June 1985
USA $4.00
Canada $4.50

80micro

T.M.

A CWC/I PUBLICATION

the magazine for TRS-80 users*

80micro 6/85 #65

HOT HINTS For the MODEL 1000

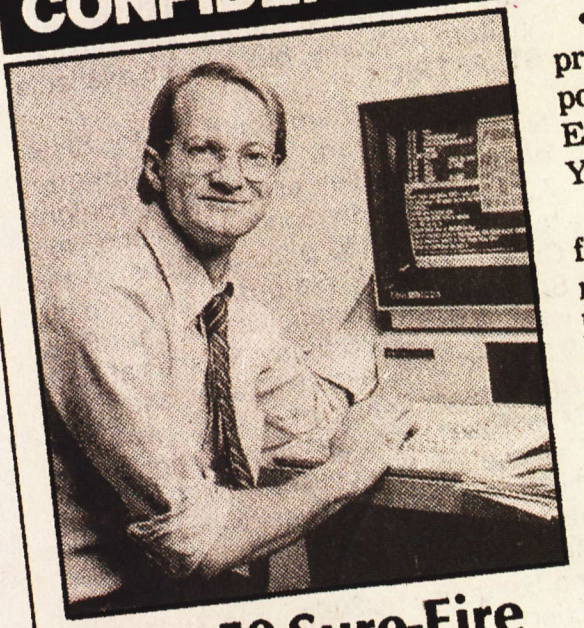
MODEL 4 WINDOWS?
Hardin Brothers Shows You How!

DOS POWER
How to Get More Out of LDOS And TRSDOS 6

HUFFMAN CODE
Shrink Your Files By 30 Percent!

REVIEWED:
DotWriter
Better Basic
NEWDOS/80 Utilities
Super DBM
Remote Control
Overdrive
Electric Desk

TANDY 1000 CONFIDENTIAL



Over 50 Sure-Fire Tips for Better Computing

By DAVE ROWELL

I've covered the Tandy 1000 since it came out. I've ended up with a hodge-podge of information and advice. Some of this might be old hat to experienced users, but everyone, from the novice to the veteran, should find some useful tips.

• Your DOS's ANSI.SYS and KEYCONVRT.SYS keyboard driv- ers can make the 1000 more com- patible with some IBM soft To install a driver, add a li CONFIG.SYS such as VICE=ANSI.SYS."

• If answering date and prompts when they serve r pose annoys you, build an EXEC file without Date an You won't see them again.

• Model III users may fe fortable with the 1000's US ment. Beware of the Basic however. To return to Ba your 8088 subroutine, use FAR Return command not RET 7 as the manual

• Beware of leanir against the front of your speaker magnets are d hind the front of the pla haven't heard of any p far, but you never knov

• Tandy has changed pansion boards mech tach to the back pan easily modify boards the PC to fit in the 10 by either cutting ½ i tab on the board fra or by bending that tal on an IBM serial works fine.

• Did you ever wa Mate on an IBM PC, other PC-compati with only 10 functi is a modification You need a disk-ed

IT'S ONLY 4½ LBS.
AND RARING TO GO!

The Tandy 200 is the one portable for all.

Meet the New Generation of Portable Computing

Our celebrated Model 100 set a new standard in portable computing. Now we've done it again! Introducing the Tandy 200, another true breakthrough, featuring advanced features *you* requested. You get more built-in software, a bigger screen and a larger memory. All this in a system that measures just $2^{1}/_{4} \times 11^{3}/_{4} \times 8^{1}/_{2}$", and goes wherever you go because it's completely battery powered.

Six Built-In Programs Including Multiplan™

For complex spreadsheet analysis and calculations, we put popular Multiplan software into the Tandy 200's permanent memory. It's easy to do sales forecasts, profit and loss projections, budgeting, pricing, engineering calculations and more.

Comes with Five More Powerful Programs

An improved version of the Model 100's easy-to-use word processing program makes the Tandy 200 especially useful for journalists, salespeople, students and anyone who needs to write letter-perfect memos, reports and correspondence in a hurry. Edit, delete and move blocks of text with the touch of a convenient function key.

Four other "instant-on" programs let you use the Tandy 200 as your personal appointment calendar, address and phone directory and telephone auto-dialer/directory (the Tandy 200 generates tone dialing pulses, so you can use it with long-distance services). A much more powerful built-in program for communications makes it easy to access other computers by phone, as well as national information networks. Resident BASIC language lets you write your own programs, too.

Why 40 Columns Are "Bigger" than 80

Take a look at the 80-column screens on other portables, and you'll see why we chose a 16×40-character format. Characters on 80-column displays are tiny and difficult to read. Tandy 200's flip-up liquid crystal display has 240×128 resolution for big, clear graphics and easy-to-read characters. Tandy 200 is the perfect take-along tool for word processing and spreadsheets—without eyestrain.

We also increased the standard memory size to 24,000 characters, expandable to 72K.

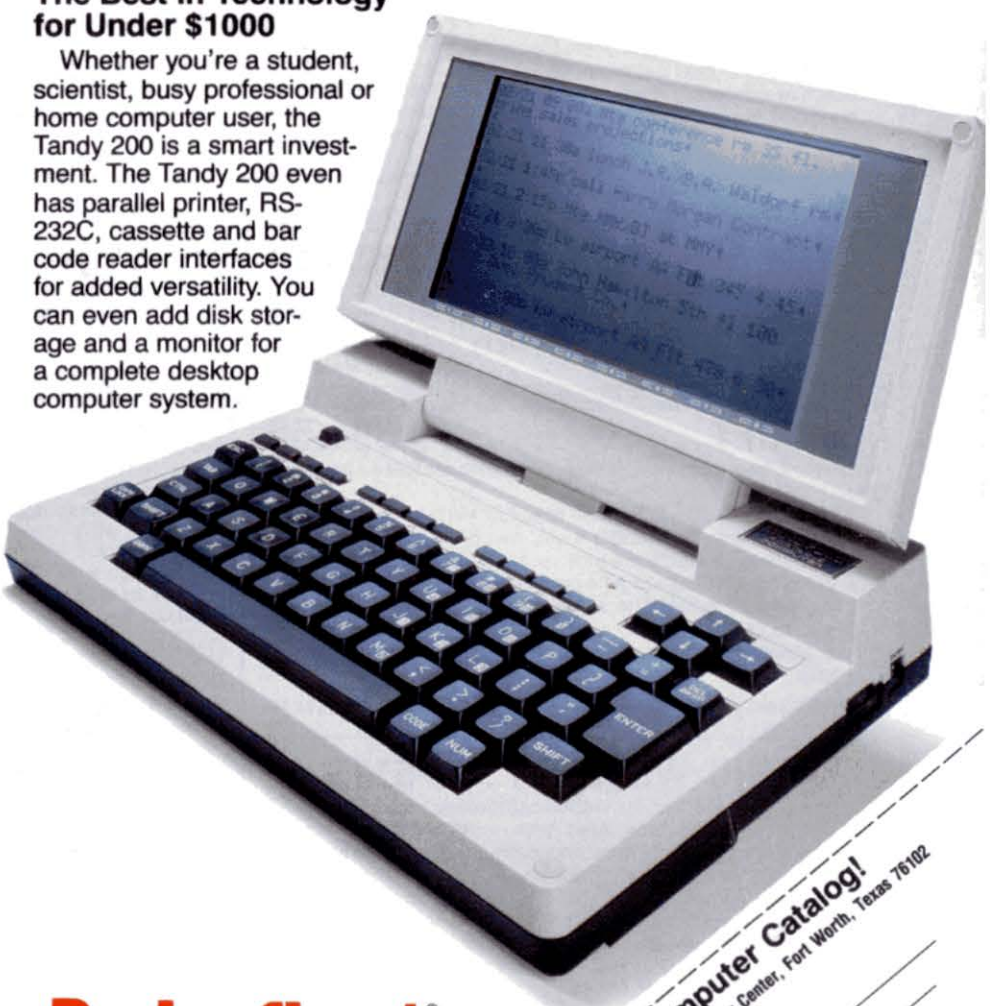
The Best in Technology for Under $1000

Whether you're a student, scientist, busy professional or home computer user, the Tandy 200 is a smart investment. The Tandy 200 even has parallel printer, RS-232C, cassette and bar code reader interfaces for added versatility. You can even add disk storage and a monitor for a complete desktop computer system.

Adopt One Today!

Step up to the powerful software and impressive capabilities of the Tandy 200 portable computer for just $999 (26-3860). Best of all, the Advanced Technology Tandy 200 represents the state of the art in performance, quality and price breakthrough (because we've introduced the latest technology for over 60 years). Stop by your local Radio Shack Computer Center, or participating Radio Shack store or dealer and "size it up" today!

Prices apply at Radio Shack Computer Centers and at participating Radio Shack stores and dealers. Multiplan/TM Microsoft Corp.



Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION
Circle 75 on Reader Service card.

Send Me a 1985 Computer Catalog!
Mail To: Radio Shack, Dept. 85-A-388, 300 One Tandy Center, Fort Worth, Texas 76102

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

Circle 126 on Reader Service card.

The Best Gets BETTER:
JMG Now Offers FREE SHIPPING!

In an effort to give our customers even better value for their software dollar, we have now eliminated shipping charges for all orders over $25 to the continental US or Canada. Simple. Except for an extra charge if you order by COD, there are no other charges at all. The price you see is the price you get. Someday, all dealers will sell this way, but for now you'll just have to stick with the best — JMG Software.

NEW! from INFOCOM

HITCHHIKERS GUIDE TO THE GALAXY

Douglas Adams and Steve Meretzky have adapted Adams' best selling book into an interactive adventure game. **Infocom** has some great games, but this is one of the best!

Model 3/4 only (unfortunately) **$34.50**

ACCEL 3/4 Basic Compiler

This compiler from Southern Software and Allen Gelder is one of the best; it compiles almost all BASIC commands, and produces fast machine language programs.

ACCEL 3/4, Mod 1/3 Disk **$89.50**

JMG has recently expanded its line with some excellent programs, and here is a run-down of the new guys on our software block:

T/MAKER

This integrated software package for the Model 4 combines word processing, spelling checking, spreadsheet, data base management, and graphics all into one package. An excellent over-all package, and a great price.

T/Maker, Mod 4 only .... **(List $299) $269.50**

ENBase

This is a "relational data base manager" and what that all boils down to is a very powerful program. This will handle most any data base job you can throw at it, and more.

ENBASE, Model 1 or 3 .... **(List $140) $129.50**

DIS'n'DATa Dissassembler

This is a dissassembler with a unique and efficient way of automatically separating data areas from machine language code. It's not 100% foolproof, but it is as close as you can get.

DIS'n'DATa Model I/III Disk **$37.50**
DIS'n'DATa Model 4 ..... **$46.50**

OTHERS:

Disk Drive Analyzer, Model I **$84.50**
Disk Drive Analyzer, Model 3/4 ..... **$74.50**
(Does what it says, list $89/$79)
PASCAL80 Model I/III **$69.50**
PASCAL80 for CP/M **$36.50**
(A well-praised Pascal Compiler)
EDIT Mod I/III from Allen Gelder **$36.50**
(A full-screen editor for BASIC)
SBE from Allen Gelder **$94.50**
("Mid-level language compiler"...)
VersaBusiness Series **$89.50**
(AR, AP, Payroll & Inventory available)
Versaledger II **$134.50**
CNVBASIC for Mod I/III or 4 ..... **$27.50**
(Powersoft's entry in the conversion club)
And there's more new stuff coming!

LESCRIPT $94.50

Our best selling word procesor, loaded with features (many not found elsewhere).

Great printer support, ease of use, full Model 4 support, and much more! On a 128K Model 4 you can have over 90K of text buffer for use on a single file (not split into multiple buffers, like other WP programs do). Model 4 features also available while running in Model III mode! The same program will run under most DOSes form TRSDOS 2.3 on a model I to DOSPLUS IV on a mod 4! And at our low price, it's the best word processing value anywhere.

LESCRIPT Models I/III/4 ..... **(List $129.95) $94.50**

ELECTRIC WEBSTER . . . $119.50

The best Spelling checker for TRS-80 computers; includes a 50,000 word dictionary and integrates with most word processors. Features fast checking, interactive correcting, and the ability to add your own words to its dictionary. Not much more you can say about this program, just that it does the job and it does it very well. (Get it quick before the price goes up to $129.50) Specify computer & word processor when ordering.

Electric Webster Model I/III or 4 ..... **(List $149.95) $119.50**
E.W. Grammar or Hyphenation ..... **(List $49.95) $38.50**

WORDPROCESSING PACKAGE DEAL $199.50

Buy both LESCRIPT and ELECTRIC WEBSTER together and save even more! These two programs work great together, so if you're getting into serious word processing this is the "first class" way to go. This is a special offer for, as they say, "a limited time."

SAVE $80 OFF THE LIST PRICE!!

KSoft's LOG and SUPERLOG

Very versatile "Electronic Notebook" programs that allow you to access stored information at the touch of a key, even when running other programs. Keep notes, memos, lists, or other information in the instantly accessable "pages". SUPERLOG4 for the Model 4 also contains many advanced features and commands that will make you wonder how you ever lived without the program.

LOG for Model I or III **$44.50**
SUPERLOG for Mod I or III LDOS **$99.50**
SUPERLOG4 for Mod 4 ..... **(List $119.95) $99.50**

DOSPLUS 3.5 and DOSPLUS IVa

DOSPLUS is an excellent alternative to TRSDOS for Models I/III and Model 4. As they say, it's "better, faster and stronger"; in this case stronger means more powerful. Both versions come bundled with many utilities that are alone worth the price. It won't leap tall buildings in a single bound, but it will do the next best ting, which is to make life a little easier for you.

DOSPLUS 3.5 for Model I or III ..... **$ 59.50**
DOSPLUS IVa for Model 4 ..... **(List $169.95) $119.50**

The Home Accountant $59.50

A complete personal finance package. A thorough program; somewhat slow, but otherwise a very good package.

Home Accountant, Model III only **$59.50**

TAS Public Domain Disks

These disks are a collection of quality public domain programs from all over. There's lots of stuff here, from games to utilities to applications and much more. Each disk is a "flippy" disk, and both sides are filled to the brim.

Public Domain Disk Package, #1 to #4 ..... **$34.50**
Public Domain Disk Package, #1 to #6 ..... **$49.50**
Single Disk (specify 1 to 6) ..... **$ 9.50**

JMG

THE SOURCE OF TRS-80 SOFTWARE!

IF YOU BOUGHT YOUR SOFTWARE ELSEWHERE, YOU PROBABLY PAID TOO MUCH

JMG is one of the largest sources for TRS-80 software around; we specialize in software for Models I, III and 4. Our prices are the best, and if you find a better price then we'll beat it (see below). As well, we support the programs we sell; we sell only top-quality software, and our 99% satisfaction rate speaks for itself. With the best prices, selection and support on your side, you can't lose. Model 4 owners: ALL Model 3 programs we sell will work on the Mod 4 in "III mode".

APPLICATIONS/BUSINESS

Program Name	(List)	JMG
DOTWRITER w/LDS	(99.95)	$ 89.50
POWERDOT II	(59.50)	$ 49.50
DATAGRAPH	(79.95)	$ 69.50
Mumford's Disk Indexer	(39.95)	$ 34.50
Howe's System Diagnostic	(99.95)	$ 89.50
J&M's Disk Drive Analyzer - I	(89.00)	$ 84.50
J&M's Disk Drive Analyzer - III	(79.00)	$ 74.50
ENBASE Data Base Manager	(140.00)	$129.50
POWERMAIL PLUS	(150.00)	$129.50
POWERMAIL w/Txtmg	(175.00)	$149.50
TAS's ZMAIL Mail List	(29.95)	$ 24.50
LESCRIPT	(129.95)	$ 94.50
LESCRIPT CP/M	(199.95)	$149.50
ZORLOF II	(69.95)	$ 49.50
LAZYWRITER	(125.00)	$ 99.50
TYPEITALL	(129.95)	$ 99.50
PowerScript (New Ver)	(39.95)	$ 34.50
ELECTRIC PENCIL	(89.00)	$ 79.50
TEXTPRESS	(49.95)	$ 39.50
ELECTRIC WEBSTER	(149.95)	$119.50
E.W. Options (each)	(49.95)	$ 38.50
Home Accountant	(79.95)	$ 59.50
VersaLedger II	(149.95)	$134.50
Versa Series (each)	(99.50)	$ 89.50

UTILITIES

SUPER UTILITY 4/4P	$ 69.50
SUPER UTILITY 3.2	$ 59.50
SUPERCROSS XT	$ 94.50
SUPERCROSS XT w/CnvBasic	$112.50
EDAS / PRO-CREATE	$ 69.50
ALE - Assem. Lang Editor	$ 39.50
M-ZAL Macro Assembler	$ 79.50
Mumford's Instant Assembler	$ 44.50
Instant Assembler Model 4	$ 59.50
ZEN Assembler	$ 34.50
DSMBLR III / PRO-DUCE	$ 23.50
DIS'n' DATa I/III	$ 37.50
DIS'n' DATa Mod 4	$ 46.50
TASMON Monitor I/III or 4	$ 34.50
Howe's Monitor #5	$ 19.50
LC / PRO-LC Compiler	$114.50
PASCAL80 Compiler	$ 69.50
PASCAL80 for CP/M	$ 36.50
SBE Compiler	$ 94.50
ACCEL 3/4 Compiler	$ 89.50
ZBASIC Compiler	$ 79.50
Model 4 Toolbelt	$ 39.50
PRO-ESP Utility set (Mod 4)	$ 23.50
6.2 Plus Enhancements	$ 36.50
BAS 3-to-4 Converter	$ 24.50
Lazycomm terminal	$ 29.50
DISK TERM Terminal	$ 59.50
MULTIDOS Version 1.6 b	$ 49.50
MULTIDOS Version 1.7	$ 79.50
MULTIDOS Model 4	$ 89.50

GAMES

SUPREME RULER PLUS	$26.50
FLIGHT SIMULATOR	$29.50
NUCLIEX	$14.50
APE	$14.50
SIFTER SHIFTER	$ 8.50
BATTLE OF ZEIGHTY	$ 8.50
FOREST FIRE DISPATCH	$26.50

INFOCOM GAMES:

"Standard Level"		Each $34.50
PLANETFALL	WITNESS	
ENCHANTER	HITCHHIKER'S	
"Intermediate Level"		Each $39.50
ZORK II	ZORK III	
SORCERER	INFIDEL	
"Very Difficult Level"		Each $42.50
DEADLINE	STARCROSS	
SUSPENDED		

OTHER GOODIES:

BOOKS:	
ROM ROUTINES Documented	$16.50
Model III Assembly Language	$15.50
Microsoft Basic Decoded	$23.50
TRSDOS 2.3 Decoded	$23.50
BASIC Faster & Better	$23.50
BFBLIB or BFBDEM Disks	each $16.50
BASIC Disk I/O F & B	$23.50
DFBLOAD disk	$16.50

DISKS: On a trial basis we are offering Wabash "Datatech" blank diskettes for sale. Lifetime guarantee, in soft box with labels etc. These are Single Side Double Density (other formats available).

SSDD Wabash (10 pack)	$15.00

OUR NEW PHONE NUMBER:

(416) 575-2867

Use this number for ordering and for technical information. Phones are usually staffed Monday to Saturday, 10 A.M. to 7 P.M. (No technical info on Wednesday.)

A SPECIAL SALE:

ALCOR C Compiler	$84.50
ALCOR Multi BASIC Compiller	$84.50

NOW AVAILABLE: WARRIORS and WARLOCKS

D + D type game. Call or write for details.

OUR PRICING POLICY:

We will beat any legitimate price advertised for any product that we carry. If you find a lower price advertised, our price will be $1.00 less, under the same conditions (eg. same shipping and other charges, etc). To receive the lower price you must mention the location of the other ad when ordering.

TO ORDER:

We accept orders by phone or mail. When ordering please specify the Model of TRS-80 you own, the exact program(s) wanted, and the method of payment. We accept Check, Money Order, VISA, MasterCard. (For Electric Webster please mention your word processor.) (For Dotwriter & PowerDot mention your printer brand.)

COMING SOON:

Tandy 1000 and MS/DOS

OUR GUARANTEE:

We sell only top-quality software. If, however, you are unsatisfied with a product you have purchased from JMG, you may return it (in good condition) within 10 days for a refund, less a $2.50 handling charge for programs under $50 ($5.00 for programs over $50). We also ask that you send us a letter stating the reason for your return.

JMG SOFTWARE INTERNATIONAL

THE FINE PRINT:

Regular shipping in continental US and Canada is FREE (our choice of method). COD orders add $2.50 to cover COD costs. PO's accepted for gov't & schools, add $5.00 handling charge. Overseas orders will be charged actual shipping costs; specify surface or air. All prices subject to change without notice.

3235 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

OR

710 UPPER JAMES ST.
HAMILTON, ONTARIO
CANADA L9C 2Z8

Phone: (416) 575-2867

Circle 2 on Reader Service card.

NEW!

IS YOUR PRINTER TOO SHORT FOR YOUR SPREADSHEET?

LONGVIEW

LONGVIEW turns a VisiCalc (R) spreadsheet on its side so that DOTWRITER can print it down the paper instead of across. It gives you the effect of a 400-character wide printer (or even longer, if your spreadsheet is that big).

The number of "rows" becomes the limit when you print this way: you can fit between 48 (Microline 92) and 180 (C.ITOH 1550) rows across the page.

LONGVIEW is an "add-on" to our Dotwriter system. It includes programs and three character sizes, and runs on 48K-64K TRS-80 Models I, III, and 4/4P (native Model 4 mode). Please see our ad later in this magazine for information and pricing on Dotwriter, and the printers we support.

LONGVIEW is easy to use and comes with ready-to-run setups. First, tell VisiCalc to print your spreadsheet to disk. Next, rotate the file with LONGVIEW. Then, print it with Dotwriter. That's all there is to it.

LONGVIEW $29.95
(does not include Dotwriter or VisiCalc)

DOWNLOADABLE FONTS

We have dozens of high-resolution, downloadable fonts for the Radio Shack DMP 2100P and the Epson LQ-1500. They include italics, cursive, headline, and other fancy typefaces. Each font disk includes programs to perform the download, and sample files to print them for you.

The print quality of these fonts must be seen to be believed. ALLWRITE can load these fonts "on the fly" and give you right-justified, proportional printing. If you do not have ALLWRITE, you can pre-load a font and use it with any software, including BASIC (right-justification is only possible with ALLWRITE, however).

Each disk contains at least eleven fonts and supporting programs. The disks cost $59.95 each, and we offer substantial discounts to ALLWRITE owners. Please call or write to us for print samples, further information and pricing. Due to the specialized nature of this product, we recommend that you see the samples before ordering. Disk formats are available for TRS-80 I, III, 4, and MS-DOS. ALLWRITE is available only for TRS-80.

Information on these products is not available at our toll-free answering service, so please call or write to our Technical Support group for details:

(818) 764-3131

PROSOFT®

Box 560, No. Hollywood, CA 91603

Please add $3.00 for shipping. Calif. residents add sales tax. We accept M/C, VISA, checks and C.O.D.

PUBLISHER
Peter Hutchinson

EDITOR-IN-CHIEF
Eric Maloney

MANAGING EDITOR (EDITORIAL)
Peter E. McKie

MANAGING EDITOR (PRODUCTION)
Deborah M. Sargent

REVIEW EDITOR
Ryan Davis-Wright

COPY EDITORS
Robert Mitchell (New Products)
Penelope Hamblin

TECHNICAL EDITORS
Bradford N. Dixon
Mare-Anne Jarvela
Keith Johnson (Load 80)
Dave Rowell
Beverly Woodbury

PROOFREADER
Vinoy Laughner

EDITORIAL ADMINISTRATION
Carole Macioci

ASSOCIATE EDITORS
Hardin Brothers
David Engelhardt
John B. Harrell III
Terry Kepner
Thomas L. Quindry

ADVERTISING SALES

SALES MANAGER
William Smith

SALES REPRESENTATIVES
Richard J. Alden
Michael Wozmak
1-800-441-4403

WEST COAST OFFICE
1060 Marsh Road
Menlo Park, CA 94025
415-328-3470

SALES REPRESENTATIVE
Alisson Walsh

ADVERTISING COORDINATOR
Judy Walker

ADVERTISING SECRETARY
Cathy Berry

MARKETING/PROMOTION DIRECTOR
Jane Butterfield

MPA ABC

The left bracket, [, replaces the up arrow used by Radio Shack to indicate exponentiation on our printouts. When entering programs published in *80 Micro*, you should make this change.

80 formats its program listings to run 64-characters wide, the way they look on your video screen. This accounts for the occasional wrap-around you will notice in our program listings. Don't let it throw you, particularly when entering assembly listings.

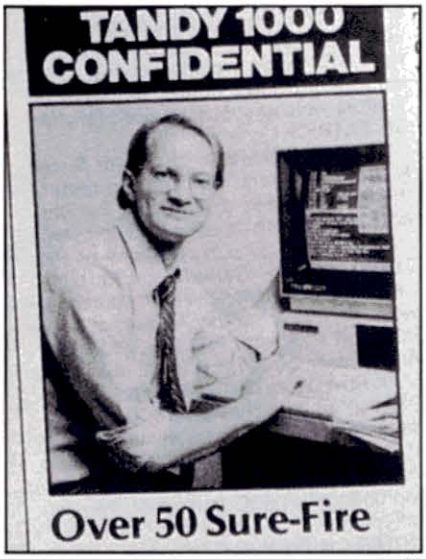
Article submissions from our readers are welcomed and encouraged. Inquires should be addressed to: Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include an SASE for a copy of "How to Write for *80 Micro*." Payment for accepted articles is made at a rate of approximately $50 per printed page; all rights are purchased.

*TRS-80, Scripsit, and TRSDOS are trademarks of Radio Shack, a division of Tandy Corp.

80 Micro (ISSN–0744-7868) is published monthly by CW Communications/Peterborough Inc., 80 Pine St., Peterborough, NH, 03458. Phone: 603-924-9471. Second class postage paid at Peterborough, NH, and additional mailing offices. (Canadian second class mail registration number 9563.) Subscription rates in U.S. are $24.97 for one year, $38 for two years, and $53 for three years. In Canada and Mexico $27.97—one year only, U.S. funds drawn on a U.S. bank. Nationally distributed by International Circulation Distributors. Foreign subscriptions (surface mail), $44.97—one year only, U.S. funds drawn on a U.S. bank. Foreign subscriptions (air mail) please inquire. In South Africa contact *80 Micro* P.O. Box 782815, Sandton, South Africa 2146. All subscription correspondence should be addressed to *80 Micro*, Subscription Department, P.O. Box 981, Farmingdale, NY 11737. Please include your address label with any correspondence. Postmaster: Send address changes to *80 Micro*, Subscription Services, P.O. Box 981, Farmingdale, NY 11737. Send Canadian changes of address to *80 Micro*, P.O. Box 1051, Fort Erie, Ontario L2A 5N8, Canada. Return postage guaranteed.

Entire contents ©copyright 1985 by CW Communications/Peterborough Inc. No part of this publication may be reprinted, or reproduced by any means, without prior written permission from the publisher. All programs are published for personal use only. All rights reserved.

June 1985 80micro



page 38

page 48

page 54

On the Cover

38. The Tandy 1000 Tip Sheet
by Dave Rowell
Our answer to Heloise offers helpful hints on everything from MS-DOS to DeskMate to printers. (Model 1000)

48. Extra-Strength DOS
by Keith E. Risler
Advanced DOS features in easy-to-take capsule form. (Models III and 4; Load 80)

54. Storage to Spare
by Steve Woicik
Clear your SuperScripsit disks of clutter and pack in more text files. Also—a SuperScripsit file recovery program. (Model 4; Load 80)

60. Room Available
by Stewart F. Hunter
Witness the incredible shrinking ASCII file. (Models I and III; Load 80)

Features

74. Don't Be Late
by Jack Wallace
Critical path scheduling lets you get a handle on project timetables. (Models I, III, and 4; Load 80; Models 1000 and 2000)

82. Mutual Understanding
by Hardin Brothers
Finding points of agreement among editor/assembler source code files.

Departments

6. Load 80 Directory
8. Side Tracks
by Eric Maloney
12. Input
14. Feedback Loop
by Terry Kepner
21. Pulse Train
by Bradford N. Dixon
25. Reader Exchange
29. Reviews
edited by Ryan Davis-Wright
DotWriter
Better Basic
NEWDOS/80 Utilities
Super DBM
Remote Control
58. Tidbit #21
58. Tidbit #22
71. Tidbit #23
90. Project 80
by Roger C. Alford
98. Basic Takes
by Richard Ramella
102. The Next Step
by Hardin Brothers
110. Spreadsheet Beat
by David A. Williams
114. Express Checkouts
Electric Desk
Overdrive
Etch-A-Mouse
TRSDOS 6.X Training Course
118. New Products
edited by Robert Mitchell
128. Ask Tandy

LOAD 80

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

Using Load 80 is simple. If you own a tape system, load the Load 80 tape as per the instructions provided. If you own a Model I or III disk system, you boot the Load 80 disk and transfer the files to a TRSDOS system disk according to simple on-screen directions. If you own a Model 4, copy the Model 4 programs from the Load 80 disk to your TRSDOS 6.X disk using the COPY command.

If you have any questions about the programs, call Keith Johnson at 603-924-9471. Yearly subscriptions to Load 80 are $199.97 for disk, or $99.97 for cassette. Individual loaders are available on disk for $21.47 or on cassette for $11.47, 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 Load 80, 80 Pine St., Peterborough, NH 03458.

Directory

Setup
Article: Extra-Strength DOS (p. 48).
Systems: Model III, LDOS 5.X.X; Model 4, TRSDOS 6.X.X.
This JCL file adds additional features to your LDOS 5.X.X/TRSDOS 6.X.X system disks.
Cassette filespec: SETUP/JCL.
Disk filespec: SETUP/JCL.

Repair
Article: Full Recovery (sidebar to "Storage to Spare," p. 54) (p.57).
System: Model 4, 128K RAM, SuperScripsit.
A file-recovery program for Model 4 SuperScripsit.
Cassette filespec: B.
Disk filespec: REPAIR/BAS.

Compress
Article: Room Available (p. 60).
Systems: Models I and III, 32K RAM, editor/assembler, Scripsit.
Language: Assembly.
Conserve disk space by saving your files in Huffman format.
Cassette filespec: COMPRS, DCOMPR.
Disk filespec: COMPRS/SCR (source code), COMPRS/CMD (object code), DCOMPR/SRC (source code), DCOMPR/CMD (object code).

CPS
Article: Don't Be Late (p. 74).
Systems: Models I, III and 4, 32K RAM, printer optional.
Language: Disk Basic.
Develop timelines for important projects.
Cassette filespec: C.
Disk filespec: CPS/BAS.

Driver
Article: The Next Step (p. 102).
System: Model 4, 64K RAM, TRSDOS 6.2, ALDS editor/assembler.
Languages: Assembly, Basic.
Add windowing capability to your Model 4.
Cassette filespec: DRIVER, D.
Disk filespec: DRIVER/SRC (source code), DRIVER/CMD (object code), DRIVETST/BAS.

Documenter
Article: Spreadsheet Beat (p. 110).
System: Model 4, 64K RAM, Multiplan 1.06.
Language: Basic.
Print SYLK files in an easy-to-read format.
Cassette filespec: E.
Disk filespec: MULTPLAN/BAS.

Convert2
Article: Special to Load 80.
System: Model III, 32K RAM.
Language: Disk Basic.
Convert Assembly-language source files from one assembler to another.
Cassette filespec: F.
Disk filespec: CONVERT2/BAS.

SPECIAL BONUS

TapeDisk, the Special Bonus program on the April 1985 Load 80, contains an error that prevents it from running properly. We inadvertently omitted the last two Basic statements in line 530. To make the program run, add the following to line 530:

```
:COMD$(C) = "L":C = C + 1
```

We apologize for the error.—Eds.

ART DIRECTOR
Beth Krommes
PRODUCTION SUPERVISOR
Dion Owens
PRODUCTION ASSISTANT
George Gardos
AD/GRAPHICS PRODUCTION
Gary Ciocci

GRAPHIC SERVICES MANAGER
Dennis Christensen
MANUFACTURING MANAGER
Susan Gross
FILM PREPARATION SUPERVISOR
Robert M. Villeneuve

PRESIDENT
Debra Wetherbee
VICE PRESIDENT/FINANCE
Roger Murphy
ASSISTANT GENERAL MANAGER
Matt Smith
ASSISTANT TO VP/FINANCE
Dominique Smith
DIRECTOR OF CIRCULATION
William P. Howard
CIRCULATION MANAGER
Frank Smith
DIRECT AND NEWSSTAND SALES MANAGER
Raino Wirein
1-800-343-0728
DIRECTOR OF CREDIT SALES AND COLLECTION
William M. Boyer
EXECUTIVE CREATIVE DIRECTOR
Christine Destrempes
PUBLIC RELATIONS
Michele Christian

FOUNDER
Wayne Green

Cover photograph by Edward Judice

Photograph of Dave Rowell by Frank Cordelle

80 Micro is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 52 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld/Argentina*; Australia's *Australia Computerworld, Australian Micro Computer Magazine, Australian PC World and Directories*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld/Denmark* and *MicroVerden*; Finland's *Mikro*; France's *Le Monde Informatique, Golden* (Apple) and *OPC* (IBM); Germany's *Computerwoche, Microcomputerwelt, PC Welt, Software Markt, CW Edition/Seminar, Computer Business* and *Commodore Magazine*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *Perso ComWorld*; Mexico's *Computerworld/Mexico* and *CompuMundo*; Netherlands' *CW Benelux* and *Micro/Info*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Singapore's *The Asian Computerworld*; Spain's *Computerworld/Espana* and *MicroSistemas*; Sweden's *ComputerSweden, MikroDatorn*, and *Min Hemdator*; the UK's *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, HOT CoCo, *inCider, InfoWorld, MacWorld, Micro Marketworld, PC World, Run, 73 Magazine* and *80 Micro*.

Problems with Subscriptions: Send a description of the problem and your current and/or most recent address to: *80 Micro*, Subscription Department, P.O. Box 981, Farmingdale, NY 11737.
Problems with Load 80 Circulation: Address correspondence to Load 80, 80 Pine St., Peterborough, NH 03458.
Problems with Advertisers: Send a description of the problem and your current address to: *80 Micro*, Rt. 101 & Elm Street, Peterborough, NH 03458, ATTN.: Rita B. Rivard, Customer Service Manager. If urgent, call 1-800-441-4403.
Change of Address: Send old label or copy of old address and new address to: *80 Micro*, P.O. Box 981, Farmingdale, NY 11373. Please give eight weeks advance notice.
Microfilm: This publication is available in microform from University Microfilms International. United States address: 300 North Zeeb Road, Dept. P.R., Ann Arbor, MI 48106. Foreign address: 18 Bedford Row, Dept. P.R., London, WC1R4EJ, England.
Dealers: Contact Raino Wirein, Retail Sales Manager, *80 Micro*, Pine St., Peterborough, NH 03458. (800) 343-0728.

TRS-80™ – Tandy – IBM Personal Computer – MS-DOS – CP/M

SMALL BUSINESS ACCOUNTING WITH PAYROLL $79.95

Based on the **Dome Bookkeeping Record #612,** this program handles income, expenditures, and payroll for a small business. Complete ledgers are maintained for income and expenses on a monthly basis. The program computes monthly, through last month, and year-to-date summaries. The payroll section can handle up to 99 employees. Paychecks with up to six deductions can be entered whenever desired (weekly, monthly, etc.). The program can print both payroll and expense checks. Quarterly and year-to-date payroll summaries can be computed for one or all employees.

HOME BUDGET and CHECKBOOK ANALYST $59.95

A complete checkbook program together with budgeting, income and expense analysis, comparisons, and projections. First, it is a complete checking program: enter and print checks, enter deposits, and compute your current checking balance. The program also handles non-check expenses and income. It computes monthly and year-to-date income and expense summaries, and projections for the year based on data through a known month. Monthly expenses can be compared to a pre-established budget.

MAILING LIST $69.95

Maintain mailing lists of up to as many names as you can fit on a standard diskette (1,250 for TRSDOS, 2,500 for MS-DOS). Add, change, delete, or find names. Sort according to data in **any** field. Print labels in 1, 2, 3, or 4 columns with adjustable tabs.

TRS-80™ Models 1, 3, and 4

TYPITALL Word Processor $129.95 TYPITALL with Spelling Checker $179.95

The most powerful word processor for the TRS-80s. TYPITALL is upward compatible with SCRIPSIT — it reads your old SCRIPSIT files and uses the formatting and cursor movement commands you are already familiar with. But it is a completely new word processor with so many advanced features that we can't even mention all of them here. You'll wonder why other word processors don't have some of these features.

- Send **any** control or graphic/special character to the printer.
- Print the formatted text **on the screen** before going to the printer.
- Send formatted text to a **disk file** for later printing.
- **Merge** data from a file during printing. Names, addresses, and other text can be inserted during printing. No need for a separate program for "mail merge" capabilities!
- Print while editing (spooling).
- Assign **any sequence of keystrokes** to a **single** control key.
- Call up to 16 **help screens** at any time.
- **Move cursor** forwards or backwards by character, word, line, or page.
- **Reenter** the program with **all text intact if you accidentally exit** without saving the text.
- Optional spelling checker comes with 29,500 word dictionary. Verify a 3,500 word document in **less than two minutes.**
- True Model 4 (80 x 24 display, TRSDOS 6) and Model I/III versions.

SYSTEM DIAGNOSTIC $99.95

Is your computer working correctly? **Are you sure?** Find out for certain with System Diagnostic, which has complete tests for every component of your TRS-80 Model 1, 3, or 4.

ROM: checksum test. **RAM:** three tests including every location and data value. **Video display:** character generator, video RAM, video signal. **Keyboard:** every key contact tested. **Line printer:** character tests with adjustable platen length. **Cassette recorder:** read, write, verify data. **Disk drives:** disk controller, drive select, track seek, read sectors, formatting, read/write/verify data with or without erasing, disk drive timer, disk head cleaner. Single or double density, 1-99 tracks. **RS-232-C interface:** connector fault, data transmission, framing, data loop, baud rate generator.

SMART TERMINAL $74.95

The **intelligent** communication program. Use your TRS-80 to communicate with other computers, bulletin boards, information services, time sharing, or for data transmission. **Memory buffer** holds data to be transmitted or received. **Automatic transmission** of data from buffer. **Automatic storage** of incoming data. **Character translations.** Data files compatible with word processors and BASIC programs. True BREAK key.

TRS-80™ MODEL III ASSEMBLY LANGUAGE book $16.95

A complete course on assembly language, written for the **beginner.** Contents include: the Z80 instruction set; TRS-80™ Model III ROM and RAM; Using the Editor/Assembler; Reading, printing and moving data; arithmetic operations; floating-point and BCD numbers; logical and bit operations; cassette input and output; USR subroutines in BASIC; RS-232-C data communication; disk input and output; the TRSDOS 1.3 disk operating system.

ASSEMBLY LANGUAGE MONITOR #5 $22.95

TRS-80™ MODEL III ASSEMBLY LANGUAGE book and MONITOR #5 $29.95

A comprehensive machine language monitor and debugging program. **Display** memory in ASCII or hexadecimal format. **Disassemble** memory to show machine language commands. **Move and compare** blocks. **Search** through memory for different values. **Modify** memory in different ways. **Relocate** machine language programs. **Read and write** cassette tapes of machine language programs. **Unload** programs in low RAM on disk. **Print** output optionally on video display or line printer. **Save and load** disk files. **Input and output of disk sectors,** bypassing disk operating system. **Complete debugging package,** including setting and displaying registers, single stepping through machine instructions, setting breakpoints, and executing machine language operations.

Circle 125 on Reader Service card.

HOWE SOFTWARE
14 Lexington Road
New City, NY 10956

Developing software for TRS-80™ computers since 1979.

24-Hour TOLL-FREE Order Number:
Outside California call:
(800) 428-7825, ext. 169
Inside California call
(800) 428-7824, ext. 169
Visa, Master Card, or COD orders only

For information call (914) 634-1821

Add $3.00 shipping and handling ($6.00 for Canada, Alaska, Hawaii, $17.00 air mail postage overseas.)
New York residents add sales tax.

*TRS-80 is a trademark of Tandy Corp.

Notes From A Model 4 Watcher

Last summer, the Model 4 was on the brink of death. The people at Tandy were excited about the Model 1000, which seemed destined to replace its 8-bit older brother. The two units were simply too close in price to share a market—why would anyone pay for an obsolete 8-bit computer when, for just a bit more, they could get an MS-DOS operating system and IBM compatibility?

I was pretty depressed about the Model 4's future back then, and in several editorials predicted the demise of the computer.

But then the 4 found new life. Tandy officials, who had been harumphing and coughing into their hands when asked about the 4's future, made bold public commitments to the machine. Sales, by all accounts, improved significantly, and Radio Shack stores seemed to be moving 4's faster than batteries.

What gave the Model 4 its reprieve was its dramatic drop in price, from $1,999 originally to as low as $999 around Christmas. For a thousand bucks, you could get a plug-in-and-use microcomputer. The 4's price-performance ratio was hard to beat.

Looking Forward

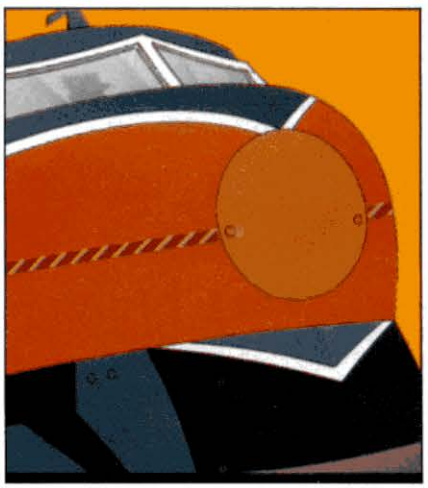
Now the question is where Tandy will take the Model 4 from here. The company has kept the machine moving by cutting its price, and could possibly do so again. But there's another way to go: Tandy could make the 4 a better machine.

With some exceptions, the Model 4 today is the same one Tandy introduced in June 1983. The green screen is its most significant change, and the only one that could truly be called an enhancement. The clustered arrow keys and repositioned RS-232 come more under the heading of fine tuning (although anyone who has wrestled with a null modem adapter on an original Model 4 will certainly appreciate the latter).

The New Model 4?

That leaves lots of room for improvement. Here are some possible enhancements Tandy might want to consider:

● A high-resolution graphics board. The Model 4 is a word- and number-crunching machine; its graphics, as we all know, are



miserable. You can't even produce a decent line graph. And TRS-80 arcade games long ago went the way of the brontosaurus.

The hi-res board would be a welcome feature. *80 Micro* has a Model III hi-res system, and we're impressed by it. We've heard mostly good things about the Model 4 board. It gives you 640- by 240-pixel resolution, the same as the Model 1000 in hi-res mode. You also get BASICG, which we've found will easily adapt many GW-Basic programs.

The hi-res board would make the Model 4 appropriate for many new applications. The most obvious is business graphs, as evidenced by our cover story in April ("Clear-Cut Trends," p. 40). CAD-CAM programs and arcade games represent other possibilities.

As anyone with a hi-res board knows, the problem now is finding software. But you can bet that if the board was standard, the software would come.

● Extra disk storage. Tandy has three options here: more floppy disk storage with double-sided (and perhaps quad-density) drives, a hard disk, or both. In the first case, two-drive storage would increase memory from the current 360K to 720K (1.4 megabytes if the drives were quad density).

Hard disks are no longer the luxury or novelty they once were, and they're inexpensive enough to be included in computers as standard equipment. Witness the Model 1200, a $1,999 machine with a 10-megabyte hard drive.

● A full 128K random-access memory. The extra memory isn't critical for most Model 4 applications, but Multiplan and SuperScripsit users will tell you how valuable the Memdisk option is in cutting down disk input/output and increasing execution speed. Tandy's DoubleDuty is another way to put the additional 64K to good use, by letting you load two independent programs and toggle between them. In fact, why not give users the 128K, and include DoubleDuty on the TRSDOS 6.X disk?

● Bundled software. Tandy has traditionally avoided bundling software (DOS and Basic excepted), although it did so for a while last year with the Model 4P.

The argument against bundled software is that the consumer doesn't necessarily get the packages he wants. The alternative is free software. The consumer has a choice of, say, three programs from a list of 10, or receives a coupon for $300 or so worth of software.

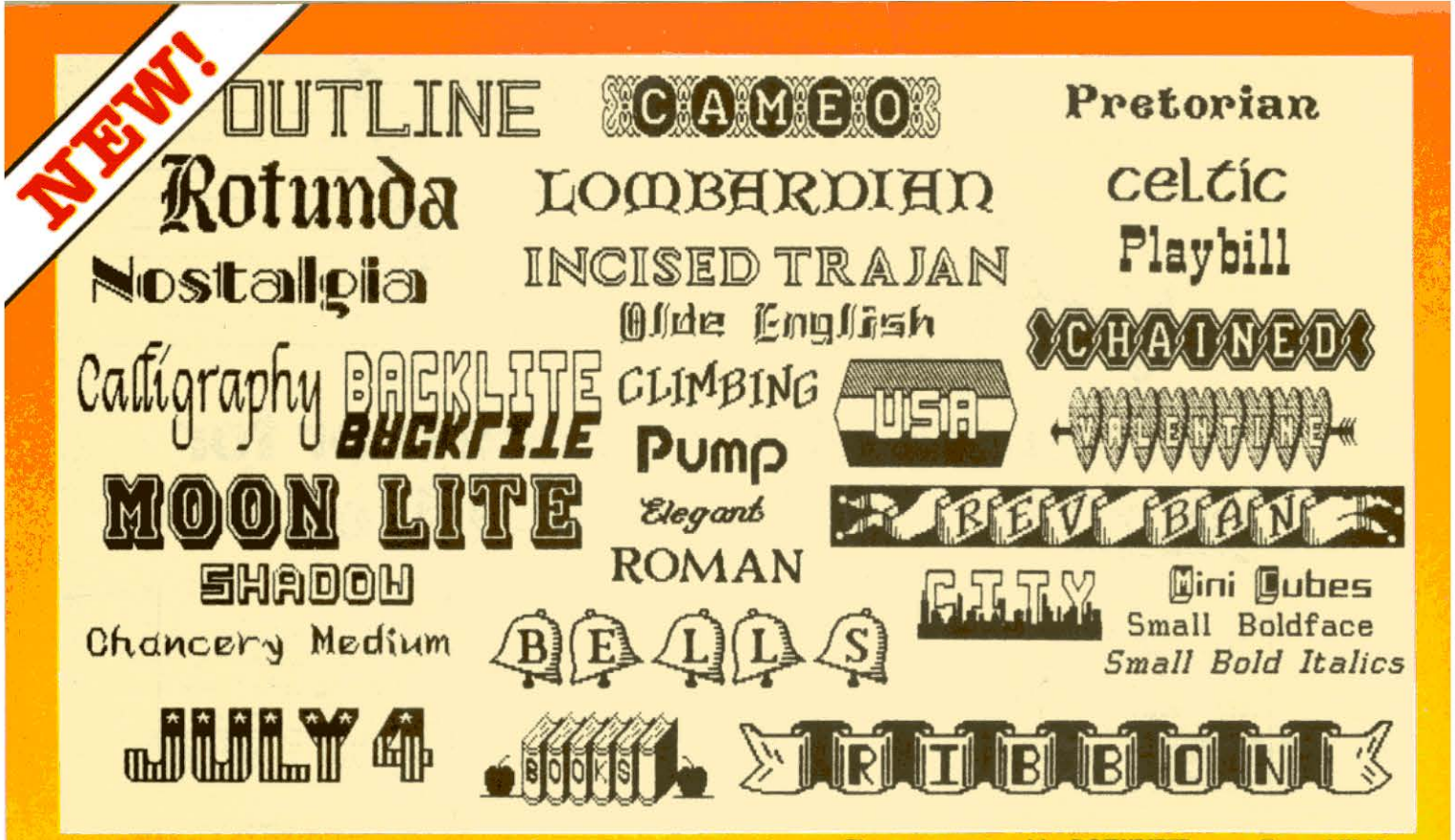
Would a package that included, say, VisiCalc, Profile, and Scripsit help sales? How about a Model 4 version of DeskMate, the software that comes with the Model 1000? *C'est possible.*

● Bundled hardware. Why not? Tandy has already done it, earlier this year with the 2000, 1200, and 100. They called it a two-for-one sale: if you bought either of the MS-DOS machines, you got an 8K 100 for free. They could sell the Model 4 and, say, the DMP-105 printer ($199.95 in the 1985 catalog) as a package. Or how about a free 16K Color Computer 2, a $119.95 value?

● The first three of the above: the high-resolution board, a 10-megabyte hard drive, and 128K. Tandy could add $500 or so to the list price and call it the Model 4 Plus, an 8-bit version of the Fat Mac or IBM PC XT.

Some of these enhancements are more the result of wishful thinking than of pragmatic analysis. In any case, the point is that Fort Worth must continue to modify and improve the Model 4 if Tandy wants the system to remain a viable product.

Consumers always like more value for their money. Otherwise, they go looking elsewhere, as Tandy has already learned the hard way.■



Circle 91 on Reader Service card.

These were printed by DOTWRITER on an Epson MX-80.

See What You Can Do With DOTWRITER 4.0!

Now available for the Model 4, too!

DOTWRITER lets you create spectacular, eye-catching letterheads, catalogs, invitations, or even books. It is just what you need to turn your dot-matrix printer into a versatile typesetting machine. And it's **available for the Model 4 (yes, in native mode)** as well as for the Models I and III.

What is DOTWRITER?

DOTWRITER uses the "bit-image graphics" of your printer to produce the kinds of stunning results shown inside the box. It is a full-function text printing program, so you can inter-mix different character sets, do centering, paragraphs, pagination, magnification, draw horizontal and vertical lines, reversals (white on black), and even print **right-justified proportional text.**

DOTWRITER includes the printing program, complete documentation, and fourteen useful sets of typefaces (60 to 90 characters in each set). We will include the 160 page Letterset Reference Summary at half-price ($10.00) with your order.

To use DOTWRITER, just write your text with any popular TRS-80 Word Processor, add the necessary formatting commands, and DOTWRITER will do the rest.

35 more disks are available separately. Each has 3–12 complete typefaces (60–95 characters in each set). These disks cost less than $25 each, and may be purchased at any time.

80 readers' choice micro 1983

If you want to create your own logos, modify our typefaces, or even design entirely new typefaces, then you will also want to order the "Letterset Design System" (LDS). We offer LDS at half-price when you order it along with DOTWRITER. LDS operates in Model III mode on the Model 4.

Versions are available for Epson MX-80 with Graftrax, MX-100 with Graftrax-Plus, RX-80, FX-80, C. ITOH 8510/1550, Microline 84/92/93; Radio Shack's DMP series 200–2100, CGP-220 & Gemini 10X, 15X. Please specify printer and computer!

Our print samples were done on an Epson. Sizes vary on other printers. Some of the samples shown here are taken from the additional Letterset disks.

Two disk drives and at least 48K of memory are required. LDS is not available in native Model 4 mode.

Send for free print samples! We've only shown you a few of the 230 DOTWRITER fonts. If you want the best in graphics printing, we suggest you order DOTWRITER today, toll-free.

Please specify printer and computer when ordering.

DOTWRITER (Models I, III)	$79.95
DOTWRITER (Model 4)	99.95
Letterset Design System	39.95
Special: DOTWRITER and LDS	99.95
Additional Letterset disks (4–12 per disk)	24.95
Letterset Reference Summary	20.00

ORDER NOW, TOLL-FREE

(800) 824-7888, oper. 422

PROSOFT®

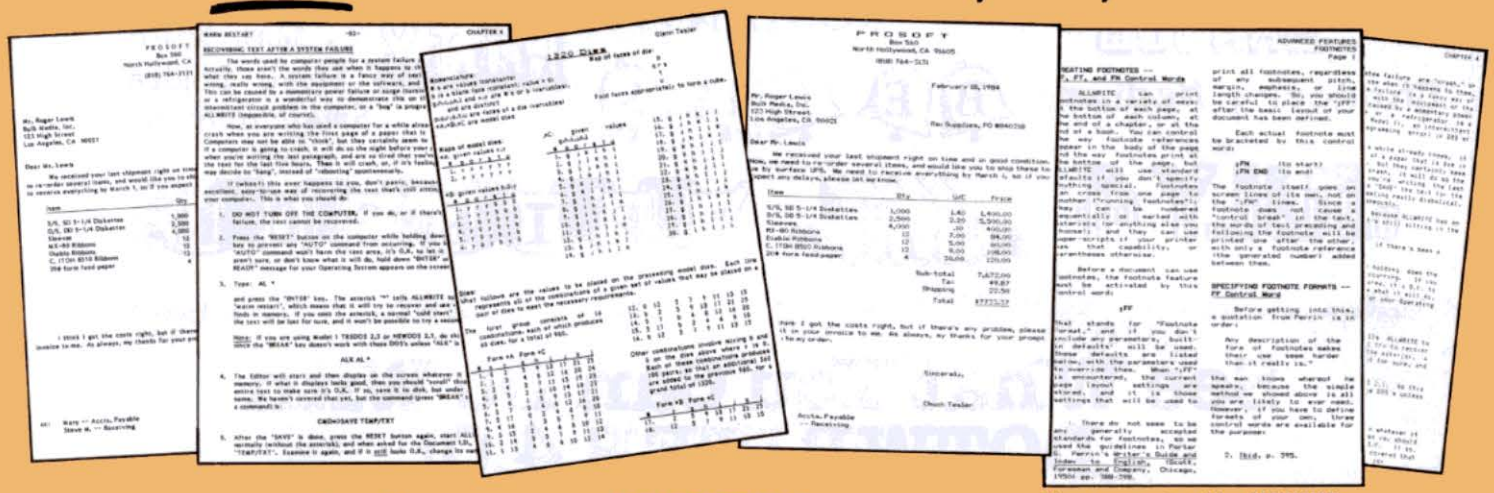
Dept. C, Box 560, No. Hollywood, CA 91603

(818) 764-3131 Information and Same-Day Processing

TERMS: VISA, MC, checks, COD. Please add $3.00 shipping in U.S. or Canada, $15.00 overseas, sales tax in Ca. Most orders filled within one day.

