, one of them on the list, almost everything worked most of the time. Although neither word processor crashed, Whoops! occasionally became addled, but I was always able to regain control of the computer if I persisted and pronounced the right curse.

The fourth word processor uses a bit-mapped display. As the manual promised, Whoops! reconfigured to respond to the keyboard instead of the display, and I was able to use its real-time mode. But it couldn't proofread the screen or make corrections. Whoops! didn't work at all with the fifth word processor, which was on the list. The two programs in the same computer guaranteed mutually assured destruction.

### Conclusion

I feel that the way Whoops! worked with the five word processors is representative of the way it will behave in general: The program performs well enough under most conditions. Sometimes it delivers its full potential superbly; sometimes it proves useless.

—Harry Bee

## Mergemate

★★★

**Mergemate** runs on the Tandy 1000 (128K) and requires one disk drive. McAdams Associates, 109 Spanish Village Center, Suite 618, Dallas, TX 75248. 214-239-9646. \$40.

Mergemate, a Deskmate accessory, is a fine example of what "kitchen table" software can be (and so often is not). The program lets you use data stored and organized with Filer and documents prepared with Text to produce form letters, mailing labels, reports, and such. It delivers this extra capability, missing from Deskmate, efficiently and with style.

To use Mergemate you need to create a special document. In the first line, you identify all the fields in each Filer record. There's no need to use the field names you used in Filer, nor must you use a certain character to set off your field identifiers. Any nomenclature that is distinct enough so it won't be confused with normal text will do.

You then place the identifiers you specified in the body of the text where you want the contents of a field inserted. You don't have to use every field, and the ones you do use don't have to be in order. You can print any combination of fields, once or any number of times each, in any order that suits your purpose.

One problem you might encounter at this point is with the unnamed fields that are possible with Filer. When you leave blank lines in an entry screen for visual separation, Filer treats them as fields. Allowing for this, Mergemate checks the document and the file you name for agreement. If they don't agree (or if you notice anything amiss while using Mergemate), a shell function lets you leave the program to make corrections, and return with whatever variables you've established intact.

You'll need to make few modifications to your Filer files to use them. Even if you've entered data in uppercase, a selectable filter converts all but initial letters to lowercase. And Mergemate supports Filer's edit characters, used with dates and telephone numbers.

Mergemate uses the same document formatting scheme as Text. Though this doesn't add anything, it provides compatibility and familiarity. You can save your standard document format as the program's default, but change parameters temporarily during use. Mergemate is very good at supporting wordwrap, adjusting for fields of varying sizes, and tracking the line count and page length.

When the program encounters an empty field, it leaves a blank or a blank line. You can prevent the poor appearance this can cause by using the program's selection criteria to exclude empty fields. Mergemate supports the same data-selection ability as Filer, including wild cards. You can have separate criteria for every field, even ones you don't intend to print.

The program disk includes two versions of Mergemate that differ in the way

each handles Filer's index and records. Version 1.1, for files of fewer than 5,000 records, performs fewer disk accesses; version 2.1 handles up to 65,535 records. A program called Which tells you which version to use.

Mergemate does not sort. If you need to sort a file for a particular purpose, such as by zip code for mailing labels, you must use Filer's Order function. It does ignore records that are deleted, but not erased, so you don't have to pack your files. It also remembers file names, formats, and selection criteria, so that, between printings, you need only type changes.

Mergemate is flexible. It's easy to use and handles errors well. Its screens, if spare, are nicely designed, and its functions are clearly prompted. The somewhat self-conscious documentation, contained in a Text file on the program disk, is organized, indexed, and sufficient. Though there are omissions, the program covers enough bases to make it a valuable utility. If you use Deskmate and need to create form letters and the like, you won't go wrong choosing Mergemate.

—Harry Bee

## 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.



# MS-DOS

## The Engineer's Scratchpad

Mathcad lets engineers and scientists use their computers as scratchpads to perform complex numerical analysis and document the results. You can enter and calculate equations, create plots, and enter and edit text on the same screen. The computational features include differentiation, integration, root finding, curve fitting, cubic splines, built-in statistics functions, and the fast Fourier and inverse transforms.

Mathcad runs on MS-DOS 2.x and requires 512K. It costs \$249 from Mathsoft Inc., One Kendall Square, Cambridge, MA 02139, 617-577-1017.

Circle 560 on Reader Service card.

## Two From Aedex

The Aedex COM-100 is an RS-232 port sharing device that lets you connect two input devices to a single serial port. The 4- by 4- by 1.5-inch unit features one nine-pin D connector on the front panel and two on the back. The unit can transfer data at 300 to 38,400 baud.

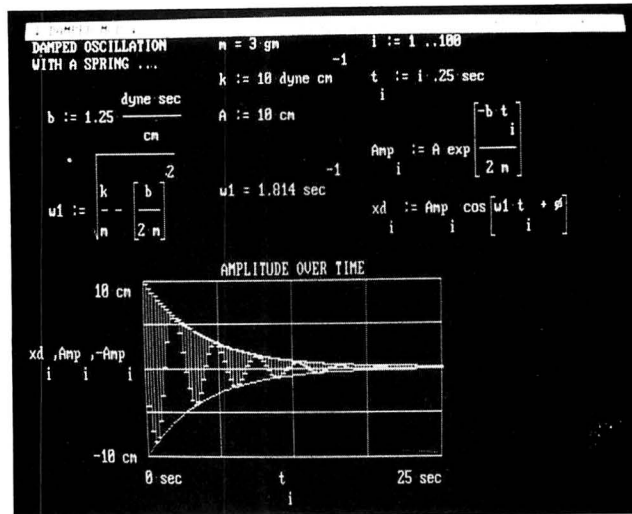
The COM-100 comes with an external power supply and sells for \$250.

The BCS-150 Bar Code System plugs into any bus slot and allows three inputs. It comes with a bar-code scanner, bar-code printing firmware, and remote data-entry firmware. The board lets you add on other boards and network devices and has inputs for a wand, a laser scanner, and a magnetic strip reader.

The BCS-250 sells for \$995. For information contact Aedex Corp., 181 W. Orange-thorpe Ave., Suite C, Placentia, CA 92670, 714-528-4700. Circle 556 on Reader Service card.

## Learn Dbase III Plus

Individual Training for



Mathcad in a mechanical engineering application: damped oscillation with a spring.

Dbase III Plus is a software program that teaches you how to use Dbase III Plus. The tutorial includes interactive lessons that provide hands-on experience with a variety of Dbase commands to show you how to create a data base, enter records, retrieve and edit data, sort and index a data base, and print reports.

Individual Training for Dbase III Plus requires 256K and DOS 2.x and sells for \$69.95 from Individual Software Inc., 1163-I Chess Drive, Foster City, CA 94404, 415-341-6116

Circle 557 on Reader Service card.

## Editor Assembler

ED/ASM-86 3.1 is a full macro assembly-language development system that includes a line editor, screen editor, assembler, linker, debugger, and disassembler in one 60K file.

The assembler can directly generate a COM or EXE file, assemble directly into memory, and assemble to a special link format file for modular program development. The debugger includes symbolic disassembly of arbitrary code, 8087 register display in scientific notation, assembly to memory, and use of complex expressions with previously defined symbols or

register values.

The line editor features intra-line editing, block move and copy, partial save and load, and tokenized source for quick loading and assembly.

ED/ASM-86 sells for \$124.95 and comes with a manual that includes a tutorial on assembly, an 8086/186/286/87 instruction reference, and an extensive index. Contact Misosys Inc., P.O. Box 239, Sterling, VA 22170, 800-647-6797 (in VA, 703-450-4181). Circle 550 on Reader Service card.