Allwrite!™

The Premier Word Processor for Your TRS-80 Model I, III, or 4



These were printed by ALLWRITE; shown 20% actual size.

We are proud to offer you the one Word Processor that will satisfy all your writing needs:* ALLWRITE. *It sets new standards for text editing and printing, and will give new life to your TRS-80. Let us tell you why...

In an attempt to push the public into expensive 16-bit computers, many manufacturers have been saying that the TRS-80 is obsolete. The truth is that the software, not the hardware, makes the difference. And the best word processor of all is now available *only* on the humble TRS-80, not on those expensive 16-bit machines!

ALLWRITE is based on the proven methods that made NEWSCRIPT the most popular independently produced TRS-80 word processor, but it also has the speed and new features our customers have asked us for. ALLWRITE will save you time and let you produce the highest-quality, most professional-looking letters, term papers, and reports available on a micro-computer.

Allwrite Can Save You Time!

Reads a 25,000 character file (10 printed pages) from disk in SIX SECONDS...does a global search-and-replace in FOUR SECONDS...outruns even the fastest popular micro-printer.

ALLWRITE'S Screen Handling Makes Word Processing Easier Than Ever

Change text width at any time; wide lines shift left and right as you type. ALLWRITE preserves double-blanks between sentences, uses the entire screen for text, and displays a complete Status Screen at the touch of a key. Scroll by line, partial screen, full screen, to top or end of file, or to any marked point. Move cursor by character, word, tab, line, or screen.

You can set and change on-screen tabs and store them on disk. The print-time tabbing features are incredibly versatile: they allow left, right, and centered tabs, and even line up your decimal points.

ALLWRITE shows you where you forgot to turn off underlining, boldface, italics, or double-width. Special on-screen Preview feature shows page breaks and page layouts...including underlining and boldface ...without annoying blinking or screen flicker. In "Summary" mode, ALLWRITE quickly flags formatting errors without wasting time printing all the text. These standard features make document preparation faster and easier than ever!

State-Of-The-Art File Handling

There is no upper-limit on document size with ALLWRITE, because it chains files *backwards* as well as forwards, even across diskettes. Switch from one chained file to another in less than six seconds by pressing two keys. Select portions of other files for inclusion at print time...great for stock paragraphs.

ALLWRITE salvages text from bad disks! If a sector goes bad, you won't lose the entire file, because it will skip bad sectors, **read the rest of the file,**

TAKES FULL ADVANTAGE OF YOUR MODEL 4.

The model 4 version of ALLWRITE uses **the entire 80-by-24 screen.** On a 64K machine, you can edit **over 34,000 characters** of text. On a 128K machine, you can edit **THREE FILES AT THE SAME TIME!** The second and third files can be over 32,600 characters each, for a total of **almost 100,000 characters** of text in memory.

and then show you where the lost text belongs. This advanced error recovery turns a disaster into a feeling of profound relief.

User-Definable Soft Keys Reduce Typing Time

You can store **22 phrases or commands at a time into "soft-keys,"** then press just two keys to retrieve them. This makes frequently-used phrases and formatting controls *a snap to use*. You can store these definitions on disk and build a library of hundreds of preprogrammed keys to fit every one of your applications.

Our specially-designed templates fit right on your keyboard to let you see your settings at all times. Each template is also a Reference ("Cue") Card, so it is always right in front of you when you need it, without using up valuable screen space.

ALLWRITE Is Easy To Learn

ALLWRITE's commands and control keys are easy to remember because they use the first letters of common English words: 'CE' stands for 'Center,' 'Search' and 'Replace' do just that, and so forth. The **on-line HELP menu** offers over fifty screens of topics.

NEWSCRIPT's documentation was acclaimed in every review, and ALLWRITE's 350-page book is even better. Portions of it are designed for beginners, with every feature clearly explained in step-by-step tutorial style. Since you won't always be a beginner, other parts of the book offer advanced topics. There is a cross-reference summary chapter, a 14-page comprehensive index, and a detailed Table of Contents. We've been developing computer programs and manuals for over 20 years, and understand the importance of good documentation.

To make installation easy, we include Tiny DOSPLUS for the Models I and III, and special, pre-tailored versions of **both** TRSDOS 6.2 **and** DOSPLUS IV for the Model 4, all at no extra charge. The Model I and III versions work equally well with all major DOS's.

PROSOFT'S On-Going Customer Support

Perhaps the best reason of all for having ALLWRITE is the continuing support we offer you: friendly, expert, direct support that is unsurpassed in the micro-computer industry. There is no time limit to our support: if you are our customer and you need help, just call or write. We give free updates for 90 days, and charge little or nothing for minor updates thereafter.

Customer Comments

"This is the best software package I have ever received ... superb, easy to use, fast, and has more features than the business word-processor at the office." *(E.R.L.)*

"ALLWRITE is a professional system that sets a new standard in word processing. It's powerful and easy to learn and use."

80 MICRO, Nov., 1984

"Your company and products have to be one of the strongest factors I can think of for keeping me with the TRS-80!" *(J.R.H.)*

"NEWSCRIPT is the Cadillac of word processors. ALLWRITE is the Mercedes Benz!!" *(B.E.)*

"...a very readable manual." *(D.S.)*

BENEFITS OF OWNING ★★ ALLWRITE ★★

If Word Processing is important to you, PROSOFT's ALLWRITE is the best choice you can make. The clean, professional appearance it adds to your letters and reports will make an excellent impression on people. We will be happy to send you free print samples so that you can see for yourself how good ALLWRITE will make you look.

You probably know that quality word processors for CP/M and the IBM-PC sell for $300–500, and they don't have ALLWRITE's capabilities or speed ... or PROSOFT's proven, on-going support. Now, for a fraction of the cost of a new computer, you can have the most complete word processor of all. And you won't have the headaches of starting all over again with a new, different computer.

Note to college students: with its Footnote, Table of Contents and Index features, ALLWRITE is ideal for your reports and Term papers.

Circle 30 on Reader Service card.

HUNDREDS OF USEFUL CAPABILITIES

ALLWRITE comes with just about every useful word processing feature ... standard. Here are some highlights: excellent right-justified proportional printing on most printers having that ability; powerful Form Letter and Mailing Label preparation; Instant counts of words, characters, lines, changes; block Move, Copy, Delete, Putfile, Getfile, and List; delete by character, word, line, sentence, paragraph, or block; insert and one-key insert; great RS-232 printer support; accepts all 256 ASCII codes from keyboard; intermix pitches on same line (printer-dependent); 1.5 line spacing, 6, 7, 8, 12 lines per inch (printer-dependent); does multiple-columns on all printers; perfect alignment of hanging indents; variables, logic statements, conditional printing; wildcard Directories; integrated with Electric Webster and DOTWRITER for Models I, III, and 4 (these are sold separately); "Legal" line numbering; paragraph, list, and figure numbering; supports most popular printers (all "printer drivers" included); compatible with high-memory drivers; fully explains all DOS and ALLWRITE error messages; wildcard search-replace; tabs, search-replace, other settings remembered across files; word reversal; up to nine levels of boldface; flexible page titles; footnotes at bottom of page or end of document; Table of Contents and Index generation; and PROSOFT's unmatched text formatting and printing capabilities.

Attention NEWSCRIPT Owners

You can trade in your copy of NEWSCRIPT at very substantial savings. Please call our technical line for details.

How To Order

You can order by phone or mail. For quickest delivery, call our Technical Support line. Please specify your TRS-80 model (I, III, or 4, 48K, at least two disk drives), and your printer(s). Our price includes normal shipping in the U.S. and Canada. The sooner you order, the sooner you will begin to benefit from the ALLWRITE! Word Processor.

~~$249.95~~ **$199.95**

ORDER NOW, TOLL-FREE

(800) 824-7888, oper. 422

PROSOFT.®

Box 560, No. Hollywood, CA 91603

(818) 764-3131 for Technical Information and Same-Day Processing.

Terms: VISA, MasterCard, checks, C.O.D. California residents please add sales tax. Most orders filled within one day.

Bonjour, TRSDOS

The first issue of your publication that I received as a substitute for the cancelled *TRS-80 Microcomputer News* contained Andy Levinson's brilliant article "Patch Work" (January 1985, p. 112). I sincerely hope Andy continues this, as there is more to fix on TRSDOS.

Listen all you TRSDOS 1.3 owners: Radio Shack has issued 11 customer service bulletins since the May 1, 1981, release of 1.3. Apparently, only Radio Shack stores, not registered owners, get them; at least, I didn't receive any. After seeing the bulletins in a store, I wrote to Fort Worth and got copies. If you don't have them, go to your Radio Shack store and copy them. Some patches are just typo corrections, but others are important.

Henry H. Herrdegen
Windsor, Ontario
Canada

What's Up, Doc?

I stand up in defense of *80 Micro*'s authors and programmers. I found Alain Cirkovic's Easydata program (December 1984, p. 72) easy to understand and useful. However, I did have a couple of problems that prompted me to write Cirkovic. I received back a copy of the unedited version of the documentation. These instructions answered all my questions except one. Had you printed them as submitted, I, for one, would not have experienced the frustration of not understanding parts of the documentation.

Tom Johnson
Beavercreek, OH

Electric Plug

We've made some changes in Electric Webster since Terry Kepner reviewed the Model 4 version (March 1984, p. 116). One change applies to the Model 4 version only: After proofing a document, Electric Webster now prompts, "Press <B> to make back-up or <enter> to replace document file." In either case, the original file name becomes the corrected text.

All other changes apply to the Models I, III, and 4 versions. The standard version now integrates with word processing programs the same way the correcting version does. In place of the

correcting menu, it displays a menu with the option of sending the list of errors to a printer.

We've eliminated virtually all renaming when you install Electric Webster. Hyphen/EW remains Hyphen/EW. The new Install/CMD program handles installation. The Model I/III version now comes in TRSDOS 1.3 format on one side, and in DOSPLUS double-density format on the other, eliminating the need for conversion for most users.

The grammatical checking feature is now available as an independent program. Also, Tandy will be offering Electric Webster through its Express Order Software service.

Philip Manfield, President
Cornucopia Software
Albany, CA

The Price You Pay

I found Patrick B. Anderson's note to *80 Micro* (February 1985, p. 12) interesting, particularly the part about the IBM PC costing less than his Model III. The lowest price I've seen for the PC is still $900 more than I paid for my Model 4P with 128K. I can bear to lose a little word processing efficiency for $900 in my pocket.

E.A. Morris
Sparta, NJ

Cut-Out

As I was looking through my 1984 back issues of *80 Micro*, I saw there were no Reader's Choice awards last year. Have they been canceled like so much of the other good stuff you used to carry? Will you publish 1985 Reader's Choice awards?

John C. Fowler
Los Alamos, NM

We've canceled the Reader's Choice awards because it's almost impossible to cover all of the Tandy/TRS-80 systems adequately.

—Eds.

Pronoun Protest

There has been a lot of publicity about the lack of females in computer fields, so I was disappointed with the introduction to the Young Programmer's awards in the February issue (p. 49). I draw your attention to this sentence: "We wanted docs that would easily lead the user through the program, telling him what he needed to know to run the program and anticipating any questions he might have."

I would suggest this alternative wording: "We wanted docs that would easily lead the user through the program, explaining the program while anticipating any questions that might arise."

80 Micro should strive to be a leader in encouraging women to participate in all phases of computer use.

Betty Burnett
Emeryville, CA

80 Micro *uses the male pronoun by default; the alternatives offer no satisfactory solution. We could use "her," but that is no less sexist than using "him"; we could use the neutral "their," but that is grammatically incorrect; we could use "his/her," but that's awkward and verbose; we could use "user," but that is formal and stilted; we could rewrite the prose as you did, but at some point we would have to refer to a person. In the end, we follow journalistic convention and go with the male pronoun. Fortunately, people generally understand that this is a term of convenience rather than a purposeful bias.*

—Eds.

Send correspondence to Input, c/o 80 Micro, *80 Pine St., Peterborough, NH 03458.*

SPEECH

fun simple powerful

with the vs-100 voice synthesizer

Check these features:

Talker 2.0 and Talker 4.0 software:

- ☑ Unlimited translation of English text to clear speech.
- ☑ Powerful video or keyboard echo can be switched on or off at any time.
- ☑ Can be used in BASIC with 2 new commands: PRINT* "I can talk" speaks any expression. PRINT! "Hello" speaks *and* prints on screen.
- ☑ Reads numbers up to 999 trillion.
- ☑ Speaks many abbreviations, such as Mrs., Mr., lb., oz., Co., etc.
- ☐ Walks the dog.
- ☑ Many control codes to tailor the system to your wishes. (Pitch, speed, etc.)
- ☑ Only 6¼K long.
- ☑ Talker relocates itself into available high memory. Compatible with any DOS (not CPM).

The VS-100 hardware:

- ☑ Same performance as very expensive units.
- ☑ Super efficient: About 50 bytes per sentence.
- ☑ Handsome speaker module included.
- ☑ Detailed 48 page manual.
- ☑ Ready to plug in and talk right away.
- ☑ Uses the famous Votrax SC-01 with 4 pitch levels and automatic inflection.
- ☑ Built in audio amplifier with volume control.

See the detailed review in 80-Micro December 1984.

The VS-100 system. (Model I shown)

$69.95

Includes:
- VS-100 synthesizer
- Speaker
- Power supply
- Manual

Specify Model I, III, 4 or 4P.

Model 4P needs short 50 pin extension cable 14.95

TEXT-TO-SPEECH SOFTWARE

- **Talker 2.0** for Models I and III On disk only..... 29.95
- **Talker 4.0** for Model 4. Includes Talker 2.0 for Model III mode. On disk only..... 39.95
- Text-to-Speech for tape users 19.95

Small Print: ● Model I: unit plugs into keyboard or expansion interface 40 pin bus. ● Model III,4,4P: unit plugs into 50-pin I/O bus. Model III VS-100 works with Model III,4,4P. Use our "Y-cables" (see next page) if your bus is already used.

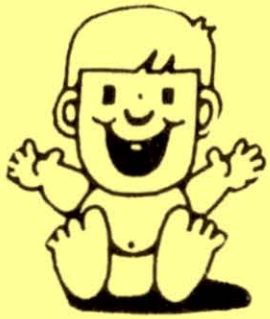
The VS-100: You've never had so much fun with your TRS-80

"Doctor SIGMUND" will amaze you!

See Artificial Intelligence at work!

If you want to show off your computer, run "Doctor SIGMUND" and see their expressions as your TRS-80 has an intelligent conversation with you. If you have a VS-100 voice synthesizer, Sigmund actually talks back to you. Even YOU will be impressed. **$29.95**

Doctor SIGMUND, for Models I, III and 4 (48K required); available on disk only



Circle 17 on Reader Service card.

ALPHA Products

79-04 Jamaica Ave., Woodhaven, NY 11421 **(718) 296-5916**

Toll Free Order Line
800-221-0916
Orders Only. NY & info call (718) 296-5916
Hours: 9-5 Eastern Standard Time

Add $3.00 per order for shipping/handling. We accept Visa, Mastercard, Checks, M.O. C.O.D. Add $3.00 extra. N.Y. Residents add sales tax. Overseas, FPO, APO: Add 10% Dealer discounts available.

Send your questions or problems dealing with any area of Tandy/Radio Shack microcomputing to Feedback Loop, 80 Micro, 80 Pine St., Peterborough, NH 03458.

Q: How do you disable the Model 4's break key? Also, how do I get the computer to load a directory from Basic? *(Scott Pierce, N. Little Rock, AR)*

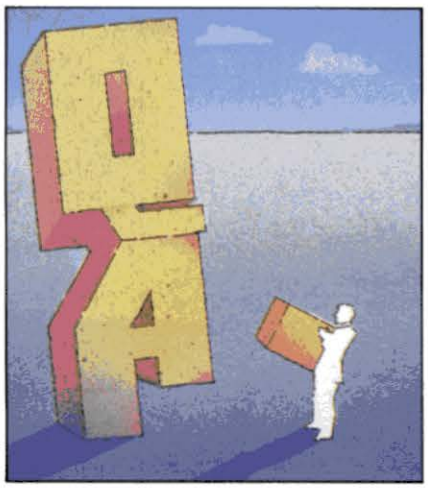
A: So far, Radio Shack has released five versions of Model 4 TRSDOS, each different from the others in important machine-code locations. This makes it almost impossible to find a POKE to disable the break key at the DOS level. Fortunately, TRSDOS includes a command that makes a POKE unnecessary. Type in SYSTEM (BREAK = OFF) at DOS ready and the computer will ignore the break key.

If you're already in Basic, use SYSTEM"SYSTEM (BREAK = OFF)". That should disable the break key without interrupting your program. Similarly, to get a disk directory from within Basic, type in SYSTEM"DIR" as one program line. To return to DOS ready, type in SYSTEM as the program's last line.

Q: In the August 1984 Feedback Loop (p. 18) you told Mario Camou that a few Radio Shack disk drives don't support double-density operation. I'd appreciate some elaboration. I have a Model I with an Aerocomp double-density add-on. My drive 1 (Radio Shack catalog number 26-1160) has 35 tracks; drive zero (catalog number 26-1161) has 40 tracks. I can read double-density disks in drive zero but not in drive 1. Is there a way I can determine if drive 1 is one of those few single-density drives? *(Ed Weiner, Huntington Beach, CA)*

A: First, use the CONFIG or System command (depending on your DOS) to slow the track-to-track stepping rate to 40 milliseconds or more. It's possible the drive can't keep up with the DOS at faster speeds in double-density mode.

If drive zero writes as well as reads double-density disks, format a double-density disk, store data on it, then put the disk in drive 1 and try to read it. If you have a disk-zapping utility such as Super Utility Plus, use that to access the



disk in drive 1. If your DOS or the disk-zapping program still can't recognize the double-density disk, then drive 1 is indeed single density only.

Q: On my old Model III, I loaded SuperScripsit using the Auto command, resetting the computer to bypass the date and time prompts. However, I recently bought a Model 4P and got an 80-column version of SuperScripsit, and I find I can no longer bypass the date prompt by pressing the reset button. The DOS manual says you must enter the date before any automatic loads; is there a way around this? *(Mark Headlee, Edinburgh, Scotland)*

A: To turn off the date prompt, boot up your system disk, type in SYSTEM (DATE = OFF) and use the SYSGEN command to save the new configuration to disk. The next time you boot up the disk, your computer won't display the date prompt and your Auto sequence will execute immediately.

Q: For over five years, our company has been involved in developing and marketing a software package that goes by the general name of Computer-Aided Transcription. Our software has run on the Models I, II, 12, and 16. When the Tandy 2000 came out, we converted the program for this computer. Some type of error in the 2000's hardware or in MS-DOS causes the loss of all free space on a hard or floppy disk; apparently this happens when writing a file to disk.

For example, if you have 9 megabytes of free space on hard disk and you write a 5000-byte file, you've suddenly lost all 9 million bytes of space. The file you're writing is destroyed in the process.

When reading and writing files to or from hard disk, our software uses MS-DOS's function calls 14, 15, 21, and 22 hexadecimal (hex). We know the problem isn't with our program because a Radio Shack dealer has had the same problem running Tandy software on a floppy disk. You can recover the lost disk space using the DSKCHK program, but users who spend hours editing large files lose their work each time this happens, and it happens frequently.

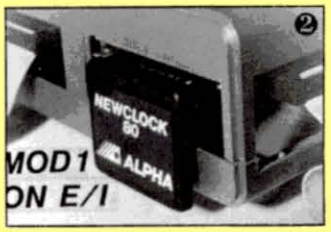
Are you or any of your readers aware of the problem? Do you know of any work-around procedures or programming methods to alleviate it? *(Maurice Fowler, Innovative Software Co., Houston, TX)*

A: Sorry, I haven't heard of the problem. Have you cleared all the CPU registers, set the flags to normal states, set the necessary entry conditions, and made sure the stack is clean? Perhaps some garbage in the registers causes the trouble. Also, make sure you're getting the service call addresses out of the Tandy 2000 programmer's reference manual and not out of an IBM MS-DOS reference book. Tandy's MS-DOS call addresses differ from those of the IBM. Can anyone else help?

Q: After trying Eric Burstein's "More 4P Storage" hint (Reader Exchange, July 1984, p. 32), I had to let you know about my experience with formatting 42 tracks. I was able to format my disks for 42 tracks on a Model III using DOSPLUS 3.5 (Burstein used TRSDOS). It worked perfectly until I had my drives aligned. When I got them back, none of my drives could read anything on the 41st or 42nd tracks.

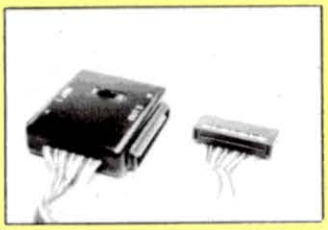
Radio Shack's explanation was that they support only 40 tracks, and that they aligned the drives within specifications for a 40-track drive. They also said they couldn't do anything else, since they'd never heard of getting 42 tracks out of a 40-track drive. It seems to me that if a drive read 42 tracks before servicing, it should certainly read 42 tracks after alignment. I've been unable to find

Newclock-80 $69.95



The right time at the right price! Keep the time and date with quartz accuracy, even when your computer is off. The backup lithium battery (included) will last for over 2 years. Software on tape or disk, please specify. Use "TIMESET" once to set the clock. Use "SETCLK" to set your computer's internal clock (at power up) or use "TSTRING" so that the "TIME$" function reads the Newclock.
Connection: Model I: plugs into the keyboard or expansion interface. Model III: plugs into the 50-pin I/O bus. Compatible with all operating systems.

Printswitch $59.00

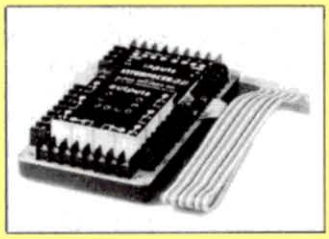


Do you have 2 printers? Get a Printswitch. Stop plugging and unplugging those printer cables. With the Printswitch, you can have 2 printers connected to your computer and you can select either one at the flick of a switch. Works with any printer, plotter, or device that uses the parallel printer port. Simply plug the 14 inch Printswitch cable into your computer, and plug your existing printer cables into the Printswitch. This is the nicest unit on the market. Superior quality board with gold plated edge connectors. For Models I,III, 4 and 4P.

Alpha Joystick $27.95

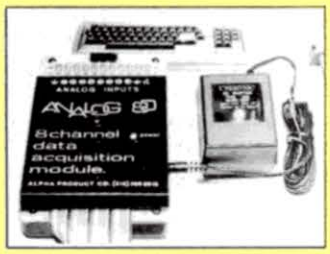
When it's time for fun, don't be without your Alpha Joystick. Do you know that most action games are Joystick compatible? Stop pounding on your keyboard and enjoy real arcade control. The joystick can also be used with BASIC programs; simply do J=INP(0) to read the joystick position (8 directions and fire button). Model I: plugs into keyboard or expansion interface. Model III, 4 and 4P: plugs into 50-pin I/O bus. The Alpha Joystick comes fully assembled and tested, ready to plug in and enjoy. (Specify Model I, or Model III,4).

Interfacer-80 $159.00



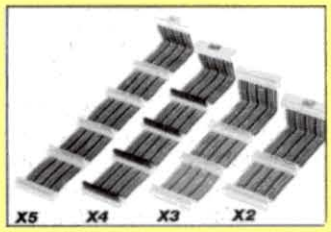
Low cost input and output device. The outputs consist of **8 relays** (rated 2 Amp @125V), easily controlled using "OUT" commands. For example, OUT 0,0 turns all the relays off. Eight LED's show the states of the relays. The **8 inputs** are optically isolated, so it's safe and easy to connect external devices (switches, sensors, thermostats, etc.). Simple "INP" commands read the inputs.
Connection: Mod I: 40 pin bus. Mod III, 4, 4P: requires 50-pin I/O bus converter ($39.95), plugs into 50-pin I/O bus. Comes complete with power supply, cable, and detailed manual.
(Up to 8 interfacers can be connected to your TRS-80 using our Y- cables).

Analog-80 $139.00



8 channel 8 bit Analog to Digital converter. Your TRS-80 can read voltages, temperatures, pressures, light levels, etc. • Input range: 0 to 5.1 Volts. • Resolution: 20mV. • Conversion time: 120 microseconds. In BASIC, you can take up to 100 readings per second. • Port address: selectable. Up to 8 Analog-80's can be connected to your TRS-80 for a total of 64 channels!
Connection: Model I: 40 pin I/O bus. Model III, 4, 4P: requires 50-pin bus adapter ($39.95). Comes complete with power supply, cable, and manual.

Special Cables

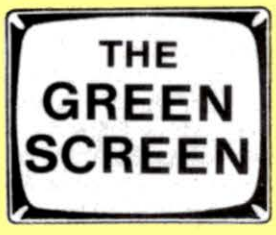


Disk drive extender cable (8")...C160:$9.95
Y-Cable for Mod I bus (40 pin): • **X2-40**...$29 • **X3-40**...$44 • **X4**...$59 • **X5**..$74
Y-Cable for Mod 3 & 4 bus (50-pin): • **X2-50**...$34 • **X3-50**...$49 • **X4-50**...$64
Disk drive cable (34 pin): • 2-drive...**C162:**$32 • 4-drive...**C163:**$45
Extension cable, 4 foot: • For printer and drive (34-pin)...**C165:**$22
• For Mod I bus (40-pin)...**C167:**$24 • For Mod 3 & 4 bus (50-pin)...**C169:**$28
Keyboard to E/I (40-pin, 8")...**C161:**$21 If this is confusing, send for our Cable Flyer.
Our cables are made with high quality gold plated connectors to ensure utmost reliability.

NO RISK

We know that ordering by mail can sometimes be a hassle, but with Alpha, you are fully protected.
1) Our 15 day money back guarantee protects you from disapointment.
2) All our products are tested on a TRS-80 and waranteed fo 90 days (parts & labor)
3) We ship 90% of our orders within 24 hours.
4) We are committed to help you

Green Screen $12.50



Do your eyes a favor, put on a green screen. Tens of thousands are in use for a good reason: they work. Contrast is enhanced and eye fatigue is greatly reduced. Our green screen is curved; it fits right on the face of the tube. (Fits Models I,II,III,4,12,16)

Circle 17 on Reader Service card.

ALPHA Products
79-04 Jamaica Ave., Woodhaven, NY 11421
(718) 296-5916

Toll Free Order Line
800-221-0916
Orders Only. NY & Info call (718) 296-5916.
Hours: 9-5 Eastern Standard Time

Add $3.00 Per Order For Shipping And Handling. We Accept Visa, Mastercard, Checks, M.O. C.O.D. Add Sales Tax. Overseas, FPO APO: Add 10%. Dealer Discounts Available C.O.D. add $3.00 extra.

a solution and would appreciate any help you can provide. *(Robert E. Rachlow, Louisville, KY)*

A: The problem is with the stepping motor that maneuvers the drive head across a disk. The stepping motor is designed to have 40 stops, but frequently it has more, to give the manufacturer room for error.

To set the motor's alignment, you measure everything from the track zero position. A track zero detect switch sets track zero. So you step the motor backwards, which moves the drive head toward the disk rim until the drive head hits the track zero detect switch. Then you step the head forward until it reaches track 40, normally the last position possible for the stepping motor.

In your case, your stepping motor had two positions left when it reached track position 40, letting you step it further in to use those extra tracks. During alignment, the technician turned the drive motor and repositioned it so the last position became track 40. The extra positions are now beyond track zero's position, and are unusable because the track zero detect switch prevents the motor from moving closer toward the disk rim. Your upper tracks, 41 and 42, are now beyond the motor's reach.

The only solution is to realign the drive-stepping motor. You'll need an oscilloscope, an alignment disk, and a technical repair manual for your disk drive. If you don't know how to realign a drive, find an independent drive-repair technician to do the job for you.

Q: In February 1985 (p. 16), you printed a question from C.G. McProud about using 4164 chips in place of the 4416s commonly found in the Model I. Coincidentally, we ran an article on this very subject in Vol. 5, No. 8 of *Northern Bytes*. We reprinted the article from the Sydney (New S. Wales, Australia) TRS-80 User's Group Newsletter.

If any of your readers are interested in this hardware modification, I'll be happy to send a copy of this issue if you send a mailing label (not an envelope) with your address and 60 cents to cover postage.

In the same issue, James Criscimagna asked how to get TRS-80 block graphics on an Epson RX-80 printer (p. 19). *Northern Bytes'* Vol. 6, No. 1 contains a routine for the FX-80 that I suspect works with the RX series as well. The same offer applies to any readers who'd like a copy of this issue. *(Jack Decker, Editor, Northern Bytes, 1804 W. 18th St., Lot #155, Sault Ste. Marie, MI 49783.)*

A: *Northern Bytes* isn't exactly a commercial publication, but it's not just a computer club newsletter either. It's a promotional publication for The Alternate Source's customers that also exchanges newsletters with TRS-80 user's groups.

Q: After adding a Radio Shack double-density adapter to my Model I, I find I'm having trouble upgrading my software library. I use TRSDOS 2.8, and I'm trying to convert the Edit/CMD program from Microsoft's Editor/Assembler Development package. I'm having problems with calls to DOS address 4442 hex (read specified record from file).

Do you know of any books or other publications dealing with double-density disk input/output (I/O)? I know single-density I/O fairly well, but none of it seems to apply to double-density. The technical manual refers to synching the computer for reliable data I/O. How do I do this?

Also, I find NEWDOS/80 1.0 won't load with the double-density adapter installed. Why? *(Carlos H. Matos, Shaw A.F.B., SC)*

A: Your problem with location 4442 hex is that TRSDOS 2.8 requires a different register setup from the program you're converting. Since I don't know the program, I really can't be more specific than to suggest that you trace the program's flow with a machine-language monitor and examine the CPU registers just before the program calls location 4442 hex. Compare what's in the registers with the technical manual's requirements for calling that location and reading from disk.

The main difference between single- and double-density operation is the disk sectors' skew rate, since the DOS has more sectors to deal with under double-density. Your DOS might also read and write data differently. Because DOSes differ and the Model I lacks a standard double-density system, you won't find any books on the subject.

As for synching data, the Model I, in single-density mode, uses the floppy disk controller's (FDC's) memory bank for storing disk data. Unfortunately, the FDC chip also uses this space to store information. Usually this is OK, but it can lead to problems when the computer clock's 25-millisecond "heartbeat" interrupts the FDC, destroying the data in its memory area.

Now, in theory, the drive delivers information fast enough so that the CPU can pull it out of the FDC before the clock interferes. But if the drive's timing is precisely right (or, depending on your viewpoint, precisely wrong), it won't start delivering data from a sector until late in the clock's cycle. Remember, the drive has to wait for the right sector to pass beneath the drive head before it can send data to the FDC. When this happens, the clock destroys the data in the FDC before the CPU fetches it.

This is usually the cause of Model I "Data Lost" error messages. Double density aggravates the situation a bit by making the timing even more critical; sometimes it takes even more passes to read the whole sector than under single-density operation.

Manufacturers other than Radio Shack include a data separator with their double-density boards to remove conflicts in use of the FCD memory area. The only way to establish reliable data transfer without such a separator is to synchronize your data-fetch operations with your computer's clock, delaying reading until immediately after a clock pulse.

NEWDOS/80 1.0 won't load because it doesn't support double-density operation; you'll have to get NEWDOS/80 2.0 or DOSPLUS, MULTIDOS, or LDOS. Be sure to call the manufacturer before ordering a new DOS to make sure it supports Radio Shack's double-density board.

Q: I need information about securing a copyright for software. Can you help? *(Darrell Eldridge, Ardmore, TN)*

A: Look for the book *Legal Care for Your Software* by Daniel Remer—Nolo Press, 950 Parker St., Berkeley, CA 94710, $19.95. The Addison-Wesley Publishing Co. distributes it. The book gives most of the information you need to protect your software from illegal copying and use.

Not everyone agrees about the book's value. One lawyer says it's "pretty good" while another calls it "misleading." However, I don't know of any legal text that all lawyers agree is good. The book seems quite thorough, with many useful suggestions and examples.

Q: I'm responding to Hugh Ruppersburg's complaint about Model 4 SuperScripsit's losing characters during wraparound (January 1985, p. 19). I suspect that his operating system may be at fault.

The Model 4 SuperScripsit upgrade package I recently received from Radio Shack contained SuperScripsit 1.0.1 and TRSDOS 6.1.1. I, too, noticed the program's tendency to lose characters during wraparound, a problem I didn't have with Model III SuperScripsit running under LDOS. SuperScripsit's command response also felt sluggish. When I moved Model 4 SuperScripsit to a TRSDOS 6.2 system disk, I found that these problems disappeared.

TRSDOS 6.2 is an optional upgrade that you have to buy from Radio Shack. According to the catalogue, it operates

up to 20 percent faster than the 6.0 and the 6.1 versions and includes many technical enhancements. The mandatory upgrade that I (and many other Model 4 owners I know) received free of charge from Radio Shack was version 6.1.2. Hugh Ruppersburg might not find that version fast enough for SuperScripsit. *(Jane A. Layman, Waukesha, WI)*

A: You're right; you can attribute SuperScripsit's losing characters to the DOS. Getting 6.2 should solve this problem most of the time, but it's still possible to lose characters if you're a fast typist.

Q: Like Howard Feldman, I was disappointed to discover that the Model 4/4P has no Basic sort routine comparable to CMD"O". I took your advice to Feldman in the November 1984 column (p. 16) and typed in the machine-language sort published in the July 1980 *TRS-80 Microcomputer News*, but I can't get it to work on my Model 4P.

I modified the program by substituting 255 for 127 except for its first occurrence, replaced line 30 with DEF USR0 = &HFF00, entered Basic with M = 65279, removed the 10000 after the Clear statement, and changed lines 1240 and 1260 as indicated. When I run the program, it works nicely through line 160, but when I press the enter key the computer hangs up. I've looked for hints in the Model 4 manuals, but I can't find any.

I have the feeling the problem has something to do with the first three machine-language statements, 205,127,10, which is a Model III ROM call CD 7F A, but I can't figure out what to replace them with or what else to change in the program. *(Charles H. Samuel, Tigard, OR)*

A: The program was originally for the Model I, so I don't think your problem could be a ROM call—the Models I and III ROMs just aren't the same. The program works on the Models I, III, 4, and Lobo Max-80.

Rather than try to trouble-shoot the program, type in Alan D. Smith's Model 4 Basic sort in the March 1985 *80 Micro* ("A Sort Story," p. 70).

Q: I downloaded several programs from *80 Micro*'s bulletin board, saving them to disk as File name/TXT in both edited and unedited format.

How do I transform the downloaded programs in text format to executable Basic programs? I don't have a text editor. *(Gary V. Van Dyke, Sycamore, IL)*

A: Use a simple Basic program to line input the text and edit it. To fix Basic lines so they aren't broken into separate sections, write a subroutine

When the refrigerator started or the toaster toasted, garbage appeared.

that displays each line of text and asks you whether the line belongs with the previous line. When you answer no, the routine should write the previous line to disk and save the current line in memory in case it's continued on the next text line. This is time-consuming, but it does work.

80 Micro published a text editor program in November 1984 (see "Hybrid Vigor," p. 72).

Q: I just blew my fifth power supply and the local Radio Shack stores don't know where to get a replacement. I have a 16K Model I Level II with Expansion Interface, two 40-track disk drives, a printer, acoustic modem, voice synthesizer, and Alpha's Newclock 80. As you can see, my system needs a lot of power.

I designed my system for 24-hour use. It wakes me up, reminds me to take my pills, makes my phone calls, and so on. I wrote my own software, including a full-screen editor, word processor, and assembler, and it's hardware dependent, especially on the clock and voice synthesizer. It would take years to transport these programs to another computer. Help. *(Wayne Moore, Smithville, MO)*

A: The Model I's power supply is a power transformer that drops the 120-volt wall supply to 24-volt and 17-volt ac levels. The transformer then rectifies the 24-volt ac to 19.8 vdc and puts it on the power cord's pins 2 and 4. The 17-volt ac goes on pins 1 and 3, and all four pins feed directly to the Model I.

The vdc line is limited to .35 amps and the other line is limited to 1 amp. All you have to do is get a bigger power transformer (the original's setting is 50 watts) and increase the rectifier to handle your extra current load—say, .5 amps. You could probably get any good technician to build a new power supply inexpensively.

Q: How do I get my Model 4 under TRSDOS 6.2 to recognize logical drives 2 and 3—I need a patch. *(Yulee Johns, Glen Burnie, MD)*

A: You don't need patches to enable logical drives 2 and 3, assuming they're physically attached. Type in DEVICE to display the current drive configuration. If you have the external drives on the expansion cable, with disks in them and the doors closed, you should see them listed in the device table.

If the table indicates the drives are disabled, use SYSTEM (DRIVE = 2,ENABLE) and SYSTEM (DRIVE = 3,ENABLE) to make them accessible. Now try the device command; also, read from and write to the drives. When you're satisfied with the setup, use SYSGEN to save the new drive configuration to your system disk.

Q: I have a Model I with Radio Shack's Expansion Interface (EI) and two disk drives. I want to add an RS-232 port without having to buy the complete interface; do you know of anyone who still markets the port only?

Also, I've been having trouble with my Epson MX-80 printer. It usually happens right in the middle of a long listing or a mailing label printout—whenever it will create the most havoc. All of a sudden, the printer takes off like crazy, usually dropping into compressed mode, and printing garbage that looks like this: ////0000000000000000000000000/////. I've replaced all connectors with gold plugs, but the problem continues. *(Jeff Briner, Hickory, NC)*

A: The Radio Shack franchise in Brattleboro, VT (802-257-5229) still has a few Radio Shack RS-232 boards for the Model I Expansion Interface. Before installing the board, drill five or six half-inch ventilation holes in the RS-232 compartment sides and lid. Make sure you clean the RS-232 edge-card connections with alcohol to remove dirt and corrosion.

After putting the board in position and screwing it down, get a large pink eraser and cut it just to fit between the RS-232 board (over the connection to the main EI board) and the compartment lid. This prevents the RS-232 board from heat-warping and pulling away from the RS-232 board connector.

Your printer problem sounds like a voltage spike or current surge. Somehow, one or more extraneous characters are getting into the printer's buffer, causing it to misbehave. I had a similar problem with an external hardware printer buffer; every time the refrigerator started up or the toaster toasted, garbage appeared in the buffer. The cure was to install a spike and surge suppressor on the printer and the printer buffer (see "Current Events," May 1985, p. 62, for a guide to buying surge suppressors). ■

Terry Kepner is a freelance writer and programmer, and an associate editor for 80 Micro. *He's been writing about microcomputers since 1979.*

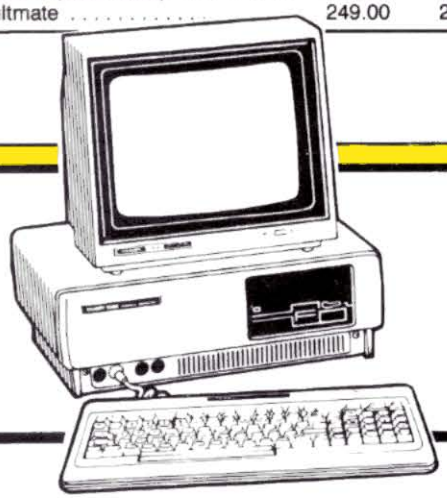
Circle 124 on Reader Service card.

PERRY COMPUTERS

THE BEST BUYS IN TOWN...

Perry Computers has been in the Computer Business for seven years and has offered you incredible products at outstanding prices. We plan to continue giving you quality merchandise at irresistible discounts. The basis of our philosophy is affordability and every effort is made to extend opportunity to you. We invite you to shop and compare.

TANDY	LIST PRICE	OUR PRICE
TANDY 1000		
25-1000 Model 1000 128K 1 Disk Drive	$1199.00	$ 995.00
25-1003 Modem Option 1000/1200	179.95	153.00
25-1004 Memory Exp 128K 1000/1200	299.95	255.00
25-1005 Disk Drive Expansion 1000	299.95	255.00
25-1006 RS-232C Interface 1000/1200	99.95	85.00
25-1007 Hard Disk Control Board	329.95	280.00
25-1009 2ND Memory Board	249.95	215.00
25-1501 MS-DOS Reference T-1000	34.95	29.00
25-1502 BASIC Reference T-1000	34.95	29.00
25-1155 Scripist 1000	299.95	255.00
25-1145 Lotus 123 1000	495.00	420.00
25-1151 DR Graph 1000	195.00	161.00
TANDY 1200		
25-3000 Tandy 1200 1 Disk & 10 Meg HD	$2495.00	$2070.00
25-3010 VM-3 Green Monitor	219.00	185.00
26-3212 CM-2 Color Monitor	549.95	468.00
25-3040 Monochrome Display Adapter	219.00	185.00
25-3043 Graphics Display Adapter	299.00	255.00
25-3044 Graphics Master	695.00	590.00
25-3061 Captain Multifunction Board	795.00	675.00
25-3130 MSDOS/BASIC	89.95	76.50
25-3170 Wordstar Professional	395.00	335.00
25-3160 Framework	695.00	590.00
25-3161 PFS File	140.00	119.00
25-3190 dBase III	695.00	590.00
TANDY 2000		
26-5103 Tandy 2000 2 Disk Drive	$2499.00	$2010.00
26-5104 Tandy 2000 1 Disk & 10 Meg HD	3950.00	3175.00
26-5111 Monochrome Monitor	199.95	165.00
26-5112 Color Monitor	649.00	535.00
26-5140 Hi Res Graphic Monochrome Bd.	359.95	305.00
26-5141 Hi Res Color Graphics Chips	149.95	125.00
26-5160 Internal 128K Memory Board	299.00	250.00
26-5300 Lotus 123	495.00	420.00
26-5311 Microsoft Multiplan	195.00	166.00
26-5320 Framework	695.00	590.00
26-5352 dBase II (Data Base)	595.00	420.00
26-5330 Multmate	249.00	205.00



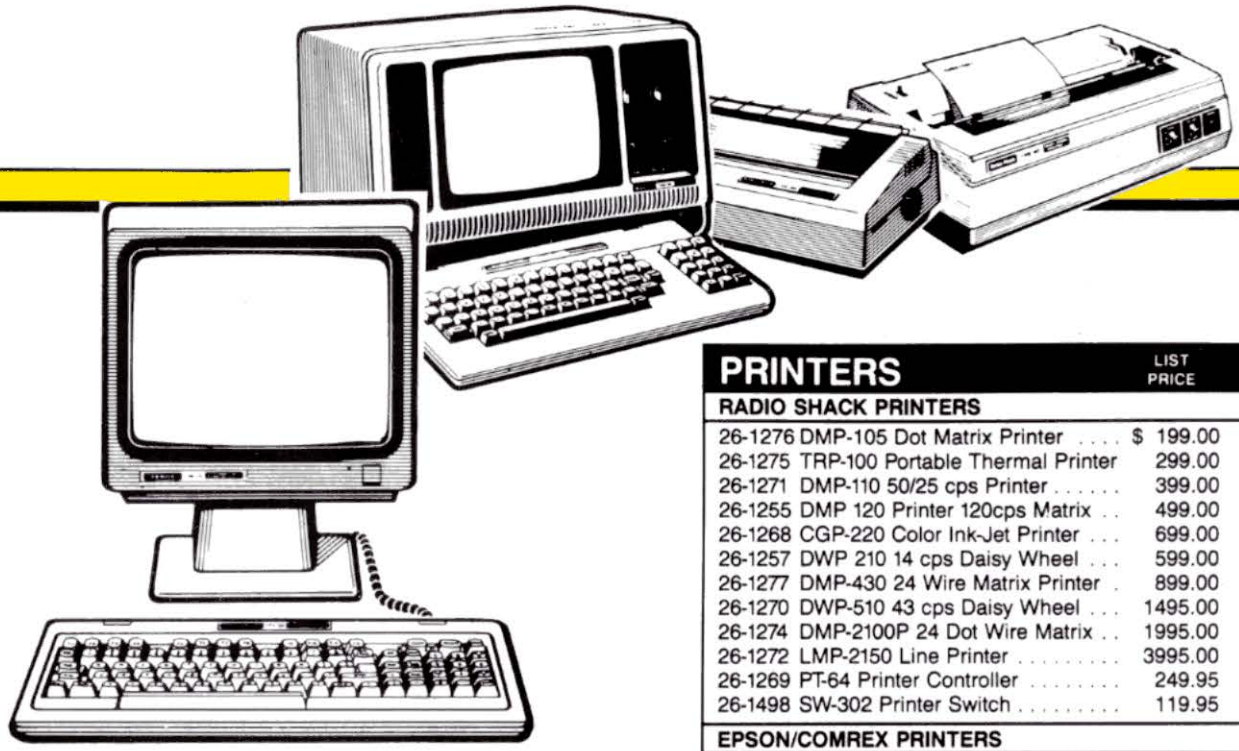
PORTABLE-COLOR	LIST PRICE	OUR PRICE
MODEL 200		
26-3860 24K Model 200 Portable Comp	$ 999.00	$ 829.00
26-3866 24K RAM Mem. Exp. Chip for 200	249.95	212.00
26-3804 AC Adaptor	5.95	5.00
26-3805 Accoustic Coupler	39.95	34.00
26-3816 8K RAM Memory Expansion Chip	119.95	95.00
26-1409 Printer Cable	14.95	12.70
26-1410 Modem Cable	19.95	17.00
26-3809 Briefcase	49.95	42.50
26-3811 Soft Carrying Case for 100/200	39.95	34.00
26-1183 Bar Code Reader	99.95	85.00
26-3806 Disk Video Interface	799.00	660.00
26-3829 Multiplan ROM for 100	149.95	127.50
COLOR COMPUTERS		
26-3127 64K Extended Color Computer 2	$ 219.95	$ 185.00
26-3136 16K Extended Color Computer 2	159.95	130.00
26-3129 Thinline Disk Drive O for Co Co	349.95	290.00
26-3018 Extended Basic Kit	39.95	36.00
26-3030 OS-9 With Editor Assembler	69.95	59.50
26-3012 Deluxe Joystick	39.95	34.00
VIP Integrated Library	149.95	139.00
VIP Writer	69.95	59.00
VIP Calc	69.95	59.00
Telewriter Disk		59.00
Botek Interface		57.00
MONITORS		
30261110 Amdek 300 Green	$ 179.00	$ 140.00
30261120 Amdek 300A Amber	199.00	155.00
30261130 Amdek 310A Amber	230.00	175.00
30261150 Amdek 300 Color Composite	349.00	280.00
30261160 Amdek 500 Color RGB/Comp	525.00	400.00
30261170 Amdek 600 Color RGB	599.00	475.00
30261210 Comrex 5600 Green 12"	119.95	95.00
30261220 Comrex 5650 Amber 12"	129.95	110.00
30261230 Comrex 6550 Color Composite	329.95	285.00
30261260 Comrex 6700 Color RGB Hi Res	549.00	450.00
30261510 Teknika MH22 RGB/Composite	399.00	340.00
30261410 NEC 12" Color Composite		250.00

FOR ORDERS CALL 1-800-248-3823

We also carry a complete line of computer acccessories (Please call for current prices.)

FOR INFORMATION CALL 1-517-625-4161

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. Call for shipping charges. C.O.D. accepted. ($4.00 charge per carton on C.O.D. Call for further C.O.D. information.) M.C., Visa, AX, add3%.



PERSONAL-BUSINESS

		LIST PRICE	OUR PRICE
MODEL 4			
26-1069	Model 4 64K 2 Drive Computer	$1299.00	$ 950.00
26-1080	Model 4P 64K Portable Computer	1299.00	950.00
26-1122	64K Memory Expansion	79.95	75.00
26-1127	Model 4 Internal Drive 1	499.95	415.00
26-1123	Model 3 to Model 4 Upgrade Kit	799.00	675.00
26-1084	Model 4P Modem Board	149.00	127.00
26-1085	Model 4P Travel Case	24.95	21.25
26-1530	Multiplan Model 4	199.00	169.00
26-1595	Super Scripist Model 4	199.95	169.00
26-1635	Profile 4 Model 4	249.95	212.00
26-2216	CP/M Plus Model 4	149.00	127.00
26-2231	Double Duty Utility	69.95	58.00
MODEL 12 & 6000			
26-4005	Model 12 80K 2 Drive Computer	$3999.00	$2700.00
26-6021	Model 6000 512K 2 Dr Computer	4499.00	3735.00
26-6022	Model 6000 512K 15Meg HD	5499.00	4565.00
26-6014	Model 12 to 6000 Upgrade	1595.00	1325.00
26-6015	Model 6000 512K Memory Board	1095.00	905.00
26-6016	Model 6000 512K Memory Kit	849.00	705.00
26-6017	Card Cage For Model 12	199.00	169.00
26-6052	DT-100 Data Terminal	795.00	650.00
26-4155	15 Meg Hard Drive Primary	1995.00	1695.00
26-4171	35 Meg Hard Drive Primary	2995.00	2545.00
26-4157	Installation Kit for Primary HD	349.00	295.00
COLUMBIA & SANYO			
10021020	VP2110 Columbia Ptb 2 Dk 128K	$2495.00	$2120.00
10021030	VP2220 Columbia Ptb 2 Dk 256K	2695.00	2290.00
10021040	MPC4210 Columbia 2 Dk 128K	2495.00	2120.00
10021050	MPC4220 Columbia 2 Dk 256K	2695.00	2290.00
10021060	MPC4610 Columbia H Dk 128K	4195.00	3565.00
10021070	MPC4620 Columbia H Dk 256K	4395.00	3795.00
10021080	MPC47 50 Columbia Pro 10 M 512K	4995.00	4140.00
10021090	MPC4950 Columbia Pro 30 M 512K	5995.00	4975.00
10041020	MBC555-2 Sanyo 1 Drive 128K	999.00	850.00
10041040	MBC555-2 Sanyo 2 Disk 128K	1495.00	1250.00
10041550	CRT-36 Sanyo Green Screen	199.00	160.00
10041560	CRT-70 Sanyo Color Screen	749.00	640.00

PRINTERS

		LIST PRICE	OUR PRICE
RADIO SHACK PRINTERS			
26-1276	DMP-105 Dot Matrix Printer	$ 199.00	$ 169.00
26-1275	TRP-100 Portable Thermal Printer	299.00	230.00
26-1271	DMP-110 50/25 cps Printer	399.00	299.00
26-1255	DMP 120 Printer 120cps Matrix	499.00	385.00
26-1268	CGP-220 Color Ink-Jet Printer	699.00	595.00
26-1257	DWP 210 14 cps Daisy Wheel	599.00	485.00
26-1277	DMP-430 24 Wire Matrix Printer	899.00	745.00
26-1270	DWP-510 43 cps Daisy Wheel	1495.00	1225.00
26-1274	DMP-2100P 24 Dot Wire Matrix	1995.00	1650.00
26-1272	LMP-2150 Line Printer	3995.00	3315.00
26-1269	PT-64 Printer Controller	249.95	210.00
26-1498	SW-302 Printer Switch	119.95	100.00
EPSON/COMREX PRINTERS			
20001010	RX-80 Dot Matrix Printer	$ 269.00	$ 230.00
20001020	RX-80 F/T Dot Matrix Printer	399.00	299.00
20001030	FX-80 Dot Matrix Printer	599.00	410.00
20001040	JX-80 Color Dot Matrix Printer	799.00	610.00
20001050	HI-80 4 Pin Plotter	599.00	450.00
20002010	RX-100 Dot Matrix Printer	499.00	405.00
20002020	FX-100 Dot Matrix Printer	889.00	625.00
20003010	LQ-1500 18 Pin Head with Intf	1495.00	1185.00
20003510	CR-IIE Comrex Com Riter	499.00	400.00
20001510	FX-80 Tractor	39.95	34.00
20004080	NLQ Parallel Intrface	209.95	175.00
20004030	RX/FX 2K Serial Board	119.00	90.00
PRINTERS			
20021010	Okidata Microline 82	$ 349.00	$ 295.00
20021020	Okidata Microline 92	499.00	410.00
20022040	Okidata Microline 93	799.00	679.00
20041020	Star SG10 Printer	399.00	265.00
20061010	Toshiba Printer 1340		835.00
20081010	C. Itoh 8510AP Printer		335.00
20081510	C. Itoh 1550 Printer		660.00
20081520	C. Itoh F-10 Starwriter		1175.00
20081530	C. Itoh F-10 Printmaster		1475.00
20121010	Juki 6100 Daisy Wheel Printer	549.00	439.00
20181010	Mannesmann Tally MT-160L	798.00	675.00
20181020	Mannesmann Tally MT-180L	1098.00	935.00

SHOP WITH US ...

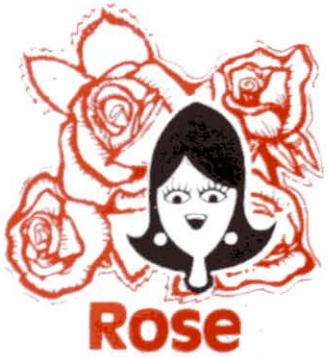
Our knowledgable and courteous staff is always available to assist you, whether it concerns taking an order on our toll free line or helping you select the right computer system. Helping you compare and select, regardless of your needs, business or personal, our trained sales personnel are here to offer you superior service that compliments our prices.

CALL TOLL FREE

1-800-248-3823

124 S. MAIN ST, PERRY, MICH. 48872

Circle 81 on Reader Service card.



You've Got TOTAL ACCESS

(specializing in TRS80 ®)

TO YOUR COMPUTER HARDWARE & SOFTWARE NEEDS. CALL ROSE TODAY!

QUALITY DISK DRIVES

These drives are complete with power supply, cover and external drive connector. For TRS-80 Model I, III, 4, IBM PC and others. All drives are Double Density and step at 6ms or less. SS means single head, DS is double head. Specify white or silver color cover. Add $5 per drive shipping unless otherwise specified. All drives have a one year warranty on parts and labor.

COMPLETE FULL SIZE 5.25" DISK DRIVES

40tk Single Side Tandon TM100-1	$ 167
40tk Dual Side Tandon TM100-2	197
80tk Dual Side Tandon TM101-4	297

COMPLETE HALF-HIGH 5.25" DISK DRIVES

1ea. 40tk SS TEAC FD-55A in dual case	$ 167
2ea. 40tk SS TEAC FD-55A in dual case	317
1ea. 40tk DS TEAC FD-55B in dual case	167
2ea. 40tk DS TEAC FD-55B in dual case	357
1ea. 80tk DS TEAC FD-55F in dual case	217
2ea. 80tk DS TEAC FD-55F in dual case	387

COMPLETE 8" DRIVES

Add $10 shipping

2ea. SS TM848-1E's in dual case with fan	$ 647
2ea. DS TM848-2E's in dual case with fan	697

BARE 5.25" & 8" DRIVES

Add $4 shipping

40tk SS, Full Size, Tandon TM100-1	$ 127
40tk DS, Full Size, Tandon TM100-2	167
80tk DS, Full Size, Tandon TM101-4	267
40tk SS, Half-High, TEAC FD55-A	147
40tk DS, Half-High, TEAC FD55-B	187
80tk DS, Half-High, TEAC FD55-F	237
8" SS, Thinline, Tandon TM848-1E	259
8" DS, Thinline, Tandon TM848-2E	333

TRS-80 MODEL III/4 DISK KITS

Internal drive kit complete with disk controller, power supply, mounting brackets, cables and all hardware plus step-by-step instructions. This kit contains everything you need (except the Disk Operating System, drive and a screwdriver) to convert your cassette Model III or 4 to fast reliable disk operation. Don't confuse this quality kit with the high-priced ripoffs. Thousands of satisfied customers cannot be wrong. You can join them for only ..... Add $8 shipping per kit ..... $ 189

Same as above with 1-40tk SS drive 299
Same as above with 2-40tk SS drives 419

TRS-80 MODEL I DOUBLE DENSITY CONTROLLERS

Add $3 shipping

Aerocomp "DDC" Really the best by test	$ 99
Aerocomp "DDC" with LDOS	159
Aerocomp "DDC" with NEWDOS 80-v2.0	179

OTHER DRIVE GOODIES

Add $2 shipping

TRSDOS 1.3 Disk & Manual for Model III	$ 24
TRSDOS 2.3 Disk & Manual for Model I	24
TRSDOS 6.x Disk & Manual for Model 4	19
LDOS for the Model I or III	69
NEWDOS 80 v2.0 for the Model I or III	99
2-drive cable for Model I/III/4	24
2-drive external cable for IBM PC	48
4-drive cable for Model I	34
Extender cable, 7" long	9
5.25" power supply & encl., white or silver	59
8" power supply, fan & enclosure, beige	149

TRS-80 SPECIAL EQUIPMENT

12" Green Phosphor Monitor	79
12" Amber Phosphor Monitor	84
16K 200 nsec RAM Guaranteed 1 year (8 chips)	9
64K 200 nsec RAM Guaranteed 1 year (8 chips)	34
64K RAM plus Genuine PAL for Model 4 upgrade	44

MEDIA & SUPPLIES

5" Diskettes SSDD, Lifetime Guar. Pk of 10	$ 16
5" Diskettes DSDD, Lifetime Guar. Pack of 10	19
5" Flipsort, holds 75 Diskettes	19
8" Diskettes SSDD, Lifetime Guar. Pack of 10	29
8" Disketted DSDD, Lifetime Guar. Pack of 10	34
8" Flipsort, holds 50 Diskettes	24
5.25" or 8" Head Cleaning Kit	9
Letter Size 20 lb. Tractor Paper, 2900 sheets	25

ROSE GETS RIGHT!

NOW---ROSE'S MOD 4 CP/M

$ 69

Complete with Manual

Rose has latched onto this slick version of CP/M 2.2 that allows you to run most of your favorite CP/M programs with ease. It even lets you read and write other manufacturers' disk formats. What could be nicer? They are in stock ready for you to use and enjoy.

PRINTERS & ACCESSORIES

PROWRITER 120cps, 10" Wide Friction/Tractor	319
PROWRITER 2, 120cps, 15" Wide Fric/Trac	595
STARWRITER F10-40cps Daisy Wheel	895
LPRINTMASTER F10-55cps Fast Daisy Wheel	995
Rutishauser Bidirectional Tractor	150
Rutishauser Sheet Feeder, A Best One	495

CP/M & 80 COLUMN for your MODEL III

No need to buy a new computer when you can use the Holmes VID-80 modification and get CP/M 2.2, 64K RAM and 80 column video. This kit is easy to install and requires no soldering. Even a dolt like you can can end up with a complete 64K CP/M computer with an 80 column screen that is still able to run all your existing Model III software. For the first time you will be able to use CP/M programs that normal people do, such as dBASE II and WordStar. The regular price of this kit is $524. Now Rose will get you going for only ..... **$ 299**

Add $5 shipping

SUPER SALE

I'll ship you the Holmes deal above PLUS WordStar 3.3 installed and ready to run for only ..... **$ 399**

SPECIAL SOFTWARE DEALS

Add $4 shipping

WordStar 3.3 (Specify MM or R/S format)	$ 195
MailMerg, SpellStar, Starindex, all 3 for just	99
WordStar Professional (Above 4 Progams)	275
DataStar Data Entry & Retrieval	125
ReportStar Report Generator	105
InfoStar Advanced DBMS (Above 2 Programs)	195
dBASE II Complete With Disk Tutorial	345
Super Utility Plus 3.2 by Kim Watt	59
CP/M 2.2 for Model 4 by Monte Zuma	169
Turbo PASCAL by Bor Land. Requires CP/M	44
Turbo Toolbox by Bor Land	45
Turbo TUTOR by Bor Land	35
Pickles & Trout CP/M 2.2m for the Model 2-12-16. Floppy Version	179
Same thing but the Radio Shack Hard Disk	219

ORDER NOW! TOLL-FREE

800-527-3582

Orders Only Please

Call in your order or write to us at the address below. Texas residents call us at 214-337-4346 and deduct $2.00 from your order but you should remind me 'cause sometimes I forget. If you need technical information or service please call the Texas number as the Toll Free lines are just for orders only. Prices are subject to change without notice and are mail order only. I accept AMERICAN EXPRESS, MASTERCARD and VISA and I will not charge your card until I ship your goodies. You can send a check or a money order. I also accept COD orders but they require cash or a cashier's check upon delivery. If shipping charges are not shown please call for the correct amount. Add $5.00 handling charge if your order is less than $50.00. Shipping charges quoted in this ad are for the lower 48 states only. Orders to Canadian address add $20.00 to pay for doing all those papers for customs. Texans add State Sales tax. No tax collected on shipments outside of Texas. Be sure you know what you are buying. SOFTWARE IS SOLD ON A REPLACEMENT BASIS ONLY - NO REFUNDS. If it is defective call us for instructions. Please order from me now---I need the money and I will not jack you around. I reserve the right to charge up to a ten percent restocking charge if you jack me around. All merchandise carries the original manufacturers' warranty and all repairs or adjustments will be made by the manufacturer or his designated representative.

NEXT DAY SHIPMENT of Goods in Stock.

TOTAL ACCESS

P.O. Box 790276
Dallas, Texas 75379
214-337-4346

Tandy's ACT Pact: Uneven Trade?

Tandyland

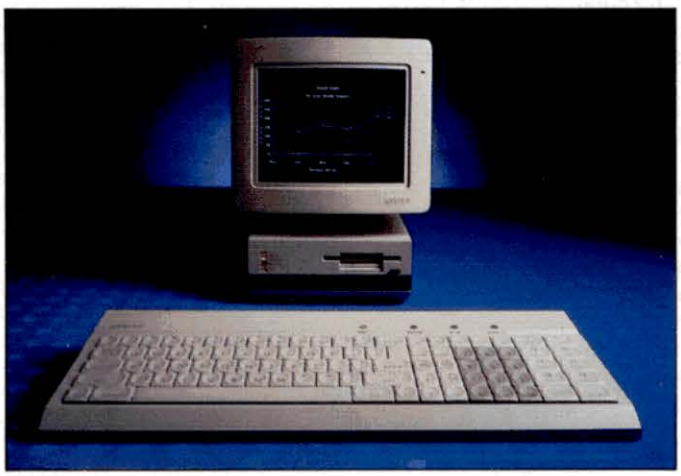


Photo. ACT's Apricot.

When Tandy finalized its limited retail agreement with Great Britain's Applied Computer Techniques (ACT), makers of the 8-bit Apricot home computer, the January 1985 deal was significantly different from the one first announced in December 1984 (see Pulse Train, April 1985, p. 21).

As things now stand, Tandy and ACT have dropped plans for jointly owned stores in both Europe and England; the only place you'll find AT stores is in the United Kingdom. Stores selling both Tandy computers and ACT's Apricots are called AT ComputerWorld Ltd., not TA ComputerWorld as originally planned. In all, 18 Tandy Computer Centers and 20 ACT ComputerWorld franchises merged and began business in England under the new name on February 1, 1985.

As far as the European market goes, ACT will supply Apricot products (see the Photo) to all 46 of Tandy's electronics stores that have a business computer department. The final tally shows ACT picking up distribution of its Apricot in all Tandy computer stores in the U.K. and Europe. Tandy gets increased distribution only at ACT's 20 stores in Great Britain. The deal's apparent lopsidedness has some people wondering.

According to Luc Sala, a reporter for International Data Corp., the merger worries Tandy employees in England. Rumors are circulating that poor sales in Europe might prompt Tandy to pull out of Europe and the U.K. altogether. "That's ridiculous," says Tandy's director of financial planning, Garland Asher. "There's been no contemplation to do that." Asher blames weak European sales solely on the strong American dollar.

Execs in the Tandy Towers have to field questions about rumors almost every day, but the phones were abnormally busy after *InfoWorld*'s John Dvorak passed along some Tandy gossip in his March 4, 1985, Inside Track column.

An anonymous source tipped off Dvorak to some hot rumors making the rounds in Fort Worth. Perhaps the most provocative has Tandy bringing out a PC AT clone sometime in 1985's third quarter. Tandy maintained its usual solitary stance when questioned on the subject.

As for the potential rivalry between a high-priced AT clone and the Tandy 2000, financial planner Asher said, "I don't think you can assume (the two machines) would be mutually exclusive in terms of function or price if such a new machine were to be introduced. Besides, the Tandy 2000 is selling for $1,999 right now."

Dvorak also cited a rumor that Tandy's considering importing an Apple clone that would go for about $500 at Radio Shack Computer Centers.

Asher put the damper on that one, saying it would be foolish to add another piece of hardware to the load Computer Center personnel must currently support, to say nothing of supporting another nonstandard operating system. Tandy made its choice in getting on the MS-DOS bandwagon; selling Apple lookalikes would be a move in the wrong direction.

Dvorak's inside source also speculated that Tandy would sell its computer division if sales didn't improve. Asher had already heard that rumor, and he ended our Q and A by simply stating, "To throw away a billion dollar part of our business would be stupid."

All the hype surrounding the success of the Tandy 1000 makes some computerists wonder how long the unit's price will stay at $1,195 while its main competitors, the PCjr and the Apple IIc, retail for $995.

Tandy's buyer for the 1000, David Frager, commented on the rumor that Tandy might reduce the price of his machine. "There's no truth to that," Frager said. "The machine is still selling very well. Besides, we wouldn't change the price for at least six months. At least not until the July catalog comes out." Frager also told me Tandy had no plans to introduce a portable version of the 1000. He added that Tandy has dropped the idea of a special stripped-down 1000 for the education market. "The education market is responding well to the 1000 as it is," Frager said. "There's no need to bring out a model just for that market."

Readers who follow Tandy's financial ups and downs know there was reason to celebrate in Fort Worth after the release of January's sales figures. Consolidated sales totaled $235,678,000 for a gain of 5 percent over January 1984.

In Tandy's Radio Shack division, the news was equally good, with sales topping $171 million in January. That's a 6 percent increase over the same month last year. And Tandy may be making gains with the 1000 on another front: its campaign to build a stronger media image. According to estimates, the Tandy 1000 made the cover or appeared prominently in 22 computer magazines in December 1984 and January 1985.

MicroTrends

If you have any doubts about the microcomputer market's competitive-

ness, just look at the money big companies spend on advertising. C Systems Ltd., specialists in advertising analysis, tracked micro manufacturers' 1984 print advertising in 155 publications.

As you might expect, IBM leads the pack with nearly $30 million in ads. AT&T posted expenditures of $25 million, while Hewlett-Packard placed third with a $15 million advertising outlay.

Apple, Texas Instruments, and 3M Corp. trailed HP, each spending nearly $9 million. The report didn't mention Tandy, and I asked C System's James Callan why. "Tandy doesn't advertise as much as you'd expect," he told me. Instead, "they use a lot of co-op advertising." In other words, Tandy chips in for advertising of another company's product (such as software) in which a Tandy product appears prominently. C Systems doesn't track co-op advertising.

It turns out that Tandy bought 364 pages of advertising outright at a cost of $3.5 million. Where did the money go? Frequent flyers got a good dose of Tandy ads, which appeared in several airlines' in-flight magazines.

Callan thinks in-flight ads are effective. "There are few places during the month when a businessman has time to read more than just what comes across his desk. In the air, though, computer companies have a captive audience that is given free and accessible information to read and an opportunity to read it."

Tandy also advertised in business magazines such as *Business Week*, *Forbes*, and *Venture*. Science magazines tend to be favorites with computer companies, too, and Tandy ads appeared in *Discover* and *Popular Science*.

Most of Tandy's print dollars, however, went to system-specific magazines. *Rainbow* ran 24 Tandy ads last year, more than any other magazine. *80 Micro* and *Hot CoCo* tied for second with 23 ad pages apiece.

Office micro systems enjoyed U.S. sales of $6.6 billion in 1984, according to Future Computing Inc. Meanwhile, Dataquest Inc. reports that worldwide sales of office microcomputers hit $26.3 billion last year. Despite all this money changing hands, Future Computing says that U.S. offices contain only five million personal computers out of a potential market of 55 million desk-bound office workers.

Dataquest and Future Computing's studies give IBM the largest piece of the office computing pie (41.5 percent U.S., 30 percent worldwide). Apple is a distant second in U.S. (11 percent) and worldwide (9 percent) markets. Tandy takes third in the U.S. market with 6.3 percent of the business users, but worldwide, Tandy drops to fifth place with a 3 percent share (see the Table). Tandy might owe its stable number-three U.S. position to its 15 percent market share in Unix systems, which leads all sellers in the multiuser micro market.

Manufacturer	Worldwide (%)	U.S. (%)
IBM	30	41.5
Apple	9	11
DEC	4	3.7
Hewlett-Packard	4	3.9
Tandy	3	6.3
NEC	3	NL
Compaq	2	4.5
Wang	2	3.7
Zenith	NL	3.2
Kaypro	NL	1.7
Other	43	20.5

Table. Shares of the office computer market. NL indicates no listing.

Most of the micro world's heavy hitters were represented at a February 1985 manufacturers' seminar to watch Digital Research roll out its new operating environment, GEM. It looked as if DRI had the jump on Microsoft, whose late, late Windows program may finally come out this summer.

In light of Tandy's presence at the seminar, I asked Tandy's director of market planning, Ed Juge, what Tandy's plans were for GEM. Juge reported, "[We have] no specific agreement with DRI." Juge says Tandy's interested in GEM but is still committed to Windows.

Asked if GEM already had too much of a head start on Windows, Juge said he felt that Microsoft had the operating system world locked up, despite its failure to bring out Windows on schedule.

For years, CompuServe subscribers could find lively discussions about TRS-80 microcomputing on the MNET-80 SIG (special-interest group). But due to a decline in SIG activity over the past year, CompuServe decided to close down MNET-80, its longest running SIG.

Though CompuServe still has two Radio Shack-related SIGs, the TRS-80 Professional SIG and the Color Computer SIG, MNET-80 veterans feel the loss. Bob Snapp, president of Snappware, reflected, "The Model I is gone; the Mod III is up for sale. They, like MNET-80, have been replaced by the next generation. In any event, it is always sad to see the passing of an old friend."

Another former SIG member, Bob Spargo, agreed. "One of these days, my Model I is going to find its way out of the office towards its final destination: computer heaven (a/k/a the city dump). I'll miss it... I'm sad to see MNET-80 die too."

MNET-80 hasn't vanished without a trace, however. Members saved parts of its data base and moved its more important files to the TRS-80 Professional SIG. You might say an old SIG never dies...its files just get transferred.

Hot Items

To succeed at selling home computers, you've got to "know your consumer," according to Rai Wasner, an analyst at Boston's Yankee Group market research firm. Yankee profiled the personal computer user for its clients in a 12-volume survey. The survey's personal activity section offers some interesting statistics on the typical Tandy home computerist:

- The average Model III/4 owner spends about six hours a week listening to records or tapes.
- He or she spends 11½ hours a week watching television. Tandy owners like the evening news best, but for entertainment they most often watch "Knight Rider." They also display a fondness for sitcoms. Among all computer owners surveyed, "Hill Street Blues" tops the most-watched list.
- Among all computer owners, TRS-80 types spend the least amount of money per week on magazines, but they're number two in money spent on books. IBM owners are number one.
- After Commodore 64 owners, Radio Shack computer owners spend more money in video arcades than any other computer owners.
- The average Tandy computer owner spends about $6 a week on movies.
- Fifty-six percent of Model III/4 owners also use TRS-80 computers in school. Twenty-eight percent use Apples. By comparison, 78 percent of Apple owners use Apples at school while only 10 percent use TRS-80s at school.
- Tandy computerists listen to all kinds of music on the radio but, more than any other group, they also like to listen to all-news stations. CoCo users are evenly split between country music and rock.
- Tandy owners tend to be married, although their divorce rate is three times that of other computer owners.
- Model III/4 users make half as much money as IBM owners.
- Ten to 20 percent of the Radio Shack owners surveyed own their own businesses.
- The typical Tandy owner spends five and one-half hours a week working at home.
- Tandy owners tend to be nonpolitical. They also participate less in cultural activities, like going to the opera or museums, than other computer enthusiasts.■

TRS-80 MODEL 4
Word Processing Program

"For $129.95 you'll be hard-pressed to find a better overall word processing product."
(LSI JOURNAL, January, 1984)

- ☐ **80 × 24 DISPLAY** using **TRSDOS 6** or any **MODEL III DOS.** Built-in **FORM LETTER** and **MAIL-MERGE** capabilities.
- ☐ Built-in **HYPHENATION** capabilities.
- ☐ **55** seperately programmable **MACRO FUNCTION KEYS.**
- ☐ Performs **PROPORTIONAL-SPACE** right-margin justification on over **80** different printers (all drivers included **FREE**).
- ☐ Integrates with **ELECTRIC WEBSTER** spelling checker.
- ☐ Keyboard entry and printing of **31 European Characters** and special symbols.
- ☐ **LeScript** also available to run on **TRS-80 MODEL I, MODEL III, LNW-80, LNW-TEAM (80 × 24), Holmes VID-80 (80 × 24),** and **Lobo MAX-80 (80 × 24).**
- ☐ **CP/M** and **TRS-80 MODEL II** versions now available (only $199.95).
- ☐ **MODEL 2/12/16** Versions now available for **TRS-DOS 2.0, TRS DOS 4.2 and CP/M.**

CALL 1-305-259-9397

ANITEK

MasterCard

ANITEK SOFTWARE PRODUCTS
P.O. BOX 361136 ☐ MELBOURNE, FL 32936

VISA

FREE SHIPPING WITHIN THE U.S.; OUTSIDE THE U.S. ADD $10.00 FOR SHIPPING; FLORIDA RESIDENTS ADD 5% SALES TAX. ALL ORDERS PREPAID BY CHECK, MONEY ORDER, CREDIT CARD OR C.O.D. Circle 141 on Reader Service card.

FREE
TRIAL-SIZE DISK OFFER

Fill out and return this coupon to receive a free trial-size copy of the **LeScript** word processing system - a $25.00 value.

Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____

My system is:

- ☐ Model I/III
- ☐ Model 4
- ☐ MAX-80
- ☐ LNW-TEAM
- ☐ Holmes VID-80
- ☐ Model II
- ☐ CP/M Model 4
- ☐ CP/M MAX-80
- ☐ CP/M LNW-TEAM
- ☐ CP/M VID-80
- ☐ TANDY-2000
- ☐ IBM PC

Send to: ANITEK • P.O. Box 361136 • Melbourne, FL 32936

The PRODUCER
Winner of
★★★★★
FIVE STARS
in 80 MICRO Magazine's
Software Review

January 1985
The PRODUCER gained
this perfect rating
based on
Ease of Use
Quality Documentation
Freedom from Bugs
Ability to Do the Job.

The PRODUCER
Professional Program Writer

Beginners can program with no experience necessary.
Professional programmers can save days and weeks of time.

You can quickly create programs to manage such things as mail lists, personnel records, inventory control, catalogs, loan calculations, schedules, personal finances. The only limit is your imagination!

THE PRODUCER CAN SAVE YOU MONEY! Why buy expensive data base programs that never quite do what you want. The PRODUCER can write all your data storage and retrieval programs for you -- quickly, easily, and to to your exact specifications. Investing in The PRODUCER is money saved over and over again.

THE PRODUCER CAN SAVE YOU FRUSTRATION! No more frustrating dependence on inadequate software that someone else packaged for mass consumer use. With The PRODUCER you can design and write custom software to meet your exact needs. You can become a programmer even though you have no previous programming experience. The PRODUCER helps you plan what you want and then writes all the code for you at the push of a button.

THE PRODUCER CAN SAVE YOU TIME! What formerly was impossible for novices, can now be done with ease. What formerly took professional programmers days and weeks, can now be accomplished in minutes. After a few hours going through The PRODUCER's easy to follow Tutorial, you will have an incredible time saving tool at your fingertips. Most PRODUCER users testify that they can create complete programs from start to finish in as little as fifteen minutes. You will soon be wondering how you could ever have done without The PRODUCER.

WITH THE PRODUCER YOU CAN ENJOY THESE OUTSTANDING FEATURES

- **An easy-to follow tutorial** that takes you step by step through The PRODUCER process. It's all you need to get started and even lets you create an actual program as you learn.
- **The best screen generator available anywhere.** You have full screen control including graphics. You can add, insert, delete and move blocks of text on screen or between screens.
- **Full support for all math functions,** including subtotals and global calculations.
- **A B-Tree file structure,** that gives extremely fast access to data, allows global search and replace, data entry by batch mode and automatic file rebuilding.
- **The Freeform Report Generator** provides amazing versatility to design text placement, interfield calculations and formats. You can even print reports on your standard forms.
- **Full editing control at all times.** You can easily edit and refine at any point, including the finished program, without having to start over. That's a feature not found on other products. The screen generator lets you experiment, rearrange, "cut and paste" between trial screens and change your mind any time you wish.
- **A fully indexed reference manual** of over 200 pages gives you complete technical support at your finger tips. You may never need to read it, but it is all there just in case.
- **Outstanding technical support.** Your PRODUCER package comes with four free issues of The PRODUCER quarterly newsletter. And should you ever need direct technical assistance, you may call a Producer Software technician for free counsel and trouble shooting.
- **No payment of royalties.** That's right. Provided you give proper credit, you may sell PRODUCER generated programs without paying royalties. Finished programs do not need the original PRODUCER system disk to run, so they are easy to duplicate and distribute. The PRODUCER can put you into the programming business for friends and associates.

★★★★★

"The longer I used The Producer, the more impressed I was. After only one month, it had found a place among my most often used software."
Hardin Brothers
Reviewer, 80 Micro

"The Producer is an excellent package, capable of doing everything I wanted it to.
Hardin Brothers
Reviewer, 80 Micro

"The Producer will allow you to develop a data base program in a couple of hours that would take months to program and debug by hand."
Charles Knight
Reviewer, Basic Computing

"The Producer is certainly one of the better buys in today's software marketplace."
Charles Knight
Reviewer, Basic Computing

TRS-80 Models I, III, IV, 4-P
Requires 48K, 2 Disk Drives

$199.95

1-800-433-5355

(TX) 214-456-0074

Ask about DATA SHUFFLER
All purpose Sort/Merge program.

We accept money orders, cashier's checks, VISA, Master Card, and American Express.
Circle 76 on Reader Service card.

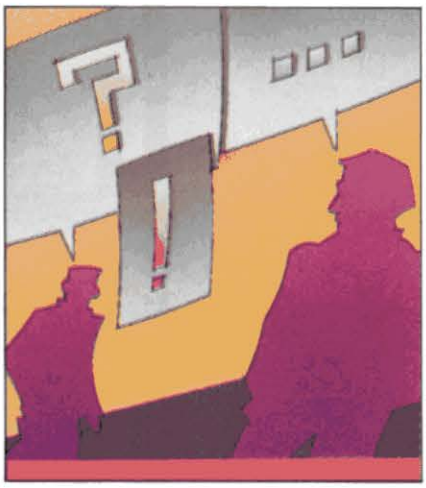
Producer Software, P.O. Box 610-866, DFW Airport, TX 75261

Thrifty Idea

Model 4P owners outraged over the price of Radio Shack's parallel printer cable ($39) can save about $20 with this alternative: Buy a Model 100 printer cable (catalog number 26-1409, $14.95) and a 34-position card-edge connector (catalog number 26-1564, $4.95).

Install the card-edge connector to the ribbon cable with the blue-striped conductor at position 1, and plug the connector into the Model 4P with the blue stripe toward the outside of the case. I left the Model 100 header connector in place on my cable, and can now use one cable for both computers.

Michael Shrout
200 N. 35th Ave. #98
Greeley, CO 80631



Debugging CP/M

Regarding my article, "The Dating Game" (October 1984, p. 114), I've discovered another bug in the CP/M Plus date routine. The faulty code is in the section following that where I corrected the leap year problem.

CP/M plus adds the days of each month to the Date variable in the system control block. Unfortunately, it uses the A register to hold the date total. This is a single byte register that holds 256 decimal, not the 365 required for total days. After September, the dates start over: Oct. 1 becomes Jan. 18.

The BIOS patch in the Figure uses the IX register to eliminate the problem. Put your working version of DOS in drive 1. Drive zero should contain SID and Set; the default drive is zero. Type in SET B:CPM3.SYS (RW) and SID B:CPM3.SYS.

Charles F. Alexander
188 E. 11th St.
Clifton, NJ 07011

Banked Version	Unbanked Version	Banked Version	Unbanked Version
S0553	S04C4	CD	CD
16	16	68	D9
00	00	F1	E7
DD	DD	2A	2A
21	21	F4	F4
00	00	D2	CA
00	00	DD	DD
5E	5E	E5	E5
DD	DD	D1	D1
19	19	19	19
0D	0D	06	06
23	23	00	00
C2	C2	09	09
D9	4A	.	.
F0	E7	WB:CPM3.	WB:CPM3.
2A	2A	SYS,100,	SYS,100,
87	F8	5CFF	3FFF
F1	E7		

Figure. BIOS patch to correct CP/M Plus's addition of months. Press the enter key after you enter each line of data.

Big Difference

I use a technique similar to that described in "The GW Difference," by Jim Heid (February 1985, p. 42) to simplify writing programs that require PRINT@ statements on the Model I/III.

By defining the PRINT@ location (with the DEF FN command) as FNL%(A%,B%) = (A% + 1)*64 + B% + 1 in the beginning of the program, you won't have to consult screen charts to locate the print position. A PRINT@ statement then looks like: 100 PRINT@ FNL%(3,10), "Here". This is similar to GW-Basic's Locate 3,10 statement.

Also, LPRINT TAB allows a tab only to 127 on the Model III (63 on the Model I). The line DEF FN T$ (A$,B%) = STRING$ (B% – PEEK(16539),32) lets you tab to 255.

John M. Tuttle
58 Broadlawn Village
Ardmore, OK 73401

The LNW Source

LNW owners take heart! Wilson Technical Service (9421 Madison Ave., Westminster, CA 92683, 714-531-8136) provides service and support for all LNW products.

Upgrades, expansion interfaces, replacement parts, software, and accessories are also available. The WTS bulletin board (same number as above, 11:00 p.m. to 8:00 a.m.) provides information and technical support. Parameters are 8-bit words, 1 stop bit, no parity.

—Eds.

Quick Cubic

The following changes make my Cubic program ("Formula Solutions," January 1985, p. 116) run faster and more accurately.

In line 120 change ,140 to ,135, and in line 150 change GOTO 140 to GOTO 135. Also, add these lines:

```
135 IF FNB(S) = 0,H = S: GOTO 160
136 IF FNB(L) = 0,H = L: GOTO 160
```

Finally, delete CC = 32 in line 20; it's a useless remnant of an earlier version of Cubic.

Mike O'Neal
220 N. College Ave. #18
College Place, WA 99324

MISOSYS

PRO-fessional Software for Model 4

NEW for 1985!

PRO-ADE: A facility to provide a two-tiered directory structure. Ideal for the hard disk user or other large drive user. $24.95

PRO-CREATE : A Macro assembler. Supports nested macros, includes, & conditionals. Full screen text editor. X-reference. $74.95+$4

PRO-DD&T: Add a disassembler to your DEBUG display. Almost makes debugging a pleasure. Includes a dynamic trace facility. $24.95

PRO-DESCRIBE: Know the contents of your files! Extends your directory with a 63 character file descriptor for each file. $24.95

PRO-ESP: 16 modules make your 4 easier to use. Altdisk, Altld, Altres, Ded, Doedit, Fkey, Iomon, RD40, Unremove, and more. $24.95

PRO-HartFORTH: A complete 1979 STANDARD FORTH with extensions. Runs under the DOS. Accesses DOS files. Floating point. $74.95+$4

PRO-LC: Integer C-compiler with float via functions. Extensive library support. I/O redirection, argc, argv, graphics. $124.95+$5

PRO-NTO: WINDOWS for your 128K Mod 4! Comes with CardFile, Term, Dialer, Calendar, Address, Calc, RPNCalc, Bringup. More! $49.95+$3

PRO-X-FTS: Make your file modem or direct CPU-CPU transfers work error-free. Has X-modem protocol. Operates from COMM, JCL. $24.95

PRO-ZSHELL: Add command line I/O redirection, piping, and multiple commands to your DOS. UNIX-like features on your Model 4! $24.95

The PROGRAMMER's GUIDE TO TRSDOS VERSION 6, by Roy Soltoff is the definitive answer to interfacing the DOS. Six chapters and Appendix with three complete filters in ASM source. $14.95+$2

U.S. Shipping: Software is $2 each unless noted. COD add $1.50, VA add 4%. Visa/MC. Most products available in Model I/III mode. Call for catalog.

MISOSYS, INC

P. O. Box 239
Sterling, VA 22170-0239
703-450-4181

TRSDOS is a trademark of Tandy Corp.

Circle 107 on Reader Service card.

Circle 86 on Reader Service card.

THE RS-232

MODEL III **MODEL 4**

State of the art technology in board design, our direct replacement of Radio Shack's* internal RS-232 board, mounts inside the Model III or 4 on the existing brackets. All cables, screws and complete mounting instructions are included. Non-technical people will find that installation is quick, straight forward and simple requiring less than 15 minutes to complete.

Total compatability with Radio Shack* and all existing software is maintained. Software programmable baud rates from 50 to 19,200 baud are supported along with programmable word length, stop bits, and parity. May be utilized in either half of full duplex operation.

Outstanding Value
At Only $69.95
Guaranteed One Full Year
Dealer Inquiries invited

CompuLogic
4831 SOUTH HAMPTON RD LB41
DALLAS TEXAS 75232
214/330-1332

Please forward payment by a cashier's check or money order.
Visa or Mastercharge also accepted.
Add $3.00 shipping & handling
(Foreign orders quoted on request)

Circle 133 on Reader Service card.

$1,999

TANDY 1000 COMPUTER SYSTEM (256K) w/Printer

THE AFFORDABLE PC COMPATIBLE!

FEATURES INCLUDE:

- **TANDY 1000 Computer**
- **Extra 128K 2nd Drive**
- **VM-2 Green Monitor Printer Cable**
- **EPSON LX-80 Printer**
- **Deluxe Printer Stand**
- **Case of Paper**

INCLUDES DESKMATE SOFTWARE

Major Credit Cards Accepted!
WE ALSO STOCK • TANDY 1200 HD • TANDY 2000 • TANDY 6000 • TANDY 200 & MODEL 4 • CALL FOR PRICE QUOTE!

AD No. 1006-6

CDA
COMPUTER SALES

ORDERING INFORMATION AND TERMS: Mail to Computer Discount of America 31 Marshall Hill Rd, West Milford, N.J. 07480 Include address and phone number. Shipping, handling and insurance are additional add 2% UPS Ground ($3.50 minimum), UPS Blue 6% ($5.00 minimum). **NO C.O.D.** Cashiers checks, moneyorders, and credit cards ship immediately. Personal and company checks allow 15 days.
ORDER 9am - 7pm EST Monday - Friday, Saturday 10-4
OUR REFERENCES: We have been selling computers since 1977 and in computer Mail Order since 1980. Our bank is: First Fidelity, West Milford, N.J. D&B listed.

ORDERS 800-526-5313 INQUIRIES & IN NJ 201-728-8080

Random Roots

Bob Barringer wanted to know how to seed the Model III's random number generator (December 1984, p. 29). The III stores the seed as a 24-bit number at location 40AA–40AC hexadecimal (hex) (16554–16556 decimal). The Program Listing shows how you can set the seed number.

Also, memory location 4210 hex (16912 decimal) is a flag buffer for Basic. The Table shows the effect of changing bits 0, 2, and 3.

Jim Foss
675 Alvarado Ave. #16
Davis, CA 95616

Aid Forum

I have a Base 2 Model 800 printer and need software and technical information for it. I'm also interested in software that uses the printer's dot graphics capabilities, including any bar code programs.

Also, does anyone know of any software that I can adapt to the Base 2 for bar code applications?

Donald Grevenow
292 Barkley Place E.
Whitehall, OH 43213
CompuServe #72425,352

Here in England, no magazine caters specifically to the TRS-80. I have a range of English computer magazines with broader, multicomputer coverage. I'll swap them with anyone who can offer me back issues of *80 Micro*.

Paul Cash
18 Penk Ridge
Havant, Hants PO9 3LU
England

We won't swap, but FYI, back issues are available from the Back Issue Order Dept., 80 Micro, 80 Pine St., Peterborough, NH, 03458.

—Eds.

Program Listing. Program to set seed number.

```
10 POKE 16554,10: POKE 16555,10: POKE 16556,10
20 FOR I=1 TO 20: PRINT RND(100),: NEXT I
30 POKE 16554, 10: POKE 16555,10: POKE 16556,10
40 FOR I=1 TO 20: PRINT RND(100),: NEXT I
```

End

Arnold E. Van Beverhoudt Jr.'s Graphmaster program ("By the Numbers," February 1985, p. 68) is terrific. I only wish I had the expertise to make the print option work on my Radio Shack LPVI printer. Has anyone done that?

Marlin Sweitzer
2324 S.E. 52nd Ave.
Portland, OR 97215

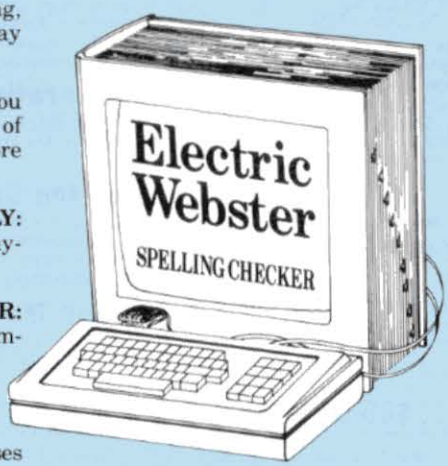
Send correspondence to Reader Exchange, c/o 80 Micro, 80 Pine St., Peterborough, NH 03458.

Bit	Function
0 (Set)	Turns on real-time clock (CMD "R")
0 (Reset)	Turns off real-time clock (CMD "T")
2 (Set)	Set text mode to 32 wide (PRINT CHR$(23))
2 (Reset)	Set text mode to 64 wide (PRINT CHR$(28))
3 (Set)	Set special character set (PRINT CHR$(22))
3 (Reset)	Set alternate characters (PRINT CHR$(22))

Table. Bits and functions at location 4210 hex.

Circle 45 on Reader Service card.

- **DISPLAYS CORRECT SPELLINGS:** If you don't know the correct spelling, EW will look it up for you, and display the dictionary.
- **VERIFIES CORRECTIONS:** If you think you know the correct spelling of a word, EW will check it for you before making the corrections.
- **HYPHENATES AUTOMATICALLY:** (Optional). Inserts discretionary hyphens throughout text.
- **GRAMMAR & STYLE CHECKER:** (Optional). Identifies 22 types of common errors. Makes suggested corrections with the stroke of a key. Runs within EW.
- **50,000 WORD DICTIONARY:** Uses only 2½ bytes per word; add as many words as you wish.
- **FAST CORRECTING:** In as little as 30 seconds, Electric Webster can return you to your Word Processing program, with your text fully corrected and on your screen.
- **INTEGRATES:** with WordStar, Deskmate, Spellbinder, Volkswriter, Open Access, Allwrite, Newscript, Lazy Writer, Superscripsit, Scripsit, Electric Pencil, Copy Art, Powerscript, Zorlof, and LeScript (specify). Begins proofing at the stroke of a key; returns you to word processing automatically.



"The Cadillac"
of spelling checkers
80 Microcomputing, 9/82

VOTED #1: For the second straight year, Electric Webster was voted the #1 spelling checker in the *80 Micro* Reader's Choice Awards. (1/83, 1/84)

"The most helpful program I've found is Electric Webster. After looking at nine proofreading programs, I've settled on Webster . . ." *Creative Computing, 11/83*

This dictionary is not published by the original publishers of Webster's Dictionary or their successors.

ACCLAIMED:
"Electric Webster is the best. Just read any review in any magazine and I don't believe that you will find even one disagreement to that statement." *CINTUG, Cincinnati's Users Group Mag., 4/83*

"Now there's a program called Electric Webster that would let me write to Presidents and Kings and never feel embarrassed. Miss Mulberry would give Electric Webster an A+, and so will you." *Computer User, 1/84*

Performance "Excellent"; Documentation "Good"; Ease of Use "Excellent"; Error Handling "Excellent". *Info World, 8/82*

" ★ ★ ★ ★ ½ " *80 Micro, 3/85*

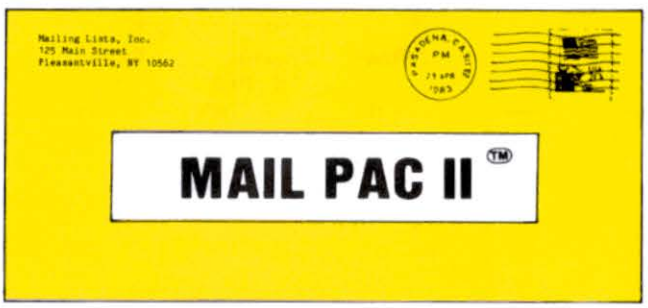
LOW PRICES:

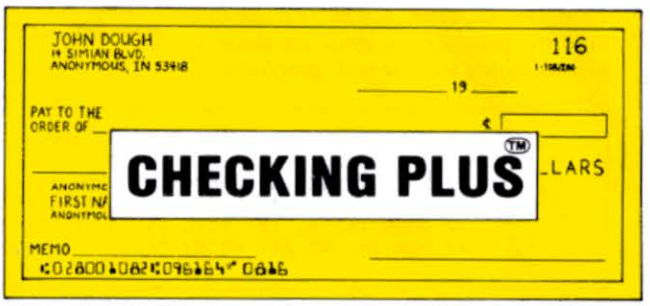
TRS-80, Model I/III or IV	$ 89.95
w/Correcting Feature	$149.95
Hyphenation	$ 49.95
Grammar & Style Checker	$ 49.95
CP/M, PC/DOS or MODEL 1/2000	
Electric Webster, w/Correcting Feature, Hyphenation, and Grammar	$199.95

CORNUCOPIA SOFTWARE
(415) 524-8098
Post Office Box 6111 Albany, California 94706

ANYONE CAN USE OUR SOFTWARE!

MAIL PAC II and CHECKING PLUS represent a new generation of computer software. Our software doesn't even need a manual! Anyone can quickly learn to use either package by following simple, explicit on-screen instructions. But, for those of you who insist -- we've included a complete user's manual as well.





MAIL PAC II FEATURES:

High Capacity --

Stores from one to one million names in Zip Code, Numerical or Alphabetical order. The only limitation is your disk storage space.

Flexibility --

Prints your mailing list on 1, 2, 3, or 4-across labels (with up to 5 user-defined lines on each label) or as a compact, user-designed directory. The record length is completely user-defined, and each field within each of your records is completely variable (allowing storage of any number of characters for any particular address entry). Devote fields to telephone numbers, codes, or even special messages related to each particular name on file.

Powerful --

A built-in word processor allows you to create personalized form letters for each address on your list (or just a particular group of addresses).

Ease of Use --

Create new mailing lists, review existing lists, handle changes of address, delete cancelled names, sort lists, and purge duplicate names from your files. Complete on-screen instructions tell you in plain english exactly how to accomplish all of these tasks.

MAIL PAC II $99.95

CHECKING PLUS FEATURES:

Complete Check Register --

Checking Plus stores your entire check register in a disk file, and then uses the data to balance your account, track your expenses, and help you make budget projections. Review the entire checkbook, enter checks, deposits, fees and adjustments, mark outstanding checks when paid, and get an instant cash balance at any time. All data can be viewed onscreen or printed out in report form.

Tax Preparation --

Storage of monthly and yearly totals and other important information aids in income tax preparation, for your personal use or for your accountant.

Handles the Details --

Store names and addresses for frequently written checks, then print checks to fit standard window envelopes, eliminating the need for extra typing. You can even store any comment, explanation or other message (up to 255 characters) related to a particular check.

Automatic Monthly Bill Payments --

Enter amounts and names of payees for all of your fixed-cost monthly payments, and then sit back while the system automatically prints checks.

CHECKING PLUS $99.95

Both Programs Require 48K And At Least One Disk Drive (2 Drives For Higher Storage Capacities). And All Hard Disk Systems Are Supported.

FREE--TRS-80 Mod I,III & 4 programs supplied on DosPlus (minimum system). Complete DosPlus also available.

FOR YOUR TRS-80™ • APPLE™ • IBM PC™ • NEC™ • OSBORNE™ • XEROX™ • KAYPRO™ • TELEVIDEO™ • ZENITH™ • SANYO™
DEC™ • TI PROFESSIONAL COMPUTER™ • SUPERBRAIN JR.™ • EPSON™ • Any CP/M™ Computer

CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80)

TRS-80 trademark Tandy Corp. - APPLE trademark Apple Corp. - IBM PC trademark IBM Corp. - ATARI trademark Atari, Inc. - OSBORNE trademark Osborne Corp. - XEROX trademark Xerox Corp. KAYPRO trademark Non-Linear Systems, Inc. - TELEVIDEO trademark Televideo Systems, Inc. - SANYO trademark Sanyo Corp. - NEC trademark NEC Corp. - DEC trademark Digital Equipment Corp. ZENITH trademark Zenith Corp. - TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc. - SUPERBRAIN trademark Intertec Corp. - CP/M trademark Digital Reseaech - EPSON trademark Epson Corp.

OUR SOFTWARE CATALOG

H & E Computronics, Inc., has mailed more than 1 million software catalogs since 1978. Send $2 for our new 64-page catalog today! (We also send you our catalog FREE with every order). DEALER INQUIRIES WELCOME

30-DAY MONEY BACK GUARANTEE

*** ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE ***
DELIVERY SUBJECT TO AVAILABILITY

COMPUTRONICS

50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977

24 HOUR ORDER LINE
(914) 425-1535

ADD $3.00 FOR SHIPPING IN UPS AREAS
ADD $4.00 FOR C.O.D. OR NON-UPS AREAS
ADD $5.00 TO CANADA & MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA & MEXICO

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

VISA MasterCard

Circle 9 on Reader Service card.

Fontastic DotWriter: Making Your Words Count

by R. Walter Steur

★★★★★

DotWriter runs on the Models III and 4. It requires two disk drives and one of the supported printers. Prosoft, Box 560, N. Hollywood, CA 91603, 800-824-7888 or 818-764-3131. $79.95 Model III, $99.95 Model 4, Letterset Design System $39.95 or half price if ordered with DotWriter.

Easy to use: ★★★★★
Good docs: ★★★★★
Bug free: ★★★★★
Does the job: ★★★★★

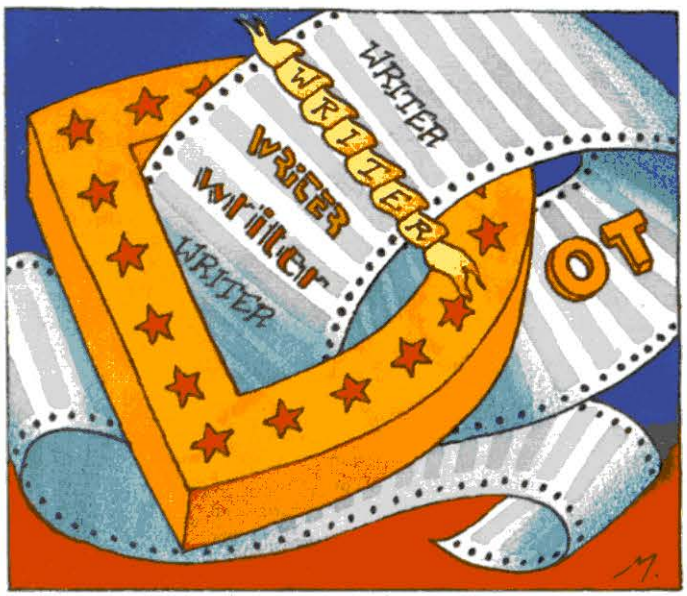


Illustration by Katherine Mahoney

It's hard to find much that's unique in word processors today; they all provide the basic functions necessary to prepare and print text. New twists in text processing now come from document formatters, software that lets you dictate the final appearance of a document. Formatters have gotten so sophisticated that they're almost at-home typesetters. Prosoft's newest version of their text formatter, DotWriter 4.0, exemplifies this. DotWriter gives you a plethora of text formatting commands, offers 14 type fonts, (see Fig. 1) and produces high-resolution graphics within text. It works with any word processor that saves text in ASCII format, is easy to use, and won't break your bank.

Features

You control your document's appearance by embedding DotWriter commands in your text, to the exclusion of your word processor's own formatting commands. Since DotWriter provides default settings for almost all its commands, you only have to program those features of particular interest. With a simple letter, you could just specify the letterset you want to use and leave almost everything else to DotWriter.

If you want to customize your documents, however, DotWriter accommodates you. It lets you set margins (left, right, top, and bottom), page lengths, text indents and offsets, top and bottom title margins, line height, and line spacing. You can also center text, allow space for a logo on the first page of a document, and set horizontal and vertical accent lines (see Fig. 2).

DotWriter's text control commands include those to start new paragraphs, turn on proportional printing (even if your printer doesn't have that feature), set the spacing between characters and words, invoke reverse printing, and enlarge letters. The commands also control double-strike and emphasized printing, text justification, and lettersets for your main, title, and alternate typefaces.

One command forces a new page immediately while another forces a page only if fewer than a specified number of lines remains on the current page. You can turn on and off automatic page numbering.

DotWriter provides ways to highlight specific portions of your text, too (see Fig. 2d). As shown by the double-width italics (the alternate font), you can use the command codes in combination with each other.

DotWriter also provides kerning, a feature not normally found in text formatters. Usually, a print formatter prints letters independently of one another, but kerning takes letter "overhang" into account when printing. For example, in the word "To," DotWriter tucks the small "o" under the "T." Kerning is helpful in giving italicized letters the same apparent spacing as a Roman letterset. Figure 2b illustrates its effect.

DotWriter supports vertical tabs, which let you return to a specific vertical location in your text. You can use the new vertical tab command to insert tables, and graphs in your text.

DotWriter supports vertical tabbing in your printout as well. When you insert the Skip command in your text with a parameter of −1000, for example, the printer returns to the desired location on the page, whether it has to forward or reverse line feed. Then you can adjust margins and line length, change lettersets, or do whatever else you need to do.

Figure 2 was printed using an extension to the Skip command that forces reverse line feeds on those printers with that capability, such as the C. Itoh 8510/1550 and the Epson FX series. As with forward line feeding, you can specify the exact number of lines the printer should back up.

Like a commercial typesetter, DotWriter 4.0 lets you set columns of text, with or without a vertical line separating them. You can set the number and width of text columns, too, within the constraints of your preset line length.

You can use the vertical tabs with the column feature. On the first page you want a column printed, you can start printing the full line length, then mark the vertical location and start column printing. On subsequent pages, column printing will start at the top margin and continue until you turn off the command. A conditional column command, similar to the conditional page command, forces a new column if more text lines than a set number are available.

For those writing reports, papers, or even software manuals, DotWriter can prepare both a table of contents and an index as it prints a text file. The resulting

table of contents and index files follow a default format and, prior to printing, can be edited like any other DotWriter text file. (Multiple text files printed as one using the Append command will produce a correctly paginated table of contents and index files for the complete document.)

DotWriter offers several ways to insert text into your file. First, you can embed a new file anywhere in your main file. This is useful for standard headings, salutations, closures, and boilerplate paragraphs. Second, you can chain files together. Third, you can enter a line of text from the keyboard during the printing run.

Improvements to the original DotWriter include better error-handling and a soft hyphen command.

Printing

DotWriter uses your printer's bit-image graphics to print a variety of letter styles and high-resolution graphics.

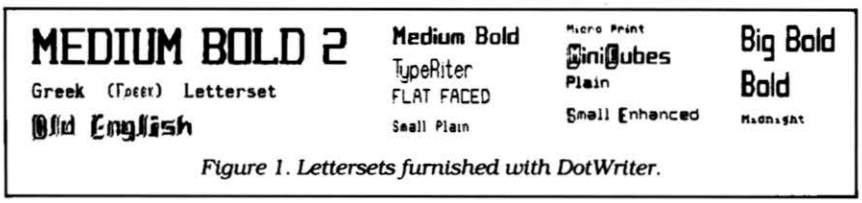


Figure 1. Lettersets furnished with DotWriter.