## Printer Emulation Package

PEP, short for Printer Emulation Package, makes any computer capable of RS-232 output think that your IBM PC compatible is a printer. Therefore, any application that is running on the other computer can "print" its data to the PC via an RS-232 cable. At the PC, PEP can receive data, modify it for MS-DOS compatibility, store it to disk, display it on a monitor, and print it on a printer at speeds up to 19,200 baud.

PEP interprets a 5-second pause between transmissions as an end-of-transmission indicator, so you can easily transmit and save a sequence of distinct data files to the PC. PEP requires an IBM PC

compatible with 192K, RS-232 capability, and DOS 2.x. The program is not copy-protected and sells for \$59.95 from Intelpro, 13 Saratoga Drive, Kirkland, Quebec H9H 3J9, 514-694-68E2.

Circle 552 on Reader Service card.

## Null Slot Clock

The Zero-Slot Clock is a battery-powered real-time clock and calendar consisting of software and a hardware module. Since the module fits into the BIOS ROM socket on the CPU board, it doesn't occupy any expansion slots. You then install the ROM on top of the module.

You can add the Zero-Slot Clock to any IBM PC compatible. Two small programs set and read the clock, and the module won't affect computer operation, even at turbo speed. The Zero-Slot Clock sells for \$35 from Zero-Slot Products, P.O. Box 282014, Columbus, OH 43228, 614-878-9080.

Circle 553 on Reader Service card.

## First Choice

First Choice is a multipurpose business program designed for those who are new to computing. It includes a word processor with built-in spelling checker, a file manager and report generator, a spreadsheet, and electronic communications. First Choice sells for \$179 and is available through Radio Shack Computer Centers (catalog no. 90-3080).

The manufacturer, Software Publishing, will include a free conversion disk that lets PFS:File owners convert their files. For more information, contact Software Publishing Corp., P.O. Box 7210, Mountain View, CA 94039-7210, 415-962-8910.

Circle 551 on Reader Service card.

## Credit Tracker

Credit Card Tracker is an expense-control management program that tracks, verifies,



## NEW PRODUCTS

and organizes credit-card charges for businesses using multiple credit cards. The menu-driven program verifies charge receipts against bank-card statements, organizes expenses by general-ledger account number, and accommodates variable deduction percentages for each expense type to meet new tax laws. Management reports or screen inquiry includes expenses by card type, card user, expense types, and time period.

The Credit Card Tracker sells for \$79.95 and runs on MS-DOS and Kaypro CP/M machines. Contact The Computing Clinic, 15524 84th St. N.E., Lake Stevens, WA 98258, 206-691-5418.

Circle 554 on Reader Service card.

### Digital-to-Analog Conversion

The Analog Connection AO is a digital-to-analog converter and digital input/output card that compares its

output to on-board, factory-calibrated references to calibrate itself. The card has two, four, six, or eight 12-bit analog outputs and four ranges (zero-10 v, zero-5 v,  $\pm 5$  v, and 4-20 mA that you can switch-select on each channel.

The Analog Connection AO is used for such laboratory and industrial control applications as analog control loops, PID loops, set-point control, and waveform generation. Prices range from \$395 for two analog outputs to \$995 for eight outputs. Contact Strawberry Tree Computers, 1010 W. Fremont Ave., Sunnyvale, CA 94087, 408-736-3083.

Circle 558 on Reader Service card.

### For the Globe Trotter

The Freequent Flyer is an interactive knowledge base that lets you keep track of the various airlines' frequent-traveler programs. It lets those who fly often enter their

travel plans to see what travel credits are available and how to best use them. The software includes information on which airlines, hotels, or car-rental firms participate with each other and what awards and bonuses are currently available.

The Freequent Flyer requires 256K and a hard disk. It sells for \$39.95 and includes two free updates to the data base. Contact The OMT Group, 1296 Albion Court, Sunnyvale, CA 94087, 408-732-8565.

Circle 559 on Reader Service card.

### Real Estate Finder

The Commercial Property Locator helps commercial and industrial real-estate brokers keep track of the properties that their brokerage lists. You can search for property by city, size, usage, availability, and so on, and get several types of printed reports.

The Commercial Property Locator sells for \$199 and re-

quires 256K. A demo disk is available for \$5. Contact Signature Solutions Inc., 454 Kenneth Ave., Campbell, CA 95008, 800-327-6111 (in CA, call 408-378-8177).

Circle 561 on Reader Service card.

### Newsmaster

Newsmaster is a desktop-publishing program that combines graphics and text-processing capabilities to produce printouts on a dot-matrix or laser printer. The program lets you mix lines, text, boxes, and clip art in multicolumn, multiple-page documents.

Newsmaster lets you choose from four different page views—expanded, normal, full-width, and full-page—with eight levels of zoom. You maintain complete editing capabilities, regardless of the view. The program offers several choices of page layout, type fonts, graphics, and design.

You can choose from one to

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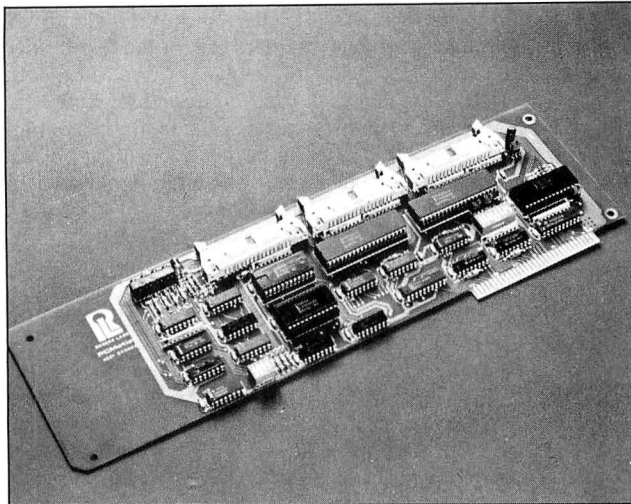
10 columns per page, and your body copy automatically flows from column to column and page to page. You can also determine how the text will flow around artwork and graphics. Newsmaster reads most word-processing programs' ASCII files, so you can read text from other sources.

Newsmaster sells for \$99.95 and requires 256K, a color adapter with color monitor, or an enhanced graphics adapter or Hercules graphics monochrome adapter with a monochrome monitor. Contact Unison World, 2150 Shattuck Ave., Suite 902, Berkeley, CA 94704, 415-848-6666.

Circle 565 on Reader Service card.

**Step by Microstep**

The PCMotion Plus is a microstep motor controller that can control two motor channels ramped and four motor channels non-ramped. You can use software commands



The PCMotion Plus fits the Tandy 1200/3000.

to adjust the microstep ratio. The unit has a single motor speed capable of 140K steps per second, a dual motor speed of 100K, and up to 500 million steps per move.

The PCMotion Plus can interface with interpreted Basic, Pascal, C, Fortran, and Forth and has an optional op-

tical encoder interface. It sells for \$695 from Rogers Labs, 2727 S. Croddy Way, Suite E, Santa Ana, CA 92704, 714-751-0442.

Circle 555 on Reader Service card.

**Mach 3.5**

The Mach 3.5 device driver software and formatter is de-

signed for 3½-inch 80-track drives with a 720K format capacity. It is compatible with DOS 2.x and was developed as an alternative to IBM's Driver.SYS.

The Mach 3.5 sells for \$29.95. Contact J&M Systems Ltd., 15100-A Central S.E., Albuquerque, NM 87123, 505-292-4182.

Circle 564 on Reader Service card.

**Computer-Aided Design**

Firstcadd is an entry-level, full-featured, two-dimensional drafting and design package that offers a set of drawing symbols, such as circles, arcs, rectangles, polygons, ellipses, and B-spline curves. The program also features rubber-banding and point and grid snapping. You can draw objects in up to 256 colors and layers.

The program lets you edit your drawings; create a library of your own symbols; and specify the size, color,

Circle 40 on Reader Service card.