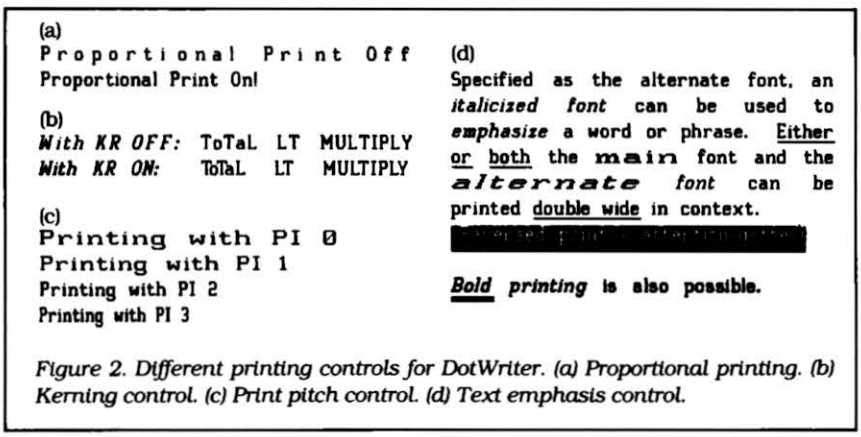


Figure 2. Different printing controls for DotWriter. (a) Proportional printing. (b) Kerning control. (c) Print pitch control. (d) Text emphasis control.

Figure 3. Color text and graphics.

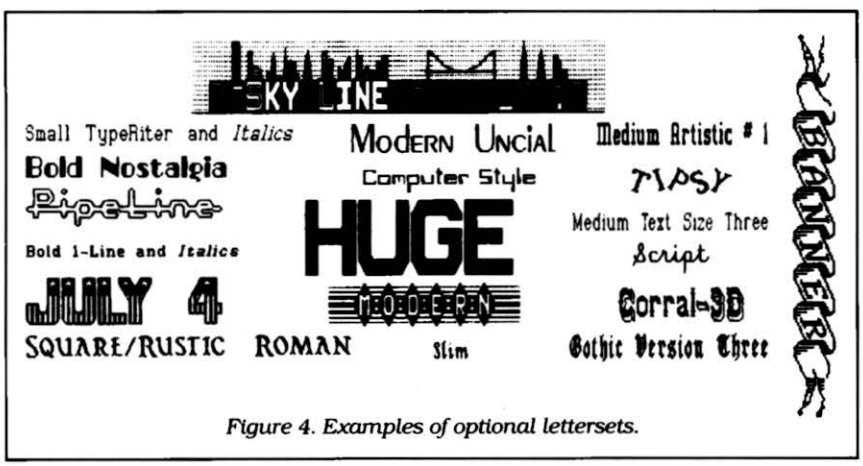


Figure 4. Examples of optional lettersets.

Print density (the number of dots per inch) varies widely among printers, and on some, such as the C. Itoh and Radio Shack DMP printers, you can control it within a specified range. It provides another way to customize the appearance of text, as well as to pack more text into a given space. Figure 2c demonstrates the effect of varying the pitch, where PI2 is the default setting.

DotWriter provides an Ignore command that lets you skip over all text and format commands, process commands but ignore text, or ignore only the commands that set the main, alternate, and title lettersets. This is especially useful to check rough drafts and refine writing efforts.

You can stop the printing process at any time and enter a valid DotWriter command from the keyboard. The command takes effect immediately but will not become a permanent part of your file. This gives you the chance to correct command errors and omissions on the fly. DotWriter interfaces directly with both NewScript and AllWrite from Prosoft, making these two particularly easy to use as editors for preparing DotWriter text files.

You can also send multiple ASCII values to the printer to use all its capabilities, including those not directly implemented in DotWriter. For example, if you have a color printer such as the C. Itoh 8510SCP or the Radio Shack CGP-220, you can print in color as shown in Fig. 3. This gives you a hint of what you can accomplish with some ingenuity.

New Features And Enhancements

The enhancement most apparent with DotWriter 4.0 is speed. Prosoft completely rewrote version 4.0 in machine language, so that DotWriter prints normal text files virtually nonstop. Another improvement is in proportional printing. At print time, the program checks the width table of the current letterset to process text into proportional lines. Figure 2a shows the difference between standard and proportional printing.

Other improvements to the original DotWriter include better error-handling and a soft hyphen command. A hyphen is printed only if the soft hyphen symbol occurs at the end of a line; otherwise it is discarded. You can insert a page range command at the start of the text file or entered at the start of print processing. DotWriter will print only the text in the specified range.

Options

In addition to the 14 standard lettersets supplied with DotWriter, ProSoft offers 36 optional font disks, each containing from three to 12 different lettersets. Figure 4 illustrates some of the 235 optional letter-

sets. Each optional font disk costs either $17.95 or $24.95, depending on the type of font. ProSoft also provides a custom font disk service that lets you pick a minimum of 10 fonts on one disk, at $5 per font.

Despite the huge number of fonts available, you may need to create a new letterset, modify an existing one, or perhaps design a logo. For these purposes, the Letterset Design System (LDS) is available, which comprises two parts: the Tiny Graphics Editor and Programmer (TGEAP) and the Letterset Manipulation Utilities (LSMU).

TGEAP is the drawing program used to create or modify letters or graphics on your monitor screen. LSMU lets you refine, combine, change the sizes and positions of symbols in your lettersets, and proportionalize the letterset. Both programs execute quickly. The LDS is only offered in a Model I/III version because of the unsymmetrical graphics on the Model 4. But letterset files prepared with LDS are directly usable on the Model 4.

Conclusions

DotWriter 4.0 has been debugged thoroughly. The documentation (typeset with DotWriter) is clear and thorough. It includes a table of contents, an index, a tutorial on getting started, and an explanation of each DotWriter command. A number of helpful hints on using the program are also included. Overall, the documentation is excellent.

Despite all the improvements made to DotWriter, the cost has risen only $10 since version 1.5 became available in late 1982. If you want to produce documents or text with something more than the standard printer fonts, DotWriter may be just what you're looking for.■

The Star Ratings

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

In most cases, the overall rating is an average of the ratings in each of the four specific categories. However, some overall ratings may be higher or lower than this average, depending on the reviewer's subjective opinion.

The stars mean:

★★★★★ Superior; ★★★★ Excellent; ★★★ Good; ★★ Fair; ★ Poor.

The ratings terms translate as follows:

Easy to use: How easy is it for the new user to use the hardware/software/book?

Good docs: Is the documentation clear and helpful in explaining the product's use and anticipating user problems?

Bug free: Did the reviewer encounter any bugs while using the product?

Does the job: How well does the product do what it was designed for?

Hard-Driving NEWDOS/80

by David Dalton

★★★★½

The NEWDOS/80 Utilities runs on the Model III and requires one disk drive and either NEWDOS/80 2.0 or 2.5. Sold by Software Success, P.O. Box 1048, Windsor, CA 95492. $49.95. Supported by Newsoft Products, P.O. Box H, Fulton, CA 95439.

Easy to use: ★★★★★
Good docs: ★★★★☆
Bug free: ★★★★★
Does the job: ★★★★★

All Model III disk operating systems have their loyal users, and this is certainly true of Apparat's NEWDOS/80. Once you get accustomed to rambling commands like:

```
COPY,0,4,,NFMT,USR,CBF,CFWO,/DAT,
SPDN=8
```

you can't live without them. But NEWDOS/80 lacks certain useful utilities, particularly those that help in file handling.

The NEWDOS/80 Utilities address this shortcoming. It provides four utilities: one puts your directories in alphabetical order (DIRSORT), one restores a killed file (Unkill), one displays a list of killed files whose names are still in the directory (DFLIST), and one sets aside memory for use as a printer spooler (RAMSPOOL).

The NEWDOS/80 Utilities is particularly useful for NEWDOS/80 users who consistently work with a large number of files, especially owners of 80-track drives or hard disks.

DIRSORT

I have a 10-megabyte hard disk on my system. It's sectioned into eight logical drives, which means that the hard disk acts like eight very large floppy disks. There's room for a total of 1,968 files. Finding one file in a directory of almost 2,000 files can be a pain. Until now, I hadn't seen a useful utility for managing files on the hard disk.

DIRSORT handles the problem of long directories in a unique way. If you type in DIRSORT,2 the program reads the directory on drive 2, sorts the file names, and rewrites your DIR/SYS in alphabetical order. As you add and kill files, the directory works its way out of order again, but all you need do is use the DIRSORT command again. I've found this helpful, and DIRSORT's quick and easy to use.

UNKILL

If you've ever killed a file and wished you hadn't, you'll like UNKILL. When you kill a file, your DOS doesn't actually erase it from the disk. It makes certain changes in the directory, and frees up the killed file's space.

Just type in UNKILL followed by the file name, and you've got your file back (unless you've overwritten it with another file). If UNKILL can't restore the file, it generates the message, "Unable to restore file. Granules have been reallocated."

DFLIST

The DFLIST command provides a list of killed files whose names still appear on the directory. Type in the command DFLIST,2 and you'll get a list of all the files on drive 2 you've killed. These files are candidates for the UNKILL command, since DFLIST doesn't check to see whether the files can be restored.

RAMSPOOL

NEWDOS/80 comes with a printer spooler, ASPOOL/MAS, but I haven't really used it much. The NEWDOS/80 Utilities' RAMSPOOL is better. It sets aside high memory for use as a printer buffer, then runs the printer as a background task using interrupts.

A computer uses interrupts to do different tasks at the same time. It has a schedule of background tasks, such as updating the real-time clock and making your cursor blink. RAMSPOOL adds printer buffering to this schedule, with no noticeable slowdown in execution speed (except during disk input/output, when even your real-time clock is ignored).

RAMSPOOL provides a number of parameters for turning spooling on and off, and for specifying how much memory you want to allot to the spooler. It works only with parallel printers, and prints only files that use the ROM printer driver routines.

You can use RAMSPOOL to LPRINT or LLIST a program from Basic, send disk directories to the printer, or print files from DOS. While RAMSPOOL is printing, you can use your computer to do whatever you want.

Documentation

The documentation consists of only five pages printed on blue paper, and is meant to be inserted into your NEWDOS/80 manual. The documentation is clear, but very little is needed because the programs are so easy to use. Since these programs aren't copy protected, you can copy them to your system disks as needed.

Conclusion

I've used all The NEWDOS/80 Utilities' programs regularly, and have encountered no bugs. I found them a big help in managing my operating system. My only complaint with the package is the cost, $49.95, which is a third of the price of NEWDOS/80 itself.■

"I am amazed at the broad spectrum of technical articles you publish, for both novice and advanced programmers . . ."

If you're still wondering which magazine you should buy for your TRS-80*, here's what **80 Micro** readers have to say about their #1 system-specific information source—

●"Not only is the magazine very professionally done, but I have found something in almost every issue that has been worth the price of the subscription . . ."

Roger L. Holstege
Millersville, MD

●"I was greatly impressed by your magazine. I got more useful information from that one issue of **80** than I have from countless other sources . . ."

John M. Crittenden
Jackson, MS

●"I have found **80 Micro** to be the most valuable magazine pertaining to home computers on the market . . ."

William C. Hardin, Jr.
Charlotte, NC

80 Micro is the magazine for every TRS-80 user—from beginner to advanced. **80 Micro** is full of tutorials, free programs, hardware modifications, new product announcements, product reviews, debugging tips, and more.

And an **80 Micro** subscription is risk-free. *If you're not completely satisfied, you'll be reimbursed for all undelivered issues.* See what **80 Micro** can do for you. It's #1 for a lot of people. Fill out this order form and send it in now.

*TRS-80 is a trademark of Radio Shack, a division of Tandy Corp.

Yes! I want a no-risk subscription to the magazine for beginner to advanced TRS-80 users. Send me 12 issues of 80 MICRO for $24.97! I'll save 48% off the newsstand price!

☐ Payment Enclosed ☐ Bill me

Name _____

Address _____

City _____ State _____ Zip _____

Canada & Mexico, $27.97. Foreign surface, $44.97. 1 year only. US funds drawn on US bank. Please allow 6-8 weeks for delivery.

80micro • PO Box 981 • Famingdale, NY 11737

356B8

Beyond Basic

by John B. Harrell III

★★★★★

BetterBASIC runs on the Tandy 1000 and 1200 (256K) with MS-DOS 2.X, and on the Tandy 2000 (256K) with MS-DOS 2.11.XX. Summit Software Technology, 40 Grove St., Wellesley, MA 02181, 617-235-0729. Programming system $199; 8087 math module $99 (Tandy 1200 only); runtime system $250.

Easy to use: ★★★★★
Good docs: ★★★★★
Bug free: ★★★☆☆
Does the job: ★★★★★

When I first heard of BetterBASIC, I thought it was just another product attempting to ride the coattails of Microsoft Basic. As it turns out, BetterBASIC is far more than that. Not only does it contain the rich and robust features of Microsoft's interpreter, it adds many others. You could say that this is a completely new language, derived from GW-Basic but with the completeness of Pascal or C.

BetterBASIC compiles your source code to p-code, an interpretive pseudo-code. It also provides a highly structured, extensible (define your own key words) language. The programming system can use all of your computer's memory (640K on the Tandy 1000/1200, 768K on the 2000), unlike Microsoft's interpreter which is limited to 64K. And, you can develop separately compiled procedures and modules for inclusion in a subroutine library.

With all of BetterBASIC's features, you would think it would deviate significantly from standard Basic. But this system's base level was designed around Microsoft's Basic and is virtually identical to it.

Starting Out

While BetterBASIC comes with a lot of documentation, Summit Software has done a superb job of writing it in plain English. This is the easiest language manual I've ever read.

BetterBASIC's system comprises different modules (see Fig. 5). You use a configuration file to select program modules and other parameters of interest. After I loaded all the standard modules, I was surprised to see I had only 60K of program space available on my 256K Tandy 2000; on my 512K IBM PC XT, I had 280K of program space.

To become more familiar with BetterBASIC, I converted a large Pascal program (a cribbage game with graphics). The resultant BetterBASIC program took up 1,500 lines of code and didn't contain a single GOTO or GOSUB statement. The code is clear, easy to read, and the modularity makes it almost self-documenting.

The System

BetterBASIC checks and compiles each program line as you enter it, providing an immediate response if you make a syntax error. The error message indicates the part of the statement where the error occurred and provides a clear message pinpointing the problem.

BetterBASIC supports record and pointer data types, full block structuring, separate procedures and functions, procedure/function arguments with optional values, local variables and line numbers, recursion, separately compiled modules, and language extensibility.

Two advanced features enhance the way BetterBASIC lets you develop procedures. First, you can use key word arguments, meaning that you must use a word as an argument. You can't pass data value with this word: It simply must be present Key word arguments can have more than one value and the presence of a particular word is determined from the numerical value assigned to the argument when you invoke the procedure.

Second, BetterBASIC lets you develop procedure families—procedures whose functions are closely related. Each of these independent procedures has the same name but carries a different extension. When you use the root name, BetterBASIC matches the arguments to one of the members of the family, then invokes the procedure.

Other Features

Another BetterBASIC feature is its windowing capability. You can have up to four windows active on the screen at once. You define the windows with a simple command; another command frames the window and a third supports titles. You can do all of this in full color, using up to eight colors at once without ever using a graphics statement.

The programming system also supports interrupts; you can intercept function keys, the system clock, and so on with an internal interrupt mechanism. BetterBASIC checks this pseudo-interrupt after each program line. These interrupts invoke special interrupt procedures to handle the proper actions.

BetterBASIC includes an advanced program chaining and overlay manager. For example, you can call a program segment as a subroutine and then return to the main program, resuming execution at the proper location.

BetterBASIC supports MS-DOS 2.X file structures. All Basic commands can use full path names to address files on the disks. Additionally, the Files module contains commands that let BetterBASIC add, change, or remove directories just as you would from the DOS command level.

Another optional load module provides full support for making operating system or Basic input/output system (BIOS) calls from within the programming system. The SYSCALL command triggers the software interrupt identified by the parameter.

Specially defined external variables in the module provide full access to the computer's internal registers prior to and after the system call. This includes full access to the central processing unit's flag register, used by many functions to return the completion status of a system call.

Runtime System

The runtime system converts programs prepared with BetterBASIC into stand-alone programs. According to Summit Software, you can sell (or give) these .EXE files to people who don't have a copy of BetterBASIC without regard to royalty payments.

Instructions for creating a stand-alone module are simple and clearly indicated. The resultant programs aren't small. For example, the program I wrote was an ASCII text file of 35K. When compiled, it grew to 43K, and when converted to stand-alone, it was 78K.

Math.BCD. Decimal floating-point arithmetic module. Supports variable-precision floating-point arithmetic, each procedure (module) can declare a different precision.
Console.TDY. Supports the console and display functions. This module also supports BetterBASIC's windowing features.
Main. Supports several BetterBASIC statements and should be a part of each load configuration.
File.DOS. Supports the file system for BetterBASIC, including MS-DOS 2.X path names and subdirectories.
Graphics.TDY. Supports the high-resolution graphics adapter. Windows don't require graphics, but if you have the capability, you should include it in the configuration.
Play.TDY. Supports statements to generate musical notes on the internal speaker.
Event.TDY. Supports event-driven interrupt functions such as the On Key statement and timer interrupts.
Chain.MOD. Supports the chain and call procedures to chain and overlay program modules.
SYSCALL.MOD. Provides support for BIOS and DOS calls with a direct interrupt interface to the system and access to the content of each register. This module also supports the Shell command so you can call the MS-DOS command interpreter.

Figure 5. BetterBASIC system modules.

Evaluating BetterBASIC

BetterBASIC isn't an interpreter, but you really can't consider it a true compiler. Unlike a compiler such as Pascal, BetterBASIC provides an exceptionally simple user environment, just like the standard interpreter system. What's more, the line-by-line compilation with syntax checking is invaluable in detecting program errors early.

I didn't expect its performance to even approximate that of a fully compiled language. I used a Sieve of Eratosthenes prime number program written in BetterBASIC. The Microsoft Basic interpreter performed one iteration in 67.3 seconds, while BetterBASIC executed one iteration in 12.9 seconds. By comparison, Microsoft Pascal executed 10 iterations in 4.3 seconds.

Disadvantages

As with any program this large and new, there are bound to be things wrong with it. Different bugs have shown up in the soft keys and in the windowing functions. But Summit has fixed them in version 1.1.

I had a hard time adapting some of my Basic graphics programs to BetterBASIC. The system initially defines two windows on the video screen: lines 1–24 for text and line 25 for status information. Several of the programs I tried to convert directly used the entire screen as a graphics display area. What I didn't know was that the system clips graphics to fit the selected window.

Another peeve with the system is the error messages the runtime support system generates.

Many Microsoft programmers have become sloppy about using the end of the current line to terminate the open string. The compiler is unforgiving about the proper termination of strings, and this is guaranteed to give you a compile error almost every time.

Conclusion

After using many different compilers and interpreters and more languages than you can count, I don't easily advocate changing from Microsoft Basic. It's an easy language for beginners and generally performs well. But, it has major shortfalls.

One of its worst features is the rat's nest of GOTOs and GOSUBs many programs require. It's difficult to read one of these programs, because the logic flow is almost impossible to decipher.

BetterBASIC is your answer if these problems sound familiar. The system is a treat. I even forgot that I was using BetterBASIC, it's that similar to Microsoft's interpreter. At the same time, it has so many unique features that it qualifies for a position of its own, and a lofty one at that.■

Almost Super For the Model 4

by Mark Goodwin

★★★★

Super runs on the Model 4/4P (64K). It requires two disk drives. Scientific Analysis, 36 E. Baltimore Pike, Media, PA 19063. $199.

Easy to use: ★★★★☆
Good docs: ★★★★☆
Bug free: ★★★★☆
Does the job: ★★★☆☆

Super is a reasonably priced data base manager for the Model 4 that offers sophisticated features like screened data entry and editing, posted transactions between data bases, arithmetic calculations within individual records, and fast multilevel sorting. It holds a maximum of 64K of records, and access time is fast, a matter of seconds for a fully configured data base.

While Super is a good Model 4 data base, it has weaknesses. It was originally written for older Radio Shack computers and the authors make only a bare-bones attempt at using the Model 4's advanced capabilities. And Super doesn't work with any TRSDOS 6.X high-memory drivers or filters.

Additionally, a more machine-specific version would give Super cosmetically better displays and data-entry screens. Had it been tailored more to the 4, with the ability to format reports for custom forms, Super really would be super.

Super also comes in a Model 1000/1200 version, but I tested only the Model 4/4P version.

Initializing the Data Base

Since Super is completely menu driven, it's easy to use. You initialize the data base by specifying how Super should partition the records into fields. Each record can store up to 255 bytes of data and you can split the records into as many as 40 different fields. In addition, you can vary the individual fields in length and type. In all, Super allows 21 different field types: three alphanumeric, 14 numeric, three special-purpose, and one of byte codes.

After specifying field lengths and types, you design the data-entry screen. Although Super imposes a limit of only one data-entry screen per data base, I think you'll find that sufficient for most purposes. You design a data-entry screen by positioning the cursor at a field's desired screen location and pressing the enter key, repeating this process until you select all the field positions you need.

Manipulating Records

Super's Add mode lets you add records to the data base. One of the Add mode's features is production input, which lets you select fields Super will carry over to succeeding entries. For example, when you specify a mailing list's state as a production input field, you only have to fill in the state for the first entry. Thereafter, Super carries that information over to the next entry. Super automatically enters the same information until the end of the data entry session or until you change a production input field's contents.

You can search the data base to display, edit, or delete records in three ways: by record number, by specifiers, or by binary search. While searching directly by record number provides the fastest response, you won't know a record's number most of the time. Therefore, searching by specifier or the binary search are usually preferable.

Searching by specifiers permits relational searches, substring searches, range searches, and code searches. While Super's searching by specifiers is a powerful feature, it could be improved by allowing wildcard characters.

Binary searches can be an extremely quick method for extracting records from a sorted data base, but they will usually fail on unsorted data bases.

Super's report generator provides several different report formats. You can display and print data horizontally, print mailing labels, or print records as they appear on the data-entry screen. Horizontally formatted reports permit selection of specific fields, titles, headers, subtotals, and totals. Optionally, you can save horizontal report formats to disk for future use. Printing mailing labels is restricted to one-up mail labels only.

Super's sort routine is fast. You can sort an entire data base to any level by specifying the appropriate sort keys. Any field within the data base qualifies as primary and secondary sort keys. Super sorts small data bases that don't exceed memory limits quickly in memory. Sorting large data bases takes longer because of the required disk accesses.

The Documentation

Super's manual is quite good at providing a working knowledge of the software, but it never explains how to transfer the program files to a TRSDOS 6.X system disk. Transferring program files between disks should be an easy task for experienced users, but novices may find the lack of information a major deficiency.

However, the manual is written for the Model I, the Model II/16, the Model III, and the CP/M versions of Super. The only Model 4 documentation provided with Super is a one-page supplement.

Conclusion

Super isn't the be-all of Model 4 data bases—in fact, Super and its documentation don't serve the Model 4 user as well as they could.■

Continued on p. 113

Circle 85 on Reader Service card.

CONVERT MOD III BASIC MOD 4 IBM PC TANDY 2000

If you own a TRS-80 Mod III and have resisted upgrading to the TRS-80 Mod 4, IBM PC, or Tandy 2000 because your software would not be compatible, good news has finally arrived. EMSI offers 3 powerful utilities for converting your Mod III BASIC programs to run on any of these new machines.

The programs are menu driven, very easy to use and automatically translate 95% or more of even your largest BASIC programs in just a few minutes. They insert all required spaces between keywords, recalculate PRINT@ addresses (or replace them with LOCATEs), adjust TAB addresses, correct exponentiation symbols, eliminate unnecessary spaces, remove down arrows, optionally remove REM's, and flag and list unresolved line numbers. User guides explain program operation in complete detail, offer alternatives for revising lines that need manual intervention and numerous hints for easier, more thorough conversions.

CONV3TO4	**Converts TRS-80 Mod III BASIC to TRS-80 Mod 4** Hundreds of satisfied users. Ask to see program review (three stars) at your local Radio Shack Computer Center.	**$ 49.95**
CONV3TOPC	**NEW! Converts TRS-80 Mod III BASIC to IBM PC***	**$139.95**
CONV3TO2000	**NEW! Converts TRS-80 Mod III BASIC to Tandy 2000***	**$139.95**

**Includes convenient diskette formatter and file transfer program so that programs and files may be exchanged between machines without modems.*

Diskettes and guides are packaged in deluxe three ring binders. User Guides available separately for those who want complete details before ordering entire package *($5.00 cash or MO only, credited to subsequent package order).*

TO ORDER, CALL NOW — TOLL FREE (Except NJ)
800-922-0786
NJ residents, and local dealers: 201-879-5982

EDUCATIONAL MICRO SYSTEMS, Inc.
P.O. Box 471, Chester, New Jersey 07930
DEALER INQUIRIES INVITED

Terms: VISA, Mastercard, MO, check, or COD. Orders shipped within 24 hrs. Add $3.00 shipping/handling. Add $1.65 for COD. Foreign or first class, add first class postage (package wt. 2 1/4 lbs.). NJ residents add 6% sales tax.

Circle 256 on Reader Service card.

CUT RIBBON COST

E-ZEE INKER
$39.50

INK MASTER
$159.00

Re-ink most fabric ribbons with only one machine

- Versatile
- Simple to Use
- No Fuss No Mess
- Adjustable

Stop throwing away used fabric ribbons. Re-ink them yourself with the E-ZEE INKER or INK MASTER. Re-ink almost any cartridge type fabric ribbon in only a few minutes. And you can do most reel to reel ribbons with an optional attachment. All without fuss! Without mess!

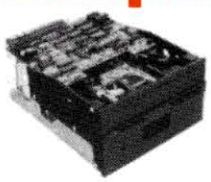
The manual E-Zee Inker is only $39.50. For higher ribbon volumes and more versatility, choose the electric Ink Master at $159.00. Ink cost is ony a few cents per ribbon.

BORG INDUSTRIES, LTD

ORDER TOLL-FREE: 800-553-2404
In Iowa: 319/987-2976
Visa/MC accepted

Circle 534 on Reader Service card.

Summer Specials from Jameco... Compare our prices!



MPI 5¼" Disk Drive TRS-80 Owners!

- Use as a second disk drive • Single-sided
- Single/double density • Full height drive
- 48 TPI • Documentation incl. • Wt.: 3.7 lbs.

$89.95 ea.
Part No. MPI51S. . . . . or 2 for $159.95

Enclose your second disk drive with JMR 5¼" disk drive enclosures.

- Houses one full ht. 5¼" disk drive • Unit complete w/power supply, switch, power cord, fuseholder & connectors • Size: 5⅞"W x 3¾"H x 11¾"D • 5.2 lbs.

DDE-1FH. $69.95

RID Disk Drive Analyzer

- Accommodates TRS-80 Model III, IV and 4P • Evaluates 7 critical steps.

5S1-3. . . . . $37.95

EXPAND TRS-80 MEMORY

TRS-80 to 16K, 32K, or 48K

**Model 1 = From 4K-16K Requires (1) One Kit
Model 3 = From 4K-48K Requires (3) Three Kits
Color = From 4K-16K Requires (1) Kit**

**Model 1 equipped with Expansion Board up to 48K Two Kits Required — One Kit Required for each 16K of Expansion —

Compare Our Prices!!

TRS-16K3 200ns for Color & Model III. . . . $6.29
TRS-16K4 250ns for Model I. $5.49

TRS-80 Color 32K or 64K Conversion Kit

Easy to install kits come complete with 8 ea. 4164-2 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 color computers with D, E, ET, F and NC circuit boards to 32K. Also converts TRS-80 color computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

TRS-64K2. . . . . $17.95 ~~$29.95~~

NEW! TRS-80 Model IV 64K or 128K Conversion Kit

Easy to install kit comes complete with 8 each 4164 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 Model IV computers from 16K to 64K. Also expands Model 4P from 64K to 128K.

TRS-64K2. . . . . $17.95 ~~$29.95~~
(Converts the Model IV from 16K to 64K or will expand the Model 4P from 64K to 128K)

TRS-64K2PAL (Model IV only). . . . $38.95 ~~$49.95~~
(8-4164's with PAL Chip to expand from 64K to 128K)

ULTRA MAGNETICS 5¼" DISKETTES

SSDD = Single Sided Double Density • DSDD = Double Sided Double Density

Part No.	Description	Boxed	Price
UM51401	SSDD with Hub Ring	10	$17.95
UM52401	DSDD with Hub Ring	10	$22.95

All diskettes are soft-sectored w/hub rings. Bulk prices available on request

DISK MINDER

Part No.	Description	Price
DM36	Stores 36 (3", 3.25" and 3.5")	$19.95 ea.
DM75	Stores 75 (5¼") Diskettes. . .	$19.95 ea.
DM50	Stores 50 (8") Diskettes.	$29.95 ea.

We also specialize in integrated circuits, custom cables, power supplies, keyboards, and much, much more! Give us a call today!

$10.00 Minimum Order — U.S. Funds Only
California Residents Add 6½% Sales Tax
Shipping — Add 5% plus $1.50 Insurance
Send S.A.S.E. for Monthly Sales Flyer!

Spec Sheets — 30¢ each
Send $1.00 Postage for your *FREE 1985 JAMECO CATALOG*
Prices Subject to Change

MasterCard **Jameco ELECTRONICS** VISA

1355 SHOREWAY ROAD, BELMONT, CA 94002
6/85 ***Phone Orders Welcome (415) 592-8097 Telex: 176043***

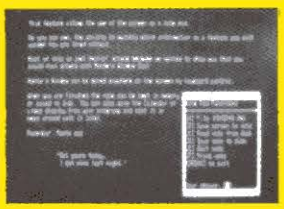
Circle 411 on Reader Service card.

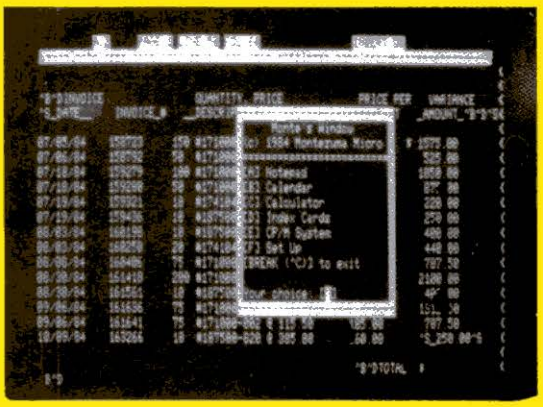
MONTEZUMA MICRO

PRESENTS

MONTE'S WINDOW™

NOTEPAD





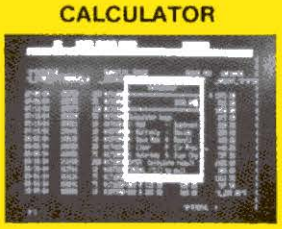
CALENDAR

WINDOWS ON YOUR MODEL 4!

TAKES NO USER RAM!

VISA MasterCard AMERICAN EXPRESS

CALCULATOR



Pop Up Menus!

$49

Easy to Use!

INDEX CARD FILE

REQUIREMENTS

Montezuma Micro CP/M® 2.2 version 2.21+

128K RAM

Model 4 or 4P

8-bit Fever

A touch of the keyboard opens a window in your screen for – a Note Pad, an Appointment Calendar, a Calculator, even a Mini Data Base. All yours for just $49! Need RAM? Monte's Christmas gift to you – 64K and the window, both for **$99!**

Once Upon A Time,

Monte Zuma, our Founder, President and King, has always had trouble keeping his desk organized. The Sidekick™ from Borland International would solve the problem, but alas, it was not available for CP/M®. So Monte asked his favorite nephew, the legendary LaMont E. Zuma (distant cousin to Rondo Talbot, a direct descendant of Monte Zuma hisself) to work on the problem as best he could during recess at the home. LaMont, a true legend in his own time, really outdid himself this time. A touch of both shift keys halts your application program in its tracks and up pops **Monte's Window™** *ready to use. What could be simpler? Put an end to the fumbling and pawing around the pile of papers on your desk. You will find* **Monte's Window™** *indispensable. When you are finished, break back to your application program and it resumes without error.* **Monte's Window™** *is truly a breakthrough. See for yourself – Look through* **Monte's Window™** *on* **your** *Model 4. How did you ever get along without it? See the page opposite for order information.* **Monte's Window™** *is available right now.*

Circle 411 on Reader Service card.

CP/M...The Software Key That Unlocks Your Model 4

CP/M is the standard 8-bit Z-80 operating system and many thousands of programs have been written to run under this system. With Montezuma Micro's CP/M you can run these programs on your Model 4/4P. Think about all those nationally known programs you've wanted to use. Programs like WordStar; dBASE II; SuperCalc; MultiPlan etc. With our version of CP/M 2.2 all those public domain programs on bulletin boards across the USA are available for free downloading. CP/M is the missing link that joins all this software to your Model 4/4P. Montezuma Micro's CP/M comes ready to use and requires no hardware modifications. This product has been awarded the best and highest ratings in the reviews and we are continuously improving it with you in mind. With our CP/M you get more than just a DOS. You get the other half of your Model 4/4P.

AVAILABLE NOW FOR IMMEDIATE SHIPMENT – Less Hard Disk Drive Support..... **$169**
Optional Hard Disk Drive Support ..... $ 30

(Radio Shack 5M, 12M, 15M, 35M • Aerocomp/Percom 5M, 10M, 15M, 30M • Bi-Tech 5M, 10M, 11M, 15M, 20M, 30M, 40M)

FEATURES

- Full range of floppy drive support. Dual-head and/or 80 tracks.
- Optional hard disk support allows positioning and selective assignment of logical drives. Easy backup routine.
- Memory drive allows the use of the other 64K RAM bank on 128K machines.
- Modem 7, a powerful public domain communications program furnished at no charge, allows for file transfer and remote database access such as CompuServ and The Source.
- CONFIG is our flexible utility that allows complete control of all operating parameters from menus. Format, read and write more than 30 different manufacturer's disk formats with more being added rapidly.
- Disk Utility Program allows fast format, backups and verifying of ours and other manufacturer's disks.
- These CP/M utilities are included: ASM; DDT; DUMP; ED; LOAD; MOVECPM; PIP; STAT; SUBMIT; SYSGEN; and XSUB.

WHY BUY OURS?

	MONTEZUMA MICRO	RADIO SHACK
Transient Program Area (TPA)	**55K**	52K
Bytes free in MBASIC	**30,776**	18,488
Bytes free of formatted disk	**196K**	160K
64K Memory drive	**YES**	NO
Double-Side/80tk drive support	**YES**	NO
Format, read/write other CP/M formats	**YES**	NO
Communication program included	**YES**	NO
Share HD with TRSDOS/LDOS	**YES**	NO
Assign multiple drives to HD	**YES**	NO
Boots from Hard Disk (4P)	**YES**	NO
Popular terminal emulation	**YES**	NO
User defined function keys	**9**	3
Timely product support	**YES**	NO

128K MEMORY UPGRADE

Our upgrade kit includes 64K RAM, a geniune PAL chip and instructions for installation. This kit will upgrade your 64K Model 4 to 128K and allow the use of our MEMLINK program and the TRSDOS 6.x MEMDISK. Guaranteed 1 year.

A BARGAIN AT ONLY $74 Model 4
$64 Model 4P – No PAL

This popular software is available for the Model 4/4P using our CP/M.

WordStar Fast memory-mapped version 3.3 ..... $250
MailMerge Multi-purpose file merging program ... 125
SpellStar 20,000 word proof-reader on a stick 125
StarIndex Creates indices and Tables of Content... 85
DataStar Data entry and retrieval is yours 175
ReportStar Report generator and file manipulator.... 150
InfoStar The above two programs 300
dBASE II with Disk Tutorial..... 385
CBASIC version 2.8..... 85
TURBO PASCAL by Borland. This is the one..... 45

ORDER INFORMATION

Call now and your order will be shipped immediately. We accept American Express, MasterCard and Visa plus we ship COD (cash or cashier's check only). Credit cards are not charged until your order is shipped. Add $4 shipping per item on orders within the 48 states. Suitability of the software is the responsibility of the purchaser as there are **NO REFUNDS.** Defective items will be replaced upon their return, postpaid.

ORDER NOW . . . TOLL FREE
800-527-0347
800-442-1310
The Toll Free lines are for orders only.
Specifications subject to change without notice.

CP/M is a Trademark of Digital Research, Inc.; Interchange and Memlink are Trademarks of Montezuma Micro; TRS-80 is a Trademark of the Tandy Corporation; WordStar, MailMerge, SpellStar, StarIndex, InfoStar, ReportStar, DataStar, SuperSort and CalcStar are Trademarks of MicroPro International Corporation. Multiplan is a Trademark of Microsoft.

Copyright Montezuma Micro 1984.

MONTEZUMA MICRO

214-339-5104
Redbird Airport, Hangar #18
P.O. Box 32027
Dallas, Tx 75232

"WE KEEP YOU RUNNING"

VISA MasterCard AMERICAN EXPRESS

A compendium of advice, tricks, and patches for Tandy 1000 users at all skill levels.

THE TANDY 1000 TIP SHEET

As an *80 Micro* technical editor, I've covered the Tandy 1000 since it first came out. I use it every day, testing PC software compatibility, converting Model III/4 software, and playing with its DOS and Basic.

I kept notes of discoveries I made on the 1000's idiosyncracies, read Tandy's advance material (and asked them lots of questions), tapped CompuServe's 1000/1200 special-interest group (SIG), and talked to *80 Micro* readers. I ended up with a hodge-podge of information and advice about the 1000 that I'll present here. Some of this might be old hat to experienced users, but everyone, from the novice to the veteran, should find some useful tips.

DOS Prep

Your Model 1000 DOS offers a number of files that can make your system easier to use. To improve your 1000's operation and PC compatibility, you should create two files, CONFIG.SYS and AUTOEXEC.BAT, on your DOS boot-up disks.

►MS-DOS looks for CONFIG.SYS on boot-up before it displays the date and time prompts. You can write this file to set the number of buffers available for disk input/output (I/O) and the number of files MS-DOS opens simultaneously.

If you don't create CONFIG.SYS, MS-DOS uses its default values: two buffers, eight files, and so on. However, you should set the number of buffers higher than two to speed up programs with lots of file I/O.

►You can also use CONFIG.SYS to specify device drivers, such as the two keyboard drivers (ANSI.SYS and KEYCNVRT.SYS) that come with the 1000's DOS (see below).

CONFIG.SYS is an ASCII file you can create with DeskMate's Text program or another word processor; just type in each parameter on a separate line and save the file as CONFIG.SYS. For example:

```
BUFFERS = 6
FILES = 10
```

sets aside six buffers and opens 10 files.

►Reserving more buffers speeds up disk I/O, but at the expense of some memory. Each buffer takes 528 bytes of RAM. If you haven't got much memory to spare, configuring a large number of buffers slows down some programs. Some commercial software packages come with instructions for setting files and buffers for optimal operation.

►Your DOS's ANSI.SYS and KEYCNVRT.SYS keyboard drivers can make the 1000

Photograph by Edward Judice

by Dave Rowell

more compatible with some IBM software. To install a driver, add a line to CONFIG.SYS such as:

DEVICE = ANSI.SYS.

ANSI.SYS defines the display and keyboard according to American National Standards Institute (ANSI) conventions; it also slows video display somewhat. PC-DOS provides this driver, too.

KEYCNVRT.SYS redefines the 1000 keyboard so that it behaves more like the PC's (more on keyboard compatibility later).

►AUTOEXEC.BAT is a batch file, that is, a job control language (JCL) file like that TRSDOS 6.X's Do file creates. After executing CONFIG.SYS, MS-DOS looks for and executes AUTOEXEC if it exists. You can use it to set up subdirectories or change the default drive for an application that uses a data disk in drive B.

Figure 1 shows my DOS disk's AUTOEXEC file. It puts the 1000 in color mode (it normally boots in black and white) and sets up the printer driver so it doesn't send a line feed with carriage returns. The printers here at *80 Micro* add their own line feeds (the Radio Shack standard), so this way I avoid unwanted double spacing without setting and resetting DIP switches every time I print.

Batch files are ASCII files. You can type them in using a text editor, or you can use MS-DOS's standardized I/O capabilities to write short batch files, as shown in Fig. 1.

►The Copy command, usually used to copy files from one disk to another, actually copies files from one device to another. In this case, you can use it to copy a batch file from the keyboard (device CON:) to disk.

When you type in COPY CON: AUTOEXEC.BAT and press the enter key, MS-DOS copies all subsequent keyboard input to a file called AUTOEXEC.BAT until you press control-Z (or F6) and the enter key. If the file doesn't yet exist, the DOS creates it.

►If answering date and time prompts annoys you, build an AUTOEXEC file without Date and Time. You won't see them again.

►When you run programs written for the IBM PC on your 1000, you'll find that

government, a New ... tradi- Temple voters ... won't find any nam...

Surprisingly, invoking the 1000's color mode improves the display on monochrome monitors.

...nd others, who a... unning f... re- ... Two write-in candidat...

many boot up in black and white unless you set the mode for color. Surprisingly, color mode also improves the display on monochrome monitors; you get full intensity instead of the half intensity some applications display.

►You can incorporate an Echo statement in batch files to display messages or prompts relevant to the execution of a batch file. For example:

```
ECHO OFF
ECHO .
ECHO Place data disk in drive B.
ECHO .
```

displays a message telling you to put a disk in drive B. Echo Off prevents the display of subsequent batch commands except for text following an Echo statement (as above).

Echo followed by a period is a sneaky way to skip a line for a more pleasing appearance. It does add time to batch file processing, however.

Don't use less-than or greater-than symbols (<or>) in Echo commands. MS-DOS interprets them as indicating I/O redirection and produces an error message or worse.

►In batch files that change the default drive from A and then load an application program, add a final command changing the drive back to A. Otherwise, you might aggravate yourself by wrongly assuming drive A is the default drive when you leave the application. When the 1000 finishes executing your program, you'll see the A> prompt again. Here's a sample batch file—call it SUPER.BAT—that loads Supertext, a fictitious word processor:

```
ECHO OFF          REM turn off echoing of commands
B:                REM Supertext stores text files on B:
A: SUPERTEXT      REM load Supertext
A:                REM change default back to drive A
```

The second command could just as well call a subdirectory where you store your application's data. When you specify a subdirectory, use the full path name; for example, B SUPERDATA. Don't assume the drive B default directory is the root or you may get an error message. Some previous application may have left you off in a subdirectory of a subdirectory, and your batch file won't find Superdata. I learned the hard way.

►MS-DOS provides a variety of JCL statements you can use in batch files, including conditional jumps and parameter shifts to allow consecutive processing of files in a loop.

Exploring EDLIN

►You'll often want to modify an existing batch file or change a device driver in the CONFIG.SYS file. You could load up your word processor, but that's a lot of bother for such a small file. Using EDLIN, MS-DOS's text processor, is quicker and simpler.

It takes only five of EDLIN's one-letter commands to do what you want: L (to list a file), I (to insert new code), D (to delete old code), Q (to quit and ignore all changes), and E (to exit and update the file). You must precede an Insert or Delete command with the line number you want to act on; typing in 4D deletes line 4. To edit an existing line, type in its number.

►Here's how to use EDLIN to install the KEYCNVRT.SYS keyboard driver in your CONFIG.SYS file so you can use an IBM PC program with minor board incompatibility, like ThinkTank. Type in EDLIN CONFIG.SYS. The text editor loads, and in turn loads CONFIG.SYS.

At EDLIN's asterisk prompt, press the L key and the enter key to list the file. In this case, the file is two lines long. To add a third line type in 3I and press the enter key. Type in the new line: DEVICE = KEYCNVRT.SYS and press the enter key. Press control-C to leave the insert mode, then press the E key to exit EDLIN and save the changes.

►Use the function keys to save keystrokes when typing in DOS, EDLIN, or Debug commands. I use F2 and F3 more than the others, usually to recover gracefully from a mistake. F3 repeats the last command you entered, which MS-DOS stores in a buffer (similar to L in TRS-DOS's Basic editor).

Pressing F2 followed by a character repeats your last command up to that character. Assume, for example, you typed in EDWIN AUTOEXEC.BAT and got a "Bad command" or "File name error" message. To correct your command line, press F2 and W. The computer displays "ED". Type in L to replace the offending W, then press F3 and when the rest of the command appears, press the enter key.

It took only five keystrokes to correct EDWIN AUTOEXEC.BAT; retyping would have taken 19 keystrokes. The Insert and Delete keys also work logically with the function keys.

Debug Session

►Debug is the assembling debugger that comes on your DOS disk. It's not at all powerful as an assembler, but it's useful for writing small machine-language programs or patches.

Figure 2 shows a machine-language program I'll use as a Debug demonstration. The program, called Query.COM, adds an important capability to your batch files: It accepts keyboard input as the batch file executes to make conditional branches. It tests only for a yes/no answer, but it's an ability I've always thought sorely lacking from MS-DOS's job control language. If you press Y or y, the computer sets an error code 1, one of the conditions you can test with an If...GOTO statement.

To create Query.COM, refer to Fig. 2 as you follow these steps. Type in DEBUG. Type in N and the program's name (Query.COM). Press the A key to begin assembly. The computer displays an eight-digit memory location where assembly begins (XXXX:0100). The four numbers before the colon vary; the number after the colon is always 0100. Complete this line as shown in Fig. 2 and press the enter key. Another memory location (XXXX:0102) will appear. Complete the instruction lines through memory location XXXX:0120, ignoring the comments following the semicolons. At location XXXX:0120 press either control-C or the enter key to end assembly.

Type in R CX to view and alter the CX register contents. The computer displays the current contents followed by a colon prompt. To enter a new value, type in 20, the number of bytes in the program in hexadecimal format, and press the enter key. You can determine the number of bytes from the instruction addresses.

Press the W key to write the 20 bytes starting at offset 0100, Debug saves the code you entered to the new file Query.COM. You now have a usable program. Press the Q key to return to DOS.

►You can use Query.COM in your batch files to let users select program options. Figure 3, for example, shows an AUTOEXEC file that loads a program called File used with a hard disk system. Anyone who doesn't want to load File can bail out of the AUTOEXEC sequence by pressing the N key at the prompt.

►The DOS program More.COM filters output to the video display so that it pauses every 23 lines (one screen) until you press the enter key. To display the ASCII file Text.ASC on the screen with pausing, type in TEXT.ASC|MORE. The | symbol pipes the Type command's output through the More.COM filter before screen display, adding pauses.

►Bob Spencer of Truckee, CA, has a patch to More.COM that lets you send an ASCII file to the printer with a pause after every page. Use Debug to install this patch (see Fig.4).

First, make a new copy of More.COM un-

der the name PMORE.COM by typing in COPY MORE.COM PMORE.COM. Type in DEBUG PMORE.COM. At the Debug prompt (a hyphen), enter a new value at memory offset 01D8 by typing in E 01D8. The computer displays the full memory address followed by the current contents (18) and a period. Type in 36 and press the enter key. You have changed the pause length from 24 decimal (one screen) to 54 decimal (one printer page). The length is actually this number minus 1. You can set this number as you like.

You can blank out the "-MORE-" message with nulls so it doesn't print out. Type in, at the next prompt, F 01E1 01EA 00. This command fills the message memory locations (offset 01E1-01EA) with zeros. Save the altered program to disk by pressing the W key, then leave Debug by pressing the Q key.

To use the patched PMORE.COM to print the file Text.ASC, type in TYPE TEXT.ASC | PMORE > LPT1. The > symbol replaces the standard output, your display screen, with your printer (LPT1 here).

DOS Miscellany

►Tandy's Disktype DOS utility comes in handy when you back up applications disks. The Back-up command requires that your destination disk have the same format as your source disk. Disktype analyzes a disk and displays its format, along with the syntax of the Format command you need to prepare the back-up disk.

►When MS-DOS tries to access a disk and the drive door is open, it returns a "Not ready error reading drive X" and prompts you to abort, retry, or ignore. Usually you close the offending latch and press the R key to continue what you were doing. Applications software exhibits this same tendency if it uses DOS routines, but sometimes the message and prompt don't show on the screen because of a program's use of graphics.

This happened to me one day; the open drive spun for a while and the program hung up with no change on the screen. I closed the drive door and pressed what I thought were appropriate keys, but got no response. On a hunch, I pressed the R key (for Retry). The program came to life, loaded the file, and I was forgiven.

►With IBM's PC-DOS, you can use the Mode command to direct all printer output to a serial port. MS-DOS 2.11, the first version of the 1000's DOS, doesn't include this feature, but it's on the new release, which should be out now.

A Little GW-Basic

The 1000's GW-Basic isn't as different from TRSDOS Basic as you might think. The biggest changes involve graphics and GW's full-screen editor (see "The GW Difference," February 1985, p. 42). Besides the printing bug mentioned in the sidebar, I've found a few things worth passing on.

►While...Wend is a control structure new to most Model I/III users. As long as the con-

```
A>COPY CON: AUTOEXEC.BAT
ECHO OFF        REM Batch file commands won't show
DATE            REM Adds the date prompt
TIME            REM Adds the time prompt
MODE CO         REM Color mode
LF              REM Invokes LF.COM which patches MODE
MODE LFOFF      REM Eliminates linefeed with carriage-return
^Z              REM CTRL-Z ends input
A>
```

Figure 1. Sample AUTOEXEC batch file.

```
A>DEBUG                     ;Enter Debug
-N QUERY.COM                ;specify program name
-A                          ;begin assembly
XXXX:0100 MOV  AH,1
XXXX:0102 INT  21           ;get keyboard input
XXXX:0104 CMP  AL,79        ;is it ASCII for Y?
XXXX:0106 JE   116          ;then YES
XXXX:0108 CMP  AL,59        ;is it y?
XXXX:010A JE   116          ;then YES
XXXX:010C CMP  AL,6E        ;is it N?
XXXX:010E JE   11A          ;then NO
XXXX:0110 CMP  AL,4E        ;is it n?
XXXX:0112 JE   11A          ;then NO
XXXX:0114 JMP  100          ;if not Y/N then again
XXXX:0116 MOV  AL,01        ;YES: return error level 1
XXXX:0118 JMP  11C          ;jump to END
XXXX:011A MOV  AL,00        ;NO: return no error
XXXX:011C MOV  AH,4C        ;END: set to leave
XXXX:011E INT  21           ;back to DOS
XXXX:0120 ^C                ;Ctrl-C ends assemble mode
-R CX                       ;display and change contents of
CX 0000                     ;CX register to number of bytes
:20                         ;in the program (20 hexidecimal)
-W                          ;write the program to disk
Writing 0020 bytes
-Q                          ;quit Debug; you're done
A>
```

Figure 2. Using Debug to create a machine-language program.

```
ECHO OFF
DATE
ECHO Do you want to use File (Y/N)?
QUERY                       REM QUERY.COM gets reply
IF ERRORLEVEL 1 GOTO YES    REM and sets error if yes
GOTO NO                     REM Otherwise skips over
:YES                        REM yes action
ECHO Insert File program disk in A:
ECHO and close drive.
PAUSE                     REM waits for enter key
CD C:\FILE                REM to File data subdir.
A:FILE                    REM Run application
CD C:\                    REM Back to root dir.
:NO                       REM Continue on-no action.
```

Figure 3. Adding query capability to batch files.

```
A>COPY MORE.COM PMORE.COM
       1 File(s) copied

A>DEBUG PMORE.COM
-E 01D8                 ;replace the 18 at offset 01D8
XXXX:01D8  18.36        ; with 36 (54 decimal)
-F 01E1 01EA 00         ;blank out MORE message
-W                      ;write patched program to disk
Writing 110C bytes
-Q
A>
```

Figure 4. Patch to add pausing to printer output.

the check ...
trustee. There was ...ally alwa... electio... of the

Type in KEY ON: KEY OFF to clear the screen's 25th line.

Jaffrey, and other towns have seen ... er. If he does not, th... interest. ... fe...d to the writ...

Fit to Print

by Dave Rowell

When it comes to using your printer with the Model 1000, you should encounter only minor problems unless you stray too far from the Tandy trail. Radio Shack's computers and printer drivers assume that a printer generates its own line feed whenever it receives a carriage return. IBM computers (and others) let the software decide when to send a line feed. The 1000 happens to be PC-compatible in this respect; you must set a switch on your Radio Shack printer to prevent it from generating extra line feeds.

If you have an older Radio Shack printer without a line feed switch, you're still OK if you set up an AUTOEXEC batch file that executes the programs LF.COM and MODE.COM (with the LFOFF parameter). To do so, run the 1000's LPINST program and answer the query about your printer. This utility creates an AUTOEXEC.BAT file with the appropriate commands. If you've already written such a file, the utility modifies it.

If you have an Epson printer, your troubles may be more than minor. Roy Cartier of Winchester, VA, found that some Centronics-type 1000 printer cables, including Tandy's, use pin 14. Input from the 1000 to this pin (unassigned on Epson printers) causes extra line feeds. Either cut this line—count 14 from the colored edge of the cable, slit along each side of the wire, pull it out, and snip it—or buy a cable from Epson.

Another problem with Epson printers arises when you try to dump high-resolution graphics to your printer by pressing the shift and print keys simultaneously. The 1000's Graphics.COM program supports screen dumps of high-resolution graphics, but only for Radio Shack's CGP-220.

Some 1000 owners have tried using PC-DOS's Graphics.COM program, written for Epson printers. The resulting dump prints out double-spaced and none of the techniques discussed above seem to help. Modifying the program is the solution. The patch in Fig. 5 eliminates the extra line feed from Graphics.COM. Graphics.COM works only in the display's two-color high-resolution mode (mode 2), however. Be sure to apply the patch to a back-up of Graphics.COM in case you goof.

Tandy says the 1000's DOS upgrade will handle Radio Shack's DMP line of printers, and possibly non-Tandy printers.

GW-Basic's LPRINT and LLIST commands exhibit a different, but solveable, bug: If you try to send lines longer than 80 characters to the printer, the 1000 displays an out-of-paper or a device-timeout message. The undocumented solution is to type in WIDTH LPRINT 255 before you invoke the list or print commands, or add the width statement to your program.

Tandy reports that Okidata's Microline 80 printer can damage the 1000's printer port due to high voltage on pin 34. You can get a fix that won't affect the port's function at Radio Shack Computer Centers.■

```
A>COPY GRAPHICS.COM EPSGRAPH.COM
        1 File(s) copied

A>DEBUG EPSGRAPH.COM
-E 02F7 90 90 90
-W
Writing 0315 bytes
-Q

A>
```

Figure 5. Patch to PC-DOS's Graphics.COM to eliminate extra line feeds.

dition following the While statement remains true, the program repeats executing all code up to the next Wend statement (endlessly if you're not careful).

I used to wonder about the value of this structure until I saw it used in this INKEY$ routine:

```
100 PRINT "Press any key to continue."
110 WHILE INKEY$ = "":WEND
```

It's more intuitive than the I/III's If...Then...GOTO structure and is independent of line numbers, which doesn't matter in this case, but would if several lines of code preceded the Wend.

►In some cases, it's nice that GW-Basic's CLS command doesn't clear the screen's 25th line. However, when your misguided graphics program plots on the bottom line and you want to clear the whole screen, it's aggravating. At *80 Micro*, we've come up with two solutions. The easiest is to type in KEY ON:KEY OFF. Use this in the command mode; it doesn't make for professional-looking programs, as the function key assignments flash on and off briefly, but it's functional.

The second method uses the Line command's filled-box form. Essentially you fill the 25th line with a solid rectangle of the background color. You must calculate the proper coordinates for the graphics mode you're in, then fill the resulting box with the proper color. It's much quicker to clear the screen and box out the 25th line than to box out the whole screen.

For graphics mode 1 with a black background, use LINE (0,192)–(639,199),0,BF. The last line clears rather slowly, but it works. This routine doesn't work in screen mode zero, but you don't need it then. The Locate statement won't touch the 25th line.

►When using the new graphics modes 5 and 6 (found on the PCjr and the 1000), you must double the RAM allocated for video from the 16K default to 32K by typing in CLEAR,,,32768. (The PC provides 16K of video RAM on the controller card exclusive of user RAM.)

►If you embed machine-language subroutines in Basic programs, use the Call statement, especially if you're passing several variables. It's similar to the Model 4's Call command, except that the 1000 stores the passed variables' addresses on the stack.

►Model III users may feel more comfortable with the 1000's USR statement. Beware of the Basic manual, however. To return to Basic from your 8088 subroutine, use a simple Far Return command (RETF), not RET 7 as the manual states. I had to reboot my 1000 repeatedly until I consulted the IBM manual and got it right.

►Also, if you're used to pointing to a contiguous block of integer variables stored 5 bytes apart, the separation is now 6 bytes because variable names are longer. But keep the variable names to two characters or the separation will be more than 6 bytes.

►You can use Debug in a roundabout way to trace machine-language subroutines in your Basic programs. Load and run Ba-

Circle 258 on Reader Service card.

NEW

14 DAY MONEY BACK GUARANTEE

FORM FILE -N-

FILE MANAGEMENT SOFTWARE FOR YOUR MODEL I, III, 4, LNW, AND LIKE MACHINES

System written in Z80 assembly language for speed. Makes extensive use of online help menus (at any time with the touch of a single key) to insure easy operation. The FORM program allows you to structure your forms to fit your needs. Only field length restriction is screen size. Up to 135 fields per form.

Loading data with the FILE program is a snap, and you'll find working with the resultant records actually a pleasure due to the many ways provided for locating desired records. Retrieved records can be displayed, selected fields printed, or selected fields can be totaled.

YOU CAN PAY MUCH MORE FOR FILE MANAGEMENT SOFTWARE SYSTEMS, BUT BEFORE YOU DO, TAKE ADVANTAGE OF THIS MONEY BACK GUARANTEE TO TRY FORM-n-FILE. YOU HAVE NOTHING TO LOSE BUT YOUR DISORGANIZED DATA!!!

Package includes a 5¼" single sided, double density diskette (unless otherwise requested) and a user's manuel.

Mail check or money order to: **ATTN: NORM DRYE**

$39.95

E-SOFT SYSTEMS
HCR 1, BOX 115G
WALKER, MN. 56484

PHONE 218/547-1381

Circle 70 on Reader Service card.

Tandy Chose TLS As Its Learning Center Training Software

TLS A TOTAL LEARNING SYSTEM FOR TANDY 1000, 1200 & 2000 COMPUTERS

TLS

A disk-based tutorial for MS-DOS

System and keyboard graphics are specific to the 1000, 1200 and 2000 model computers. Sound and color monochrome option create a pleasant learning environment. Individual levels of training menus enable users to select first time or experienced instruction.

A reference guide is included with TLS to lead first time users through getting started in the disk tutorial. Command subjects are summarized for easy review upon completion of instructions.

Retail Price $39.95

TLS - Plus

TLS disk for MS-DOS with the added feature of TLS TUTOR interactive DeskMate word processing audio cassette tutorial.

In less than an hour you will be using DeskMate to create correspondence and other documents. You'll work with actual software, not a simulation.

TLS TUTOR'S step-by-step instructions are as effective as classroom training, but much less expensive. Available for Tandy 1000 only.

Retail Price $49.95

ORDER BY PHONE (305) 771-2100 OR BY MAIL

( ) **TLS** - $39.95
( ) **TLS Plus** Tandy 1000 w/DESKMATE $49.95
( ) Tandy 1000 ( ) Tandy 1200 ( ) Tandy 2000
☐ Charge my (circle card) ☐ My check for $ _____
Visa Mastercard # _____ plus $4 handling is enclosed
NAME _____
STREET/NO _____
CITY/STATE/ZIP _____ PH: _____

TOTAL LEARNING SYSTEMS, INC., 2005 W. CYPRESS CREEK RD., #4, FORT LAUDERDALE, FL 33309

© Total Learning Systems, Inc.

Dealer Inquiries Invited
(305) 771-2100

Circle 282 on Reader Service card.

ALWAYS AT SALE PRICES

TANDY® COMPUTERS

CHECK OUR SALE PRICES

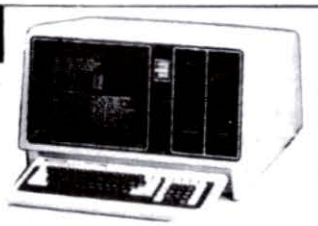
WITH THE MANUFACTURERS WARRANTY

HARD DISK DRIVES

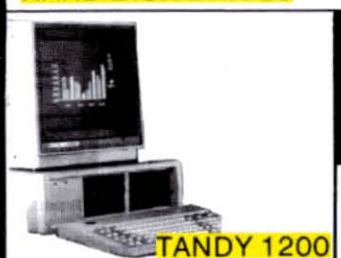
COMPUTER DFW CENTER

CUTOMER SERVICE
(817) 481-SALE
(9 a.m. - 5 p.m. C.S.T.)

DFW COMPUTER CENTER
326-MAIN ST.,
GRAPEVINE, TEXAS 76051



MODEL 12



TANDY 1200

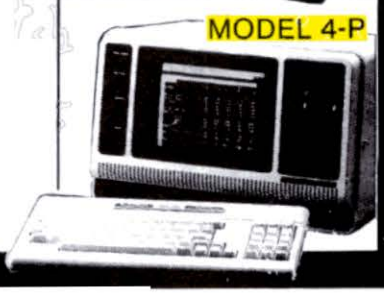
HAVE YOU GOT OUR PRICES?
CALL TOLL FREE
1-800-433-SALE

TANDY 200

TANDY 6000

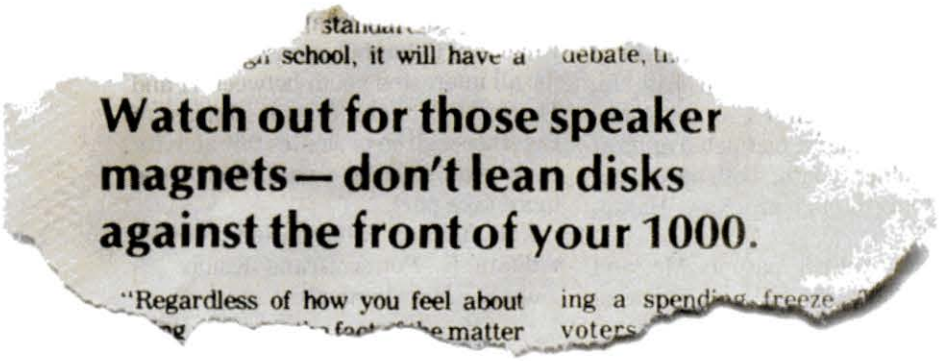
TANDY 1000

MODEL 4-P



Radio Shack CITILINE

VISA MasterCard



sic.EXE from within Debug, then run your Basic program. However, it's hard (maybe impossible) to set a breakpoint at your 8088 subroutine because you can't predict where Basic's data segment (DS) will start in memory.

By dumb luck, I found that starting Basic with a breakpoint set at offset 1020 (G 1020) makes it break at the first INPUT$ statement encountered in a program. You can then see DS's contents and use the Trace command to single-step through your subroutine. Put the first INPUT$ statement after any code setting up data for the subroutine. When Basic loads, you'll see an error message, but ignore it and run your program.

DeskMate Details

Tandy has fixed some bugs in and made some improvements to the new version of DeskMate (version 1.1); it's available free as an upgrade. Here are some ideas you can use with either version.

►If you use DeskMate with a VM-2 monochrome monitor and the screen seems dim or lacks contrast, change the tint using the function keys as explained on p. 25 of the *DeskMate Tutorial*.

►Noisy phone lines can disconnect the Tandy 300-baud modem before it picks up a carrier signal. Tandy suggests adding some Pause commands (P) when you dial, like so: 1-800-123-4567PP. This gives the telephone line time to stabilize before the modem checks for the carrier.

►To use automatic dialing from DeskMate with Tandy's 300-baud modem, you must program the modem every time you get on the system, since the default is manual dialing. Chris Murphy of Baltimore, MD, suggests setting up an auto-log file in Telecom like the one below. Call it something like SYSINIT.LOG and have it dial your own number (no phone bill):

```
NUMBER: *MDT123-4567X
```

The asterisk opens the modem for programming, M toggles the modem from manual to automatic dialing, DT sets the modem for tone dialing (if appropriate), 123-4567 is your phone number, and X tells the modem to execute the command.

If this is the first call you make, the modem will be set for autodialing the rest of the session.

►To set up Telecom for voice dialing without turning on the modem, change your voice dial definition to this:

```
SEND: *C*GM^\DT
RECEIVE: T
NUMBER
SEND: PPX
RECEIVE: X
PAUSE: 2
SEND: *
```

►Did you ever want to use DeskMate on an IBM PC, Tandy 1200, or other PC-compatible computer with only 10 function keys? Here's a DeskMate modification to do just that (stolen from CompuServe's 1000/1200 SIG). You need a disk-editing program to change 2 bytes in Desk.EXE, DeskMate's main program. Unfortunately, you can't fix this with Debug because it can't handle .EXE programs.

Change memory locations 0BCC and 0BCD from 98 and 99 (keyboard scan codes for F11 and F12) to 70 and 71 (ALT-F9 and ALT-F10). To find these locations, look near the end of the sixth file sector for the table of function key scan codes. ALT-F9 now shows the auxiliary functions and ALT-F10 becomes the exit key. DeskMate requires a color graphics board on a 1200 or an IBM PC.

Repair Service

►Everyone knows the value of backing up important disks. You should also run CHKDSK periodically on the disks you use most. This DOS utility checks for errors in disk space allocation, and can do some minor repairs. Use it regularly to stamp out disk problems before they grow into catastrophes.

►When a disk has damage that CHKDSK can't handle, another DOS utility, Recover, might be able to pull some of your data out of the fire.

►If you're an old TRS-80 user, Super Utility Plus might be your favorite security blanket. The MS-DOS equivalent is called The Norton Utilities. It's as close to Super U as you'll get for now. It doesn't do a lot of the things Super U does, but in many cases it doesn't have to, because of the compatibility among different versions of MS-DOS.

The NU also does things that Super U doesn't, and it's easier to use because it's aimed at a more business-oriented market. NU has what you need to recover lost data and edit files. However, one thing Norton doesn't offer is the ability to copy protected software.

►Beware of leaning disks against the front of your 1000. The speaker magnets are directly behind the front of the plastic case. I haven't heard of any problems so far, but you never know.

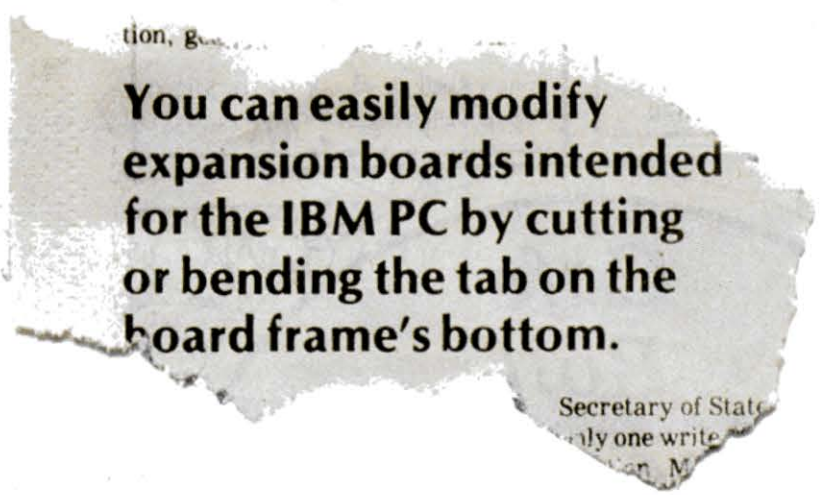
Board Room

You'll find expansion boards out there fewer than 10 inches long that work in the 1000. Tandy claims that any PC-compatible board will work. So far, I haven't heard any contradiction to this. The selection isn't great, but more short boards will become available thanks to the IBM Portable PC, which has slots even shorter than the 1000's.

►Tandy has changed the way expansion boards mechanically attach to the back panel to improve grounding. You can easily modify boards intended for the PC to fit in the 1000 by either cutting 1/2 inch from the tab on the board frame's bottom or by bending that tab. I cut the tab on an IBM serial board, and it works fine. However, I did have to buy a gender changer for my RS-232 cable because the IBM port is male, while the Tandy board is female.

Compatibility Questions

The Tandy 1000 is mostly PC-compatible, but not absolutely. A few programs will never run on it because they flagrantly violate MS-DOS conventions. Some other programs will cause problems, but you can get them to run if you take the right steps. I've already men-



Circle 347 on Reader Service card.

TRS 80 Computers

NEW Computers, Accessories & Software

Manufacture Warranty

26-5103	Model 2000	$2200
26-1069	Model 4	$970
26-4005	Model 12	$2800
26-3802	Mod. 100-24K	
26-5111	Monitor	Now available
26-1158	Printer	Model 1000, 1200HD
26-1256	Printer	AND 2000.
26-3801	Mod. 100 8K	

Low, Low Prices: Please Call

Visa — MasterCard — American Express
Cashier's Check — Money Order

Business Telephone Systems—Discount Prices—
Install your own. Completely modular.
Call for Prices

Computer Specialist available for assistance.

TALLEY COMMUNICATIONS CO.

P.O. Box 193 • 121 N. State St.
Decatur, Texas 76234 • 817-627-5585 • 817-627-1017
Call for other computer, telephone and accessory prices!

Fast Delivery **References Available**

Circle 248 on Reader Service card.

WE HAVE THE ANSWER!

TRS-80 Model 16/6000 Accounting Software

Business Answers For Serious Business
The Programmer & Associates
Your Computer Professionals

Xenix Multi-User Software

- Accounts Receivable
- General Ledger
- Inventory/Invoicing
- Accounts Payable
- Payroll
- Job Costing $595
- Purchase Orders
- Order Entry $395
- Mail List $195
- Manufacturing Inventory $995

(Modifications are available)

The Programmer & Associates, Inc.

CALL US!

10802 Forest Lane Suite 110
Dallas Texas 75243
1-214-341-9874

Circle 214 on Reader Service card.

TANDY™ COMPUTERS "CAN YOU BUY DIRECT?" WILL YOU PAY TOO MUCH?

SERVICE AND WARRANTY NATIONWIDE

Ask About Our "30 Days Buy - Back - Policy"

SAVE SALES TAX* PLUS DISCOUNT
*Texas Residents Add Only 4⅛%

FORT WORTH COMPUTERS

WE ARE SERIOUS ABOUT SAVING YOU MONEY

(Located 30 miles from Fort Worth)
377 Plaza • GRANBURY • NR FORT WORTH, TEXAS 76048

For Prices Call

CALL FREE NUMBER: 1-800-433-S-A-V-E

Monday thru Friday — 9:00 a.m. to 5:00 p.m. Texas Time
(Order Inquiries/Customer Service &) IN TEXAS: 817-573-4111

" TRADEMARK OF TANDY CORP.

Circle 150 on Reader Service card.

You're in Good Company When You Program in BetterBASIC

All of these companies rely on BetterBASIC to write their software programs. They have found that BetterBASIC combines the features they need from BASIC, Pascal, C and Forth in one familiar environment. Some of these features include the following.

640K Now you can use the full memory of your PC to develop large programs.

STRUCTURED Create well organized programs using procedures and functions that are easily identified and understood and completely reusable in future programs.

MODULAR Use procedures and functions grouped together to form "library modules" which are then available to you or anyone else for future use.

INTERACTIVE BetterBASIC acts like an interpreter because it responds to the users' commands in an immediate mode. However, each statement is actually compiled as it is entered.

EXTENSIBLE Create your own BetterBASIC modules which contain BetterBASIC extensions. This feature, coupled with the easy-to-use Assembly Language support, makes this an ideal OEM language.

COMPILED Each line of the program is compiled as it is entered into the computer's memory rather than interpreted at runtime. The optional Runtime System generates EXE. files allowing for the distribution of products written in BetterBASIC.

ALSO AVAILABLE FOR THE TANDY 2000, 1200 AND 1000

Better BASIC™

BetterBASIC Runs on IBM PC, IBM PC/XT and all other IBM-compatible machines.

CALL 1-800-225-5800

Order BetterBASIC now, or write Summit Software Technology, Inc.,™ P.O. Box 99, Babson Park, Wellesley, MA 02157. Prices are listed below.

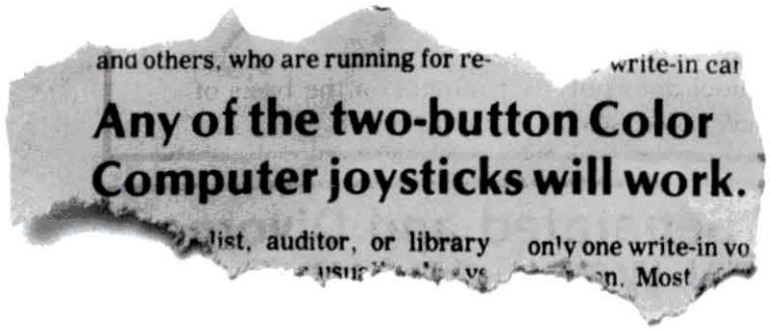
BetterBASIC: $199
8087 Math Module: $99
Runtime System: $250

Still not convinced? Order the BetterBASIC sample disk which includes a demo, a tutorial, compatibility issues, 50 lines of BetterBASIC and more. Only $10.

MasterCard, VISA, P.O. Checks, Money Order and C.O.D. accepted.

BetterBASIC is a registered trademark of Summit Software Technology, Inc. IBM PC and IBM PC/XT are registered trademarks of International Business Machines Corp. Tandy is a registered trademark of Tandy Corp. Illustrated above are registered trademarks of the following companies: Mobil Oil Corp.; A T & T; General Electric Co.; Westinghouse Electric Corp.; TRW, Inc. and International Business Machines Corp.

SEE OUR REVIEW ON PAGE 33.



tioned how to configure the 1000 for color mode and for the keyboard drivers. Here are some other potential problems and suggestions for dealing with them.

►The 1000 requires more of your RAM than the PC, leaving less room for applications. The 1000's MS-DOS is a little larger, and video RAM now resides in user RAM rather than on the video controller board. That costs you 16K of RAM, 32K if you use the newer graphics modes (5 and 6).

►If you use Basic, the squeeze gets worse, because GW-Basic is totally RAM-resident. After loading Basic on a 128K 1000, you have only 18K free.

The solution is to spend more money and upgrade to 256K, for two reasons. You can run larger programs, and with the upgrade you get direct memory access (DMA), which speeds up processing. More important, some software protection schemes require a DMA chip.

►Some PC software requires that you copy the DOS system files, or at least Command.COM, to the program disk. If a program is copy-protected, you're supposed to use the SYS command to move the system files to the protected disk. But the 1000's SYS command won't work on a disk unless the 1000's DOS formatted it.

Sometimes you can copy the 1000's Command.COM to the application disk, boot up with your DOS, replace it with the protected disk and run the program. You can also buy PC-DOS, which runs fine on the 1000, except for Basic.

►If you run a PC program known to be compatible with your 1000 and see only a blank screen, make sure the program isn't configured for the IBM monochrome monitor.

►Programs written for the PC often use keys on the PC's numeric keypad that the 1000 lacks. You can simulate the PC's scroll-lock key with control-break on the 1000. If you need the PC keypad's plus or minus keys, you'll have to install the KEYCNVRT.SYS driver in CONFIG.SYS. Among other things, this driver also makes keypad numbers act as arrow keys.

►The 1000's joystick ports are IBM hardware-compatible but, as a rule, PC software requiring joysticks won't run on the 1000. That's because the joystick routines' software timing loops run at different speeds on the two computers. If you find PC software that does run, or Tandy software that uses joysticks, any of the two-button Color Computer joysticks will work. I recommend the deluxe models with "tabbing."■

Dave Rowell is an 80 Micro *technical editor who specializes in MS-DOS computers. You can write to him at* 80 Micro, *80 Pine St., Peterborough, NH 03458.*

Related Articles

Heid, Jim. "The GW Difference," February 1985, p. 42. An introduction to GW-Basic for Tandy 1000/1200 owners.

Rowell, Dave. "Tandy Rides Again," April 1985, p. 50. A detailed review of the Tandy 1000.

Circle 374 on Reader Service card.

PRINTER DRIVERS FOR SUPERSCRIPSIT

Easily and automatically attach your printer to SuperSCRIPSIT with an *ALPS software printer driver program*. No need to learn special printer codes. Call or write for info describing features supported on each printer (underline, bold, proportional, scripts, etc.).

Over 120 Different Printers Supported.
Custom Printer Driver For Each Printer.
2-1/2 years experience. Customer Support !!!
$49 or $59 each, depending on printer.

MSDOS UTILITIES
TANDY 1000, 1200, 2000
IBM PC/XT/AT

No Technical Knowledge Required !!! Easy to Use.

***** RAMDISK ***** $49

RAMDISK -- Use spare memory as a superfast disk to speed up applications. (You specify Ramdisk size). Appears to programs as a disk, but gives instant access. Easy to install and use.

***** ALPHA TOOL BOX ***** $59

ALPHABETIZED DIRECTORY DISPLAY -- View Directory on 1 screen (5 columns, sorted, Fast!).
FIND FILE -- Search all directories for file.
DIRECTORY DTREE -- Display all sub-directory names in an easily readable form.
BACKMOD MODIFIED FILES -- Quick, automatic backup of files. Backup in same format as original. Perfect for Hard Disks. Also for floppies.

***** BETA TOOL BOX ***** $59

SINGLE KEY COMMAND -- Define any text string (or DOS Command) as a single keystroke. Press single key to execute commands!
COUNT LINES -- Superfast count of lines in a file.
DUMP FILE IN HEX -- Formatted dump of file in Hex/Ascii. Scroll Forward, Backward, Begin, End.
CHANGE FILE ATTRIBUTES -- Make files hidden, readonly, archive, etc. Set or reset attributes.

***** SERIAL PRINTERS ***** $49

Connect your Serial Printer to your RS232 port. Full handshaking. Easy commands. Complete instructions.

Don't miss the review of these ALPS utilities in the February, 1985 issue of 80-Micro (P.119).
More ALPS Tools Available. Call or Write for ALPS catalog. Customer Support !!!

ALPS
23 Angus Road
Warren, New Jersey 07060
201-647-7230

EXTRA-STRENGTH DOS

by Keith E. Risler

Get a punched-up Model III/4 DOS in minutes with this package of LDOS 5.X/TRSDOS 6.X features.

It's no good having tricks up your sleeve if you can't get at them. Logical Systems' Model III LDOS 5.X.X and Tandy's LDOS-based Model 4 TRSDOS 6.X.X offer a number of excellent user-definable features, but it's hard for a beginner to take advantage of them.

The DOS manuals don't help matters. They're full of detail about individual functions, but they don't tell you how to invoke them. In fact, they're almost guaranteed to frustrate first-time users.

Setup (see the Program Listing) gets new owners running a powerfully configured DOS almost immediately. It's a package of advanced LDOS 5.X.X/TRSDOS 6.X.X options that you install on system disks. Setup:

- configures your keyboard to give you up to 26 definable function keys;
- sets up your computer's communications parameters;
- formats printouts;
- turns on TRSDOS 6.X.X's keyboard click option;
- speeds up keyboard response;
- installs DOS overlays in memory for faster execution; and
- (for LDOS only) installs the MINIDOS program, which lets you execute certain DOS commands without being at LDOS Ready.

Illustration by Wayne McLoughlin

Experienced users can tailor these options to their own needs. You can run Setup each time you boot up, or you can use it to configure your system disks permanently.

About JCL

Setup is actually a job control language (JCL) file, that is, a series of DOS commands that the computer automatically executes, as if you typed them in from the keyboard.

The simplest way to create JCL files is to use the Build library command in the form BUILD FILE NAME. Then, following the manual's instructions, you type in a list of commands; for example, you can have a JCL file call a directory, display the amount of free space on a disk, and enter Basic.

The computer saves these files with the extension /JCL unless you specify otherwise. To execute a JCL file, type in DO FILE NAME/JCL at DOS Ready.

The Build command has a serious shortcoming, however: You can't edit lines once you've typed them in. To create long files like that in the Listing, you should use a word processor capable of saving text files in ASCII format. This way, you can correct any typing errors you make in entering the JCL file.

If you don't have a word processor that supports ASCII files, you have a third choice: Raymond E. Wilson's Makedo program, which lets you create and edit JCL files (see "Command Performance," June 1984, p. 62).

The Listing comprises seven sections, one for each DOS option. Setup works as-is under TRSDOS 6.X.X. Comment lines, beginning with a period, contain documentation, including instructions for changes LDOS users must make.

I've listed LDOS-specific commands as comments; LDOS users need only remove the periods to enable these commands. You can disable a line of code by inserting a period at the beginning.

The Listing begins with a % sign and the hexadecimal number 1F, which clears the screen. You can leave out any comment lines except the first one; JCL files must begin with a comment.

Setup's comments instruct LDOS users to add a line before typing in option 1. This

LOAD 80

System Requirements

Model III, LDOS 5.X.X
Model 4, TRSDOS 6.X.X

installs KI/DVR, a keyboard filter that enables your computer's lowercase mode; also, under LDOS, you must have KI/DVR in place before you use many of Setup's features.

The LDOS command's parameters speed up key repeat and activate the screen print option so you can output a screen display to the printer by pressing the left shift, up-arrow, and asterisk keys simultaneously.

Model 4 owners using LDOS 5.1.4 (in Model III mode) might want to try a longer repeat rate, since your version runs at the Model 4's higher processor speed.

If you've already set KI/DVR, be sure to reset it before you execute the JCL file; otherwise Setup aborts.

Going Over the Options

Option 1 configures the keyboard so you can execute commands or enter strings with only two keystrokes, using the DOS keystroke multiply capability. You assign each of the 26 alphabetic keys a specific command; after running Setup, you can execute these commands by pressing the clear key and the appropriate letter key.

Table 1 lists the commands I chose; you can substitute your own commands, Basic program lines, or any other string of up to 255 characters. A semicolon after a character means the command executes immediately, as if you'd pressed the enter key along with the command keys.

Setup writes your key assignments to disk in a file called Routine/KSM after you've typed in 26 entries. I left three keys unassigned, so I typed in NOT USED to reserve the keys for future use. You can redefine keys later, but you can't expand the file once you've saved to disk.

Option 2 installs a driver that sets the communications line to RS-232C hardware and sets communications parameters. The default values are 300 baud, 7 data bits, 1 stop bit, even parity, and a Break value of control-C.

Option 3, for TRSDOS only, makes your Model 4 produce a clicking sound via its internal speaker whenever you press a key. The sound is barely audible under TRSDOS 6.1.2 and earlier versions; under 6.2, however, the click filter produces a painful screech.

The manual says you can patch the click filter to alter its tone, but it doesn't tell you what values to use. Unless you have the time to test for a workable pitch, I suggest TRSDOS 6.2 users omit the keyboard click option.

Option 4 formats your printouts. Under TRSDOS 6.X.X, the Forms command sets printer parameters. Ordinarily, you have to set the printer filter to the forms filter program before using Forms, but Setup takes care of these preliminaries.

Setup also invokes a Forms command that tells the printer to begin printing 10 spaces from the left edge of the page, print a maximum of 60 characters per line, and indent 17 spaces from the edge of the page (7 spaces from the margin) when word-wrapping lines longer than 60 characters. You can omit the line containing these parameters; once you've run Setup, you can reformat printouts any time by typing in a Forms command from DOS Ready.

The single command line for LDOS users sets the same printer parameters as the TRSDOS version. LDOS supports a great variety of additional parameters, so you should check your manual to get the most out of this option.

Option 5 provides snappier keyboard response by adjusting the time it takes a key to repeat when you hold it down. It also affects the rate at which a key repeats. LDOS users should ignore this option; the line you type in at the beginning of the Listing does the same thing.

Option 6 loads every possible DOS overlay into high memory. This makes your computer run faster since it reduces disk accesses. LDOS users should add overlay 8.

I've found that these overlays can create problems with programs like SuperScripsit, so you'll have to test your software to see how many overlays you can safely install. You must put specific overlays in memory to back up a nonsystem disk in drive zero. Under LDOS, be sure to install overlays 2, 3, 8, and 10; under TRSDOS, don't omit overlays 2, 3, and 10.

Option 7, for LDOS only, activates the MINIDOS filter program, which lets you execute certain DOS commands without being at DOS Ready; you do so by pressing the clear and shift keys simultaneously with an alphabetic key. Table 2 lists the keys and the functions they invoke.

To enable option 7, you must delete the period at the beginning of the line of code.

Let's Do It

After you decide which options you want, type in the appropriate parts of Setup and, assuming you're using a word processor, store the text file in ASCII format as Setup/JCL. As I mentioned above, you can also use the Build command or Makedo/BAS.

To configure a system disk, make a copy of your unconfigured master DOS disk. Put this copy in drive zero and boot up to DOS ready. You can either copy Setup/JCL to the unconfigured system disk (necessary if you have only one drive) or run it from drive 1.

A word of caution might save some heartache. If you don't have room on your system disk to store Routine/KSM, you get a "Disk full" error message and Setup aborts. If this happens, remove (kill) Routine/KSM and some of your nonsystem files and try again. You'll also need space to store a SYSGEN configuration file if you decide to configure the disk permanently.

When you're all set, type in DO SETUP/JCL and press the enter key. Setup builds the Routine/KSM file, writes it to disk, and uses that file to configure the keyboard to the alphabetic commands. Then it installs the remaining options you selected.

After you install your DOS features, Setup reminds you that, to make the configuration permanent, you must type in SYSGEN (YES) at TRSDOS Ready or SYSTEM (SYSGEN = ON) at LDOS Ready and press the enter key. Setup doesn't do this automatically because you can't execute SYSGEN from a JCL file.

The "yes" and "on" in the SYSGEN commands above are switches; you can delete the SYSGEN configuration file from your disk using the same commands with "no" or "off" instead.

If you don't SYSGEN, the whole configuration vanishes as soon as you turn off or reset your computer.

Other Options

You can modify Setup to include other options. In its present form, Setup offers most of the definable DOS options users want. It doesn't prevent the print spooler's use under TRSDOS 6.X.X or LDOS 5.X.X and allows full use of Memdisk and the print spooler in any combination on the Model 4.

If you install too many options, however, you may not be able to use Model 4 Memdisk, since the part of low memory it uses may be full.■

Keith E. Risler is a computer hobbyist who's studying for his master's degree in English at the University of Western Ontario. You can write to him at 80 Adelaide St. S., London, Ontario, Canada N5Z 3K5.

Circle 427 on Reader Service card.

JOIN THE FORTH REVOLUTION

Discover the flexibility and power of FORTH programming!

You'll find your development time is shortened, programs run faster and memory requirements are drastically reduced. FORTH is the language of tomorrow and it's available today from SOTA Computing Systems Limited

With truly impressive benchmark timings • a library of over 300 predefined FORTH words • and running in less than 8K • this is the state-of-the-art FORTH implementation you have been waiting for!

figFORTH from SOTA

$75.00 Gives you the introductory programmer's guide, the comprehensive reference manual, and FORTH disk. The diskette contains the standard core vocabulary, an editor, an assembler (with true Z-80 mnemonics) and a FORTH operating system (which like FORTH itself is simple to use and easy to master). In addition to the FORTH definitions required by the standard, we've included over 50 extra commands that you'll find particularly useful. We've even provided a way for you to distribute your own programs without incurring expensive and awkward licensing arrangements. What's more, fig-FORTH from SOTA is totally compatible with TRSDOS™, LDOS™, NEWDOS™ and CP/M Plus™

ORDER FORM

Gentlemen: I want to join the FORTH revolution
☐ Enclosed is my ☐ check ☐ money-order for $75.00 (US Funds)
☐ Bill my ☐ VISA ☐ Mastercard. I have indicated my card number and expiry date below
Please rush me my copy of fig-FORTH by SOTA for the TRS-80™ computer. I have indicated I understand you guarantee to ship my order within 24 hours of receipt, so let's get with it!
☐ Model I ☐ Model III ☐ Model 4/4P

NAME:
STREET:
STATE: ZIP:
CARD TYPE: EXP/DATE:
CARD NO:
SIGNATURE:

ORDER TODAY
213-1080 Broughton Street
Vancouver, British Columbia
Canada V6G 2R8
ORDER BY MAIL OR BY PHONE: (604) 688-5009

State of the Art since 1981
SOTA
Computing Systems Limited

*TRSDOS, LDOS, NEWDOS and CP/M Plus are registered trademarks of Radio Shack, Logical Systems Inc., Apparat Inc and Digital Research respectively
TRS-80 is a registered trademark of Radio Shack

Key	Definition	Key	Definition
A	DIR :0 (A);	N	NEW;
B	DIR :1 (A);	O	DIR :0 (P);
C	FREE :0;	P	DIR :1 (P);
D	FREE :1;	Q	FREE :0 (P);
E	DEVICE;	R	FREE :1 (P);
F	FORMAT :1 (Q=N);	S	SAVE"
G	BACKUP :0 :1;	T	RUN
H	BACKUP :0 :1 (X);	U	RUN;
I	BACKUP :1 :0 (X);	V	LOAD
J	NOT USED	W	SPOOL *PR (NO);
K	BASIC;	X	NOT USED
L	LIST;	Y	SPOOL (CLEAR);
M	NOT USED	Z	BOOT;

Table 1. Setup's keystroke multiply assignments.

Key	Definition
C	Clock on or off
D	Debug
F	Free
K	Kill
P	Send a character to the printer
Q	Directory
R	Repeat the last DOS command
T	Top of form

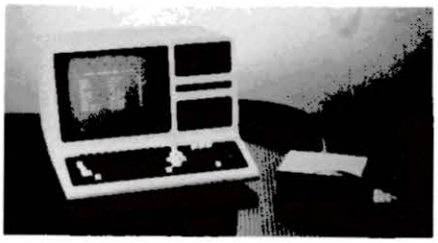
Table 2. MINIDOS commands.

Program Listing. Setup/JCL.

```
%1F.SETUP/JCL-TRSDOS 6/LDOS 5 system disk configuration file
.Copyright (C) 1983, 1984, 1985 Keith E. Risler, M.A.
.All Rights Reserved.
.IMPORTANT: All LDOS 5 features are labelled as such:
.  You install them by REMOVING THE PERIOD before the line
.  of code AND DELETING other lines as instructed
.Tested and fully functional for LDOS 5.1.3, LDOS 5.1.4,
.  TRSDOS 6.01.01, TRSDOS 6.01.02 and TRSDOS 6.02.00
.May not work with certain software packages:
.  Experiment with backup disks to determine which
.  combination of options works best with your
.  applications.
.Leave out the options you do not want or cannot use
.FOR LDOS 5, include the next line:
.SET *KI TO KI/DVR (DELAY=10,RATE=1,JKL)
.
.OPTION 1 - Build Routine/KSM to define Keystroke Multiply
.Starts at letter A, ends at letter Z
.Change to suit your needs, but be sure all 26 keys
.  are defined, or type NOT USED in the appropriate place
BUILD ROUTINE/KSM
DIR :0 (A);
DIR :1 (A);
FREE :0;
FREE :1;
DEVICE;
FORMAT :1 (Q=N);
BACKUP :0 :1;
BACKUP :0 :1 (X);
BACKUP :1 :0 (X);
NOT USED
BASIC;
LIST;
NOT USED
NEW;
DIR :0 (P);
DIR :1 (P);
FREE :0 (P);
FREE :1 (P);
SAVE"
```

Listing continued

Circle 321 on Reader Service card.



NEW PRODUCT FOR AUTOMATION

USE YOUR TRS-80 MODEL III, IV or 4P:

- For direct measurement of:
  voltage, or alarm conditions
- With one resistor to measure:
  current, resistance, or 4-20 ma. signals
- With transducers to measure:
  acceleration, dewpoint, force, humidity, pH, position, pressure, temperature, velocity, viscosity, wind speed or direction
- With interfaces to turn power on/off, control analog voltage, motor speed, temperature, etc.

Note: We also manufacture the Model 100 A/D for the TRS-80* Model 100 Computer

MODEL III, IV, or 4P—A/D, converter and digital interface for your TRS-80* Model III or IV:

- 0 to 4.096 volts full scale (adjustable)
- 12 bit integrating A/D converter (.025%)
- 16 analog voltage input
- 8 digital inputs, expansion to 24 bits
- 8 digital outputs, expansion to 24 bits
- 3 addressable output strobes

Price: **$580** including software ($5.00 for manual)

HUMPHREY INSTRUMENTS, INC.
301 N. Harrison St., Suite 191
Princeton, N.J. 08540
(609) 896-1612

***TRS-80 is a trademark of The Tandy Corporation**

Circle 151 on Reader Service card.

CONVERT YOUR TRS-80 MODEL III OR 4 INTO A

DEVELOPMENT SYSTEM

Now you can develop Z-80 based, *stand-alone* devices such as games, robots, instruments and peripheral controllers, by using your TRS-80 as a development system. The DEVELOPMATE plugs into the expansion connector of your TRS-80 and adds **PROM PROGRAMMING** and **IN-CIRCUIT-EMULATION** capabilities to your system.

Complete instructions and sample schematics are included to help you design your own simple stand-alone microcomputer systems. THESE SYSTEMS CAN BE AS SIMPLE AS FOUR ICs: one TTL circuit for clock and reset, a Z-80, an EPROM, and one peripheral interface chip.

When the In-Circuit-Emulation cable is plugged into the Z-80 socket of your stand-alone system, the system becomes a part of your TRS-80. You can use the full power of your editor/assembler s debug and trace programs to check out both the *hardware and the software*. Simple test loops can be used to check out the hardware, then the system program can be run to debug the logic of your stand-alone device.

Since the program is kept in TRS-80 RAM, changes can be made quickly and easily. When your stand-alone device works as desired, you use the Developmate s PROM PROGRAMMER to copy the program into a PROM. With this PROM, and a Z-80 in place of the emulation cable, your stand-alone device will work by itself.

The DEVELOPMATE is extremely compact. Both the PROM programmer and the In-Circuit-Emulator are in one small plastic box only 3.2" × 5.4". A line-plug mounted power supply is included. The PROM programmer has a "personality module" which defines the voltages and connections of the PROM so that future devices can be accommodated. However, the system comes with a "universal" personality module which handles 2758,2508(8K), 2716,2516(16K), 2532(32K), as well as the new electrically alterable 2816 and 48016(16K EEPROMs).

The COMPLETE DEVELOPMATE 83 with software, power supply, emulation cable, TRS-80 cable, and "universal" personality module, is ONLY $329!

PM2 PERSONALITY MODULE for 2732A EPROM $15
PM3 PERSONALITY MODULE for 2764 EPROM $15

ORION INSTRUMENTS
172 Otis Avenue, Dept. M, Woodside, CA 94062
(415) 851-1172
Master Charge and Visa phone orders accepted.
California residents please add sales tax.

Circle 306 on Reader Service card.

New from PowerSOFT®

Now Copy files From TRS-80 to PC/MS DOS or CPM and BACK with SuperCROSS/XT!

Did you just get a new Model 1000,1200, or PC? How about CP/M? Just get that? Now with SuperCROSS/XT you can COPY your files TO or FROM 70 different DOS formats direct disk to disk! You can also FORMAT an alien disk, display the DIRectory or KILL files. Fully MENU driven with plenty of on-line HELP available! Very easy to operate in today's computer environment, especially for non-programmers.

GREAT new features make SuperCROSS/XT the transfer system of choice:

***"FOREIGN-TO-FOREIGN"** file transfers for the first time!! No longer a two step operation! Setup two different DOS formats in two different drives ala SU+ for COPYing files back and forth.

***MASS FILE TRANSFERS!** Now features a new TAG feature which allows you to "mark" any number of files for COPYing or KILLing!

***CONFIGURE** for the DOS you COPY from most, for faster automatic startup time!

SKIP command for reading or writing a 40 track disk in an 80 track drive!

PowerSOFT presents the **state-of-the-art-file transfer program** for use on the TRS-80! SuperCROSS/XT is designed to allow you to move DATA and program files freely between your own TRS-80 and DOS formats of other computers. You can now do this with SuperCROSS/XT and your existing hardware, eliminating modems, wires, and terminal program transfers. SuperCROSS/XT runs as a /CMD file under your TRS-80 operating system and will allow you to COPY files back and forth between different operating systems. You may format on a foreign disk in your TRS-80 and COPY files to it that can be read by, for example a Model 1000, a KAYPRO or an IBM PC. Note that machine language programs, although transferable, will NOT run due to the difference in microprocessor chips used in the different machines.

You can copy BASIC, PASCAL, FORTRAN, C, or other high level language programs, and run them with little modification, unless they make extensive use of graphics, or have machine language calls. CNVBASIC/CMD, available separately, will make most of the syntax and spacing changes required for converting Model I/III BASIC programs for use on other systems. Data files, spreadsheet files, and text files can also be usefully moved between machines. If you use or have the same Visicalc or Multiplan on the TRS-80, you can use the same files on other machines! These spreadsheet files are directly convertable to 123 and other calc-type programs. Of course, the combinations and possibilities are endless, and the flexibility is ALL there with SuperCROSS/XT!

DOS Formats Supported MS-DOS variations include MS-DOS 1.0, 2.0/2.1 single or double-sided (IBM and most compatibles), and Tandy 2000. CP/M variations include most well known single and double-sided formats including Tandy's 3.0+, Montezuma Micro 2.2 (all versions), Holmes and 60 others including: ALTOS, CROMEMCO, DEC, EAGLE, EPSON, HP 125, CP/M 86, KAYPRO, LNW-80, LOBO MAX-80, MORROW, NEC, OSBORNE, OTRONA, SANYO, SUPERBRAIN, TELETEK, TELEVIDEO, TRS-80, LIFEBOAT/I, OMICRON/1, HOLMES/3, HURRICANE COMPACTOR/3, SHUFFLEBOARD/3, XEROX, ZENITH-HEATH, and 8" standard CP/M. *Of course double-sided drives are required for reading DS disks. Use SS for transfers, if needed.

If you use another computer besides your TRS-80 at work or home–you need SuperCROSS/XT so call or write, but order today! Only $99.95. Check, VISA/Mastercard or COD accepted. Please add $3 for shipping/handling ($2 additional for COD). Foreign orders please add $10 for AIRMAIL.

SuperCROSS/XT $99.95
(Please specify Model I-DD/III, 4/4P, or MAX-80 version)
CNVBASIC/CMD (CONVERT BASIC for Mod I/III/4) $29.95
Converts I/III BASIC programs for use on MS-DOS, CP/M, or Mod 4!
If ordered WITH SuperCROSS get BOTH programs for only $119.95

POWERSOFT

PowerSOFT Products
17060 Dallas Parkway, Suite 114
Dallas, TX 75248
(214)733-4475

All trademarks are the properties of the companies represented.

Circle 357 on Reader Service card.

Mac Inker

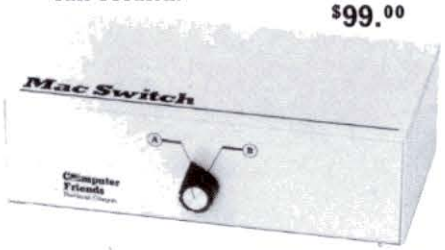
Re-ink any fabric ribbon AUTOMATICALLY for less than 5¢. Extremely simple operation with built-in electric motor. We have a MAC INKER for any printer: cartridge/spool/harmonica/zip pack. Lubricant ink safe for dot matrix printheads. Multicolored inks, uninked cartridges available. Ask for brochure. Thousands of satisfied customers.

$54.95 +

Mac Switch

Mac Switch lets you share your computer with any two peripherals (serial or parallel). Ideal for word processors—never type an address twice. Ask us for brochure with tips on how to share two peripherals (or two computers) with MAC SWITCH. Total satisfaction or full refund.

$99.00



Order toll free 1-800-547-3303

Computer Friends
6415 SW Canyon Court
Suite #10
Portland, Oregon 97221
(503) 297-2321
Dealer inquiries welcome

Listing continued

```
RUN
RUN;
LOAD
SPOOL *PR (NO);
NOT USED
SPOOL (CLEAR);
BOOT;
.ROUTINE/KSM has terminated automatically
.Now setting defineable keys using above file
SET *KB KSM/FLT USING ROUTINE/KSM
.FOR LDOS 5: Delete next line before running:
FILTER *KI *KB
.
.OPTION 2 - Set Communications line device for RS-232C use
SET *CL TO COM/DVR
.FOR LDOS 5: replace ABOVE line with:
.SET *CL TO RS232T/DVR (BAUD=300,WORD=7)
.
.Option 3 - Set keyboard keyclick option TRSDOS 6 ONLY
.Works ONLY with TRSDOS 6.01.02 or earlier on Model 4
.The click may be too shrill with TRSDOS 6.02
.FOR LDOS 5: Delete the next two lines:
SET *CK CLICK/FLT
FILTER *KI *CK
.
.Option 4 - Set printer filter and printout form
SET *FF TO FORMS/FLT
FILTER *PR *FF
FORMS (MARGIN=10,CHARS=60,INDENT=17)
.FOR LDOS 5, replace ABOVE three lines with:
.FILTER *PR PR/FLT (CHARS=60,MARGIN=10,INDENT=17)
.
.Option 5 - Set keyboard repeat delay and rate
.FOR LDOS 5: This was done at the beginning for LDOS
.FOR LDOS 5: Delete next line
SETKI (WAIT=10,RATE=1)
.
.Option 6 - Install all allowable TRSDOS 6 overlays
.Delete those not desired before running SETUP/JCL
.LDOS 5 users should also install overlay 8
.NOTE: loading all overlays has caused program errors
.  while running some BASIC and machine language
.  programs including SuperSCRIPSIT ; load only needed
.  overlays or test as required
SYSTEM (SYSRES=1)
SYSTEM (SYSRES=2)
SYSTEM (SYSRES=3)
SYSTEM (SYSRES=4)
SYSTEM (SYSRES=5)
.FOR LDOS 5 ONLY: Add the next line
.SYSTEM (SYSRES=8)
SYSTEM (SYSRES=9)
SYSTEM (SYSRES=10)
SYSTEM (SYSRES=11)
SYSTEM (SYSRES=12)
.
.OPTION 7 - FOR LDOS 5 users only
.Establish MINIDOS/FLT: add the line below
.FILTER *KI USING MINIDOS/FLT
.
.Installation concluded
.
.When this JCL file ends, type:
.SYSGEN (YES) FOR TRSDOS 6, OR
.SYSTEM (SYSGEN=ON) FOR LDOS 5
. and  <ENTER> to permanently install changes.
.END OF SETUP/JCL BY KEITH E. RISLER
```

End

Circle 468 on Reader Service card.

IT'S LIKE DISKETTES FOR 99¢ EACH!

21™ diskettes

- 100% more capacity than Single Side Diskettes
- For use in **ANY** 5¼ Disk Drive
- Just turn it over to use the other side
- Both sides are certified 100% Error Free
- 5 Year Guarantee

• MADE IN U.S.A. • TOTAL SEAM BONDING
• TYVEK JACKETS, REINFORCED HUB RINGS
• EXCEEDS INDUSTRY TECHNICAL SPECIFICATIONS

only **$19.80*** for 10 disks (20 sides)
call for quantity discounts

*On all orders add $2. for postage & handling ($5 Foreign). Florida res. add 5% Sales Tax.

ORDER TODAY
MasterCard VISA

SATISFACTION GUARANTEED OR YOUR MONEY BACK!

TOLL FREE 1-800-642-2536
FLORIDA 305-493-8355
or send check or money order to:

nibble notch®
computer products
4211 NW 75th Terrace • Dept. 2 0 2 Lauderhill, FL 33319

Circle 216 on Reader Service card.

TRS-80+ MOD I, III, COCO, TI99/4a
TIMEX 1000, OSBORNE, others

GOLD PLUG - 80

Eliminate disk reboots and data loss due to oxidized contacts at the card edge connectors. **GOLD PLUG 80** solders to the board edge connector. Use your existing cables. (if gold plated)

GOLD PLUG 80 Mod I (6)	$44.95	~~$54.95~~
Keyboard/EI (mod I)	15.95	~~18.95~~
Individual connectors	7.95	~~9.95~~
COCO Disk Module (2)	16.95	~~18.95~~
Ground tab extensions	INCL	~~1.00~~
Disk Drives (all R.S.)	7.95	~~9.95~~
Gold Disk Cable 2 Drive		29.95
Four Drive Cable		39.95
GOLD PLUG 80 Mod III (6)		54.95
Internal 2 Drive Cable		29.95
Mod III Expansion port		10.95

SPECIAL PRICES

COCO MODULE INSTALLATION AVAILABLE

USA shipping $1.45 — Can/Mex $4.
Foreign $7. — TEXAS 5% TAX

Ask your favorite dealer or order direct

MasterCard VISA

E.A.P. CO.
P.O. BOX 14
KELLER, TEXAS 76248

ORDER TODAY!
(817) 498-4242
MC/VISA

+ trademark Tandy Corp

Circle 406 on Reader Service card.

PowerSCRIPT 4.2

The state-of-the art UNIVERSAL add-on enhancement for SCRIPSIT™ users!
Now supports TRUE Model 4/4P
80 column version of SCRIPSIT
Supports ALL released versions of SCRIPSIT™ for 4/III/I.
Get the MOST from your printer!

Our PowerSCRIPT modification for SCRIPSIT (all versions) gives you everything that SuperSCRIPSIT does, except for proportional printing, but we give features that even SS doesn't have! Our files are full of letters from enthusiastic users who cannot believe how powerful little ole SCRIPSIT can become with PowerSCRIPT!(and this version adds even more features!)

With all the smarter printers out there, it doesn't make sense to use a "dumb" word processor anymore. If you notice, there are MANY word processors out there besides the ones available from TANDY. We could recommend every one of them, IF YOU WANTED TO BUY SOMETHING NEW! What if you don't want to pop another $200 bucks for another program? What if you don't NEED another program, but you'd like a LOT of new features without relearning a WHOLE NEW SYSTEM? SCRIPSIT is a VERY good program - we just give it some horsepower and bring it up to today's standards! PowerSCRIPT gives you MANY new features, while retaining the commands you already know - at a very low price! All your previous files will, of course be compatible.