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Clock card for the 1000, 1000A, 1000SX, and 3000 \$39.95.

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30 megabyte seagate 4038 for the Tandy 3000 \$579.00.

360K Fujitsu floppy drives \$84.95. 1.2 Meg Fujitsu floppy drives \$124.95.

Internal 300/1200 modem with software and five year warranty \$139.95.

256K chips \$2.79 each 64K chips \$.99 each.

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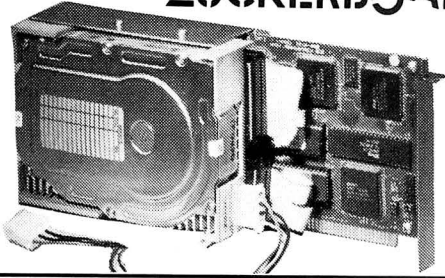
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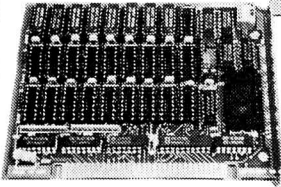
**FEATURES:** • A microprocessor-controlled servo mechanism guarantees high performance and maximum reliability • 20 MegaBytes formatted capacity • Compact design • DC power only (+12V and +5V) • Access time: 85ms • Pre-formatted with MSDOS • Uses only 1 slot • 2-year warranty • **Just Plug In and Go!**

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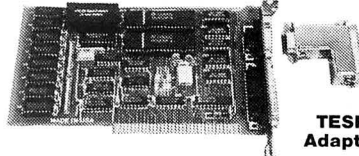


The Zuckierboard Memory Half-Card provides an extra 256K of memory for the Model 1000SX, bringing your 384K Tandy 1000SX to 640K. Optional battery backed 20-year clock/calendar, TAN-C @ \$39.95 (not included, see below) 2-yr. warranty. Documentation included. Made in the U.S.A.

- TSX256K** Includes 256K RAM. . . . . **\$119.95**

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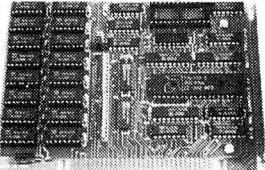
The Zuckierboard Multifunction Board provides an extra 256K of memory bringing your 384K Tandy 1000SX to the maximum of 640K. Board comes complete with serial port (expandable to two, see below: TESP \$39.95) and is addressable up to 4 COM. RAM Disk Printer Spooler Software and 20-year battery backed clock/calendar are also included. Made in the U.S.A. 2-year warranty and documentation included.

- M256K** Includes 256K RAM. . . . . **\$189.95**
- TESP** Second Serial Port for M256K. . . . . **\$ 39.95**

**ZUCKERBOARD**

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• Expands Tandy 1000 (128K Version) to as much as 640K using 256K DRAM chips • Includes DMA controller chip • Optional clock/calendar plugs onto board (not included) • Made in the U.S.A. • 2-year warranty



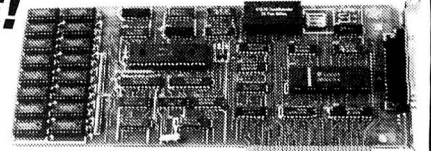
- TAN-C** Clock/Calendar Option (Only). . . . . **\$ 39.95**
- TAN-EM256K** Includes 256K RAM and Manual. . . . . **\$ 99.95**
- TAN-EM512K** Includes 512K RAM and Manual. . . . . **\$129.95 \$119.95**

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• Expands Tandy 1000 (128K Version) to as much as 640K • Comes with RS232 serial port, RAM Disk Printer Spooler and on-board DMA controller chip • Made in U.S.A. • 2-year warranty



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- EMTAN-384K** Includes 384K RAM and Documentation. . . . . **\$109.95**

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# How to Use 80 Micro Program Listings

Basic program listings in *80 Micro* include a checksum value at the end 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 program code *exactly* as listed, omitting the indentations (when program lines continue to a second or third magazine line). The '\*' characters, checksum values, and comments may be omitted.

● Save the program in ASCII format with the command SAVE "file name",A.

● Load and run Checksum (see Program Listing). (For the Tandy 1000, change line 10 to: 10 CLS:LOCATE 2,25:PRINT "VERIFY CHECKSUMS ON PROGRAM" '\* 3544.) The program will prompt you for the name of the file to be verified and give you the option of sending the line numbers and checksum values to the printer or to the screen.

When printing to the screen, Checksum lists 20 lines and then waits for you to press the enter key.

● Compare the displayed line numbers and checksum values with the checksums shown in the listing. Correct errors in lines having checksum values that don't match.

—Beverly Woodbury,  
Technical Editor

## Program Listing. Checksum.

```

10 CLEAR 1000:CLS:PRINT@140,"VERIFY CHECKSUMS ON PROGRAM"      ** 3713
20 PRINT:PRINT:INPUT "Enter Name of File to verify";F$         ** 4245
30 PRINT:PRINT:PRINT "List Checksums to:"                      ** 3233
40 PRINT TAB(20) "<P>inter":PRINT TAB(20) "<S>creen"          ** 3628
50 PRINT:PRINT:PRINT TAB(30);"? ";                             ** 2148
60 K$=INKEY$                                                    ** 726
70 IF K$="P" OR K$="p" OR K$="S" OR K$="s" THEN 80 ELSE 60     ** 3269
80 PRINT K$:IF K$="P" OR K$="p" THEN LP=1                       ** 2439
90 OPEN "I",1,F$:B$=CHR$(34)                                    ** 1521
100 IF EOF(1) THEN CLOSE:GOTO 390                               ** 2000
110 LINE INPUT#1,L$:L=VAL(LEFT$(L$,6))                          ** 2275
120 IF Z=2 AND L=0 THEN 100 ELSE Z=2                            ** 2089
130 A=VARPTR(L$):GOSUB 270:Q=PEEK(A)                            ** 2244
140 L$=PEEK(A+1):M$=PEEK(A+2):A=MS*256+L$:GOSUB 270           ** 3115
150 IF INSTR(L$,"") THEN GOSUB 280                             ** 2038
160 IF RIGHT$(L$,1)=" " THEN IQ=Q:GOSUB 370                   ** 2514
170 FOR K=1 TO Q:P=PEEK(A):CS=CS+P:A=A+1:NEXT K                 ** 2945
180 IF CS=0 THEN 100                                            ** 1131
190 IF CS<100000! THEN D$="-"                                  ** 1538
200 IF CS<10000 THEN D$="-"                                    ** 1481
210 IF CS<1000 THEN D$="-"                                     ** 1466
220 IF CS<100 THEN D$="-"                                     ** 1451
230 IF LP=1 THEN LPRINT "Line";L;D$;CS:CS=0:GOTO 100          ** 3370
240 PRINT "Line";L;D$;CS:CS=0:X=X+1                             ** 2282
250 IF X=20 THEN X=0:PRINT TAB(30) "Press <ENTER> to continue."
    ELSE 100                                                    ** 4924
260 K$=INKEY$:IF K$<>CHR$(13) THEN 260 ELSE 100               ** 2705
270 IF A>32767 THEN A=(65536!-A)*-1:RETURN:ELSE RETURN        ** 3275
280 I=INSTR(L$,""):IQ=I-1                                       ** 1504
290 IF LEN(L$)=INSTR(L$,"") THEN 100                            ** 2095
300 LQ$=STR$(L):LQ=LEN(LQ$):IF LQ+2=>I THEN 100                ** 2839
310 Q1=INSTR(L$,B$):IF Q1>I OR Q1=0 THEN 370                  ** 2593
320 Q2=INSTR(Q1+1,L$,B$):IF Q2>I THEN I=INSTR(Q2,L$,"")     ** 3297
330 IF I=0 THEN RETURN                                          ** 1386
340 Q3=INSTR(Q2+1,L$,B$):IF Q3>I OR Q3=0 THEN 370            ** 2869
350 Q4=INSTR(Q3+1,L$,B$):IF Q4>I THEN I=INSTR(Q4,L$,"")     ** 3308
360 IF I=0 THEN RETURN                                          ** 1389
370 FOR I=IQ TO 1 STEP-1:C=ASC(MID$(L$,I,1)):IF C<33 THEN NEXT I
380 RL$=LEFT$(L$,I):Q=LEN(RL$):RETURN                           ** 2323
390 PRINT:PRINT"CHECKSUM/BAS now in Memory"                    ** 3248
400 PRINT "Reload the PROGRAM that you are working on? (Y/N)";
410 INPUT Q$:IF Q$="Y" OR Q$="y" THEN CLS:LOAD F$              ** 4890
                                                                ** 2967

```

End

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Reader Service Number	Page	Reader Service Number	Page	Reader Service Number	Page			
82	Aerocomp	76	Moving	18, 120	100	Montezuma Micro	81	
82	Aerocomp	77	PC Resource Subscription	85	411	Montezuma Micro	78	
202	Aerocomp	69	Reader Service	118, 125	416	Montezuma Micro	65	
302	Aerocomp	33, 34, 35, 36	Subscription	83	424	Montezuma Micro	64	
17	Alpha Products	15	University Micro	83	167	National Computer Supply	18	
141	Anitek Software Products	7	361	Electric Software Corp.	2	232	Nocona Electronics	105
378	ATD	17, 52, 52A	45	Electric Webster	1	124	Perry Computers	75
152	BCCompcop	119	214	Fort Worth Computers	28, 29	308	Powersoft	4, 50
301	Big D Computers	92	90	Freedom Electronics	103	30	Prosoft	9
186	Blue Ridge Software	118	*	GE Information Services	CII	478	Purple Computing	73
133	CDA World of Computers	62	9	H & E Computronics	CIV	120	R&L Electronics	54
95	Center Computer Services	71	*	Halix Institute	83	75	Radio Shack	24, 25, 122, 123
357	Computer Friends	31	540	Hannah Tanning Inc.	86, 87	371	Seatronics	118
18	Computer Plus	47	455	Hard Drive Specialists	121	245	Software Sales	1
438	Computer Supplies of Peterborough	117	175	Howe Software	10	188	Spectre Tech	120
291	Comtrek Computer Components	70	46	Hypersoft	53	444	Southwestern Digital	124
45	Cornucopia Software	1	101	J & M Systems, Ltd.	103	434	Telebyte Tech	113
397	DAC Software	CIII	534	Jameco Electronics	115	198	Traveling Software	91
282	DFW Computer Center	13	485	Kalglø	113	390	Unison World	57
40	Discount Computer Supplies	114	197	Logical Systems	80			
204	DiskCount Data	3		Marketing Origo International	21			
91	Dotwriter (Prosoft)	9	250	Marymac Industries, Inc.	48			
452	Dresselhaus Computer Products	95	225	Merritt Computer	95			
85	Educational Micro Systems	26	464	Micro Labs, Inc.	26			
	80 Micro		*	Micro Smart	40, 41, 43			
	Classified	18, 114	299	Microdex	30			
549	Classified Ads	125, 127	107	Misosys, Inc.	55			
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 2. I intend to purchase.  4. Not interested.
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 3. Home management applications  6. Programming Utilities
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 2. Two  4. Four
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27 32 37 42 47	177 182 187 192 197	327 332 337 342 347	477 482 487 492 497
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104 109 114 119 124	254 259 264 269 274	404 409 414 419 424	554 559 564 569 574
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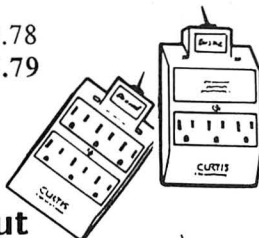
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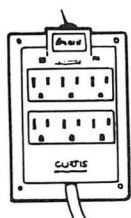


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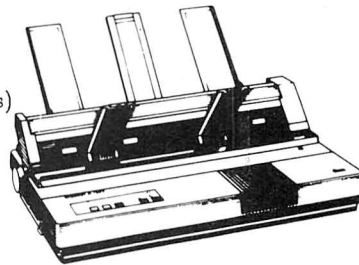


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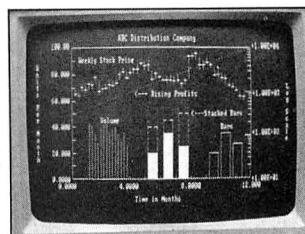


## NEW PRODUCTS

and rotation of text. You can rotate, scale, stretch, copy, and erase objects and print out your drawings on most dot-matrix printers.

Firstcadd requires 256K, DOS 2.x, and a graphics card. It costs \$49.95 from Generic Software Inc., 8763 148th N.E., Building C, Redmond, WA 98052, 800-228-3601.

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Plotting financial data with PCPlot.

### Financial and Scientific Graphs

PCPlot 3 is a high-resolution graphics program that creates linear and logarithmic plots and creates line graphs with error bars, stock-market charts, and bar charts. The program supports two independent Y axes that you can scale to two different data sets. You can mix different charts on a single graph and scale X and Y data separately.

PCPlot 3 sells for \$95 from BV Engineering, 2200 Business Way, Suite 207, Riverside, CA 92501, 714-781-0252.

Circle 563 on Reader Service card.

### Doan's Pills, Software Style

Dr. David Lehrman, founder of the St. Francis Hospital Spine Center and the Lehrman Back Center in Miami, has developed a program to help you identify the causes and possible solutions to back problems. Backaid Software takes you inside the aching back and illustrates the probable causes of distress. While not intended to diagnose or supplement professional treatment, it helps identify and monitor the physical and emotional factors that may contribute to back discomfort and offers some ways to ease or elimi-

nate the pain.

Backaid Software sells for \$99 from Brainbank Inc., Suite 1201, 220 Fifth Ave., New York, NY 10001, 212-686-6565.

Circle 566 on Reader Service card.

### Guide for Mouse Programmers

The *Microsoft Mouse Programmers's Reference Guide* explains how to create a mouse menu program that lets you use the Microsoft Mouse with an application that does not have built-in mouse support and how to build mouse support directly into applications you've written. The guide contains the tools and technical information you need to make calls to the driver.

The *Microsoft Mouse Programmer's Reference Guide* sells for \$25 and includes the Microsoft Mouse Tools disk, which contains version 6.0 of the mouse library, the EGA register interface library, mouse menu generation tools, and several examples. Contact Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, 206-882-8080.

Circle 568 on Reader Service card.

### Five-Minute Business Graphs

Stella Systems claims you can create a chart within 5 minutes after you've opened its software package, Stella Business Graphics.

You can type in your data or import it from Lotus's 1-2-3, Multiplan, Dbase, or a word processor and then select from one of 12 graph types to best display your data. Stella Business Graphics sells for \$199 from Stella Systems, 10430 S. De Anza Blvd., Suite 185, Cupertino, CA 95014, 408-257-6644.

Circle 567 on Reader Service card.

## TRS-80

### Rembrandt for CP/M

Spectre Technologies' Rembrandt Complete Business Graphics Toolkit is now available for the TRS-80 Model 4 running CP/M. The



# NEW PRODUCTS

package lets you draw free-hand; create bar charts, pie charts, and x,y charts; print graphics on most dot-matrix and daisy-wheel printers; create on-screen electronic slide shows; and print out integrated text and graphics.

Rembrandt sells for \$39.95 from Spectre Technologies Inc., 22458 Ventura Blvd., Suite E, Woodland Hills, CA 91364, 818-716-1655.

Circle 569 on Reader Service card.