Some features that get added to SCRIPSIT via PowerSCRIPT 4.2:

- Send commands to printer to activate special formats and functions, even embedded in the middle of the line!
- Get an ALPHABETICAL Directory from within PSCRIPT and FETCH, KILL, or CHAIN any file right from the display! No more going back to DOS!
- Keyboard can be customized for special needs or keys.
- Special characters can be generated from keyboard without using special printer codes!
- Removes protection for your own use.
- Any code from 1 through 255 can be sent to printer through special format line.
- Video PAGE FORWARD OR REVERSE at a key-stroke!
- Multiple files can be CHAINED together at print time!
- Will not crash programs protected in HIGH MEMORY.
- "END" returns to DOS READY quickly instead of rebooting operating system.
- Built-in HELP command! HELP can be modified by user.
- Optionally select line feed after carriage return.
- Support for user-definable filters included.

For Model 4/4P, III, or I (lower case only). Works with most Model I/III operating systems or TRSDOS 6.0-6.2 on the Mod 4. Will work OK with TRSDOS 2.7DD, except for DIR from PSCRIPT. Purchaser must own appropriate version of disk-based SCRIPSIT.

PowerSCRIPT 4.2 Still only $39.95

SuperSCRIPSIT® Users... We didn't leave YOU out!

Now you can use SuperSCRIPT on your NON-Tandy printer! Your printer will work great using our special Printer Drivers customized for your particular printer and SuperSCRIPSIT. Low priced too, so don't miss out if you have one of the printer models listed! Model 4 fully supported!

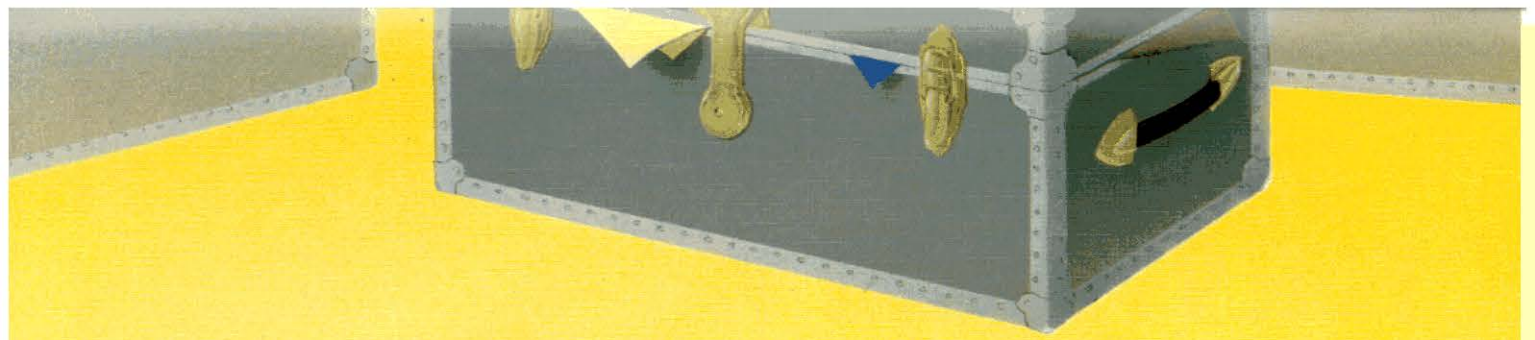
- EPSON MX-80/100 series
- EPSON FX/RX 80/100 series
- Most all EPSON "compatibles"
- Okidata 92/93 Dot Matrix
- C. Itoh 8510 Prowriter
- C. Itoh A10-20 Daisy
- C. Itoh F-10 Starwriter

All features of SuperSCRIPSIT are supported to the fullest capabilities of the printer. Easy to install at OPEN DOCUMENT screen easy to use, and no extra commands to learn!

PowerDRIVER–Only 29.95 ea.
PLEASE SPECIFY PRINTER TYPE!

POWERSOFT
17060 Dallas Parkway, Suite 114
Dallas, TX 75248
(214) 733-4475

MasterCard VISA



Storage to Spare

Increase SuperScripsit's text storage space beyond your wildest dreams.

by Steve Woicik

SuperScripsit users know things can get pretty cramped on their disks. It's not unusual to get a "Disk full" error message when you try to compress or convert a file. When you add in the dictionary program, you have barely enough room left over for documents.

I'll describe a way to get greatly increased SuperScripsit disk storage capacity on a one- or two-drive Model 4/4P using Memdisk. And, because the word processor and three system files reside in RAM, you'll find that the program runs faster.

Here's how it works. You develop a minimum TRSDOS, with three system files in memory and four files on a drive-zero data disk. A special booting disk puts your computer under JCL (job control language) control, loads a minimum SuperScripsit into Memdisk, and loads TRSDOS system files 1, 2, and 3 into memory. With SuperScripsit in memory, you replace the booting disk with a drive-zero data disk containing system files 4, 10, 11, and 12; the rest of the disk is free for data storage. Drive 1 is also free for data. For extra storage, you can use data disks formatted for 42 tracks.

Using 42-track disks, this gives you 174K for documents on drive zero and 181.5K on drive 1, a total of 355.5K. With Scripsit Spelling Dictionary on drive zero, you still have 181.5K of disk space on drive 1. Disk storage on a one-drive Model 4 increases to 171K.

The procedures below are for dual-drive computers; most apply to single-drive systems as well, but see "Instructions for One-Drive Computers" for specific changes.

These Disks Are Made for Booting

Your first order of business is to create a SuperScripsit booting disk. Boot a back-up copy of a standard TRSDOS disk with SuperScripsit in drive zero and put a disk with Memdisk/DCT in drive 1. Type in PURGE :0 and press the enter key.

To purge a file, type in Y and press the enter key; to retain a file, press the enter key only. Retain the files listed in the Table and purge any other visible files.

Next, copy Memdisk to drive zero using the command COPY MEMDISK/DCT:1 :0.

Load system files 1, 2, and 3 into RAM by typing in SYSTEM (SYSRES = 1), SYSTEM (SYSRES = 2) and SYSTEM (SYSRES = 3). SYSGEN these files by typing in SYSGEN (YES).

Now build the two JCL files, Scripsit/JCL and Exit/JCL, in Program Listing 1. At TRSDOS Ready, type in BUILD SCRIPSIT/JCL:0. Carefully type in SCRIPSIT/JCL. To save the file to disk, press the control, shift, and @ keys simultaneously. Build Exit/JCL, also in Listing 1, the same way.

To execute Scripsit/JCL automatically each time you boot the disk, type in AUTO DO = SCRIPSIT/JCL :0. Your Scripsit booting disk is now complete.

The Bare Essentials

To create a drive-zero data disk, put a standard system disk in drive zero and format a disk in drive 1. I use the command FORMAT:1(CYL = 42,Q = N,ABS) to format 42 cylinders, giving me an extra 9K per disk. This technique might not always work, but I've used it successfully.

After formatting, copy system files 4, 10, 11, and 12 to drive 1. These files are protected, so you must use the Back-up utility to move them; type in BACKUP :0 :1(SYS,Q = Y). Use the enter key to move from file to file. Type in Y and press the enter key to copy a file. After you've copied the four files, press the break key to quit.

This disk containing only four system files is your drive-zero data disk. It has plenty of room for documents, but you don't have access to TRSDOS commands like Copy, Backup, Reset, Boot, and Remove.

To use Scripsit Dictionary, follow the procedure for creating a minimum system disk, making sure the computer verifies all 42 cylinders. Otherwise, you may not have room for the dictionary. Load system files 10 and 12 into RAM using the SYSRES command.

Leave the minimum TRSDOS disk in drive 1 and, from TRSDOS Ready, type in BACKUP :0 :1 (Q = N,X) and press the enter key. Remove the standard TRSDOS disk from drive zero and, when prompted for the source disk, replace it with a back-up copy of the dictionary. Then answer the prompts to complete the back-up.

Instructions for One-Drive Computers

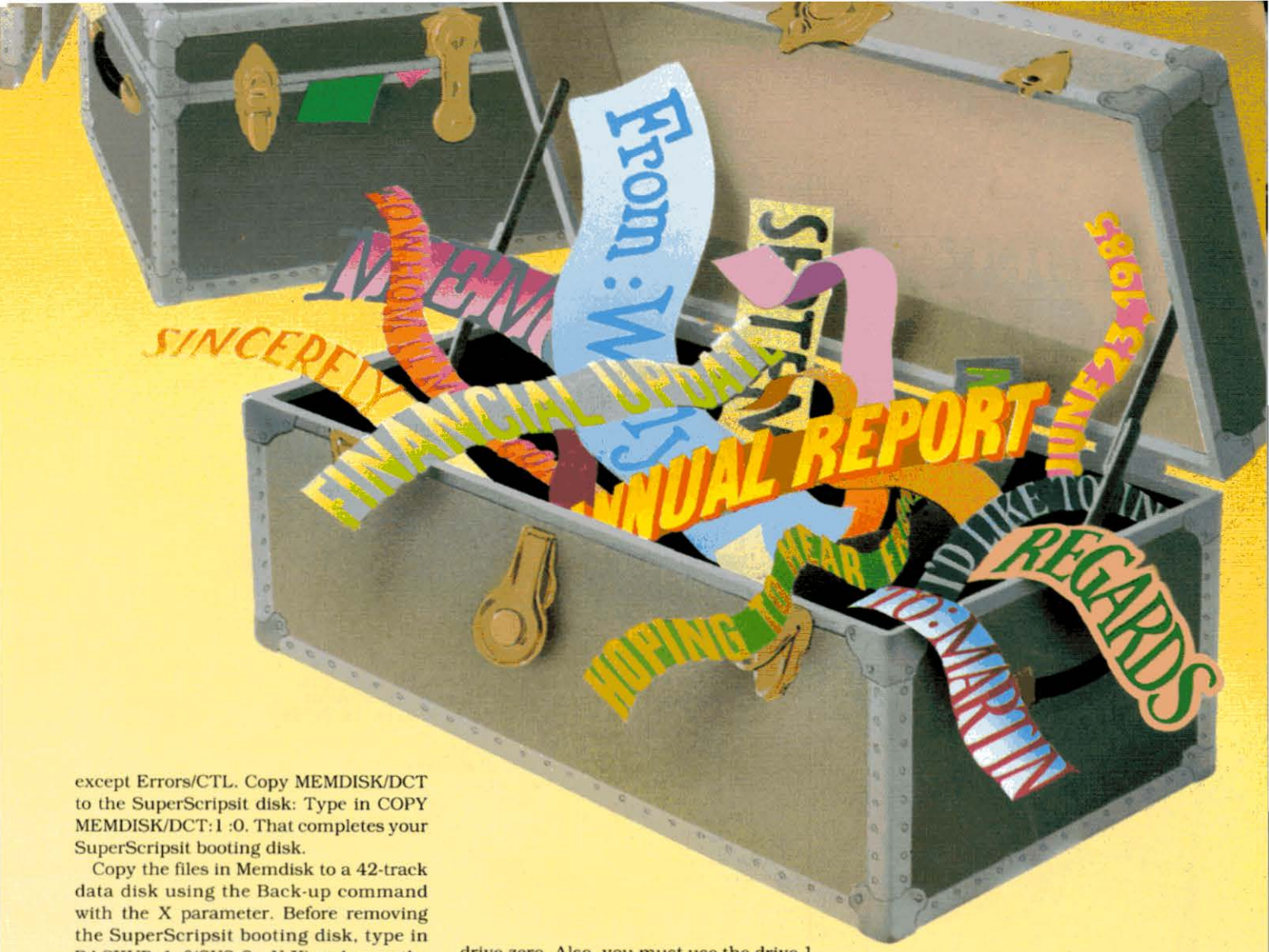
On a one-drive computer, boot up a back-up copy of TRSDOS 6.X.X with SuperScripsit, and load system files 1, 2, and 3 into memory and SYSGEN them as described above. Build Listing 2's versions of Scripsit/JCL and Exit/JCL.

Next, boot up a standard TRSDOS 6.X.X disk and install Memdisk by typing in SYSTEM (DRIVE = 1,DRIVER = "MEMDISK") and pressing the enter key. Answer the prompts with D, D, and Y. Copy Memdisk/DCT to Memdisk; type in COPY MEMDISK/DCT:0 :1.

Now put the SuperScripsit booting disk back in the drive and copy system files 4, 10, 11, and 12, and Errors/CTL to Memdisk. To do so, type in BACKUP :0 :1 (SYS,Q = Y); use the enter key to move from file to file and press Y to copy a file.

Following the instructions above, purge the disk, saving all the files in the Table

Illustration by Erick Ingraham



except Errors/CTL. Copy MEMDISK/DCT to the SuperScripsit disk: Type in COPY MEMDISK/DCT:1 :0. That completes your SuperScripsit booting disk.

Copy the files in Memdisk to a 42-track data disk using the Back-up command with the X parameter. Before removing the SuperScripsit booting disk, type in BACKUP :1 :0(SYS,Q=N,X) and press the enter key. At the prompt, replace the SuperScripsit disk with your data disk and the back-up will begin.

Off and Running

Now for the easy part. To run SuperScripsit, put the booting disk in drive zero and a formatted data disk in drive 1. Boot the system. When the JCL program prompts, replace the booting disk with your drive-zero data disk, and you're in business.

Each time you boot up, Scripsit/JCL copies Exit/JCL to drive 1. Exit/JCL keeps SuperScripsit under JCL control until it copies the /CTL files to disk; this is necessary to save system changes made to SuperScripsit. Your original drive-1 disk must remain in place until you exit SuperScripsit; otherwise, Exit/JCL won't copy the /CTL files.

To exchange your drive-1 disk without losing JCL control, exit SuperScripsit and, at the prompt, install the booting disk and press the break key. With your new disk in drive 1, restart the JCL file by typing in DO = EXIT/JCL:1 and pressing the enter key. It's important to use the equal sign option, which keeps Exit/JCL from compiling to a System/JCL file on drive zero. Also, you must use the drive 1 extension, or the JCL will abort.

You can exchange your drive-zero data disk at any time as long as you don't need to block move or block copy text; SuperScripsit stores block move/copy data on drive zero in a file called Move/CTL.

If, by the way, drive zero doesn't have room for Move/CTL, SuperScripsit locks up when you try to execute a Block Move or Block Copy command. As I've found no solution for this lockup except resetting the computer, be sure to copy your document using the Compress Document utility before trying a block move or block copy.

I've tried most SuperScripsit commands under this stripped-down operating system and found they work perfectly. However, at least during a shakedown period, I recommend making copies of valuable documents.

For SuperScripsit 1.1.0 Owners

The new version of SuperScripsit, 1.1.0, and the earlier version, 1.0.1, run under full or minimum TRSDOS 6.1.2 or 6.2. However, the new version (at least the one I received) comes with a minimum TRSDOS 6.2 that has some problems.

To use the increased storage method with the new version of SuperScripsit, boot up a back-up copy of TRSDOS 6.2 and hold down the clear key. Purge all visible files except Memdisk/DCT and CONV/CMD. Purge all invisible files except Backup/CMD, Format/CMD, and Patch/CMD. Copy Scripsit/CMD and all SuperScripsit /CTL files except the printer drivers to the new TRSDOS disk. Copy the printer driver you use to the disk. Then load system files 1, 2, and 3 into RAM as indicated above under "These Disks are Made for Booting" and follow the remaining instructions in the article. ■

You can reach Steve Wolcik at 1178 Bethany Ave., Turlock, CA 95380.

LOAD 80

System Requirements

Model 4
128K RAM
SuperScripsit
Scripsit Spelling Dictionary optional

Circle 136 on Reader Service card.

THINK AGAIN

You've spent a lot of time getting your TRS-80 Model I/III Basic Programs running right. If you think you need a newer machine to run them faster, think again! It's easy to accelerate your programs, just as they are. Compile them with ACCEL3/4.

ACCEL3/4 is famous for a unique trick. It compiles essential operations and controls the interpreter for the rest. Result: You can use the whole Basic language. You can compile big programs (25K+). And look at these speedups* . . .

Operation	Speed Improvement (Ratio)			
	INT	SNG	DBL	STR
Assignment (LET)	178	28	20	7.3
Array Reference (1 dim)	35	3.6	3.6	3.5
Array Reference (2 dim)	3.0	3.0	3.0	3.0
AND, OR	35	1.8	1.6	
Compare (=, >, <, etc.)	23	2.0	1.6	6.6
Add, Concatenate (+)	57	1.8	1.4	3.6
Subtract (-)	48	1.8	1.3	
Multiply (*)	1.5	1.5	1.1	
Divide (/)	1.08	1.17	1.02	
Constant Reference	77	7.0	8.4	9.3
FOR–NEXT	7.1	1.9		
POKE	111	6.8	4.8	
SET, RESET	10	4.5	3.6	
IF THEN ELSE	47	4.6	3.0	8.1
ON expression GOTO	33	4.3	3.5	
ON expression GOSUB	50	6.8	5.1	
PRINT simple variable	1.2	1.01	1.03	1.2
OUT	61	5.0	3.7	
Flow of Control		216		
GOTO, GOSUB/RETURN		7.4		
Functions				
VARPTR	int	int	int	int
POINT	5.2	1.9	1.7	
INP	38	2.3	1.7	
PEEK	149	2.3	2.0	
String Functions				5.3
ASC				258
LEN				4.8
LEFT$				4.7
RIGHT$				6.4
MID$				2.5
CHR$				3.6
CVI				1.6
MKI$				7.1
CVS				2.5
MKS$				5.4
CVD				1.6
MKD$				

*Actually, ratios are even better in real programs.

So if you think you need a whole new computer to get performance improvements for your Basic programs, then think again. You need ACCEL3/4.

$99.95 + $2 s/h CA add 6%

(415) 681-9371

Allen Gelder Software

Box 11721 San Francisco, CA 94101

CONV/CMD	ERRORS/CTL	HELP/CTL	SCR16/CTL	SCR17/CTL
SCR18/CTL	SCR19/CTL	SCR32/CTL	SCR33/CTL	SCR35/CTL
SCR38/CTL	SCR50/CTL	SCRIPSIT/CMD	SCRIPSIT/CTL	SYSTEM/CTL
*PRINTER				

*Save the printer driver you are using.

Table. Files to retain when creating a SuperScripsit booting disk.

Program Listing 1. Scripsit/JCL and Exit/JCL for dual-drive Model 4's. If your printer driver doesn't have a /CTL extension, copy it to drive 2 by inserting a Copy command line before the line COPY EXIT/JCL:0 : 1.

```
.SCRIPSIT/JCL:  Two-drive version
.
//FLASH Make sure a formatted data disk is in drive 1.
Press enter.
SYSTEM (DRIVE=2,DRIVER="MEMDISK")
D
D
Y
BACKUP /CTL:0 :2
COPY SCRIPSIT/CMD:0 :2
COPY EXIT/JCL:0 :1
DO = EXIT/JCL:1
//EXIT
```

```
. EXIT/JCL:  Two-drive version
. Remove the SuperScripsit booting disk and
. Install the drive zero dictionary disk or
//FLASH Put the drive zero data disk in drive
zero. Press enter.
SCRIPSIT
. Remove the drive zero disk data disk.
//FLASH Put the SuperScripsit booting disk in drive zero.
Press enter.
BACKUP /CTL:1 :0
//EXIT
```

End

Program Listing 2. Scripsit/JCL and Exit/JCL for single-drive Model 4's. If your printer driver doesn't have a /CTL extension, copy it to drive 1 by inserting a Copy command line before the line COPY EXIT/JCL:0 :1.

```
.SCRIPSIT/JCL:  One-drive version
SYSTEM (DRIVE=1,DRIVER="MEMDISK")
D
D
Y
BACKUP /CTL:0 :1
COPY SCRIPSIT/CMD:0 :1
COPY EXIT/JCL:0 :1
DO = EXIT/JCL:1
//EXIT
```

```
. EXIT/JCL:  One-drive version
. Remove the SuperScripsit booting disk and
//FLASH Put the drive zero data disk in drive
zero. Press enter.
SCRIPSIT
. Remove the drive zero disk data disk.
//FLASH Put the SuperScripsit booting disk in drive zero.
Press enter.
BACKUP /CTL:1 :0
//EXIT
```

End

Full Recovery

by Ken W. Pavlicek

SuperScripsit has a lot of features, but it's missing a vital one: a file recovery capability. If a disk error or improperly closed file causes damage, you're stuck. The next time disaster strikes, try my Model 4 file repair program (see Program Listing 3). It rescues most SuperScripsit documents from the void; you have to do some editing, but it beats retyping a file from scratch.

Before resorting to my program, however, try a couple of quick fixes. Type in RESET File Name at TRSDOS Ready or run the following routine:

```
10 OPEN "I",1,"filename":CLOSE
```

If neither method works, load and run the repair program, but first make sure your disk has room for the damaged file and its replacement.

The program prompts you for the input (damaged) file's name and the output (replacement) file's name. The output file's name must be different or have a different extension.

Now the program displays the file 128 characters at a time.

The bottom of the screen displays your options:

```
C)har prog—Invokes a subprogram that strips individual characters
S)ave line—Saves the line on the screen
D)elete line—Deletes the line on the screen
F)ile save—Saves the remainder of the document
Q)uit—Stops recovery, saving no more text
```

Before you start repairing the text, strip off SuperScripsit's header information by pressing D until you see the start of the document on screen. Then you can invoke any of the options listed above.

If the line on screen is correct, press S to save it. If only part of the line is correct, press C to invoke the character program. This displays the line one character at a time along with the options:

```
S)ave character—Saves the character on the screen
D)elete character—Deletes the character on the screen
L)ine save—Saves the rest of the line
Q)uit—Stops, saving no more of the line
```

After you exit the repair program, load SuperScripsit and select the ASCII conversion program. Again make sure your disk has enough room for the new file.

When the conversion menu appears, select "A" and type in the file names at the prompts. Don't duplicate file names, and use the repair program's output file for the name of the ASCII file. SuperScripsit will convert the correct file to SuperScripsit format.

You have to edit the converted file, since most of its control codes are gone. First, find the character that replaces the paragraph symbol. In most cases, it's a double letter. Use the global command to replace every occurrence of this double letter with a double paragraph symbol. Use S's character search at the global menu, and press control-G to produce the paragraph symbol. Then, since the program removes all clear symbol codes, replace them with the help of the global command.

The next step requires scanning the whole document to replace the double-space triangle and the wordwrap symbol, which you can't do with the global command.

Use the right-arrow key to move the cursor through the document. At the end of a sentence, insert a double space. When two words run together, insert a single space. As you do this, you should replace any other missing code, such as tabs or centering. ■

Program Listing 3. SuperScripsit file repair program.

```
10 'SUPERSCRIPSIT FILE REPAIR BY KEN PAVLICEK
20 CLEAR
30 CLS
40 INPUT "WHAT IS THE NAME OF THE INPUT FILE ";I1$
50 INPUT "WHAT IS THE NAME OF THE OUTPUT FILE ";I2$
60 OPEN "R",1,I1$,128
70 OPEN "O",2,I2$
80 FIELD 1,128 AS A$
```

Listing 3 continued

Circle 290 on Reader Service card.

FAST
HARD DISK BACK UP

FOR TANDY II/12/16/6000 (TRSDOS™, XENIX®, or CP/M®)

How much would you lose if a power failure, hardware glich, or other disaster damaged or destroyed your hard disk data files? How long would it take to reconstruct them? How would the loss affect your business?

SNAPBACK can't prevent a disaster. But it can back up your hard disk so quickly and inexpensively that you can always be prepared for the worst. This is possible because SNAPBACK is . . .

- **FAST.** It copies 1.5 (Mod. II) to 2.4 (Mod. 12/16/6000) Mbytes of data per minute to 8" floppy disks. Thus, you can back up a 15 Mbyte drive in as little as 7-8 minutes.
- **FLEXIBLE.** It works with any Model II/12/16/6000, any 8.7/12/15/35 Mbyte Tandy drive, and any XENIX, TRSDOS, and/or CP/M data.
- **EASY.** Its menus make it a snap to back up or restore your data (with optional verification).
- **INEXPENSIVE.** It only costs $125.00.

If you value your data, you need SNAPBACK. It's the best insurance available.

The SNAPBACK package includes two bootable disks and complete documentation. To order, phone or write today.

(Mastercard, VISA, Check, or UPS COD ($2) accepted. Add $7.50 for handling/shipping. CA residents add 6% sales tax.)

PICKLES & TROUT®
P.O. BOX 1206
GOLETA, CA 93116
(805) 685-4641

XENIX® Microsoft Corp.
CP/M® Digital Research, Inc.
TRSDOS™ Tandy Corp.

Tidbit #21

One of the clever tricks I tried as a beginning programmer was the statement GOSUB X to shunt program execution to a subroutine. I was sure this was a never-before-discovered solution to the problem of selecting the appropriate subroutine for varying conditions. After all, the GOSUB statement required a line number and the variable X was a number I could control.

Of course the program crashed. GOSUB and GOTO statements must precede a literal line number. I went back to the manual, and forgot about my clever trick.

Recently, a friend asked me how to use GOSUB X without crashing his program. My reaction was to tell him it was impossible. He protested. He documented all the good reasons why GOSUB X was the only logical way to write his program. He was right. As I reflected on my friend's program, I hit upon a way to use GOSUB X. The Program Listing shows how. It puts the value of X into a five-character string, with leading zeros if necessary. It then POKEs the string into line 1 after the GOTO statement. GOSUB 1 branches to the line represented by X's value. After all these years, GOSUB X really works.

Harry Bee
Cornish, ME

```
1 GOTO 01000
1000 L=PEEK(&H40A4)+PEEK
(&H40A5)*256+6
10000 X$=STR$(X):Y$=RIGHT$
(X$,LEN(X$)-1)
10010 Z$="":Y=LEN(Y$)
10020 IF Y<5 THEN Z$=STRING$
(5-Y,48)
10030 X$=Z$+Y$
10040 FOR Z = 1TO5
10050 POKE L+Z-1,ASC
(MID$(X$,Z,1))
10060 NEXT:GOSUB 1
```

Listing 3 continued

```
90 ON ERROR GOTO*640
100 FOR C1=1 TO LOF(1)
110 CLS
120 GET 1,C1
130 GOSUB 660
140 PRINT A2$
150 PRINT@1840,"C)har. Prog, S)ave line, D)elete line, F)ile save, Q)uit"
160 I$=INKEY$
170 IF I$="C" GOTO 260
180 IF I$="S" THEN PRINT# 2, A2$;:GOTO 230
190 IF I$="D" THEN 230
200 IF I$="F" THEN CLS:GOTO 470
210 IF I$="Q" THEN 240
220 GOTO 160
230 NEXT C1
240 CLOSE
250 END
260 L=LEN(A$)
270 CLS:A2$="":A1$=""
280 FOR X=1 TO L
290 A1$=MID$(A$,X,1)
300 IF ASC(A1$)=248 OR ASC(A1$)=247 THEN A1$=" "
310 IF ASC(A1$)<32 OR ASC(A1$)>122 THEN 430
320 PRINT@0+X,A1$;
330 PRINT@1840,"S)ave char, D)elete char, L)ine save, Q)uit";
340 I$=INKEY$
350 IF I$="S" THEN 400
360 IF I$="D" THEN 430
370 IF I$="L" THEN 550
380 IF I$="Q" THEN 460
390 GOTO 340
400 PRINT@1040+X1,A1$;
410 A2$=A2$+A1$
420 X1=X1+1
430 NEXT X
440 PRINT@1840,"END OF LINE. PRESS <ENTER> TO CONTINUE";
450 I$=INKEY$:IF I$<>CHR$(13) THEN 450
460 GOTO 150
470 ON ERROR GOTO 650
480 FOR C2=C1 TO LOF(1)
490 GET 1,C2
500 GOSUB 660
510 PRINT A2$;;
520 PRINT#2, A2$;
530 NEXT C2
540 GOTO 240
550 FOR N=X TO L
560 A1$=MID$(A$,N,1)
570 IF ASC(A1$)=248 OR ASC(A1$)=247 THEN A1$=" "
580 IF ASC(A1$)<32 OR ASC(A1$)>122 THEN 610
590 A2$=A2$+A1$
600 X1=X1+1
610 NEXT N
620 PRINT@1040,A2$
630 GOTO 150
640 RESUME 230
650 RESUME 530
660 L=LEN(A$):A1$="":A2$=""
670 FOR X=1 TO L
680 A1$=MID$(A$,X,1)
690 IF ASC(A1$)=248 OR ASC(A1$)=247 THEN A1$=" "
700 IF ASC(A1$)<32 OR ASC(A1$)>122 THEN 720
710 A2$=A2$+A1$
720 NEXT X
730 RETURN
```

End

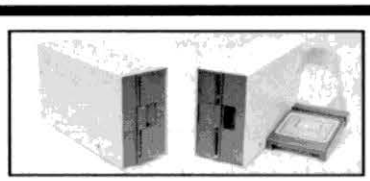
Tidbit #22

Here's a program you can use from Basic to find out how many free granules are available on a drive-zero disk. You can run the routine directly or incorporate it into another program.

Mark Taylor
Ogden, UT

```
10 DEFUSR=-304    'START
ADDRESS OF ROUTINE
20 FOR A=-304 TO -294:READ B:
POKE A,B:NEXT A   'READ DATA
30 X=USR(0) 'READ DISK AND PUT
FREE SPACE AT LOCATION -254
40 PRINT "*** ";PEEK(-254);"
FREE GRANULES ***"
50 DATA 6,0,14,255,33,0,255,
205,144,66,201
```


Circle 34 on Reader Service card.



Drive 1 139.95 — Your Choice Silver or White — 239.95 Drive 0

SUPER DRIVE SALE

Special prices on new first quality disk drives. They even have GOLD connectors on the back...Some other places charge 279.00 for dr. 1 and 349.00 for dr. 0, not us! Drive 1 is for mod I, Second Color Computer drive, or external mod III, IV. Drive 0 is your first Color Computer drive and comes complete with controller, cable and manual. Bare drives for internal mod III, IV, only 89.95! For double-sided, add 45.00 (only for those who have DS-DOS, boards and knowledge)

THE COMPUTER CENTER
901-761-4565, 5512 Poplar, Memphis, TN 38119
Add $3.90 for shipping & handling—Visa, M/C accepted—Dealer inquiries welcome

Circle 250 on Reader Service card.

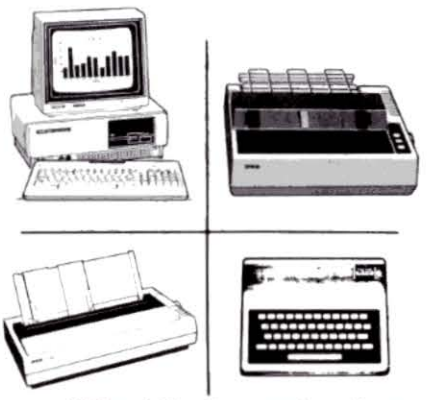
MARYMAC INDUSTRIES INC

800-231-3680

Radio Shack TRS-80's *

EPSON PRINTERS

People you Trust to give you the very best!



- Lowest Discount Prices
- Reliable Service
- Quality Products

"World's largest volume TRS-80 Dealer"

22511 Katy Fwy., Katy (Houston) Texas 77450

(713) 392-0747 Telex 774132

Circle 46 on Reader Service card.

CP/M - TRS-80 - PC/MS-DOS File Transfer!

HYPERCROSS/XT 2.0 Direct Disk To Disk File Transfer

Now you can CROSS the barrier between disk formats! Using HYPERCROSS you can directly COPY files between TRS-80 disks and many different CP/M and IBM PC disk formats on your own TRS-80 or MAX-80 without using cables. You put a disk from a CP/M or PC/MS-DOS (Tandy 1000, 1200, 2000 too) in one drive and a TRS-80 type DOS disk in another drive and you can copy files back and forth at will! You can also FORMAT an alien disk, display the DIRECTORY, and KILL files. If you have different computers at home and work, use HYPERCROSS to transfer manuscripts. BASIC, FORTRAN PASCAL or C programs, Viscalc files, data bases and binary files.

***New features - Mass files transfers and Alien to Alien Copy** Now you can copy many files at once using the new TAG feature in HYPERCROSS which allows you to tag any number of files for mass copy or deletion. You can also copy directly from one alien disk to another with only two drives.

***Formats supported:** IBM-PC and MS-DOS compatibles include DOS 1.1, 2.x/3.0 single and double sided and Tandy 2000. CP/M from Aardvark to Zorba, including Cromemco, DEC, Epson, HP, IBM CP/M 86, Kaypro, LNW, MAX-80 Morrow, NEC, Osborne, Otrona, Sanyo, Superbrain, Teletek, Televideo, TRS-80: Holmes, Hurricane Compacter, MM Shuffle Board, Montezuma, R/S CP/M 3.0+, Xerox, Zorba and standard 8 inch CP/M plus many others.

Hardware required: 48K and 2 drives minimum, Model 1 needs a doubler. Some formats need double sided or 80 track drives. 80 track skip supported.

PRICES including disk, manual and shipping:

Hypercross CP/M with 40 single sided formats **$49.95**
Hypercross PC/MS-DOS standard sided formats only **$49.95**
Hypercross XT V2.0 with 70 CP/M and PC formats **$99.95**
Hypercross XT V2.0 with 130 CP/M and PC formats **$119.95**

Upgrades always available. Please specify TRS-80 Model I, III, 4/4P, or MAX-80.

HYPERZAP 3.2c Disk Magic!

If HYPERCROSS is the program for files then HYPERZAP is the program for sectors, tracks and whole disks! On the market for 2 years, HYPERZAP is more than just another disk copying program - it is the program for analyzing, copying, repairing, creating floppy disks of all kinds. It will copy any TRS-80 format as well as many others such as CP/M, PC, CoCo etc. Specially designed to handle mixed density sectors on any track in any sequence. Many features for reading, writing, editing track and sector data. Hyperzap is the tool that lets you be in charge.

Make your own self booting disks. Take your own CMD file and turn it into a dual booting Mod 1/III/IV disk.

Autopilot mode allows learn, saves and repeats procedures. Disk comes with fascinating examples showing how to backup Funsoft, Copycat 3 and others - magic indeed!

Hardware needed: 48K 1 drive minimum, One version for all TRS-80 models 1, 3 and 4. Manual and disk **$49.95 ppd.**

Arranger II Disk Index System

World's finest disk cataloging system, Runs on Model I, III or IV and automatically recognizes virtually any DOS even NewDOS 80 double sided! Fast machine language with many features too numerous to mention here. Reviewed in Jan 84 80 Micro -heartily recommended - **$49.95 = $3 ship**

HYPERSOFT

PO Box 51155, Raleigh, NC 27609

(919) 847-4779 6-11 pm EST

Circle 206 on Reader Service card.

Introducing Super Utility 4/4P.

The indispensible first-aid kit for TRS-80 users only from PowerSoft.

Even the healthiest computer needs occasional "doctoring". And that's precisely what Super Utility 4/4P is for. To help you handle routine check-ups, take care of minor emergencies and perform major surgery with relative ease.

So effective it mends everything but a broken heart.

The latest generation of PowerSoft's highly-rated program contains over 60 different utilities. So you can examine file locations. Reformat without erasing data. Test or manipulate memory. Save valuable data and disks. Revive dead files. And much, much more.

So easy you can perform near miracles in no time.

Version Four enhancements make Super Utility 4/4P easier, faster and more efficient than ever. It boots and loads 50% faster. Utilizes 64K for faster file copies and backups. It's configurable with most Model I/III/4 operating systems for fast, easy transfer of files. And introduces three function keys, including a user-definable key, for easy, single-stroke operations.

So economical you can't afford to be without it.

At only $79.95, SU4/4P can be yours. And that includes both a master and backup disk, 148 page manual, binder and full support. The more you know about your TRS-80, the more you'll *want* SU4/4P. The less you know about your TRS-80, the more you'll *need* SU4/4P.

So place your order today by calling or writing:

PowerSoft Products
17060 Dallas Parkway
Suite 114
Dallas, Texas 75248
214/733-4475

Coming Soon For MS-DOS

POWERSOFT

VISA and MasterCard welcome.

SU 4/4P	$79.95
SU+ 3.2 Model I/III/(4)	$79.95

Please add $3.00 S/H in USA & Canada; $10.00 Foreign (airmail)

by Stewart F. Hunter

Increase disk storage capacity for your text files by up to 30 percent with Huffman code.

The most common type of information stored on disk is text. Many text files are archival in nature and so see infrequent use. Such files, normally stored in ASCII format, take up valuable disk space.

Recognizing this problem, an electrical engineer at the Massachusetts Institute of Technology named David A. Huffman developed a unique system for text storage that reduces the size of disk files by up to 30 percent.

My Compress and Decompress programs use Huffman's method of conserving disk space to convert Model I/III Scripsit text files from ASCII to Huffman format and back again (see Program Listings 1 and 2; see Fig. 1 for Model I conversions).

The Huffman Method

Your computer uses an 8-bit ASCII code for each keyboard character it stores. Huffman's algorithm takes a most-common-denominator approach to text storage. Simplistically, the Huffman algorithm determines which character occurs most frequently in a document and assigns a 1-bit code to that character (called the Huffman code). It designates the next-most-frequently occurring character a 2-bit code, and so on through the fourth most-used character.

Huffman code represents the fifth through 19th characters with 8 bits, and represents any remaining characters using 16 bits. See Fig. 2 for a screen dump of a conventional Scripsit file sector and its Huffman counterpart.

The only savings in storage occurs for the first four characters, but since those are the ones that appear most frequently, you end up with a net savings in disk space.

The Table provides an example of Huffman code. The characters in the first column represent those most frequently occurring in English text. The second column indicates each character's Huffman code. Of course, the characters Compress and Decompress use in reducing the size of a file will differ from those shown in the Table because each file displays a different character frequency.

Compression Limits

Compress reduces the size of language text files only. These compressed files appear as gibberish if you print them out.

You usually can't reduce the size of files containing programming code or numerical data—doing so often results in "compressed" files larger than the original.

The larger the original file, the greater the reduction. Files only a few disk sectors long result in little, if any, space saving.

LOAD 80

System Requirements

Models I and III
32K RAM
Editor/assembler
Scripsit

Illustration by Erick Ingraham

Circle 215 on Reader Service card.

Super Spring Sale

C compiler

for the model 1 or 3 using TRSDOS, LDOS, NEWDOS, DOSPLUS, or MULTIDOS; includes full screen text editor and advanced development package

List Price ~~$250.00~~
Sale Price $89.95

This is a full K & R standard implementation of C that includes a Unix compatible function library. The package also includes a 450 page manual with a tutorial on using the C language. If you've been wanting to learn C, this is the package you need.

Features Include

char	8 bits	initializers
short	8 bits	typedef
int	16 bits	static
unsigned	16 bits	auto
long	32 bits	extern
float	32 bits	struct/bit fields
double	64 bits	union

Execution speed on the Model 3 for 10 iterations of the prime number program published in Byte, Jan 83, page 284.

LC Compiler	105 secs.
Alcor C	78 secs.

Special Bonus

Buy one version for $89.95 and get the version for the other model for only $21.

Multi-Basic compiler

for the model 1 or 3, or 4 using TRSDOS, LOOS, NEWDOS, DOSPLUS, or MULTIDOS; includes full screen text editor and advanced development package

List Price ~~$250.00~~
Sale Price $89.95

Multi-Basic is a TRS-80 BASIC compatible compiler. The Model 4 version supports everything in the TRSDOS 6 BASIC interpreter except the COMMON statement. The same support is provided in the Model 1 and 3 versions so programs are portable. The CMD statement is the only statement from the Model 1 and 3 BASIC interpreters that is not supported.

Multi-Basic also supports advanced language features like multi-line procedures and functions, recursion, and dynamic string management (no long pauses for garbage collection).

Execution speed on the model 3 for 10 iterations of the prime number program published in Byte, Jan 83, page 286.

BASIC Interpreter	4570 secs.
Multi-Basic	89 secs.

Special Bonus

Buy one version for $89.95 and get versions for the other two models for only $21 each.

Get Yours Today - Sale Ends June 30th

C Compiler

Circle version(s)	Model 1	Model 3
One version ($89.95)		
Both versions ($110.95)		
Add 6% sales tax (Texas only)		
Shipping $6 USA/$28 foreign)		
Total		

ALCOR Systems
1132 Commerce
Richardson, TX 75081
(214) 238-8554

Name _____
Street _____
City _____
State _____
Zip _____
Country _____
Phone _____

Also available for CP/M & MSDOS

MC ☐ Visa ☐ Money Order ☐ Check ☐ COD ☐

Card # _____ exp _____

Multi-Basic Compiler

Circle version(s)	Model 1	Model 3	Model 4
One version ($89.95)			
Two versions ($110.95)			
Three versions ($131.95)			
Add 6% sales tax (Texas only)			
Shipping $6 USA/$28 foreign)			
Total			

Multi-Basic is a trademark of Alcor Systems
TRS-80 is a registered trademark of Tandy Corp.
MSDOS is a trademark of MicroSoft
CP/M is a trademark of Digital Research
Unix is a trademark of Bell Laboratories
LC is a trademark of Misosys

```
Listing 1, lines 250,  300, and Listing 2, lines  250,  300,
and 1200 should be CALL DSPLAY.

Listing 1, lines  3270, 3300,  and  Listing  2,  lines 1270,
2090, and 2120 should be DEFB 0.

Listing 1, line 3250, and Listing 2, lines 1220, 1240,  1260
and 2070 should contain DEFB 0DH.

Listing  1,  line  3280,  and Listing 2,  line  2100  should
contain DEFW 0D0DH.

Insert the following after line 3300  in Listing 1 and after
line 2160 in Listing 2:

          ;DISPLAY MESSAGE POINTED TO BY HL REGISTER
          DSPLAY    LD    A,(HL)
                    OR    A
                    RET   Z
                    CALL  33H
                    INC   HL
                    JR    DSPLAY
```

Figure 1. Model I conversions for Compress and Decompress.

```
(a) 100100: 3E4C 533D 3120 4A3D 4E8D 8D44 6570 6172 >LS=1 J=N..Depar
    100110: 746D 656E 7473 2F43 6F6C 756D 6E73 8E20 tments/Columns.
    100120: 2020 2020 4E65 7720 596F 726B 2773 2072     New York's r
    100130: 6567 756C 6172 2063 6F6C 756D 6E73 2075 egular columns u
    100140: 6E64 6572 7765 6E74 2073 6576 6572 616C nderwent several
    100150: 2063 6861 6E67 6573 2064 7572 696E 6720  changes during
    100160: 6974 7320 6669 7273 7420 6665 7720 7965 its first few ye
    100170: 6172 732E 2020 536D 616C 6C20 636F 6C75 ars.  Small colu
    100180: 6D6E 7320 696E 2074 6865 2066 726F 6E74 mns in the front
    100190: 206F 6620 7468 6520 626F 6F6B 2028 224D  of the book ("M
    1001A0: 6F63 6B20 4B6E 6973 6865 7320 416E 6420 ock Knishes And
    1001B0: 4572 7361 747A 2050 6963 6B6C 6573 2220 Ersatz Pickles"
    1001C0: 616E 6420 2254 686F 7365 2057 686F 204C and "Those Who L
    1001D0: 6976 6520 4279 2074 6865 2049 6D61 6765 ive By the Image
    1001E0: 2E2E 2E22 2028 4170 7269 6C20 382C 2031 ..." (April 8, 1
    1001F0: 3936 3829 2920 6861 6420 616E 2049 6D61 968)) had an Ima

(b) 000100: 2065 7461 736F 6E69 6C68 7264 636D 752E  etasonilhrdcmu.
    000110: 6770 6600 3E00 4C00 5300 3D00 3180 2500 gpf.>.L.S.=.1.%.
    000120: 1E80 2700 4680 4680 2221 C20E 4290 3202 ..'.F.F."!B.B.2.
    000130: 005E 0086 040A 1614 0602 011D F004 E401 .^..........p.d.
    000140: DE00 B204 0E00 D600 4E03 0743 42C1 441E ^.....V.N..CBAD.
    000150: 1204 0A16 1406 030B 0308 41C0 1DD0 3301 ..........A@.P3.
    000160: 401D 9071 0584 8308 186A 0308 0B07 0403 @..q.....j......
    000170: 0D82 1018 7820 3809 87A0 0EF0 0794 41C0 ....x 8....p..A@
    000180: 4330 0530 A105 0584 8102 8585 0180 C100 C0.0..........A.
    000190: E419 8783 8101 9810 7C83 3006 2020 2006 d.......|.0.    .
    0001A0: B801 4001 1002 6810 4803 5C01 2C0C 1004 ..@...h.H.\.,...
    0001B0: 1901 8020 8184 4011 41C0 4480 3D40 1401 ... ..@.A@D.=@..
    0001C0: 0240 1AC1 5010 0228 8184 4008 8015 0180 .@.AP..(..@.....
    0001D0: 8058 02B8 3014 0130 1001 D980 2100 3CC8 .X..0..0..Y.!.<H
    0001E0: 3300 490A 10D4 3030 3000 8A00 5000 821C 3.I..T000...P...
    0001F0: 0E08 0B00 3800 2C80 1880 1C80 1B00 1C00 ....8.,.........
```

Figure 2.(a) Screen dump of a Scripsit file sector. (b) Screen dump of the same sector in Huffman format.

Program Listing 1. Compress program.

```
                00100 ;########################################
                00110 ;#     "COMPRS"    TEXT COMPRESSOR      #
                00120 ;#           VERSION 2.1                #
                00130 ;# Copyright 1984 by Stewart F. Hunter  #
                00140 ;########################################
                00150 ;
7000            00160          ORG   7000H
7000 CDC901     00170 ENTRY    CALL 01C9H       ;CLEAR THE SCREEN
7003 218876     00180          LD HL,BUFFER     ;INITIALIZE
7006 22EF72     00190          LD (BYTPTR),HL   ;POINTER TO NEXT BYTE IN BUFFER
7009 21FF07     00200          LD HL,2047
700C 22F172     00210          LD (BTCTR),HL    ;COUNT OF BITS IN BUFFER
700F 3E08       00220          LD A,8
7011 32F372     00230          LD (BYTCTR),A    ;COUNT OF BITS PER BYTE
7014 21F774     00240          LD HL,IMSG       ;ASK FOR INPUT FILE NAME
7017 CD1B02     00250          CALL 21BH
701A 216F72     00260          LD HL,IDCB
701D 0618       00270          LD B,24
```

Listing 1 continued

Character	Binary code
space	1
e	01
t	001
a	0001
o	00000001
i	00000010
n	00000011
s	00000100
r	00000101
h	00000110
l	00000111
d	00001000
c	00001001
u	00001010
m	00001011
f	00001100
p	00001101
g	00001110
w	00001111
other characters	00000000 plus ASCII value

Table. Example of Huffman code.

Compressing

After assembling Compress to disk, run the program. A prompt asks for the name of the file you want to compress. Insert the disk with the appropriate ASCII file, type in the file name, and hit the enter key.

A second prompt asks for the name of the file to which you want the compressed text saved. Make sure the disk contains enough free space to hold the new file. A good rule of thumb is to allow as much free space as the original file occupies.

After you enter the second file name, Compress reads the original file and displays it line by line on-screen. The display occasionally pauses while Compress writes to the output file. The program returns to the DOS Ready prompt when finished.

Your disk then contains two files: the original and the compressed file. Kill the original file and you end up with an overall increase in disk space.

Decompressing

To recover text from the compressed file, assemble and run Decompress. The program prompts you for the name of the file to decompress. Insert the disk containing the compressed file and type in the file name.

Then enter a file name for the decompressed text at the prompt. Decompress reads the compressed file, converts it to ASCII, and writes it to the output file. The output text appears on the screen. Decompress exits to DOS Ready when finished.

How It Works

In Listing 1, lines 170–230 initialize several variables Compress uses. Lines 240–450 get the names of the input and output files, open the input file, and create the output file.

Lines 460–750 read each character from the input file and store a count of each

Make sure the disk contains enough space for the new file. A good rule of thumb is to allow as much free space as the original file occupies.

character's occurrence in a 256-byte table in memory. A second 256-byte table initializes with the value of all ASCII characters. Compress uses these two tables to determine the frequency of each character in the input file.

Then Compress sorts the table of character occurrences in descending order (lines 760–1130). Because the two tables are only 256 bytes long I used a simple bubble sort. A more sophisticated sort routine won't increase execution speed much for a table this short.

After the sort, Compress installs the four most frequently appearing characters in the first 4 bytes of the second table and the next 15 most frequent characters in the table's next 15 bytes.

Compress uses these 19 characters in lines 1140–1260 to alter several locations in the program. Compress stores the locations in the table in lines 3450–3630.

Lines 1270–1370 write the first 19 bytes of the table of characters to the output file. Decompress uses these characters to decode the file.

Lines 1380–1520 read a character from the input file starting at the first character in the file. Lines 1530–1740 determine if the character read is one of the four most frequent. If so, Compress converts the character to Huffman code, writes it to the output file buffer, and reads the next character from the input file.

If the character isn't one of the four most frequent characters, lines 1750–1960 check if it's one of the 15 next most frequent. If so, the program encodes the character and writes it to the output file buffer. If it isn't one of these 15 characters, lines 2060–2100 encode the character using 16 bits.

Decompress contains several of the same subroutines as Compress. In Listing 2, lines 170–230 initialize variables that the program uses. Lines 240–460 get the input and output file names and open the files.

Lines 470–570 read the first 19 bytes from the input file. These bytes represent the character frequency table that Compress wrote. Lines 580–740 use the character frequency table to alter the program at the addresses held in the table in lines 1820–2040.

Lines 750–870 read an encoded charac-

Listing 1 continued

```
701F CD4000    00280          CALL 40H         ;INPUT LINE INTO (HL)
7022 211975    00290          LD HL,OMSG       ;ASK FOR OUTPUT FILE NAME
7025 CD1B02    00300          CALL 21BH
7028 21AF72    00310          LD HL,ODCB
702B 0618      00320          LD B,24
702D CD4000    00330          CALL 40H
7030 217875    00340          LD HL,IBUFFR
7033 116F72    00350          LD DE,IDCB
7036 0601      00360          LD B,1
7038 CD2444    00370          CALL 4424H       ;OPEN INPUT FILE
703B C2CA71    00380          JP NZ,DSKERR     ;JUMP IF DISK ERROR
703E 3E01      00390 ENTRY2   LD A,1
7040 327872    00400          LD (IDCB+9),A    ;MAKE LRL = 1
7043 218876    00410          LD HL,BUFFER
7046 11AF72    00420          LD DE,ODCB
7049 0600      00430          LD B,0
704B CD2044    00440          CALL 4420H       ;CREATE OUTPUT FILE
704E C2CA71    00450          JP NZ,DSKERR     ;JUMP IF DISK ERROR
7051 21F472    00460 ENTRY3   LD HL,CFTBL
7054 11F572    00470          LD DE,CFTBL+1
7057 010001    00480          LD BC,256
705A AF        00490          XOR A
705B 77        00500          LD (HL),A
705C EDB0      00510          LDIR
705E 21F473    00520          LD HL,CFTBL2
7061 AF        00530          XOR A
7062 0600      00540          LD B,0
7064 77        00550 ENTRY4   LD (HL),A
7065 23        00560          INC HL
7066 3C        00570          INC A
7067 10FB      00580          DJNZ ENTRY4
7069 216E72    00590 RBLP     LD HL,CHAR
706C 116F72    00600          LD DE,IDCB
706F CD3644    00610          CALL 4436H       ;READ A CHAR. FROM INPUT FILE
7072 CA7D70    00620          JP Z,ENTRY5
7075 FE1C      00630          CP 28            ;EOF?
7077 CA9170    00640          JP Z,SORT        ;JUMP IF SO
707A C3CA71    00650          JP DSKERR
707D 21F472    00660 ENTRY5   LD HL,CFTBL      ;HL=START OF CHAR. TABLE
7080 1600      00670          LD D,0
7082 3A6E72    00680          LD A,(CHAR)
7085 5F        00690          LD E,A           ;DE=CHAR READ FROM INPUT
7086 19        00700          ADD HL,DE        ;POINT TO CHAR COUNT
7087 3EFF      00710          LD A,255
7089 BE        00720          CP (HL)          ;CHAR COUNT=255?
708A CA9170    00730          JP Z,SORT
708D 34        00740          INC (HL)
708E C36970    00750          JP RBLP
7091 116F72    00760 SORT     LD DE,IDCB
7094 010000    00770          LD BC,0
7097 CD4244    00780          CALL 4442H       ;RESET INPUT FILE TO 1ST BYTE
709A C2CA71    00790          JP NZ,DSKERR
709D AF        00800 SRT256   XOR A            ;SORT CFTBL AND CFTBL2, DESCEND-
709E 32F474    00810          LD (SWFLG),A     ;ING ORDER
70A1 110000    00820          LD DE,0
70A4 DD21F472  00830 SRTLP    LD IX,CFTBL
70A8 FD21F473  00840          LD IY,CFTBL2
70AC DD19      00850          ADD IX,DE
70AE FD19      00860          ADD IY,DE
70B0 DD7E00    00870          LD A,(IX)
70B3 DDBE01    00880          CP (IX+1)
70B6 D2DF70    00890          JP NC,NOSW
70B9 32F574    00900          LD (TEMP),A
70BC FD7E00    00910          LD A,(IY)
70BF 32F674    00920          LD (TEMP2),A
70C2 DD7E01    00930          LD A,(IX+1)
70C5 DD7700    00940          LD (IX),A
70C8 FD7E01    00950          LD A,(IY+1)
70CB FD7700    00960          LD (IY),A
70CE 3AF574    00970          LD A,(TEMP)
70D1 DD7701    00980          LD (IX+1),A
70D4 3AF674    00990          LD A,(TEMP2)
70D7 FD7701    01000          LD (IY+1),A
70DA 3E01      01010          LD A,1
70DC 32F474    01020          LD (SWFLG),A
70DF 13        01030 NOSW     INC DE
70E0 3EFF      01040          LD A,255
70E2 BB        01050          CP E
70E3 C2A470    01060          JP NZ,SRTLP
70E6 3AF474    01070          LD A,(SWFLG)
70E9 FE01      01080          CP 1
70EB C2F870    01090          JP NZ,DONE
70EE AF        01100          XOR A
70EF 32F474    01110          LD (SWFLG),A
70F2 110000    01120          LD DE,0
70F5 C3A470    01130          JP SRTLP
               01140 ;AT THIS POINT 1ST 19 BYTES IN CFTBL2 ARE THE 19 MOST
               01150 ;FREQUENTLY APPEARING CHARACTERS IN THE INPUT FILE
70F8 0613      01160 DONE     LD B,19          ;PUT 1ST 19 BYTES IN CFTBL2 INTO
70FA DD215275  01170          LD IX,MODS       ;ADDRESSES IN MODS TABLE
70FE 11F473    01180          LD DE,CFTBL2
7101 DD6E00    01190 MODIFY   LD L,(IX)
7104 DD6601    01200          LD H,(IX+1)
7107 1A        01210          LD A,(DE)
7108 77        01220          LD (HL),A
7109 DD23      01230          INC IX
710B DD23      01240          INC IX
710D 13        01250          INC DE
710E 10F1      01260          DJNZ MODIFY
               01270 ;WRITE 19 BYTES TO OUTPUT FILE
7110 0613      01280          LD B,19
7112 21F473    01290          LD HL,CFTBL2
7115 C5        01300 MLOOP    PUSH BC
7116 7E        01310          LD A,(HL)
```

Listing 1 continued

Now you and your TRS-80 can team up for HASSLE-FREE PROGRAMMING with LOAD 80

UTILITIES
TUTORIALS, HOME &
HOBBY APPLICATIONS

It's true

More TRS-80* pleasure and fewer programming headaches can be yours all year with **Load 80**.