## Math and Reading Help

The Word Problems series offers drill in solving math word problems, a reward game, and student/program management systems. There are two disks for grades 3 and 4, two for grades 5 and 6, and two for grades 7 and 8. The first disk develops prerequisite math skills, and the second provides drill in solving the word problems. Problems are controlled for difficulty, and students receive help if

they give a wrong answer.

Teachers can determine the number of problems presented as well as the number of correct answers a student must give in order to play the reward game. The student-management system holds up to 200 student files and records names, lessons completed, raw scores, and percent correct. Teachers can view, print, or delete any files.

The disk set for each class level sells for \$69.95. Other packages that include backup disks, class packs, and networking systems are also available.

Chance It! A Game of Details is a two-player game that uses a game-show format to encourage students to read for details. The game is available in a third- and fourth-grade level and in a fifth- and sixth-grade level.

Chance It! sells for \$39.95. As with Word Problems, more complete packages are available, and the disk includes a

similar student/program management system.

Contact Gamco Industries Inc., Box 1911, Big Spring, TX 79721, 800-351-1404 (in TX, call 915-267-6327 collect).

Circle 570 on Reader Service card.

## Portable Disk Drive

Tandy's 200K, 3½-inch Portable Disk Drive 2 for the Tandy 102 and 200 operates on four AA batteries or an optional AC adapter, weighs only 1½ pounds, and is 2½ by 5¼ by 6¾ inches in size. The unit also features a disk-access indicator, low-battery indicator, an RS-232C connecting cable, and a 19,200-baud data-transfer rate.

The Portable Disk Drive 2 (catalog no. 26-3814) sells for \$199.95. Contact the Tandy Corp., 1800 One Tandy Center, Fort Worth, TX 76102.

Circle 571 on Reader Service card.

## Sardine

Sardine is a laptop dictionary and spelling checker,

contains T-Word word processor, and comes on a plug-in ROM chip or on a 3½-inch disk. It gives you access to 33,000 words in the Random House *American Dictionary*, and you can create your own custom word lists. The ROM version includes 7,000 of the most frequently used business words.

Sardine is available for the Tandy 100/102/200. The 3½-inch disk version costs \$99.95, and the plug-in ROM version costs \$169.95. Contact Traveling Software, North Creek Corporate Center, 19310 N. Creek Parkway, Bothell, WA 98011, 206-483-8088.

Circle 572 on Reader Service card.

## High-Performance Z80

The V80-CPU is a module that upgrades the Z80 to the new Hitachi HD64180 high-integration microprocessor. To install the V80-CPU module, you insert it in place of the Z80 chip and attach a clip

### NEW PRINTERS ADDED! FIND YOURS BELOW. BCCOMPCO EXACT REPLACEMENTS

Circle 152 on Reader Service card.	PRINTER MAKE, MODEL NUMBER <i>Contact us if your printer is not listed.</i> We have many more in stock. We can probably RELOAD your old cartridges.	RIBBON SIZE Inches by Yards	NEW CARTRIDGES From the various manufacturers or made in our own shop. Ready to use.	RELOADS You SEND your used CARTRIDGES to us. WE put OUR NEW INSERTS in them.	INSERTS EZ-LOAD™ DROP IN. NO WINDING! EXACT REPLACEMENTS made in our own shop. Cartridges NOT included.
C ITOH Prowriter 1550-8510, NEC 8023-8025, APPLE DMP - IMAGEW		1/2 x 18	\$15/2 \$ 42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
IBM PROPRINTER (Standard Paper)	(4201)	7/16 x 20	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72
IBM PROPRINTER XL	(4202)	7/16 x 27	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72
RADIO SHACK-TOSHIBA-COMMODORE-PANASONIC-RICOH			RS LP-III-IV, CENTRON 730-737-739-779 (ZIP PACK)		
Carbon Film - DWP 210, DIABLO HYTYPE II	Black (1445)	5/16 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$12/3 \$45/12 \$252/72
DW II, DWP 410-510, RICOH 1200-1300-1600	Black (1419)	1/4 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72
Red, Green, Blue, Brown	Colors (1419)	1/4 x 130	\$21/3 \$72/12 \$414/72	\$6 ea 3-11 \$5 ea 12 or more	\$24/6 \$42/12 \$234/72
Fabric (Long Life), DWP 210, DIABLO HYTYPE II	Black (1458)	5/16 x 17 NOTE: LOAD 1/4 x 25	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$21/3 \$78/12 \$432/72
DW II, DWP 410-510, RICOH 1200-1300-1600	Black (1449)		\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$21/3 \$78/12 \$432/72
DMP - 100, LP VII, COMMODORE 1525, GORILLA BANANA (1424)		Inker Loop	\$18/2 \$ 51/6 \$ 96/12		
DMP - 200, 120, 130 (430 INSERTS & RELOADS)	(1483)	1/2 x 20	\$20/2 \$ 57/6 \$108/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DMP - 400 - 420, LP VI-VIII, PANASONIC KXP-130-1093	(1418)	5/16 x 14	\$15/2 \$ 42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DMP - 500	(1482)	1/2 x 20	\$22/2 \$ 63/6 \$120/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DMP - 2100, TOSHIBA P1340-1350-1351-351	(1442)	1/2 x 20	\$15/2 \$ 42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
DMP - 2200, C ITOH 3500	(1233)	1/2 x 52	\$35 GENERIC \$30	\$18/1 \$16ea 2 or more	\$30/3 \$ 57/6 \$108/12
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EPSON LQ 1000		1/2 x 18	\$22/2 \$ 63/6 \$120/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72
MX-FX-RX 70-80-85, LX 80-90 (5/16 x 7)		1/2 x 20	\$14/2 \$ 36/6 \$ 66/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
MX-FX-RX 100-185-286, LQ 800 (1/2 x 18) LQ 1500 (1/2 x 14)		1/2 x 30	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72
EPSON LQ 2500 (INSERTS & RELOADS ONLY)		1/2 x 15		\$7/1 \$6 ea 2 or more	\$15/3 \$54/12
DX 20-35 Carbon Film (Multistrike), OLIVETTI ET-121-221		5/16 x 290	\$21/3 \$72/12 \$414/72	(Call for Correctable Prices)	
NEC Spinwriter-Carbon Film - 2000-3500 (Reloads BCCOMPCO Only) - 5500-7700 (Can Reload Most Types)		5/16 x 145 NOTE: LOAD 1/4 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72
PC PR 103 / 105A		1/2 x 13		\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
Pinwriter P1-P2-P6, P-5 (1/2 x 14) P3-P7		1/2 x 20 1/2 x 27	\$25/2 \$ 69/6 \$126/12 \$30/2 \$ 84/6 \$156/12	\$7/1 \$6 ea 2 or more \$8/1 \$7 ea 2 or more	\$15/3 \$54/12 \$288/72 \$18/3 \$66/12 \$360/72
COMREX 420 Fabric (INSERTS & RELOADS ONLY)		5/16 x 52		\$8/1 \$7 ea 2 or more	\$21/3 \$78/12
DX-15, II } Fabric		5/16 x 17	\$15/2 \$ 42/6 \$ 78/12		
BROTHER HR-15-25-35 } Carbon Film (Multistrike)		5/16 x 82	\$18/3 \$60/12 \$342/72		
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Microline 182-183-192-193 292 (7/8 x 16)		Inker Loop	\$20/2 \$ 57/6 \$108/12		
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MT-180-290		9mm x 13	\$20/2 \$ 57/6 \$108/12		
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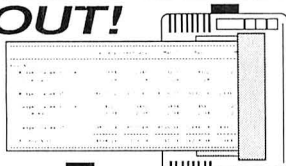
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## NEW PRODUCTS

to the clock circuitry.

The board lets you adjust the timing and phase, and the accompanying software lets you vary the number of wait states for both memory and input/output. In its fastest mode (an average increase of 40 percent), the processor runs with no wait states and no change in the system clock speed.