Load 80 comes in your choice of cassette or disk, and is filled with more than a dozen "ready to run" programs listed in **80 Micro**.

It's ready

"Ready to run" means the hard work has been done ahead of time! All you do is load and enjoy. No keyboarding hassles. No debugging.

Every *Load 80* features the high-quality tutorials, utilities, games, and word-processing programs you've come to expect from *80 Micro*. It has everything you need for enjoyable, practical, easy TRS-80 computing.

A subscription to *Load 80* is more than just a wise purchase. It's an investment! You'll be building your software library for a fraction of the cost of comparable programs sold in retail stores!

FREE assistance

Should you need assistance, the technical editors at *Load 80* and *80 Micro* will be ready to lend a hand. Hassle-free programming for you and your TRS-80 can begin right now with a year's subscription to *Load 80*. Simply return the postage-paid order card next to this ad, or call **TOLL FREE 1-800-258-5473.** In NH, dial 1-924-9471.

* TRS-80 is a registered trademark of Radio Shack, a division of Tandy Corp.

Yes! Save me time and money with LOAD 80. Send me:

- ☐ 1 year of LOAD 80 on disk for $199.97
- ☐ 1 year of LOAD 80 on cassette for $99.97
- ☐ This month's LOAD 80 disk for $21.47
- ☐ This month's LOAD 80 on cassette for only $11.47

Prices include postage and handling. Foreign airmail please add 45 cents per item or $25.00 per subscription. U.S. funds drawn on U.S. banks only.

☐ Check/MO ☐ MC ☐ Visa ☐ AE **L8506**

Card # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Load 80 • 80 Pine Street • Peterborough, NH 03458

Listing 1 continued

```
7117 23        01320          INC HL
7118 E5        01330          PUSH HL
7119 CDA971    01340          CALL EIGHT
711C E1        01350          POP HL
711D C1        01360          POP BC
711E 10F5      01370          DJNZ MLOOP
               01380 ;READ A CHAR. FROM INPUT FILE
7120 216E72    01390 GCHAR    LD HL,CHAR       ;HL=ADRS OF CHAR. READ FROM INPUT
7123 116F72    01400          LD DE,IDCB
7126 CD3644    01410          CALL 4436H       ;CALL DOS READ ROUTINE
7129 2812      01420          JR Z,GCHAR2      ;JUMP IF NO ERROR
712B FE1C      01430          CP 28            ;END OF FILE?
712D C2CA71    01440          JP NZ,DSKERR     ;JUMP IF NOT
7130 3E00      01450          LD A,0           ;ELSE WRITE END OF FILE CODE
7132 CDA971    01460          CALL EIGHT       ;SEND 1ST EOF BYTE TO FILE
7135 3E04      01470          LD A,4
7137 CDA971    01480          CALL EIGHT       ;SEND 2ND EOF BYTE TO FILE
713A C32F75    01490          JP CLOSE         ;NOW CLOSE FILES
713D 3A6E72    01500 GCHAR2   LD A,(CHAR)      ;DISPLAY CHARACTER READ
7140 CD3300    01510          CALL 33H
7143 3A6E72    01520          LD A,(CHAR)
7146 FE20      01530 CH1      CP ' '           ;CHAR=SPACE?
7148 C25171    01540          JP NZ,GCHAR3     ;JUMP IF NOT
714B CDDE71    01550          CALL CHECK1      ;SET HUFFMAN BIT IN BUFFER
714E C32071    01560          JP GCHAR
7151 FE65      01570 GCHAR3   CP 'e'           ;=LOWER CASE 'E'?
7153 C25F71    01580          JP NZ,GCHAR4
7156 CDD271    01590          CALL CHECK0
7159 CDDE71    01600          CALL CHECK1      ;SET BUFFER BITS TO '01' IF SO
715C C32071    01610          JP GCHAR
715F FE74      01620 GCHAR4   CP 't'           ;='T'?
7161 C27071    01630          JP NZ,GCHAR5
7164 CDD271    01640          CALL CHECK0
7167 CDD271    01650          CALL CHECK0
716A CDDE71    01660          CALL CHECK1      ;SET TO '001' FOR 't'
716D C32071    01670          JP GCHAR
7170 FE61      01680 GCHAR5   CP 'a'           ;='a'?
7172 C28471    01690          JP NZ,GCHAR6
7175 CDD271    01700          CALL CHECK0
7178 CDD271    01710          CALL CHECK0
717B CDD271    01720          CALL CHECK0
717E CDDE71    01730          CALL CHECK1      ;SET TO '0001' FOR 'a'
7181 C32071    01740          JP GCHAR
               01750 ;CHECK IF CHARACTER= o THRU w
7184 215072    01760 GCHAR6   LD HL,TABLE      ;TABLE OF CHAR. AND CODES
7187 1E02      01770          LD E,2           ;# OF BYTES/TABLE ENTRY
7189 060F      01780          LD B,15          ;# OF ENTRIES IN TABLE
718B 3A6E72    01790          LD A,(CHAR)      ;= SEARCH CHAR.
               01800 ;SEARCH TABLE FOR CHAR.
718E 1600      01810          LD D,0
7190 BE        01820 SRCH     CP (HL)
7191 CA9A71    01830          JP Z,SREND       ;JUMP IF CHAR FOUND
7194 19        01840          ADD HL,DE
7195 10F9      01850          DJNZ SRCH
7197 21FFFF    01860          LD HL,-1         ;FLAG FOR NOT FOUND
               01870 ;IF CHAR. FOUND IT'S ADRS IS IN HL,ELSE HL=-1
719A 7C        01880 SREND    LD A,H
719B A5        01890          AND L
719C FEFF      01900          CP 0FFH
719E CABC71    01910          JP Z,ESCGRP      ;JUMP IF CHAR NOT o THRU w
               01920 ;CHAR IS IN o THRU w GRP SO WRITE 8 BIT CODE TO BUFFER
71A1 23        01930          INC HL           ;HL POINTS TO 8 BIT CODE
71A2 7E        01940          LD A,(HL)
71A3 CDA971    01950          CALL EIGHT       ;WRITE 8 BITS IN A TO BUFFER
71A6 C32071    01960          JP GCHAR
               01970 ;WRITE 8 BITS IN A REG TO BUFFER
71A9 0608      01980 EIGHT    LD B,8           ;B HOLDS BIT COUNT
71AB CB27      01990 ELOOP    SLA A            ;SHIFT BIT INTO CARRY FLAG
71AD DAB671    02000          JP C,EIGHT1
71B0 CDD271    02010          CALL CHECK0      ;RESET BUFFER BIT
71B3 C3B971    02020          JP ECONT
71B6 CDDE71    02030 EIGHT1   CALL CHECK1      ;SET BUFFER BIT
71B9 10F0      02040 ECONT    DJNZ ELOOP       ;CONTINUE IF NOT DONE
71BB C9        02050          RET
71BC 3E00      02060 ESCGRP   LD A,0           ;WRITE 0 CODE TO BUFFER
71BE CDA971    02070          CALL EIGHT
71C1 3A6E72    02080          LD A,(CHAR)      ;WRITE 8 BIT ASCII CODE TO BUFFER
71C4 CDA971    02090          CALL EIGHT
71C7 C32071    02100          JP GCHAR
               02110 ;DISK INPUT/OUTPUT ERROR ROUTINE
71CA F6C0      02120 DSKERR   OR 0C0H
71CC CD0944    02130          CALL 4409H
71CF C32D40    02140          JP 402DH
               02150 ;ROUTINE TO SET OR RESET THE NEXT BIT IN (BUFFER). THE
               02160 ;BUFFER BYTE CONTAINING THE BIT IS POINTED TO BY (BYTPTR)
               02170 ;THE BIT WITHIN THE BYTE IS POINTED TO BY THE 3 LOWER
               02180 ;BITS OF (BTCTR). THE BUFFER IS WRITTEN TO DISK WHEN
               02190 ;BIT 0 OF LAST BYTE IN BUFFER IS ALTERED.
               02200 ;ENTER AT CHECK0 TO RESET THE NEXT BIT.
               02210 ;ENTER AT CHECK1 TO SET THE NEXT BIT.
71D2 F5        02220 CHECK0   PUSH AF
71D3 C5        02230          PUSH BC
71D4 D5        02240          PUSH DE
71D5 E5        02250          PUSH HL
71D6 3E86      02260          LD A,86H
71D8 322072    02270          LD (INSTR+1),A   ;ALTER OPCODE TO RES B,(HL)
71DB C3E771    02280          JP CHKA
71DE F5        02290 CHECK1   PUSH AF
71DF C5        02300          PUSH BC
71E0 D5        02310          PUSH DE
71E1 E5        02320          PUSH HL
71E2 3EC6      02330          LD A,0C6H
71E4 322072    02340          LD (INSTR+1),A   ;ALTER OPCODE TO SET B,(HL)
```

Listing 1 continued

ter from the input file, determine if the character is one of the first four contained in the character frequency table, and write the ASCII equivalent to the output file when it is.

Lines 1100–1210 determine if the character is a 16-bit character and write the ASCII equivalent to the output file. The program continues looping through lines 750–1180 until it reaches the end of the input file. It then closes both files and exits to DOS.

Expanding on Compression

My Compress and Decompress programs are intended primarily to conserve disk space, but since compressed files are unintelligible, you can also use them to keep prying eyes away from sensitive data held in text files.■

You can reach Stewart F. Hunter at 15510 Murray Hill, Detroit, MI 48227.

Related Articles

Miller, Franklyn D. "Compress It," March 1983, p. 336. Reduce the size of Basic programs by removing remark statements and improving program logic.

Wood, Charles. "Compress, Model II Style," Anniversary Issue 1983, p. 554. Compress Model II Basic programs.

Circle 381 on Reader Service card.

TRS-80 COMPUTERS

BODEX CORP.

MODEL 1000 ..... $979.00
Mem Board $233.00
2nd Drive $140.00
128K Mem $75.00
MODEL 1200 ..... CALL
MODEL IV $959.00
MODEL IV P
(LIMITED SUPPLY) .. $850.00
MODEL 2000 ..... CALL
MODEL 100 8K $339.00
MODEL 100 24K $409.00
MODEL 200 ..... $799.00

OKIDATA
92 ..... $379.00 93 ..... $575.00

STAR GEMINI PRINTERS
SG10 .... $239.00 SG15 ... $379.00

ALL TRS-80 PRINTERS

BODEX CORP.

224 E. Main St.
Marlboro, MA 01752
Phone (617) 485-5115 or 481-1027
TRS-80 Trademark of TANDY

Circle 235 on Reader Service card.

For Model III & Model 4, 1 or 2 drives

SPEED READING

■ IN SCHOOL ■ AT WORK ■ AT HOME

DOUBLES reading speed in three weeks!

Automatically adjusts to YOUR progress from present speed to Speed Reading

(No computer knowledge needed)

SUCCESS™

PERSONAL IMPROVEMENT PROGRAMS

THE "SUCCESS" SYSTEM WON'T LET YOU FAIL

Two great series - more coming.

Series 1 - General reading. Fifteen original stories; history, sports, mystery, culture.

Series 2 - Investments. Learn how to invest money while improving your reading skills.

Develops:

vocabulary, visual skills, reading speed and comprehension. Stores response. Charts progress.

ORDER NOW - Call or write

INTRODUCTORY 30% DISCOUNT

$49.50

SPECIAL

Sample Disk with Personal Reading Test

$5.00

(credited to purchase of program)

Additional lesson disks. . . $19.95

LSR Learning Associates, Inc.
707 Broad Hollow Road
Farmingdale, New York 11735
(516) 293-6699

VISA MasterCard

Circle 456 on Reader Service card.

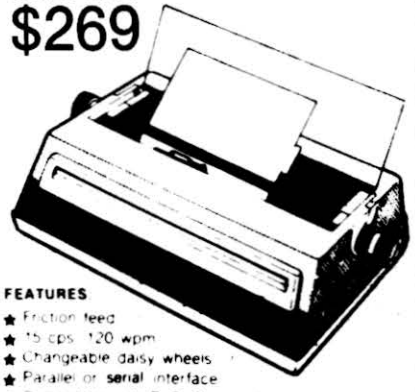
SCM DAISY WHEEL

New Smith Corona L-1000

True letter quality printer for less than the cost of an office typewriter! Priced $500 less than other popular daisy wheel printers!

SALE PRICE:

$269



FEATURES

- Friction feed
- 15 cps, 120 wpm
- Changeable daisy wheels
- Parallel or serial interface
- Compatible with R.S. Apple, etc.

SUNLOCK SYSTEMS
210 Conner Rd.
Mechanicsville, VA 23111
(804)-746-1600

ADDITIONAL PRINTER SPECIALS

Epson RX80	$239	Okidata ML82	$299	Comrex II	$389
80FT+	299	ML83	519	Comrex III	629
RX100	399	ML84	649	Gem.PrType	329
FX80+	429	ML92	369	Gem.Radx10	519
FX100+	599	ML93	579	Gemini 15x	379
JX 80	579	ML182	229	Sv.Reed 500	379

CItoh 8510	$329
CItoh F10	899
CItoh 1550	519
Okimate 20	149
Sv.Reed 550	449
LQ 1500	1039
Zen Monitor	99

TO ORDER CALL TOLL FREE 800-368-9191
In Virginia call 804-321-9191
We accept MasterCard, Visa and CODs

Listing 1 continued

```
71E7 2AF172     02350 CHKA      LD HL,(BTCTR)   ;GET COUNT OF BUFFER BITS
71EA 3E07       02360           LD A,7
71EC A5         02370           AND L           ;MASK OUT 3 LSB
71ED CB27       02380           SLA A
71EF CB27       02390           SLA A
71F1 CB27       02400           SLA A
71F3 212072     02410           LD HL,INSTR+1
71F6 B6         02420           OR (HL)
71F7 77         02430           LD (HL),A       ;INSERT 3 LSB INTO SET/RES OPCODE
71F8 2AF172     02440           LD HL,(BTCTR)
71FB 2B         02450           DEC HL          ;DECREMENT BIT COUNTER
71FC 22F172     02460           LD (BTCTR),HL
71FF 7C         02470           LD A,H
7200 A5         02480           AND L
7201 FEFF       02490           CP 0FFH         ;BIT CTR=FFFFH? (BUFFER FILLED)?
7203 C21172     02500           JP NZ,NOEOB     ;JUMP IF NOT
7206 21FF07     02510           LD HL,2047      ;ELSE RESET BIT COUNTER
7209 22F172     02520           LD (BTCTR),HL
720C 3E01       02530           LD A,1          ;SET END-OF-BUFFER FLAG
720E C31272     02540           JP NOEOB2
7211 AF         02550 NOEOB     XOR A           ;RESET END-OF-BUFFER FLAG
7212 324F72     02560 NOEOB2    LD (EOBFLG),A   ;STORE EOB FLAG
7215 3AF372     02570           LD A,(BYTCTR)
7218 3D         02580           DEC A
7219 32F372     02590           LD (BYTCTR),A   ;DECR. BYTE COUNTER
721C 2AEF72     02600 GBP       LD HL,(BYTPTR)  ;GET BYTE POINTER
721F CBC6       02610 INSTR     SET 0,(HL)      ;THIS OPCODE WAS ALTERED EARLIER
7221 3AF372     02620           LD A,(BYTCTR)
7224 B7         02630           OR A
7225 C23472     02640           JP NZ,GBP2
7228 3E08       02650           LD A,8          ;IF ALL BITS IN 1 BUFFER BYTE
722A 32F372     02660           LD (BYTCTR),A   ;ARE DONE POINT AT NEXT BYTE
722D 2AEF72     02670           LD HL,(BYTPTR)
7230 23         02680           INC HL
7231 22EF72     02690           LD (BYTPTR),HL
7234 3A4F72     02700 GBP2      LD A,(EOBFLG)
7237 B7         02710           OR A            ;EOB FLAG SET?
7238 CA4A72     02720           JP Z,CHKEND     ;JUMP IF NOT
723B 11AF72     02730           LD DE,ODCB
723E CD3944     02740           CALL 4439H      ;ELSE WRITE BUFFER TO DISK
7241 C2CA71     02750           JP NZ,DSKERR
7244 218876     02760           LD HL,BUFFER    ;SET BYTE POINTER TO START
7247 22EF72     02770           LD (BYTPTR),HL
724A E1         02780 CHKEND    POP HL          ;RESTORE REGISTERS USED
724B D1         02790           POP DE
724C C1         02800           POP BC
724D F1         02810           POP AF
724E C9         02820           RET             ;EXIT THIS ROUTINE
724F 00         02830 EOBFLG    DEFB 0
7250 6F         02840 TABLE     DEFM 'o'
7251 01         02850           DEFB 1
7252 69         02860           DEFM 'i'
7253 02         02870           DEFB 2
7254 6E         02880           DEFM 'n'
7255 03         02890           DEFB 3
7256 73         02900           DEFM 's'
7257 04         02910           DEFB 4
7258 72         02920           DEFM 'r'
7259 05         02930           DEFB 5
725A 68         02940           DEFM 'h'
725B 06         02950           DEFB 6
725C 6C         02960           DEFM 'l'
725D 07         02970           DEFB 7
725E 64         02980           DEFM 'd'
725F 08         02990           DEFB 8
7260 63         03000           DEFM 'c'
7261 09         03010           DEFB 9
7262 75         03020           DEFM 'u'
7263 0A         03030           DEFB 10
7264 6D         03040           DEFM 'm'
7265 0B         03050           DEFB 11
7266 66         03060           DEFM 'f'
7267 0C         03070           DEFB 12
7268 70         03080           DEFM 'p'
7269 0D         03090           DEFB 13
726A 67         03100           DEFM 'g'
726B 0E         03110           DEFB 14
726C 77         03120           DEFM 'w'
726D 0F         03130           DEFB 15
726E 00         03140 CHAR      DEFB 0
0040            03150 IDCB      DEFS 64
0040            03160 ODCB      DEFS 64
72EF 0000       03170 BYTPTR    DEFW 0
72F1 0000       03180 BTCTR     DEFW 0
72F3 00         03190 BYTCTR    DEFB 0
0100            03200 CFTBL     DEFS 256
0100            03210 CFTBL2    DEFS 256
74F4 00         03220 SWFLG     DEFB 0
74F5 00         03230 TEMP      DEFB 0
74F6 00         03240 TEMP2     DEFB 0
74F7 0A         03250 IMSG      DEFB 0AH
74F8 4E         03260           DEFM 'NAME OF FILE TO BE COMPRESSED = '
74F9 41
74FA 4D
74FB 45
74FC 20
74FD 4F
74FE 46
74FF 20
7500 46
7501 49
7502 4C
7503 45
```

Listing 1 continued

Circle 137 on Reader Service card.

Listing 1 continued

```
7504 20
7505 54
7506 4F
7507 20
7508 42
7509 45
750A 20
750B 43
750C 4F
750D 4D
750E 50
750F 52
7510 45
7511 53
7512 53
7513 45
7514 44
7515 20
7516 3D
7517 20
7518 03          03270          DEFB 03
7519 0A0A        03280 OMSG     DEFW 0A0AH
751B 4E          03290          DEFM 'NAME OF NEW FILE = '
751C 41
751D 4D
751E 45
751F 20
7520 4F
7521 46
7522 20
7523 4E
7524 45
7525 57
7526 20
7527 46
7528 49
7529 4C
752A 45
752B 20
752C 3D
752D 20
752E 03          03300          DEFB 03
                 03310
                 03320 ;CLOSE BOTH FILES
752F 116F72      03330 CLOSE    LD DE,IDCB
7532 CD2844      03340          CALL 4428H       ;CLOSE INPUT FILE
7535 C2CA71      03350          JP NZ,DSKERR
7538 11AF72      03360          LD DE,ODCB
753B CD3944      03370          CALL 4439H       ;WRITE REMAINING BYTES TO OUTPUT
753E C2CA71      03380          JP NZ,DSKERR
7541 11AF72      03390          LD DE,ODCB
7544 CD2844      03400          CALL 4428H       ;CLOSE OUTPUT FILE
7547 C2CA71      03410          JP NZ,DSKERR
754A 3E0D        03420          LD A,0DH
754C CD3300      03430          CALL 33H
754F C32D40      03440          JP 402DH         ;EXIT TO DOS
7552 4771        03450 MODS     DEFW CH1+1
7554 5271        03460          DEFW GCHAR3+1
7556 6071        03470          DEFW GCHAR4+1
7558 7171        03480          DEFW GCHAR5+1
755A 5072        03490          DEFW TABLE
755C 5272        03500          DEFW TABLE+2
755E 5472        03510          DEFW TABLE+4
7560 5672        03520          DEFW TABLE+6
7562 5872        03530          DEFW TABLE+8
7564 5A72        03540          DEFW TABLE+10
7566 5C72        03550          DEFW TABLE+12
7568 5E72        03560          DEFW TABLE+14
756A 6072        03570          DEFW TABLE+16
756C 6272        03580          DEFW TABLE+18
756E 6472        03590          DEFW TABLE+20
7570 6672        03600          DEFW TABLE+22
7572 6872        03610          DEFW TABLE+24
7574 6A72        03620          DEFW TABLE+26
7576 6C72        03630          DEFW TABLE+28
0100             03640 IBUFFR   DEFS 256
0010             03650          DEFS 16
0100             03660 BUFFER   DEFS 256
7000             03670          END ENTRY
00000 Total Errors
```

End

Program Listing 2. Decompress program.

```
                 00100 ;########################################
                 00110 ;#  "DCOMPRS"  TEXT DE-COMPRESSOR       #
                 00120 ;#          VERSION 2.1                 #
                 00130 ;# Copyright 1984 by Stewart F. Hunter #
                 00140 ;########################################
                 00150 ;
7000             00160          ORG     7000H
7000 CDC901      00170 START    CALL 01C9H       ;CLEAR THE SCREEN
7003 AF          00180          XOR A            ;INITIALIZE
7004 326B71      00190          LD (EOFLG),A     ;END OF FILE FLAG
7007 3E01        00200          LD A,1
7009 326A71      00210          LD (RBFLAG),A    ;READ-BUFFER FLAG
700C 3E07        00220          LD A,7
700E 326971      00230          LD (LMB),A
7011 212E72      00240          LD HL,IMSG
7014 CD1B02      00250          CALL 21BH
7017 21AE71      00260          LD HL,IDCB
```

Listing 2 continued

FOR TRS-80 MODELS 1, 3 & 4
IBM PC, XT, AND COMPAQ

COMMERCIAL SOFTWARE DEVELOPERS and INDIVIDUAL PROGRAMMERS

appreciate MMSFORTH for its:

- **Power**
- **Flexibility**
- **Compactness**
- **Development speed**
- **Execution speed**
- **Maintainability.**

When you want to create the ultimate:

- **Computer Language**
- **Application**
- **Operating System**
- **Utility,**

BUILD IT in MMSFORTH

(Unless we have it ready for you now!)

Bulk Distribution Licensing @ $500 for 50 units, or as little as pennies each in large quantities. (Corporate Site License required.)

The total software environment for IBM PC, TRS-80 Model 1, 3, 4 and close friends.

- Personal License (required):
  - **MMSFORTH System Disk** (IBM PC) **$249.95**
  - **MMSFORTH System Disk** (TRS-80 1, 3 or 4) **129.95**
- Personal License (optional modules):
  - **FORTHCOM** communications module . . . . **$ 39.95**
  - **UTILITIES** **39.95**
  - **GAMES** **39.95**
  - **EXPERT-2** expert system **69.95**
  - **DATAHANDLER** **59.95**
  - **DATAHANDLER-PLUS** (PC only, 128K req.) **99.95**
  - **FORTHWRITE** word processor **175.00**
- Corporate Site License Extensions . . . . . **from $1,000**
- Some recommended Forth books:
  - **UNDERSTANDING FORTH** (overview) . . . **$ 2.95**
  - **STARTING FORTH** (programming) **18.95**
  - **THINKING FORTH** (technique) **15.95**
  - **BEGINNING FORTH** (re MMSFORTH) . . . **16.95**

Shipping/handling & tax extra. No returns on software.

Ask your dealer to show you the world of MMSFORTH, or request our free brochure.

MILLER MICROCOMPUTER SERVICES
61 Lake Shore Road, Natick, MA 01760
(617) 653-6136

Circle 355 on Reader Service card.

LARGE CAPACITY
ACCOUNTING PROGRAMS

NEED JUST 2 DRIVES
FOR CAPACITY BELOW

ACCTS RECEIVABLE $150.00

5000+ ACCOUNTS 15000+TRANSACTIONS
BALANCE FORWARD 99 TRANSACT CODES
30-60-90-120 AGED STATEMENTS SHOW
DATE / INV# / DESCRIP / AMT / & AGEING
SELECTIVE FINANCE CHARGES & RATES
FAST ENTRY POSTING W / AUDIT REPORT
SUB-ACCTS. % CREDIT LIMIT DATE OF
LAST PAYMENT, LABELS
ADD $50.00 FOR INVOICING MODULE
OTHER OPTIONS AVAILABLE - CALL -

ACCTS PAYABLE $50.00

DERIVED FROM OUR A/R - WRITES CHECKS

GENERAL LEDGER $150.00

400+ACCTS 5000+TRANSACTIONS/MONTH
- BEST LOOKING FINANCIAL STATEMENTS
- DEPARTMENTAL P & L (UP TO 9)
- STATEMENT OF CHANGES
- SUB-TOTALS WHERE YOU WANT
- FAST FLEXIBLE POSTING INPUT
- PERCENTAGE P & L

DEMO

COMBINATION SPECIALS

1 A/R & G/L FOR $200.00
2 A/R, A/P & G/L FOR $225.00
HARD DISK VERSION SLIGHTLY MORE

H.D.P.

LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM

Circle 381 on Reader Service card.

TRS-80 COMPUTERS

BODEX CORP.

MODEL 1000 ..... $979.00
Mem Board..... $233.00
2nd Drive $140.00
128K Mem $75.00
MODEL 1200 ..... CALL
MODEL IV..... $959.00
MODEL IV P
(LIMITED SUPPLY) .. $850.00
MODEL 2000 ..... CALL
MODEL 100 8K..... $339.00
MODEL 100 24K..... $409.00
MODEL 200 ..... $799.00

OKIDATA
92 ..... $379.00 93 ..... $575.00

STAR GEMINI PRINTERS
SG10....$239.00 SG15... $379.00

ALL TRS-80 PRINTERS

BODEX CORP.

224 E. Main St.
Marlboro, MA 01752
Phone (617) 485-5115 or 481-1027
TRS-80 Trademark of TANDY

Listing 2 continued

```
701A 0618     00270          LD B,24
701C CD4088   00280          CALL 4088H        ;INPUT LINE INTO (HL)
701F 215272   00290          LD HL,OMSG
7022 CD1B02   00300          CALL 021BH
7025 21EE71   00310          LD HL,ODCB
7028 0618     00320          LD B,24
702A CD4088   00330          CALL 4088H        ;INPUT LINE INTO (HL)
702D 215573   00340          LD HL,IBUFFR
7030 11AE71   00350          LD DE,IDCB
7033 0601     00360          LD B,1
7035 CD2444   00370          CALL 4424H        ;OPEN INPUT FILE
7038 C26872   00380          JP NZ,DSKERR
703B 3E01     00390 ONXT     LD A,1
703D 32B771   00400          LD (IDCB+9),A     ;MAKE LRL = 1
7040 216574   00410          LD HL,BUFFER
7043 FD216574 00420          LD IY,BUFFER      ;INITIALIZE IY POINTER
7047 11EE71   00430          LD DE,ODCB
704A 0600     00440          LD B,0
704C CD2044   00450          CALL 4420H        ;CREATE OUTPUT FILE
704F C26872   00460          JP NZ,DSKERR
7052 0613     00470 RD19     LD B,19
7054 216C71   00480          LD HL,CFTBL2
7057 C5       00490 RD19LP   PUSH BC
7058 E5       00500          PUSH HL
7059 11AE71   00510          LD DE,IDCB
705C CD3644   00520          CALL 4436H
705F C26872   00530          JP NZ,DSKERR
7062 E1       00540          POP HL
7063 C1       00550          POP BC
7064 23       00560          INC HL
7065 10F0     00570          DJNZ RD19LP
7067 0613     00580          LD B,19
7069 DD218071 00590          LD IX,MODS
706D 116C71   00600          LD DE,CFTBL2
7070 CD7E70   00610          CALL MODIFY
7073 0604     00620          LD B,4
7075 116C71   00630          LD DE,CFTBL2
7078 CD7E70   00640          CALL MODIFY
707B C38E70   00650          JP MAINLP
707E DD6E00   00660 MODIFY   LD L,(IX)
7081 DD6601   00670          LD H,(IX+1)
7084 1A       00680          LD A,(DE)
7085 77       00690          LD (HL),A
7086 DD23     00700          INC IX
7088 DD23     00710          INC IX
708A 13       00720          INC DE
708B 10F1     00730          DJNZ MODIFY
708D C9       00740          RET
708E CDEB72   00750 MAINLP   CALL GETCHR       ;GET AN ENCODED CHAR. FROM INPUT
7091 3A6B71   00760          LD A,(EOFLG)
7094 FE01     00770          CP 1              ;END OF INPUT FILE?
7096 CA7072   00780          JP Z,CLOSE        ;CLOSE FILES IF SO
7099 3A6771   00790          LD A,(OCHAR)      ;PUT CHAR READ INTO A REG.
709C FE20     00800 CH1      CP ' '            ;IS IT A SPACE?
709E CA1F71   00810          JP Z,WRTCHR
70A1 FE65     00820 CH2      CP 'e'            ;IS IT e?
70A3 CA1F71   00830          JP Z,WRTCHR
70A6 FE74     00840 CH3      CP 't'            ;IS IT t?
70A8 CA1F71   00850          JP Z,WRTCHR
70AB FE61     00860 CH4      CP 'a'            ;IS IT a?
70AD CA1F71   00870          JP Z,WRTCHR
              00880 ;CHECK IF CHARACTER= o THRU w
70B0 214971   00890 CHKE     LD HL,TABLE       ;TABLE OF CHAR. AND CODES
70B3 1E02     00900          LD E,2            ;# OF BYTES/TABLE ENTRY
70B5 060F     00910          LD B,15           ;# OF ENTRIES IN TABLE
70B7 3A6771   00920          LD A,(OCHAR)      ;= SEARCH CHAR.
              00930 ;SEARCH TABLE FOR CHAR.
70BA 1600     00940          LD D,0
70BC BE       00950 SRCH     CP (HL)
70BD CAC670   00960          JP Z,SREND        ;JUMP IF CHAR FOUND
70C0 19       00970          ADD HL,DE
70C1 10F9     00980          DJNZ SRCH
70C3 21FFFF   00990          LD HL,-1          ;FLAG FOR NOT FOUND
              01000 ;IF CHAR. FOUND IT'S ADRS IS IN HL,ELSE HL=-1
70C6 7C       01010 SREND    LD A,H
70C7 A5       01020          AND L
70C8 FEFF     01030          CP 0FFH
70CA CAD570   01040          JP Z,ESCGRP       ;JUMP IF CHAR NOT o THRU w
              01050 ;CHAR IS IN o THRU w GRP SO WRITE ASCII CODE TO BUFFER
70CD 23       01060          INC HL            ;HL POINTS TO ASCII CODE
70CE 7E       01070          LD A,(HL)
70CF 326771   01080          LD (OCHAR),A      ;PUT ASCII CODE INTO OCHAR
70D2 C31F71   01090          JP WRTCHR         ;GO WRITE IT TO OUTPUT FILE
70D5 3A6771   01100 ESCGRP   LD A,(OCHAR)      ;CHAR.= ESC CODE (00)?
70D8 B7       01110          OR A
70D9 C2EC70   01120          JP NZ,CODERR      ;JUMP IF NOT ESC. CODE
70DC 0608     01130          LD B,8
70DE CD3273   01140          CALL GCLP         ;ELSE, READ NEXT 8 BITS TO OCHAR
70E1 3A6771   01150          LD A,(OCHAR)
70E4 FE04     01160          CP 4              ;IS IT END OF FILE CODE?
70E6 CA7072   01170          JP Z,CLOSE        ;IF SO, CLOSE FILES
70E9 C31F71   01180          JP WRTCHR         ;ELSE SEND TO OUTPUT FILE
70EC 21F570   01190 CODERR   LD HL,ERRMSG      ;PRINT ERROR MSG
70EF CD1B02   01200          CALL 021BH
70F2 C37072   01210          JP CLOSE
70F5 0A       01220 ERRMSG   DEFB 0AH
70F6 2A       01230          DEFM '** DECODING ERROR **'
70F7 2A
70F8 20
70F9 44
70FA 45
70FB 43
70FC 4F
70FD 44
```

Listing 2 continued

Listing 2 continued

```
70FE 49
70FF 4E
7100 47
7101 20
7102 45
7103 52
7104 52
7105 4F
7106 52
7107 20
7108 2A
7109 2A
710A 0A         01240           DEFB 0AH
710B 20         01250           DEFM ' ABORTING PROGRAM'
710C 41
710D 42
710E 4F
710F 52
7110 54
7111 49
7112 4E
7113 47
7114 20
7115 50
7116 52
7117 4F
7118 47
7119 52
711A 41
711B 4D
711C 0A         01260           DEFB 0AH
711D 03         01270           DEFB 03
                01280 ;WRITE AN ASCII CHARACTER TO THE OUTPUT FILE
711E 00         01290 CNTR      DEFB 0          ;OUTPUT BUFFER COUNTER
711F 216771     01300 WRTCHR    LD HL,OCHAR
7122 7E         01310           LD A,(HL)
7123 FD7700     01320           LD (IY),A
7126 CD3300     01330           CALL 33H
7129 FD23       01340           INC IY
712B 3A1E71     01350           LD A,(CNTR)
712E 3C         01360           INC A
712F 321E71     01370           LD (CNTR),A
7132 FE00       01380           CP 0
7134 2010       01390           JR NZ,SKIP
7136 216574     01400           LD HL,BUFFER
7139 11EE71     01410           LD DE,ODCB
713C CD3944     01420           CALL 4439H      ;WRITE BUFF TO OUTPUT FILE
713F C26872     01430           JP NZ,DSKERR
7142 FD216574   01440           LD IY,BUFFER    ;RESET BUFFER POINTER
7146 C38E70     01450 SKIP      JP MAINLP       ;GO DECODE NEXT CHARACTER
7149 01         01460 TABLE     DEFB 1
714A 6F         01470           DEFM 'o'
714B 02         01480           DEFB 2
714C 69         01490           DEFM 'i'
714D 03         01500           DEFB 3
714E 6E         01510           DEFM 'n'
714F 04         01520           DEFB 4
7150 73         01530           DEFM 's'
7151 05         01540           DEFB 5
7152 72         01550           DEFM 'r'
7153 06         01560           DEFB 6
7154 68         01570           DEFM 'h'
7155 07         01580           DEFB 7
7156 6C         01590           DEFM 'l'
7157 08         01600           DEFB 8
7158 64         01610           DEFM 'd'
7159 09         01620           DEFB 9
715A 63         01630           DEFM 'c'
715B 0A         01640           DEFB 10
715C 75         01650           DEFM 'u'
715D 0B         01660           DEFB 11
715E 6D         01670           DEFM 'm'
715F 0C         01680           DEFB 12
7160 66         01690           DEFM 'f'
7161 0D         01700           DEFB 13
7162 70         01710           DEFM 'p'
7163 0E         01720           DEFB 14
7164 67         01730           DEFM 'g'
7165 0F         01740           DEFB 15
7166 77         01750           DEFM 'w'
7167 00         01760 OCHAR     DEFB 0
7168 00         01770 IBYTE     DEFB 0
7169 07         01780 LMB       DEFB 7
716A 00         01790 RBFLAG    DEFB 0
716B 00         01800 EOFLG     DEFB 0
0014            01810 CFTBL2    DEFS 20
7180 9D70       01820 MODS      DEFW CH1+1
7182 A270       01830           DEFW CH2+1
7184 A770       01840           DEFW CH3+1
7186 AC70       01850           DEFW CH4+1
7188 4A71       01860           DEFW TABLE+1
718A 4C71       01870           DEFW TABLE+3
718C 4E71       01880           DEFW TABLE+5
718E 5071       01890           DEFW TABLE+7
7190 5271       01900           DEFW TABLE+9
7192 5471       01910           DEFW TABLE+11
7194 5671       01920           DEFW TABLE+13
7196 5871       01930           DEFW TABLE+15
7198 5A71       01940           DEFW TABLE+17
719A 5C71       01950           DEFW TABLE+19
719C 5E71       01960           DEFW TABLE+21
719E 6071       01970           DEFW TABLE+23
71A0 6271       01980           DEFW TABLE+25
71A2 6471       01990           DEFW TABLE+27
```

Listing 2 continued

Circle 383 on Reader Service card.

LETTER - WRITER™

" Intergrated WORD PROCESSING Power "

THE "BEST" SOFTWARE IS GUARANTEED! TRY IT and LIKE IT, or GET a REFUND

The machine code disk L-W is "A" rated by Allenbach's "SOFTWARE REPORTS" for:

EASY USE, DOCUMENTATION, FEATURES

- FORM LETTERS and LABELS on any printer.
- ADD and SUB bookkeeping and tax columns.
- LEGAL PAPER LINE NUMBERING, Centering.
- Copy, move, delete, insert, merge, select.
- Screen display same as printout, unmodified M I users can see and print up/lower case.
- * MASS MAILER, graphics, cancel changes.
- SPLIT SCREEN typing line, see old and new versions, word wrap, disk warm start.
- * Over 50 "one key" INSERTION PHRASES.
- ONE MODE: Type / Edit / Delete without switching modes — NO TRAINING PERIOD.

WE PAY TAX and USA SHIPPING. Try your L-W for 3 months. Like it or return it for a refund, less our shipping costs of: $3.50.

Models I, III / IV: TAPE 16K $ 27.99
DISK 32K (* Extra Features) $ 47.99

10 Verbatim SS/DD $ 19.99, DS/DD $ 23.99
20 Microsette C-10 tapes and boxes $ 13.95

ASTRO-STAR ENTERPRISES
5905 Stone Hill Dr. Information/orders:
Rocklin, CA 95677 (916) 624-3709

Orders: 1-800-622-4070
in IL 1-800-942-7317

Circle 539 on Reader Service card.

TRS-80
DISCOUNT

Computers at Guaranteed Low Prices*

ATON CP/M FOR II, 12, 16
EPSON & NEC PRINTERS
DYSAN DISKETTES
HAYES MODEMS

Desert Sound, Inc. of California

1-800-835-5247

Factory Authorized Dealer

TRS-80 is a Reg. Trademark of Tandy Corp.

*Call for FREE CATALOG and Price Guarantee

Calif. Res. Call 619-244-6883

Circle 239 on Reader Service card.

MODULAR I/O PORT KITS
PARALLEL 8 BIT INPUT & OUTPUT •
MODELS I, III, 4 & CoCo
MODULAR DESIGN FOR ADDITION OF MULTIPLE PORTS
LATCHED OUTPUT · STATUS MONITORED BY LED'S
SWITCH SELECTABLE I/O ADDRESS
SOFTWARE DIAGNOSTICS

I/O PORT KIT INCLUDES....
4.5" × 6" Printed circuit board; All components;
Cable (connects to bus expansion port);
Diagnostic software listing (Basic); and Manual.
(Requires 5V 100ma supply)

J107K Complete I/O Port Kit	**$35**
D100K 5 Volt Power Supply	**$25**
J202K A-D/D-A Interface	**$35**
J105K Buffer Board Kit	**$25**

(1 J105K FREE FOR EVERY 4 J107K'S ORDERED)
SEND CHECK OR MONEY ORDER
D & A Research
400 Wilson Avenue
Satellite Beach, Florida 32937
305-777-1728

Circle 56 on Reader Service card.

INTELLIBURNER
EPROM-EEPROM-MICROCONTROLLER PROGRAMMER

$299 (Cable $12)

Communicates through the serial port of any personal computer. Use your PC's modem software to read, verify, or program all popular EPROMs, EEPROMs and 87xx series microcontrollers. Custom software included for most popular PCs (source included).
Other serial programmers available from **$149.** Bare PC boards with software from **$39.**

ROSS CUSTOM ELECTRONICS
1307 Darlene Way-Suite A12
Boulder City, Nevada 89005
702-293-7426
Add $3 Shipping and Handling. C.O.D.'s OK

Circle 41 on Reader Service card.

PROFILE I / III / III+ / IV+ USERS

PROAID III+ / IV+
- Relational capabilities with up to two lookup files
- Full page reports (60x132)
- Print multiple screens per page
- And more

PROAID I / III
- Dramatic time savings for large files
- Display, edit, delete records in seconds
- Add records in order without sorting
- Remove deleted records without sorting

Programs use existing files.
Price includes documentation and 30 day money back guarantee:

PROAID I / III	$50
PROAID III+	$95
PROAID IV+	under development

Write for more information or send check or money order to:
Clay Watts Software
68C North Loop
Cedar Hill, TX 75104

PROFILE is a trademark of Tandy Corp

Listing 2 continued

```
71A4 6671      02080          DEFW TABLE+29
71A6 FE72      02090          DEFW CH5+1
71A8 0D73      02100          DEFW CH6+1
71AA 1C73      02110          DEFW CH7+1
71AC 2B73      02120          DEFW CH8+1
0040           02130 IDCB     DEFS 64
0040           02140 ODCB     DEFS 64
722E 0A        02150 IMSG     DEFB 0AH
722F 4E        02160          DEFM 'NAME OF FILE TO BE DECOMPRESSED = '
7230 41
7231 4D
7232 45
7233 20
7234 4F
7235 46
7236 20
7237 46
7238 49
7239 4C
723A 45
723B 20
723C 54
723D 4F
723E 20
723F 42
7240 45
7241 20
7242 44
7243 45
7244 43
7245 4F
7246 4D
7247 50
7248 52
7249 45
724A 53
724B 53
724C 45
724D 44
724E 20
724F 3D
7250 20
7251 03        02170          DEFB 03
7252 0A0A      02180 OMSG     DEFW 0A0AH
7254 4E        02190          DEFM 'NAME OF NEW FILE = '
7255 41
7256 4D
7257 45
7258 20
7259 4F
725A 46
725B 20
725C 4E
725D 45
725E 57
725F 20
7260 46
7261 49
7262 4C
7263 45
7264 20
7265 3D
7266 20
7267 03        02200          DEFB 03
7268 F6C0      02210 DSKERR   OR 0C0H
726A CD0944    02220          CALL 4409H
726D C32D40    02230          JP 402DH
               02240
7270 11AE71    02250 CLOSE    LD DE,IDCB       ;CLOSE BOTH FILES
7273 CD2844    02260          CALL 4428H
7276 C26872    02270          JP NZ,DSKERR
7279 216574    02280          LD HL,BUFFER
727C 11EE71    02290          LD DE,ODCB
727F CD3944    02300          CALL 4439H       ;WRITE REMAINING BYTES TO OUTPUT
7282 C26872    02310          JP NZ,DSKERR
7285 11EE71    02320          LD DE,ODCB
7288 CD2844    02330          CALL 4428H
728B C26872    02340          JP NZ,DSKERR
728E 3E0D      02350          LD A,0DH
7290 CD3300    02360          CALL 33H
7293 C32D40    02370          JP 402DH         ;JUMP TO DOS
               02380 ;SUBROUTINE GETS 1 BIT FROM INPUT FILE. RETURNS WITH
               02390 ;Z FLAG SET FOR ZERO, RESET FOR ONE. CARRY FLAG IS
               02400 ;SET IF EOF WAS READ.
7296 3A6A71    02410 GETBIT   LD A,(RBFLAG)    ;TIME TO READ ANOTHER BYTE
7299 FE01      02420          CP 1             ;FROM INPUT?
729B C2BA72    02430          JP NZ,GETLMB     ;JUMP IF NOT
729E 216871    02440          LD HL,IBYTE      ;READ 1 BYTE FROM INPUT FILE
72A1 11AE71    02450          LD DE,IDCB       ;TO IBYTE
72A4 CD3644    02460          CALL 4436H
72A7 CAB172    02470          JP Z,INITL       ;JUMP IF NO ERROR
72AA FE1C      02480          CP 28            ;EOF READ?
72AC C26872    02490          JP NZ,DSKERR
72AF 37        02500          SCF              ;SET CARRY IF EOF
72B0 C9        02510          RET              ;EXIT THIS ROUTINE
72B1 3E07      02520 INITL    LD A,7
72B3 326971    02530          LD (LMB),A
72B6 AF        02540          XOR A
72B7 326A71    02550          LD (RBFLAG),A
72BA 3E46      02560 GETLMB   LD A,46H
72BC 32D172    02570          LD (INS+1),A     ;INITIALIZE 'BIT b,(HL)' INSTR.
72BF 3A6971    02580          LD A,(LMB)
72C2 CB27      02590          SLA A
72C4 CB27      02600          SLA A
```

Listing 2 continued

Listing 2 continued

```
72C6 CB27      02530          SLA A
72C8 21D172    02540          LD HL,INS+1      ;MODIFY OPCODE AT INS+1
72CB B6        02550          OR (HL)
72CC 77        02560          LD (HL),A        ;INSERT BIT # TO BE TESTED
72CD 216871    02570          LD HL,IBYTE
72D0 CB46      02580 INS      BIT 0,(HL)       ;TEST STATE OF BIT IN IBYTE
72D2 F5        02590          PUSH AF          ;SAVE BIT'S STATE IN Z
72D3 3A6971    02600          LD A,(LMB)       ;DECR. BIT #
72D6 3D        02610          DEC A
72D7 326971    02620          LD (LMB),A
72DA F2E772    02630          JP P,GETST       ;JUMP IF LMB IS NOT -1
72DD 3E07      02640          LD A,7           ;ELSE SET LMB TO 7
72DF 326971    02650          LD (LMB),A
72E2 3E01      02660          LD A,1
72E4 326A71    02670          LD (RBFLAG),A
72E7 F1        02680 GETST    POP AF           ;RESTORE BIT STATE
72E8 37        02690          SCF
72E9 3F        02700          CCF              ;RESET CARRY
72EA C9        02710          RET              ;EXIT THIS ROUTINE
               02720 ;GET 1 ENCODED CHARACTER FROM INPUT FILE. CHAR IS
               02730 ;RETURNED IN OCHAR. EOFLG EQUALS 1 IF END OF FILE
               02740 ;OF INPUT FILE IS READ.
72EB AF        02750 GETCHR   XOR A
72EC 326771    02760          LD (OCHAR),A
72EF CD9672    02770          CALL GETBIT
72F2 DA4F73    02780          JP C,GCHRA
72F5 3E00      02790          LD A,0
72F7 326B71    02800          LD (EOFLG),A
72FA CA0373    02810          JP Z,GC1
72FD 3E20      02820 CH5      LD A,' '
72FF 326771    02830          LD (OCHAR),A
7302 C9        02840          RET
7303 CD9672    02850 GC1      CALL GETBIT
7306 DA4F73    02860          JP C,GCHRA
7309 CA1273    02870          JP Z,GC2
730C 3E65      02880 CH6      LD A,'e'
730E 326771    02890          LD (OCHAR),A
7311 C9        02900          RET
7312 CD9672    02910 GC2      CALL GETBIT
7315 DA4F73    02920          JP C,GCHRA
7318 CA2173    02930          JP Z,GC3
731B 3E74      02940 CH7      LD A,'t'
731D 326771    02950          LD (OCHAR),A
7320 C9        02960          RET
7321 CD9672    02970 GC3      CALL GETBIT
7324 DA4F73    02980          JP C,GCHRA
7327 CA3073    02990          JP Z,GC4
732A 3E61      03000 CH8      LD A,'a'
732C 326771    03010          LD (OCHAR),A
732F C9        03020          RET
7330 0604      03030 GC4      LD B,4
7332 C5        03040 GCLP     PUSH BC
7333 CD9672    03050          CALL GETBIT
7336 DA4B73    03060          JP C,GCLPX
7339 F5        03070          PUSH AF
733A E1        03080          POP HL
733B 7D        03090          LD A,L
733C 07        03100          RLCA
733D 07        03110          RLCA
733E 6F        03120          LD L,A
733F E5        03130          PUSH HL
7340 F1        03140          POP AF
7341 3F        03150          CCF
7342 216771    03160          LD HL,OCHAR
7345 CB16      03170          RL (HL)
7347 C1        03180          POP BC
7348 10E8      03190          DJNZ GCLP
734A C9        03200          RET              ;EXIT THIS ROUTINE
734B C1        03210 GCLPX    POP BC
734C C34F73    03220          JP GCHRA
734F 3E01      03230 GCHRA    LD A,1
7351 326B71    03240          LD (EOFLG),A
7354 C9        03250          RET
0100           03260 IBUFFR   DEFS 256
0010           03270          DEFS 16
0100           03280 BUFFER   DEFS 256
7000           03290          END START
00000 Total Errors
```

End

Tidbit #23

Even when you modify Model I Scripsit to run on a Model III, the two versions' text files aren't completely compatible. Because of differences in the way each version stores a disk file's sector count in its directory entry, modified Model I Scripsit drops 256 bytes when it reads a Model III Scripsit file.

To restore these bytes, use a disk-zap program like Super Utility to read the directory. Find the text file's directory entry and increase relative byte 14's value by 1. This makes modified Model I Scripsit think the file has one more sector. Then load Model I Scripsit, load the text file, and resave it. Now both Scripsit versions can read the file. Model III Scripsit will give the error message, "Attempt to read outside of file limits," but you can ignore it.

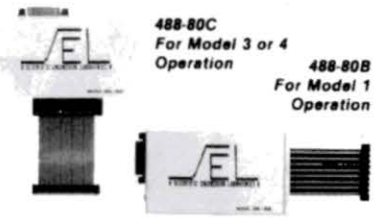
If you don't have a disk zapper, add 256 spaces, or a little more than four lines, to your Model III Scripsit files.