The V80-CPU sells for \$149. The package includes one choice of software for adjusting the wait states for the DOS you're running (CP/M, TRSDOS 6.x, LDOS 5.14, Multidos, or Dosplus III). Disks for other DOSes are available for \$14.50 each. Contact Electronic Repair Service, 118½ N. Dallas Highway, Waxahachie, TX 75165, 214-937-7017.

Circle 573 on Reader Service card.

### Program Titles

Title lets you add large titles to your Basic programs by creating subroutines that you can call with a Gosub command.

The Color Computer version gives you choices of background and character color and creates characters four lines high by three spaces wide. Characters in the Model I/III version are three lines high by five spaces wide. You can mix the titles with text.

Title sells for \$30 from B. Erickson Software, P.O. Box 11099, Chicago, IL 60611-0099, 312-276-9712.

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## Etc.

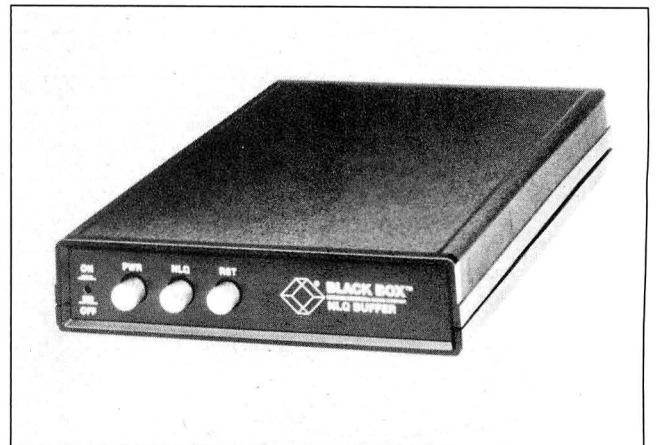
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The Black Box NLQ Print Buffer lets any Epson FX or RX printer with a Centronics interface produce near-letter-quality type in Courier, Prestige, Elan, Italic, or Roman typefaces. The unit has a 128K buffer that stores the graphic codes and can hold up to 65 pages of text. It receives standard data from the computer software and converts it (via self-contained software) into a series of graphic instructions.

The NLQ Printer Buffer can perform a number of word-processing functions and sells for \$269. Contact Black Box Corp., P.O. Box 12800, Pittsburgh, PA 15241, 412-746-5500.

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Circle 576 on Reader Service card.



The NLQ Print Buffer lets you print near letter quality in a variety of typefaces.

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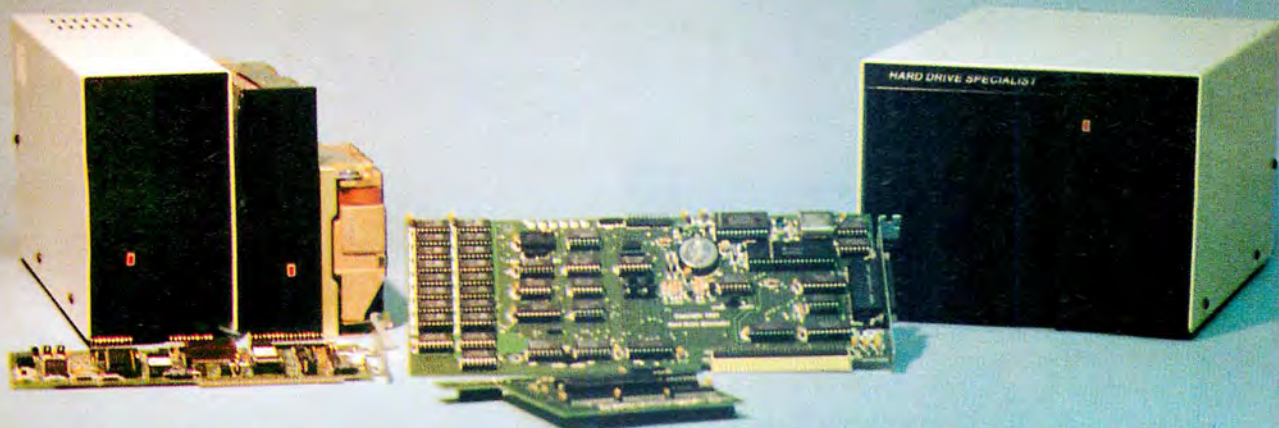
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For the Tandy 1000, 1000A, 1000SX, AND THE TANDY 1200. Expands memory beyond the 640K, limited by DOS, to use the Intel/Lotus/Microsoft expanded memory format. Includes a printer spooler, memory disk, and Plus port. PLUS expansion cards (RS232C, Clock, ETC) can be plugged into a special connector, saving a slot for other applications.

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For the Tandy 1000 and 1000A. Seven of the most needed functions/features have been combined into one package using only one expansion slot. Features include memory up to 512K, RS232, Serial Port, Clock-Calendar, DMA, Printer Spooler, Memory disk, and a PLUS expansion port that can use most PLUS cards.

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If you already have a Model 1000 memory card and do not wish to replace it the TanPak secondary is for you. It retains all the Features of the TanPak except for the DMA. For the 1000, 1000A.

TanPak™ Secondary OK ..... \$139.

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Made for the New Tandy 1000 SX, it contains all the features of the TanPak™ except the Memory and DMA features.

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## TANDY 1000 Also Tandy 1000 EX

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Now available for the TanPak, the Tandy Memory Expansion PLUS Card, the HDS Memory Expansion Plus Card, and other boards that configure their expansion port with side A (component side) routing conductors to the top side of the 62 conductor dual row header.

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Clock/Calendar PLUS Card ..... \$ 59.

RS232C-Serial, Clock/Calendar PLUS Card .. \$129.

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For the 1000, 1000A. Includes sockets for 512K, DMA, and a PLUS expansion port.

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## Tandy 1000, 1000A, 1000SX Hard Drives

Shop and compare. Hard Drive Specialist has been building hard drive systems for years and have sold thousands of subsystems to satisfied Radio Shack/Tandy customers. Our drives all use buffered seek logic and plated media to result in almost one-fourth the average access found on our competitor's drives. Internal drive systems include an interface card and a half-height hard drive that replaces the top disk drive in both size and power consumption. External units include an interface card, case, power supply, and hard drive unit. All units require a memory board with DMA compatible with the Tandy 1000.

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## TANDY 1000 EX Hard Drives

Our new External Hard Drives for the Tandy 1000 EX work just like our hard drive units for the Tandy 1000 with the exception of the PLUS type interfacing. Tandy 1000 EX Hard drives require a memory/dma card.

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## Model 1,3,4 Hard Drives Model 1 add \$50

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# New! Enhanced DeskMate 3™





# software for the Color Computer 3™

## An "enhanced" version of DeskMate?

That's right. DeskMate 3 is the latest version of our popular DeskMate integrated software program. It was created exclusively for the power of our new Color Computer 3 and features seven of the most commonly used personal-productivity programs—all on one diskette!

DeskMate 3 (26-3262, \$99.95) is designed for maximum efficiency and simplicity. There are no complicated commands to memorize, so you can begin working on your Color Computer 3 from the very first day.

## Get seven applications...on one diskette

DeskMate 3 offers you seven program options that you will find useful for both your business and your personal household needs. You can select an application by simply using your mouse, joystick or keyboard. The applications are identified by name and icon and are arranged on an easy-to-read menu.



*TEXT* lets you compose, edit and print letters, reports on a 40/80-column switchable display.

*TEXT* is a general-purpose word processor that allows you to write reports, letters, resumes and other correspondence or text. You can edit your work with a few simple commands, perform search and replaces, merge files,

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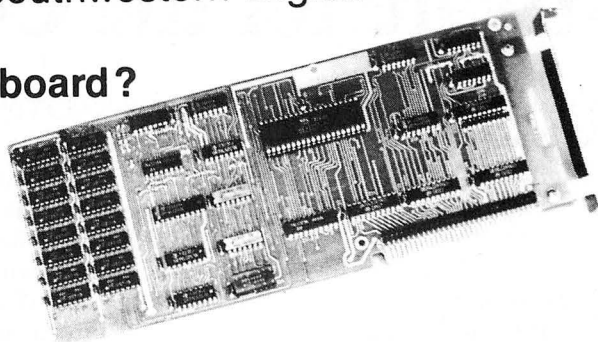
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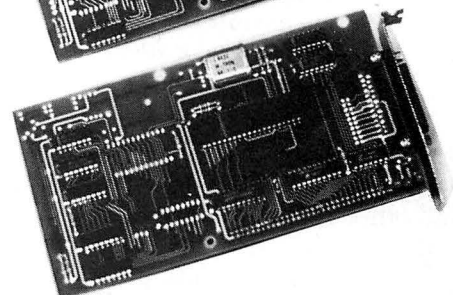
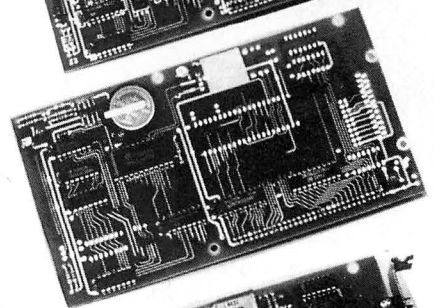
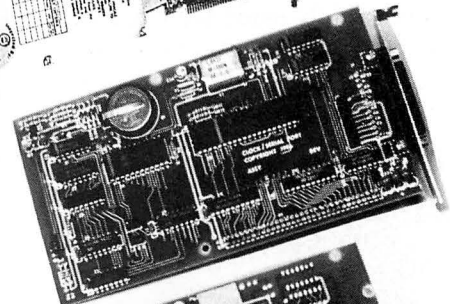
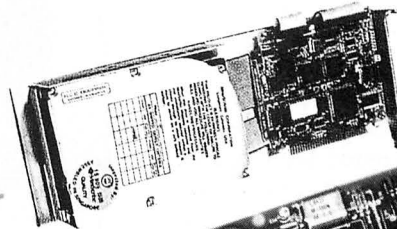
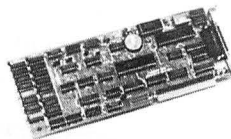
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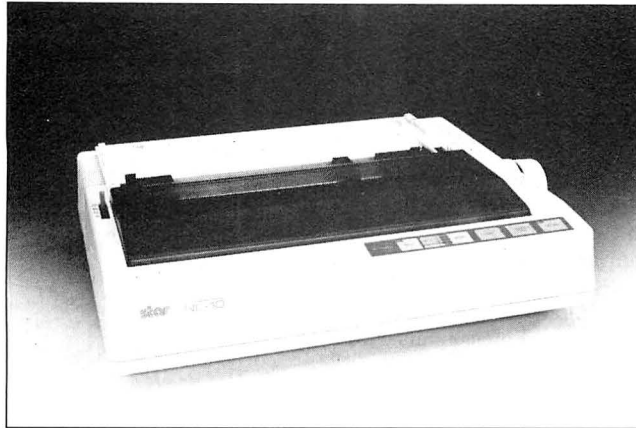


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Prices for Memory Minder range from \$60-\$130, depending on the system you

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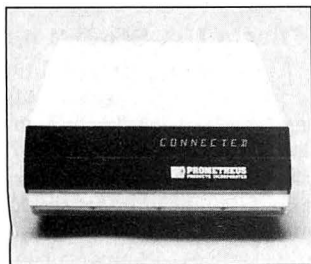
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The modems provide an audit trail of the number of valid and invalid calls to alert the system operator if someone is trying to access the system illegally. The 1200S Promodem sells for \$499, and the 2400S sells for \$649 from Prometheus Products Inc., 4545

Cushing Parkway, Fremont, CA 94538, 415-490-2370.  
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## Computer Careers

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## One Size Fits All

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You can customize Scooter RS-232 Interface Cables to fit different types of computers and printers.

your own customized nine- and 25-pin RS-232 cables. The kit's insertion/extraction tool lets you change the pin arrangement to accommodate any computer or peripheral interface.

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Cable Kits include a RS-232 Mini Tester that shows lead activity and polarity.

Scooter offers eight combinations of nine- and 25-pin male and female connectors in 5- or 10-foot lengths. Prices range from \$24.95 to \$31.50 (Deluxe Cable Kits are an extra \$18). Contact Ohm/Electronics Inc., 746 Vermont St., Palatine, IL 60067, 800-323-2727 (in IL, call 312-359-6040).

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Circle 572 on Reader Service card.

## DIFFERENT TRACK

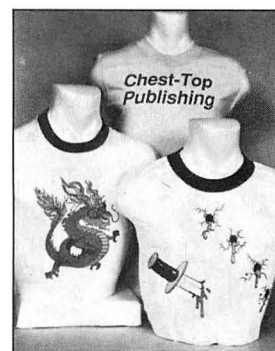
### Chest-Top Publishing

Underware ribbons and Colorpacks let your dot-matrix or impact printer create designs that you can iron onto a T-shirt. You draw an image on your computer, put the Underware ribbon in your printer, and print the image on normal printer paper. Then you put the paper face down on a T-shirt and iron over it.

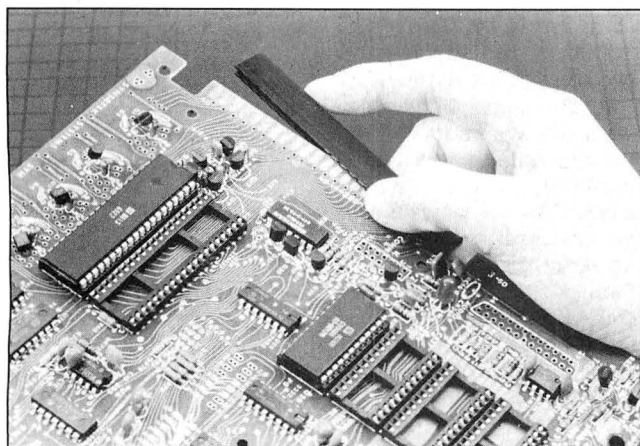
Underware ribbons can print from 20-100 shirts, depending on the complexity of the design, and will not damage printheads or irons. Transfers to fabrics with at least 50 percent polyester content are permanent. Ribbons are available in a variety of colors, and multicolor ribbons are available for color printers. You can also get fine-point and jumbo color pens with the ribbon to enhance your creations.

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Continued on p. 125

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# Where'd Everybody Go?

When your average, run-of-the-mill columnist gets no mail, it's no disaster. An ego may be bruised or crushed, but opinion, satire, reportage, even humor, can continue unabated. Who's to know? Some advice columns regularly offer less-than-authentic correspondence, the way I hear it. Not so with Fine Lines. Our conversation over the back fence needs your end of the dialogue.

So when there was a single entry into our March contest, I found myself peering twixt the horns of a hairy dilemma. What to do? Fake it? Write a dozen programs, pick the best, and award myself a T-shirt?

I considered it. But the best I came up with was a rupee-to-drachma conversion from Wendy Walpinger of Wishful, WI. Who would believe it? Sad to say, I couldn't save you the embarrassment of the world knowing you weren't able to invent a few simple conversion programs. Don't worry. You'll do better next time.

## What to Do?

Meanwhile, the mail that did come in reminded me of a frequent request I've not had room to address till now: Many of you, new to programming, have asked for a novice-class exercise along with our usually challenging conundrum. This is our chance. Rather than *my* using the extra space I have this month to advance my political agenda, *you* get two chances to win.

Here are two puzzles. One of them is easy enough to invite everyone's participation, yet tricky enough to test your mettle. The other is a bit more taxing than our usual fare.

## Unfinished Business

A few months ago you sent some clever one-line sort routines. After the contest was over, I noticed that the list of words I used to test the programs, though nicely ordered, still contained duplicate words. "That's not neat," says I to me, "nor yet complete." Let's finish it.

I have a sorted list of strings stored in the array A\$. The kind of sort is irrelevant. The list contains exact duplicates. Identical strings are, naturally, adjacent to each other. The first element in the list is A\$(1); the last A\$(S%).

Your mission (should you decide to accept it): In one line of Basic, line 2000,

write a subroutine, finishing with a return, that eliminates the duplicates and shortens the list.

## Self-help

One of the less obvious programming techniques is code that modifies itself. This is a common strategy of low-level (e.g., assembly language) programmers, and you can use it profitably in Basic, too.

Self-modifying code can redirect branches by changing the line numbers behind Goto and Gosub commands. Such code can change commands so that the program behaves differently. Making Print out of Print#, for example, makes quite a difference in what a program does. Another candidate for self-management is a constant. You can alter the dimension of an array, for instance, to accommodate even longer lists.

Most often, a program modifies itself in memory, and the changes apply immediately. In Basic that's usually done by poking directly into RAM. It requires that you know where your program code resides, and how it looks.

If you've never seen what Basic looks like on the job, it's not as mystical as you may expect. Remarks and literal strings look the same as when you list them. Most of the difference is that key words (Goto, INT) and operators (+, =) are stored as 1- or 2-byte "tokens," or codes, mostly to save space.

Program Listing 1, Mempeek, lets you peek at Basic. Add it to an existing program that begins with remarks you'll recognize. Load the program, and type RUN 65000. Stepping through memory, Mempeek displays the starting address of consecutive 8-byte blocks, the 8 con-

tiguous bytes as text characters, and their ASCII values in decimal. Codes that are below 32 and above 127 appear as periods.

Program Listing 2, Self-accounter, demonstrates another self-modification technique. It changes the code as it's stored on disk. Under TRSDOS change the file name P.P to P/P. Save the program (as P.P or P/P) in ASCII format with the A option, then run it.

Listing 2 also illustrates that we're *not* looking for programs that *do* something, necessarily, but routines that *demonstrate* a way to implement self-modifying techniques. Use up to two lines of Basic.

There you have it: Two puzzles, two ways to win.

## The Rules:

1. Write your solution(s) in any TRS or Tandy Basic, except Pocket Computer Basic.
2. This month's entries must reach us by June 15, 1987. This doesn't give everyone the same amount of time, we know, and we apologize to our overseas readers especially.
3. This month's winners will appear in the September 1987 issue.
4. Employees of CW Communications are not eligible.
5. Send your entry to: *80 Micro*, Fine Lines, 80 Elm St., Peterborough, NH 03458. We cannot return entries.
6. Specify your T-shirt size. Bumper size not required. ■

*Harry Bee is a free-lance writer, puzzle creator, programmer, and dreamer. Contact him at P.O. Box 567, Cornish, ME 04020.*

### Program Listing 1. Mempeek.

```
65000 CLS:FOR L=0 TO 655351 STEP 8:N=L+655361*(L>32767):PRINT L;TAB(8):FOR
M=N TO N+7:P=PEEK(M):P=P*((P>31)*(P<128))-(((P<32)+(P>127))*46):PRINT CHR$(
P);NEXT M:FOR M=0 TO 7:P=PEEK(N+M):PRINT TAB(20+M*4-LEN(STR$(P)));STR$(P);
:NEXT M:PRINT:NEXT L
```

End

### Program Listing 2. Self-accounter.

```
10 PRINT"Run number 1.":OPEN"1",1,"P.P":LINE INPUT#1,P$:CLOSE:N=VAL(MID$(P$,
21))+1:P$=LEFT$(P$,19)+STR$(N)+RIGHT$(P$,LEN(P$)-19-LEN(STR$(N-1))):OPEN"
",1,"P.P":PRINT#1,P$:CLOSE:RUN"P.P"
```

End





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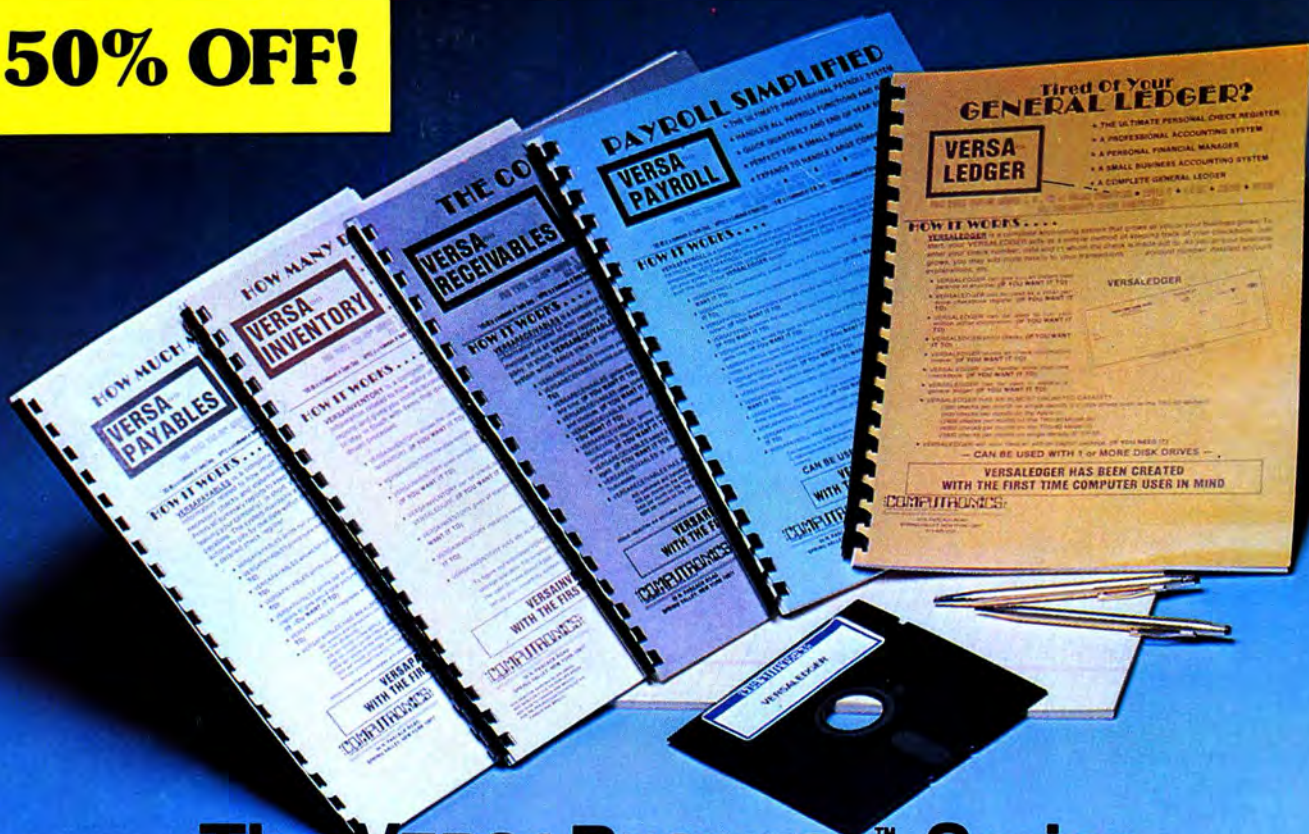
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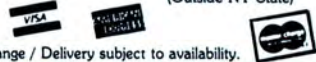
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