Thomas Quindry
Burke, VA

Circle 203 on Reader Service card.

IEEE-488 TO TRS-80* INTERFACE

Everything needed to add *powerful* BASIC GPIB-488 controller capability to TRS-80 Model 1, 3 or 4, Level 2 or DOS with a minimum of 16K.



488-80C
For Model 3 or 4 Operation

488-80B
For Model 1 Operation

Model 448-80B or 488-80C Price: $450
+ shipping, insurance & tax

WHEN ORDERING SPECIFY DISK OR TAPE

SCIENTIFIC ENGINEERING LABORATORIES
11 Neil Drive • Old Bethpage, NY 11804
Telephone: (516) 694-3370

*Trademark of Tandy Corp.

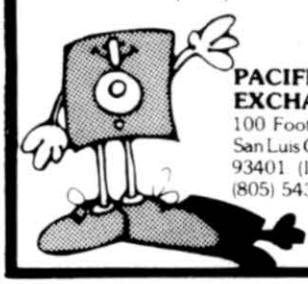
There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack.

Circle 207 on Reader Service card.

wabash®

When it comes to Flexible Disks, nobody does it better than Wabash.

MasterCard, Visa Accepted.
Call Free: (800) 235-4137



PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401 (In Cal. call (805) 543-1037.)

Subscription Problems?

80 Micro does not keep subscription records on the premises, therefore calling us only adds time and doesn't solve the problem.

Please send a description of the problem and your most recent address label to:

80Micro
Subscription Dept.
PO Box 981
Farmingdale, NY 11737

Thank you and enjoy your subscription.

Circle 506 on Reader Service card.

STAR'S NEW SPREADSHEET PRINTERS: 4 WAYS TO A BETTER BALANCE SHEET.

SR-15™ features a 16K buffer and prints at 200cps

For a better return on your computer investment, consider Star's new "S" series spreadsheet printers.

They're faster—with 20% increased throughput and an unbeatable 16K memory. And better—100% IBM® compatible, with prices that make these printers the best value in the business.

0 TO 15" IN JUST .66 SECONDS

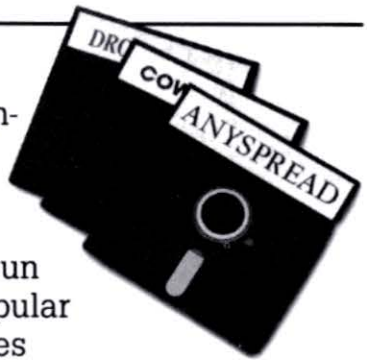
No other printer gives you greater throughput-per-dollar than Star. With the highest-speed NLQ in its class. And the best print quality in the business.

All our new business printers feature draft *and* near-letter-quality *standard* (no extra charge). So whatever the assignment, these printers come fully qualified.

16K AND NOT A BIT LESS

On all Star's new business machines, the convenience of a 16K buffer is standard. No leading spreadsheet printer has more memory. So hooking up with a Star gives your system the power to process and print at the same time.

EASY AS 1-2-3



Star's business printers are fully compatible with IBM®-PC, Apple,® and all compatibles.

They're ready to run with hundreds of popular spreadsheet packages including 1-2-3,™ General Accounting,™ dBase III™ and MultiPlan.® Even integrated formats like Framework™ and Symphony.™

All Star printers are covered by a full one year warranty on parts and labor. Plus a network of factory-trained service centers.

Faster. More memory. More flexibility. More compatibility. Greater reliability. The best print quality. And the best value in the business.

Star's spreadsheet printers give you the best-looking financial statements you've ever seen.

SD-15™ prints draft and NLQ

SG-15™ includes 16K memory for spreadsheets

star®

THE POWER BEHIND THE PRINTED WORD®

200 Park Avenue, New York, NY 10166
Chicago, IL (312) 773-3717 • Boston, MA (617) 329-8560
Irvine, CA (714) 586-8850

All trademarks (except SG-10/15, SD-10/15, SR-10/15 and Star Micronics Inc.) are proprietary to or registered trademarks of companies other than Star Micronics, Inc.

by Jack Wallace

Don't Be Late

Use critical path scheduling to bring your projects in on time.

Time, as the man says, is money. To keep a project within budget you have to bring it in on time. Critical path scheduling (CPS) is a graphing technique that tells a project manager how best to apply his resources to stay on schedule.

My CPS program analyzes a project's subtasks to find those on which the overall schedule depends (see the Program Listing). Using your inputs, the program calculates the time a project will take and produces bar charts that give you a timeline for these critical tasks (see Fig. 1).

The Path to Success

You most often find critical path scheduling applications in the shipbuilding, aerospace, and construction industries, but you can apply the technique to any project that involves completing a series of specific tasks according to a schedule.

As its name indicates, CPS finds a route, or path, through a network of tasks from a project's beginning to its end. This route shows the minimum time it takes to complete the project. Tasks along this path must start on schedule.

As an illustration of critical path scheduling, see the sample program output in Fig. 1. This typical CPS bar chart shows a 60-week construction schedule for an apartment building.

The letter C indicates the project's critical path; any schedule slip along this path delays the entire project. Each C stands for one time unit in the schedule, in this case a week. Building Design, for example, takes eight weeks and must begin the first week of the project if it's to come in on time.

The letter N indicates a noncritical task that doesn't have to start at the earliest indicated date. The dashes following the N's tell you how long a noncritical task can slip.

For example, hiring subcontractors takes four weeks (see Fig. 1). Hiring can't begin until after four weeks of design. As long as you finish hiring subcontractors by the 20th week, the project's on schedule. So the project manager has 12 weeks of slack time for this task; he can begin hiring any time from the fourth through the 16th week of the project. This overview helps a manager efficiently use resources by recognizing which tasks he must start on time and which allow some leeway.

Dissecting Your Project

The value of a CPS graph depends on the validity of your task assignments. You

```
TITLE: APARTMENT          TIME: (WEEKS)
      TASK       0         10        20        30        40        50        60
----------------+---------+---------+---------+---------+---------+---------+
DESIGN BUILDING +CCCCCCCC +         +         +         +         +         +
SUBCONTRACTORS  +    NNNN------------         +         +         +         +
EXCAVATE        +      CCCCCC       +         +         +         +         +
POUR FOUNDATION +         +  CCCCCC +         +         +         +         +
LANDSCAPE       +         +  NNNNNNNN---------------------------------------
FRAME STRUCTURE +         +         +CCCCCCCCCC         +         +         +
ENCLOSE BLDG    +         +         +         +CCCCCCCC +         +         +
PARTITIONS      +         +         +         +    NNNNNNNNNN------         +
INSTALL SYSTEMS +         +         +         +        CCCCCCCCCCC          +
INSTALL FINISH  +         +         +         +         +         +CCCCCCCCCC
----------------+---------+---------+---------+---------+---------+---------+
                0         10        20        30        40        50        60
Legend: C = critical path; N = non-critical; - = slack time.
```

Figure 1. CPS/BAS critical path schedule.

Task ID	Task Name	Task Length (weeks)	Precedence ID	Precedence Offset
1000	Design Building	8	0999	0
1010	Subcontractors	4	1000	-4
1020	Excavate	6	1000	2
1030	Pour Foundation	6	1020	0
1040	Landscape	8	1020	0
1050	Frame Structure	10	1010	0
			1030	2
1060	Enclose Building	8	1050	0
1070	Partitions	10	1060	-4
1080	Install Systems	12	1060	0
1090	Install Finish	10	1070	0
			1080	0
9999	Stop	0	1040	0
			1090	0

Table. CPS/BAS input format.

LOAD 80

System Requirements

Models I, III, 4, 1000 and 1200
32K RAM
Disk Basic
Printer optional

must break a project down into specific tasks, determine their proper order, and estimate each task's length. Since most projects undergo constant, unpredictable changes, it's often worthwhile to try out a variety of scenarios that bring a project in on time and within budget.

To use my program, you must format these task assignments as shown in the Table. These sample inputs correspond to the output in Fig. 1.

You should assign each task a four-digit identification (ID) number, a name of up to 15 characters, and a time length. In the Table, the time period is in weeks, but you can use days, months, or any other unit you choose.

Then you must determine precedences, that is, which tasks must precede others. For each task, enter the ID number of any task that must precede the current task. For example, the Table lists two precedences for Frame Structure: ID 1010 (Subcontractors) and ID 1030 (Pour Foundation).

The offset represents a time relationship between a task and a precedence. As a precedence to framing the structure, hiring subcontractors has an offset of zero weeks, meaning that framing can begin as soon as you've hired the subcontractor.

Photo 1. CPS/BAS main menu.

Photo 2. CPS/BAS parameter table.

```
10 CLEAR:DEFINT A-Z
220 PRINT "<<";TAB(36)"Entry format:";TAB(79)">>";:PRINT
"<<";TAB(20) "(L)etter - Hit 'L', ENTER key not required";
TAB(79)">>";:PRINT "<<";TAB(31)"Hit CLEAR key to escape";
TAB(79)">>";
230 PRINT "<<";TAB(21)"<ENTER> - ENTER key required for
entry"; TAB(79)">>";
260 PRINT STRING$(40,"<"); STRING$(40,">");:RETURN
570 IF P$="0" THEN 590
1020 PRINT TAB(65)O$:P=P+8:M=M+1:IF M=16 THEN GOSUB 1090:
M=0
2750 PRINT TAB(17) "(Terminate precedence input by 0,0
<ENTER>)":PRINT:PRINT:PRINT:PRINT:PRINT:RETURN

Add TAB(10) to all PRINT and PRINT TAB locations.  For
example, line 980 should be:
980 PRINT TAB(10) T$; TAB(17) LEFT$(T$(I),4); TAB(14)
RIGHT$(T$(I),LC-4); TAB(44) L$(I);:IF I=1 THEN M=M+1:
PRINT: GOTO 1040
```

Figure 2. Modifications to CPS/BAS for the Models 4 and 1000.

Change the PRINT @ locations by the following table. In some lines, the variable P is assigned the location. On the Model 1000, insert the LOCATE r,c: command before the PRINT and delete the @location,. When the P is assigned the location variable, assign P the row location, and Q the column location. For example: P=23:Q=12: LOCATE P,Q:PRINT

Model III	Model 4	Model 1000 Row, Column	
520	817	12	15
533	830	12	28
535	832	12	30
536	833	12	31
537	834	12	32
654	888	10	18
960	1684	23	15
961	1685	23	16
966	1690	23	21
968	1692	23	23
970	1694	23	25
972	1696	23	22
980	1704	23	26
982	1706	23	28

Figure 3. Additional modifications for the Models 4 and 1000.

Pouring the foundation has an offset to framing the building of two weeks, because the concrete must set for two weeks before framing starts.

If a task can begin while a precedence is in progress, the offset has a negative value. This is illustrated under Partitions (ID 1070): the precedence task, Enclose Building (ID 1060), has an offset of −4, indicating that you can begin partitioning the building four weeks before it's completely enclosed.

You can define tasks and assign ID numbers, lengths, and precedences as you please, with a few minor restrictions. Your first task must use 0999, a dummy number, as a precedence. Your last task must be 9999 Stop, as in the Table.

You must assign all tasks as a precedence somewhere in the schedule; if you haven't assigned a task as a precedence by the end of your list, include it as a precedent under 9999 Stop. In the Table, Landscaping and Installing Finish don't precede any tasks, so they're assigned as precedences under Stop.

Entering Your Data

The program fits in a 32K RAM disk-based system, which gives you a maximum of 40 tasks. If you have a 48K system, you can add capacity for more tasks by modifying the Dimension statement in line 120 for up to 100 tasks. Figures 2 and 3 list modifications for the Models 4 and 1000.

When you load and run the program, it displays the menu shown in Photo 1. To invoke its options (or any submenu options) press the letter key in parentheses; you don't have to press the enter key.

Use the keyboard Data Entry option to type in project information in the format de-

scribed above. The program prompts you for each task's ID number and name, length, precedences, and offset.

After you enter task 9999 Stop, the program automatically returns you to the main menu. Use the Save option to save your data to disk.

The Edit/Review feature displays your inputs and gives you the options of editing, deleting, or inserting tasks. However, if you delete or insert a task, the program doesn't delete or insert it as a precedence; you have to do this separately using the edit option.

Once you're satisfied with your inputs, you can select the Critical Path Computation option. After a brief calculation period, the program displays a menu with these options: (P)arameter table, (S)chedule, (R)eturn to data I/O options, (E)nd program.

The Parameter Table option gives you a printout or screen display of the early and late start times and slack time for each task (see Photo 2). If you compare Photo 2 with Fig. 1, you'll see that tasks on the critical path have a slack time of zero and their early and late start times are the same.

Hiring subcontractors, a noncritical task, can start as early as week 4 or as late as week 16; its slack time is 12 weeks.

The Schedule option gives you a screen display or printout of a bar chart like that in Fig. 1. It's subroutine prompts you for a project title and its time base (weeks, days, or whatever).

The Return to Data I/O option takes you back to the main menu so you can modify inputs after evaluating your results.■

Jack Wallace has been working with computers since the 1950s. He's currently a staff engineer in the aerospace industry. You can write to him at 3000 W. Speedway Blvd., Tucson, AZ 85745.

Program Listing. CPS/BAS critical path scheduling program.

```
10 CLEAR 2000:DEFINT A-Z
20 AN$="":PI$="":PH$="":K$="":P$="":D$="":N$="":E$="":K1$="":
   I$="":O$="":C$="":T$="":F$="":LC=0:LL=0:L=0:I=0:P=0:S=0:
   E=0:J=0:M=0:N=0:K=0:C=0:C1=0: C2=0:C3=0:C4=0:C5=0:X=0:Y=0:
   O=0
30 DIM E(40),T$(40),L$(40),P$(40),P(40,40),S(40,2)
40 GOSUB 200  ' Display heading
50 PRINT:PRINT TAB(20)"DATA OPTIONS:"
60 PRINT TAB(24) "(K)eyboard data entry"
70 PRINT TAB(24) "(L)oad data"
80 PRINT TAB(24) "(S)ave data"
90 PRINT TAB(24) "(E)dit/review data"
100 PRINT TAB(24) "(C)ritical path computation"
110 GOSUB 290 :IF K$="K" THEN 480 ELSE IF K$="L" THEN 770 ELSE
    IF K$="E" THEN 940 ELSE IF K$="C" THEN 340 ELSE IF K$="S"
    THEN 1610 ELSE 40
120 ' OUTPUT OPTIONS
130 K$="":GOSUB 200  ' display heading
140 PRINT:PRINT TAB(25)"DISPLAY OPTIONS"
150 PRINT TAB(24) "(P)arameter table"
160 PRINT TAB(24) "(S)chedule"
170 PRINT TAB(24) "(R)eturn to data I/O options"
180 PRINT TAB(24) "(E)nd program"
190 GOSUB 290:IF K$="P" THEN 2430 ELSE IF K$="S" THEN 1700 ELSE
    IF K$="T" THEN 1610 ELSE IF K$="R" THEN 40 ELSE IF K$="E"
    THEN CLS:END ELSE 140
200 ' CPS HEADING
210 CLS:PRINT TAB(20)"CRITICAL PATH SCHEDULING":GOSUB 250
220 PRINT "<<";TAB(26)"Entry format:";TAB(62)">>";:PRINT "<<";
    TAB(10)"(L)etter - Hit 'L', ENTER key not required";
    TAB(62)">>";:PRINT "<<";TAB(21)"Hit CLEAR key to escape";
    TAB(62)">>";
230 PRINT "<<";TAB(11)
    "<ENTER> - ENTER key required for entry";TAB(62)">>";
240 GOSUB 250  :RETURN
250 ' HASH MARK
260 PRINT STRING$(32,"<");STRING$(32,">");:RETURN
270 ' RESUME MESSAGE
280 PRINT @980,"Hit space bar to continue";:GOSUB 290  :RETURN
290 ' SINGLE KEY ENTRY
300 K$=INKEY$:IF K$="" THEN 300  ELSE IF ASC(K$)=31 THEN 130
310 RETURN
320 'WORKING MESSAGE
330 CLS:PRINT @537,"*** WORKING ***";:RETURN
340 ' COMPUTE STARTS & TOTAL TIME
350 GOSUB 1410 ' Compute early starts
360 C=S(N,1)+VAL(L$(N))
370 GOSUB 1520 ' Compute late starts
380 GOTO 120
390 ' ERASE BOTTOM LINE ON SCREEN
400 PRINT @960,STRING$(63," ");:RETURN
410 ' KEYBOARD DIGIT COUNTER
420 D$=""
430 GOSUB 290 :IF ASC(K$)=8 THEN K$="":L=LEN(D$): IF L=0 OR L=1
    THEN D$="":GOTO 450 ELSE D$=LEFT$(D$,L-1):GOTO 450
440 IF ASC(K$)=13 THEN 470  ELSE D$=D$+K$
450 PRINT @P+LEN(PH$)+LEN(PI$),D$;" ";
460 FOR K=1 TO 150:NEXT:IF LEN(D$)<>D THEN 430
470 GOSUB 390  :RETURN
480 ' KEYBOARD ENTRY
490 L$(1)="00":T$(1)="0999START":P$="":
    FOR I=2 TO N:FOR J=1 TO N:P(I,J)=0:NEXT J:T$(I)="":P$(I)=""
    :S(I,1)=0:S(I,2)=0:NEXT I
500 FOR I=2 TO 100
510 GOSUB 2730 :PRINT TAB(44)"1   1            15"
520 PRINT TAB(44)"+  ++---+----+----+"
530 PRINT ;:INPUT "<ENTER> Task ID+name(4 digits+15 char max)";
    T$(I):LC=LEN(T$(I))
540 IF LEFT$(T$(I),4)="9999" THEN L$(I)="00":GOTO 560
550 GOSUB 2730 :PRINT TAB(15);:
    INPUT "<ENTER) Length (time) of task";L$(I):
    LL=LEN(L$(I)):IF LL=1 THEN L$(I)="0"+L$(I)
560 GOSUB 2730 :PRINT TAB(1);:INPUT
    "<ENTER> Precedence ID (4 digits), Offset ";P$,O
570 IF P$="" THEN 590
580 GOSUB 710 :IF E=0 THEN P(I,J)=5000+O:P$="":GOTO 560 ELSE
    P(I,J)=0:P$="":GOTO 560
590 IF LEFT$(T$(I),4)="9999" AND L$(I)="00" THEN 610
600 NEXT I
610 N=I:N$=STR$(N):GOSUB 620  :GOTO 40
620 ' GENERATE PRECEDENCE STRING P$(I) WITH OFFSETS
630 FOR I=2 TO N:P$(I)="":C=0
640 FOR J=1 TO I-1
650 IF P(I,J)=0 THEN 670  ELSE O$=RIGHT$(STR$(P(I,J)),4)
660 P$(I)=P$(I)+LEFT$(T$(J),4)+O$:C=C+1
670 NEXT J
680 C$=STR$(C):L=LEN(C$)-1:C$=RIGHT$(C$,L):IF L=1 THEN C$="0"+C$
690 P$(I)=C$+P$(I)
700 NEXT I:RETURN
710 ' VERIFY PRECEDENCE(S)
720 FOR J=1 TO I-1
730 E=0:IF P$=LEFT$(T$(J),4) THEN 760
740 NEXT
750 E=1:PRINT:PRINT P$;"DOES NOT PRECEDE ";T$(J):
    PRINT "<ENTER> to continue.";:INPUT Y
760 RETURN
770 '  LOAD FROM DISK
780 CLS:GOSUB 200  :PRINT @530,"*** Load data from disk? ***";
790 GOSUB 900:ON ERROR GOTO 920:CLS:PRINT @537,"*** READING ***";
800 OPEN "I",1,P$:INPUT #1,N$:N=VAL(N$)
810 FOR L=1 TO N
820 INPUT #1,T$(L)
```

Listing continued

Circle 279 on Reader Service card.

PRINTER OWNERS

Letters are received here on a regular basis from customers saying how much they really enjoy receiving our lists.

It's probably safe to say that the price lists issued here are different from most of the others. Maybe it's the chatty folksy style of writing? Perhaps it's the low, almost unbelievable, prices on printer cartridges? Again, it could be dealing with a dealer that understands the hobby Computer user and really cares about what you think?

Send your name and address today for a rather fat envelope of printer and computer related offers.

ZYGOTRON
P.O. Box 27
Fremont, Michigan 49412

Listing continued

```
830 INPUT #1,P$(L)
840 INPUT #1,L$(L)
850 NEXT:CLOSE:GOSUB 320  :GOSUB 860  :GOTO 40
860 ' ESTABLISH PECEDENCES & OFFSETS
870 FOR I=2 TO N:P=3:FOR J=1 TO N:P(I,J)=0:NEXT J
880 FOR L=1 TO VAL(LEFT$(P$(I),2)):P$=MID$(P$(I),P,4):GOSUB 710
    :P(I,J)=VAL(MID$(P$(I),P+4,4)):P=P+8:NEXT L
890 NEXT I:ON ERROR GOTO 2630 :RETURN
900 '  DISK FILE NAME
910 PH$="":PI$="<ENTER> File name (8 chars. max.): ":P=654:
    PRINT @P,PI$;:D=15:GOSUB 410  :P$=D$:RETURN
920 ' FILE MESSAGE
930 PRINT @535,"** FILE NOT FOUND **";:GOTO 790
940 ' REVIEW-MODIFY DATA
950 GOSUB 2630 :M=0:FOR I=S TO N
960 P=3:LC=LEN(T$(I)):T$=STR$(I):LL=LEN(T$):
    IF LL=2 THEN T$=" 00"+RIGHT$(T$,1) ELSE IF LL=3 THEN
    T$=" 0"+RIGHT$(T$,2) ELSE T$=" "+RIGHT$(T$,3)
970 IF LC=0 THEN 1040
980 PRINT T$;TAB(7)LEFT$(T$(I),4);TAB(14)RIGHT$(T$(I),LC-4);
    TAB(34)L$(I);:IF I=1 THEN M=M+1:PRINT:GOTO 1040
990 PRINT TAB(42)LEFT$(P$(I),2);" ";
1000 P=3:FOR J=1 TO VAL(LEFT$(P$(I),2))
1010 PRINT TAB(47)MID$(P$(I),P,4);:
     O$=STR$(VAL(MID$(P$(I),P+4,4))-5000):
     IF LEN(O$)=2 THEN O$=LEFT$(O$,1)+"0"+RIGHT$(O$,1)
1020 PRINT TAB(55)O$:P=P+8:M=M+1:IF M=12 THEN GOSUB 1050 :M=0
1030 NEXT J:IF I=N THEN GOSUB 1050
1040 NEXT I:GOTO 40
1050 'EDIT OR CONTINUE
1060 PRINT @982,"(E)dit or (C)ontinue?";
1070 GOSUB 290 :IF K$="E" THEN 1100 ELSE IF K$<>"C" THEN 1070
     ELSE CLS: S=I
1080 IF I<>N THEN GOSUB 2630
1090 RETURN
1100 '  EDIT OPTIONS
1110 GOSUB 390 :PRINT @960,
     "(I)nsert after task, (D)elete task or (E)dit task";
1120 GOSUB 290  :K1$=K$:IF K1$<>"I" AND K1$<>"D" AND K1$<>"E" THEN 1110
1130 PH$="task no. 'N' (3 digits): ":IF K$="I" THEN
     PI$="Insert after " ELSE IF K$="D" THEN PI$="Delete "
     ELSE PI$="Edit "
1140 GOSUB 390 :P=970:D=3:PRINT @P,PI$;PH$;:GOSUB 410
     :AN=VAL(D$): AN$=D$
1150 IF K1$="D" THEN 1260 ELSE IF K1$="I" THEN 1180
1160 GOSUB 390 :PRINT @961,"Edit task ";AN$;
     " (N)ame, (L)ength, or (P)recedence(s)+offset(s)?";
1170 GOSUB 290 :IF K$="L" THEN 1310 ELSE IF K$="P" THEN 1350
     ELSE IF K$="N" THEN 1280 ELSE 1160
1180 ' TASK INSERTION
1190 N=N+1:FOR L=N TO AN+2 STEP -1:T$(L)=T$(L-1):L$(L)=L$(L-1):
     P$(L)=P$(L-1):FOR K=N TO 1 STEP -1:P(L,K)=P(L-1,K):NEXT K,L
1200 I=AN+1:T$(I)="":L$(I)="":P$(I)="":FOR K=1 TO N:
     P(I,K)=0:NEXT K:S(I,1)=0:S(I,2)=0
1210 PH$="<ENTER> Task ID+name(4 dgt ID+15 char max)":
     PI$="":P=960:D=19:PRINT @P,PH$;:GOSUB 410  :T$(I)=D$
1220 PH$="Input task length (2 digits) ":P=972:D=2:
     PRINT @P,PH$;:GOSUB 410  :L$(I)=D$
1230 PH$="Input precedence QTY (2 digits): ":GOSUB 390  :
     P=970:D=2:PRINT @P,PH$;:GOSUB 410  :P$(I)=D$:D0=VAL(D$)
1240 PH$="<ENTER> precedence ID, offset: ":P=961:D=8:
     PRINT @P,PH$;:GOSUB 410  :D0=D0-1:L=LEN(D$):
     P$(I)=P$(I)+LEFT$(D$,4):O=VAL(RIGHT$(D$,L-5))+5000:
     P$(I)=P$(I)+RIGHT$(STR$(O),4):IF D0>0 THEN 1240
1250 GOSUB 320  :GOSUB 860  :CLS:GOTO 950
1260 '  TASK DELETION
1270 FOR L=AN TO N-1:T$(L)=T$(L+1):L$(L)=L$(L+1):P$(L)=P$(L+1):
     NEXT L:FOR L=1 TO AN-1:P(AN,L)=0:NEXT L:T$(N)="":P$(N)="":
     L$(N)="":S(AN,1)=0:S(AN,2)=0:N=N-1:CLS:GOTO 950
1280 '  TASK NAME EDIT
1290 GOSUB 390  :PRINT @960,
     "Task: ";AN$;". <ENTER> new name (15 char. max.)";:
     INPUT PI$:T$(AN)=LEFT$(T$(AN),4)+PI$
1300 CLS:GOTO 950
1310 '  TASK LENGTH EDIT
1320 PH$="Length of task ":
     PI$=". Input new length (2 digits):"
1330 GOSUB 390 :PRINT @961,PH$;AN$;" = ";L$(AN);PI$;:P=968:D=2:
     GOSUB 410 :L$(AN)=D$
1340 CLS:GOTO 950
1350 '  TASK PRECEDENCE EDIT
1360 I=AN:FOR J=1 TO I:P(I,J)=0:NEXT:PH$="For task ":
     PI$="Input precedence QTY (2 digits)"
1370 GOSUB 390 :PRINT @961,PH$;AN$;" ";PI$;:P=966:D=2:GOSUB 410
     :P$(I)=D$:D0=VAL(D$)
1380 PI$=" <ENTER> precedence ID, offset:    ":GOSUB 390:
     P=961:PRINT @P,PH$;AN$;PI$;:D=10:GOSUB 410
1390 D0=D0-1:L=LEN(D$):P$(I)=P$(I)+LEFT$(D$,4):
     O=VAL(RIGHT$(D$,L-5))+5000:
     P$(I)=P$(I)+RIGHT$(STR$(O),4):IF D0>0 THEN 1380
1400 P=3:FOR L=1 TO VAL(LEFT$(P$(I),2)):P$=MID$(P$(I),P,4):
     GOSUB 710:P(I,J)=VAL(MID$(P$(I),P+4,4)):P=P+8:NEXT L:
     CLS:GOTO 950
1410 ' COMPUTE EARLY START
1420 GOSUB 320
1430 FOR I=1 TO N
1440 E=0
1450 FOR J=1 TO N
1460 IF P(I,J)=0 OR E=>E(J) THEN 1480
1470 E=E(J)+(P(I,J)-5000)
1480 NEXT J
1490 S(I,1)=E
1500 E(I)=E+VAL(L$(I))
1510 NEXT I:RETURN
```

Listing continued

Circle 449 on Reader Service card.

The
Master Handicapper™
Series by Professor Jones

EVALUATES FROM RACING FORM!

PROGRAM

GLD. Thoroughbred "Gold" Edition™
A "Full" featured thoroughbred analysis designed for the professional and serious novice. **$159.95** complete

EGLD. Enhanced "Gold" Edition™
"Gold" Edition with complete Master Bettor™ system integrated onto the same disk. This powerful program will transfer all horses and scores to the bet analysis with a "single keystroke".
(Master Bettor™ included) **$199.95** complete

GLTD. Limited "Gold"™
Enables **Professional Handicappers** to assign specific values to the racing variables "they" feel are important.

PROFESSIONAL HANDICAPPING SYSTEMS

%	%	%
Age 5	Consistency 15	Speed 10
Class 15	Jockey 15	Workouts 0
Condition 10	Trainer 5	Time of Year 0
Earnings 5	Post 10	Consistency 5
100%	Is Everything OK (Y/N)	

Create program weight based on a particular track and fine tune it for **maximum** win percentage. This program is designed for "ease of use". The user needs **no programming experience.**
(contains integrated Bettor™) **$299.95** complete

GD. Gold Dog Analysis™
The only professional dog handicapper on the market. Includes:

1) Speed	6) Condition
2) Post Today	7) Running Style
3) Kennel	8) Weight
4) Post Last	9) All new internal weighting
5) Distance	10) NEW class indicator

If you are near a greyhound track, *you can't afford not to use this program.*
$149.95 complete
(with integrated Master Bettor™) **$199.95**

Limited Dog™ $299.95

MHH. Master Harness Handicapper™
Professional software designed to provide a thorough analysis of all trotter and pacer races in North America and Canada. Features:

Class	Post Positions	Time Finish
Driver	Track Conditions	Time Last Quarter
Days Since Last	Trainer	Track Rating
Gender	Time ¼	Temp Allowance

$159.95 complete w/integrated Master Bettor™ **$199.95**

PPX. Professor Jones' Football Predictor, Prof. Pix™
Complete Football Analysis with **Data-Base.**

1) Overlays	4) "Over/Under" bets
2) Point Spreads	5) Data Base Stats
3) "Super Plays"	6) Holds "100" teams

Highest percentage of winners 1983

$39.95 complete
$99.95 with Data Base Management

NBA. Basketball™
This data base managed analysis will provide the user with "ALL" betting situations while storing relevant information on the disk.
$99.95 complete w/Manual **$129.95** NBA/College Version

LOT. LOTTERY ANALYSIS™
Statistical comparison program designed to detect subtle patterns in winning lottery numbers.
$79.95 complete w/Manual **$99.95** with Lotto

BROCHURE AVAILABLE

Send check / money order / VISA / Mastercharge (Include expiration date) to:

Prof. Jones
1940 W. State St.
Boise, ID 83702

TELEPHONE
(208) 342-6939

VISA MasterCard

TERMS: FREE SHIPPING ALL SOFTWARE. Add $6.00 hardware / $6.00 C.O.D. / UPS Blue $6.00 / Out of Country $9.00 / ID Residents 4% / 3 weeks personal checks / Cash price only, add 2% Visa, MC / Prices subject to change.

IBM, APPLE, TRS-80, C-64 AND OTHERS

Moving?

Subscription Problems?

Get help with your subscription by calling our new toll free number:

1-800-645-9559*

between 9 a.m. and 5 p.m. EST, Monday–Friday.

If possible, please have your mailing label in front of you as well as your cancelled check or credit card statement if you are having problems with payment.

If moving, please give both your old and new addresses.

*New York State residents call 1-800-732-9119.

Foreign Dealers

You have a large technical audience that speaks English and is in need of the kind of microcomputer information that ***CW Communications/Peterborough*** provides.

Provide your audience with the magazines they need and make money at the same time.

For details on selling ***80 Micro***, ***InCider***, ***HOT CoCo***, and ***RUN*** contact:

SANDRA JOSEPH WORLD WIDE MEDIA
380 PARK AVE. SOUTH
NEW YORK, N.Y. 10016
PHONE-(212) 686-1520 TELEX-620430

Listing continued

```
1520 '  COMPUTE LATE START
1530 FOR J=N TO 1 STEP -1
1540 L=C
1550 FOR I=1 TO N
1560 IF P(I,J)=0 OR L<=S(I,2)+(P(I,J)-5000) THEN 1580
1570 L=S(I,2)-(P(I,J)-5000)
1580 NEXT I
1590 S(J,2)=L-VAL(L$(J))
1600 NEXT J:RETURN
1610 ' WRITE TO DISK
1620 CLS:GOSUB 200  :PRINT @530,"*** Save data on disk? ***";:
     GOSUB 900
1630 CLS:PRINT @537,"*** WRITING ***";
1640 OPEN "O",1,F$:N$=STR$(N):PRINT #1,N$
1650 FOR L=1 TO N
1660 PRINT #1,T$(L)
1670 PRINT #1,P$(L)
1680 PRINT #1,L$(L)
1690 NEXT:CLOSE:GOTO 40
1700 ' SCHEDULE PRINT
1710 CLS:PRINT @533,"(S)creen or (P)rinter?";:GOSUB 290
1720 IF K$="P" THEN 1980 ELSE IF K$<>"S" THEN 1710
1730 ' Screen print
1740 GOSUB 2350
1750 PRINT TAB(6)"TASK";:FOR K=0 TO C1:PRINT TAB(15+K*10)K*10*C4;
    :NEXT:PRINT:PRINT "----------------+";
1760 FOR K=0 TO C1-1:PRINT TAB(17+K*10)"---------+";:NEXT:PRINT
1770 FOR I=2 TO N-1
1780 LC=LEN(T$(I))
1790 PRINT RIGHT$(T$(I),LC-4);TAB(16)"+";
1800 K=S(I,1):GOSUB 2310
1810 IF S(I,1)-S(I,2)<>0 THEN 1820 ELSE 1900
1820 IF K>S(I,1)+VAL(L$(I))-1 THEN 1860
1830 IF K/C4=INT(K/C4) THEN PRINT TAB(17+K/C4)"N";
1840 K=K+1
1850 GOTO 1820
1860 IF K>S(I,2)+VAL(L$(I))-1 THEN 1940
1870 IF K/C4=INT(K/C4) THEN PRINT TAB(17+K/C4)"-";
1880 K=K+1
1890 GOTO 1860
1900 IF K>S(I,1)+VAL(L$(I))-1 THEN 1940
1910 IF K/C4=INT(K/C4) THEN PRINT TAB(17+K/C4)"C";
1920 K=K+1
1930 GOTO 1900
1940 GOSUB 2260 :PRINT
1950 NEXT I:PRINT "----------------+";:FOR K=0 TO C1-1:
     PRINT TAB(17+K*10)"---------+";:NEXT:PRINT
1960 PRINT "C = critical path; N = non-critical; - = slack time"
1970 GOSUB 270  :GOTO 120
1980 '  Line printer
1990 GOSUB 2350 ' heading subroutine
2000 LPRINT TAB(6)"TASK";:FOR K=0 TO C1:LPRINT TAB(15+K*10)K*10*C4;
     :NEXT:LPRINT
2010 LPRINT "----------------+";
2020 FOR K=0 TO C1-1
2030 LPRINT TAB(17+K*10)"---------+";
2040 NEXT K:LPRINT
2050 FOR I=2 TO N-1
2060 LC=LEN(T$(I))
2070 LPRINT RIGHT$(T$(I),LC-4);TAB(16)"+";
2080 K=S(I,1):GOSUB 2310 :
     IF (S(I,1)-S(I,2))<>0 THEN 2090 ELSE 2170
2090 IF K>(S(I,1)+VAL(L$(I))-1) THEN 2130
2100 IF K/C4=INT(K/C4) THEN LPRINT TAB(17+K/C4)"N";
2110 K=K+1
2120 GOTO 2090
2130 IF K>(S(I,2)+VAL(L$(I))-1) THEN 2210
2140 IF K/C4=INT(K/C4) THEN LPRINT TAB(17+K/C4)"-";
2150 K=K+1
2160 GOTO 2130
2170 IF K>(S(I,1)+VAL(L$(I))-1) THEN 2210
2180 IF K/C4=INT(K/C4) THEN LPRINT TAB(17+K/C4)"C";
2190 K=K+1
2200 GOTO 2170
2210 GOSUB 2260 :LPRINT
2220 NEXT I
2230 LPRINT "----------------+";:FOR K=0 TO C1-1:
     LPRINT TAB(17+K*10)"---------+";:NEXT:LPRINT
2240 FOR K=0 TO C1:LPRINT TAB(15+K*10)K*10*C4;:NEXT:LPRINT
2250 LPRINT
     "Legend: C = critical path; N = non-critical; - = slack time."
     :LPRINT:LPRINT:GOTO 120
2260 ' POSTSCHEDULE MARKERS
2270 IF K/C4>(C1*10) THEN 2310
2280 FOR L=10 TO C1*10 STEP 10
2290 IF K/C4<L THEN IF K$="P" THEN LPRINT TAB(L+16)"+"; ELSE
     PRINT TAB(L+16)"+";
2300 NEXT L:RETURN
2310 'PRESCHEDULE MARKERS
2320 FOR L=10 TO C1*10 STEP 10
2330 IF K/C4>L-1 THEN IF K$="P" THEN LPRINT TAB(L+16)"+"; ELSE
     PRINT TAB(L+16)"+";
2340 NEXT L:RETURN
2350 'CHART TITLE
2360 CLS:PRINT @520,"";:INPUT "<ENTER> Chart title:";C$
2370 CLS:PRINT @520,"";:
     INPUT "<ENTER> Time units:(weeks, hrs. etc.)";T$
2380 IF (K$="P" AND C>60) OR (K$="S" AND C>40) THEN C3=INT(C/2+.5)
     ELSE C3=C
2390 C1=INT(C3/10+.9):C4=INT(C/C3+.5):C5=C4
2400 POKE 16916,0:CLS
2410 IF K$="S" THEN PRINT "TITLE: ";C$;TAB(25)"TIME: (";T$;")" ELSE
      LPRINT "TITLE: ";C$;TAB(25)"TIME: (";T$;")"
2420 RETURN
```

Listing continued

Listing continued

```
2430 '  PRINT PARAMETER TABLE
2440 CLS:PRINT @533,"(S)creen or (P)rinter?";:GOSUB 290
2450 IF K$="P" THEN 2530 ELSE IF K$<>"S" THEN 2440
2460 ' Screen print
2470 GOSUB 2680 :FOR I=2 TO N-1
2480 LC=LEN(T$(I))
2490 PRINT TAB(1)RIGHT$(T$(I),LC-4);TAB(24)L$(I);
     TAB(34)S(I,1);TAB(45)S(I,2);TAB(56)S(I,2)-S(I,1)
2500 IF I<>N-1 AND (I-1)/10=INT((I-1)/10) THEN GOSUB 270  :GOSUB 2680
2510 NEXT I
2520 GOSUB 270  :GOTO 120
2530 ' Line Printer
2540 PH$="### PARAMETERS ###":LPRINT TAB(22)PH$:GOSUB 2350
2550 LPRINT TAB(34)"<----STARTS--->"
2560 LPRINT TAB(6)"TASK";TAB(22)"LENGTH";TAB(34)"EARLY";
      TAB(45)"LATE";TAB(56)"SLACK"
2570 LPRINT "==================";TAB(21)"========";
     TAB(33)"=======";TAB(44)"======";TAB(55)"======="
2580 FOR I=2 TO N-1
2590 LC=LEN(T$(I))
2600 LPRINT TAB(1)RIGHT$(T$(I),LC-4);TAB(24)L$(I);
     TAB(34)S(I,1);TAB(45)S(I,2);TAB(56)S(I,2)-S(I,1)
2610 NEXT I
2620 LPRINT:LPRINT TAB(20)"Time of completion:";STR$(C);
     " time units.":LPRINT:LPRINT:LPRINT:GOTO 120
2630 ' EDIT/REVIEW HEADING
2640 CLS:PRINT " <------------ TASK (N) ------------->";
     TAB(43)"PRECENDENCE(S)"
2650 PRINT " (N)";TAB(6)"ID NO.";TAB(20)"NAME"TAB(32)"LENGTH";
     TAB(41)"QTY  ID NO.";TAB(54)"OFFSET"
2660 PRINT " ===";TAB(7)"====";TAB(14)"===============";
     TAB(32)"======";TAB(41)"===  ====";TAB(54)"======"
2670 S=1:FOR Y=0 TO 5:SET(1,Y):SET(76,Y):NEXT:RETURN
2680 ' PARAMETER TABLE HEADING
2690 CLS:PRINT "<";TAB(23)"### PARAMETERS ###";TAB(63)">";:
     GOSUB 250
2700 PRINT "TIME OF COMPLETION:";STR$(C);" time units";
     TAB(34)"<----STARTS--->"
2710 PRINT TAB(6)"TASK";TAB(22)"LENGTH";TAB(34)"EARLY";
     TAB(45)"LATE";TAB(56)"SLACK"
2720 PRINT "==================";TAB(21)"========";
     TAB(33)"=======";TAB(44)"======";TAB(55)"=======";
     RETURN
2730 ' START/STOP MESSAGE
2740 CLS:PRINT TAB(26)"*** NOTE ***":IF I>2 THEN PRINT TAB(12)
     "Your last task entered must be 9999STOP" ELSE PRINT TAB(4)
     "Your first precedence ID NO. must be 0999 and 0 offset"
2750 PRINT TAB(7)
     "(Terminate precedence input by pressing <ENTER>)":
     PRINT:PRINT:PRINT:PRINT:PRINT:RETURN
```

End

Circle 249 on Reader Service card.

Type fast!

Hunt and peck is fine for chickens but you can **FasType.**™

- *FasType*™ is the fun and easy way to learn to type.
- *FasType*™ teaches the TRS-80 *III/4/4P keyboard.*
- *FasType*™ is machine language fast.
- *FasType*™ is teacher written, classroom proven.
- *FasType*™ for Tandy 1000, August 1, 1985.

$39.95/disk plus $1.50 shipping. Arizona residents add 5%. Specify model. Schools ask about our network version.

FasType™

Press 'A' Software
Box 364
Jerome, AZ 86331
602-634-2688

Circle 214 on Reader Service card.

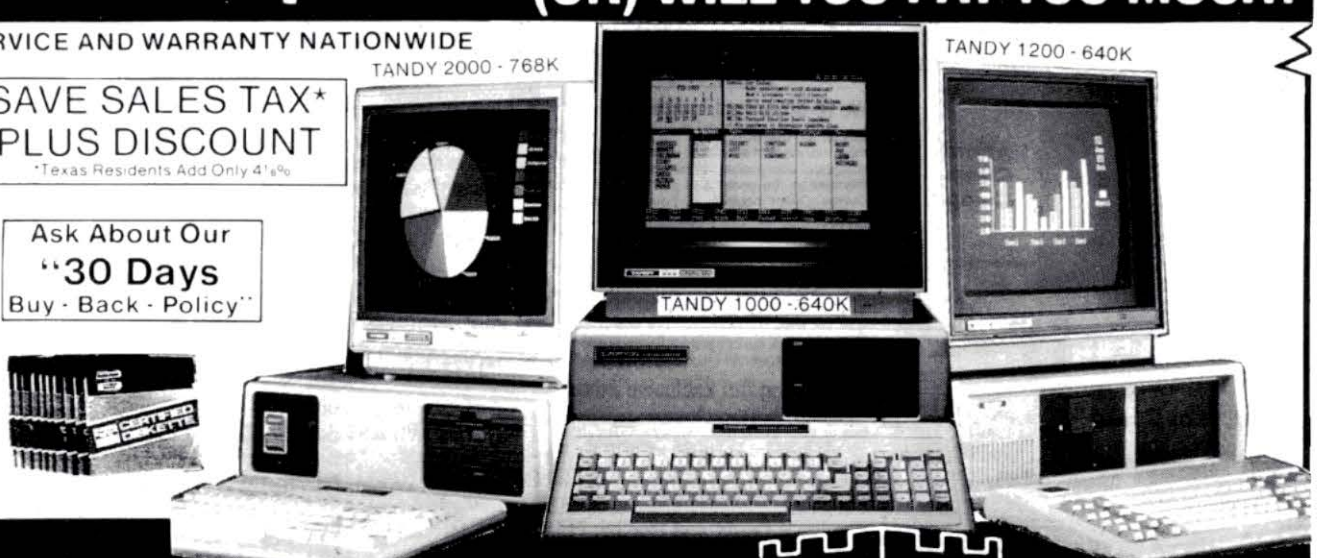
WILL YOU BUY COMPATIBLE?

IBM Compatible (OR) WILL YOU PAY TOO MUCH?

SERVICE AND WARRANTY NATIONWIDE

SAVE SALES TAX* PLUS DISCOUNT
*Texas Residents Add Only 4½%

Ask About Our "30 Days Buy - Back - Policy"



SERVICE AND WARRANTY NATIONWIDE

FORT WORTH COMPUTERS

WE ARE SERIOUS ABOUT SAVING YOU MONEY

(Located 30 miles from Fort Worth)
377 PLAZA ● GRANBURY ● NR FORT WORTH, TEXAS 76048

For Prices Call

CALL FREE NUMBER: 1-800-433-S-A-V-E

Monday thru Friday - 9:00 a.m. to 5:00 p.m. Texas Time
(Order Inquires/Customer Service) IN TEXAS: 817-573-4111

TM: INTERNATIONAL BUSINESS MACHINES INC.

KAYPRO NEC
3M SANYO
IBM Hayes

TOLL FREE 1-800-321-3552
IN OHIO & OTHER INQUIRIES 216-481-5515

star EPSON
OKIDATA BASF
Datalife
Verbatim

IF ANYTHING BEATS OUR SELECTION, IT'S OUR PRICES!

YOUR REFERENCE GUIDE FOR TANDY 1000 - IBM - IBM COMPATIBLES

UPGRADES

64K Memory 4164'S	$ 39.95
16K 4116, 200NS	17.95
AST Six Pack Plus 0K	225.00
AST Six Pack Plus 64K	278.00
Quadram Quadboard 0K	219.00
Quadram Quadboard 64K	269.00
Quadram Quadcolor	219.00
Persyst Graphics Brd	229.00
Persyst Mono/Parallel	249.00
Hercules Graphics Board	359.00
Techmar Color/Parallel	339.00

MONITORS

Amdek 300 Green	$149.00
Amdek 300 Amber	159.00
Amdek 310 Amber	199.00
Zenith 122A	109.00
Zenith 124A	159.00
Quadram Quadchrome RGB	499.00
Taxan 420 RGB	499.00

MODEMS

Hayes Smartmodem 300	$205.00
Hayes Smartmodem 1200	449.00
Hayes Smartmodem 1200B	399.00
Hayes Micromodem IIe	269.00
Signalman Mark VII	109.00
Signalman Mark XII	299.00
Popcom X100	399.00
Popcom C100	379.00

DISKETTES

3M

5¼" 1S/DD/SS - Box of 10	$19.95
5¼" 2S/DD/SS - Box of 10	26.95
Purchase 10 boxes of disks and you pay only	$18.95 per box

Verbatim

5¼" MD525-01 IS/D Den (box of 10)	$19.95
5¼" 2S/D Den (MD550-01)	26.95
5¼" 2S/4 Den (MD557-01)	49.90
8" 1S/D Den (FD34-8000)	43.95

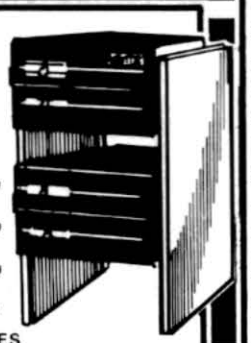
IBM PCX
10 MEGABYTE HARD DRIVE

NOW ONLY **$2995**

Includes MDS controller, 10 megabyte hard drive and memory, CPU, IBM keyboard, 256K RAM, mono/-parallel board, monitor and single 320K floppy drive. Easily expandable.

DISKIT III™

MODEL III & IV DISK UPGRADE — As low as **$199**



DISKIT III w/o Drives	$199.00
DISKIT III w/one Teac 55A 40 Track Drive	$345.00
DISKIT III w/two Teac 55A 40 Track Drive	$495.00
DISKIT III w/two Teac 55B 40/40 Dual Drive	$595.00

ADD $10.00 EA. FOR TANDON DRIVES

NOW ADD UP TO 4 INTERNAL DISK DRIVES TO A RADIO SHACK MODEL 3 & MODEL 4. UP TO 1.3 MEGABYTES OF DISK STORAGE!

- Gold Plated Edge Connectors
- Metal Disk Drive Brackets
- All Hardware and Cables
- Switching Power Supply
- 1 hour or less for installation
- 40 80 Track supported
- Single Dual head supported
- 100% compatible
- No Soldering needed
- 180 days warranty on Controller.

MODEL III & IV
RS-232 Communication

RS-232 ..... $59.95

Direct replacement for RS-2332, fully tested and burned in, easy installation, 120 day warranty.

SOFTWARE-IBM

DBase II	$329.00
DBase II - DBase III Upgrade	150.00
DBase III	499.00
Framework	499.00
Dollars & Sense	129.00
Flight Simulator	39.00
Knoware	79.00
Lotus 123	329.00
Lotus 123 - Symphony Upgrade	150.00
Lotus Symphony	499.00
Mastertype	39.00
Microsoft Word w/Mouse	319.00
Multimate	329.00
Open Access	389.00
PFS:Access	69.00
PFS:File	99.00
PFS:Proof	69.00
PFS:Report	99.00
PFS:Write	99.00
RBase 4000	349.00
RBase Clout	145.00
RBase Extended Report	109.00
Wordstar	239.00

DRIVES

TEAC 55A 40 TRK	$149.00
TEAC 55B 40/40 TRK	199.00
Tandon TM100-1 40 TRK	149.00
Tandon TM100-2 40/40 TRK	219.00
Tandon TM100-4 80/80 TRK	319.00
Datamac 10 Megabyte	999.00
Datamac 30 Megabyte	1949.00
10 Meg Internal Drive w/Controller	679.00

DRIVE PARTS FOR TANDON, TEAC, MPI CALL FOR PRICES!

TANDON DRIVES REPAIRED **$29.95** Plus Parts & Shipping

ADD $3.00 FOR SHIPPING & HANDLING
$6.00 Extra for C.O.D. Orders
Ohio Residents Add 6½% Sales Tax

MICRO DATA SUPPLIES
22295 Euclid Ave.
Euclid, Ohio 44117

A SUBSIDIARY OF THE COMPUTER WAREHOUSE, INC. OF OHIO

VISA
master charge

WE ACCEPT
- Visa
- Mastercard
- Checks
- Money Orders
- C.O.D.

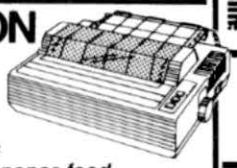
IF ANYTHING BEATS OUR SELECTION IT'S OUR PRICES!

TOLL FREE 1-800-321-3552
IN OHIO & OTHER INQUIRIES 216-481-5515

EPSON RX80 $229

- 100 cps
- Tractor paper feed
- 128 Typestyles
- 7 graphic modes
- Proportional space
- 10" carriage

EPSON FX100 $619

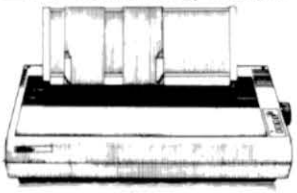


- 160 cps
- Tractor paper feed
- 128 Typestyles
- 7 graphic modes
- Proportional space
- 15" carrriage

EPSON FX80

160 CPS, 10" carriage . . . $409

EPSON LQ 1500



includes parallel interface, 200 CPS, bi-directional, sheet feeders available. $1169

When you call M.D.S. you receive the fastest delivery available anywhere. We now have a bigger and better facility to serve you in the most efficient way possible. Call us, you'll be glad you did.

Russ Knotts

CP/M

Exclusively for the

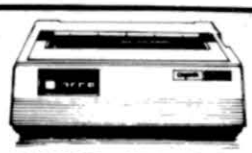
Model 4

Montezuma Micro

- Includes INTERCHANGE: a utility that allows reading, writing and copying 20 different manufacturer's disk formats such as IBM, KAYPRO, OSBORNE, XEROX, etc.
- Complete with the following CP/M utilities: ASM, DDT, DUMP, ED, LOAD, PIP, STAT and SYSGEN.
- Includes MODEM 7, a powerful public domain communications program for file transfer and remote data base access.
- Supports 80 x 24 video, reverse video, direct cursor addressing and more.
- Utilizes the Model 4 function keys and allows user defined keys.
- Auto execute command for turnkey applications.
- FORMAT utility permits up to 52 disk formats to be constructed, all menu drive.

$159.95

ELECTRIC WEBSTER	Le Script	NEWDOS/80
Complete System $189.	Model I-III & IV $104.95	Version 2.0 MOD I or III $89.95



OKIDATA 92

The most advanced dot matrix printer in its price range. $399

OKIDATA 93

- 160 cps
- Tractor paper feed
- Proportional space
- 15" carriage

$629

COMREX II

13 CPS Printer $349

COMREX III	$629
OKIDATA 82	$319
OKIDATA 93	$629
OKIDATA 84	$709
BROTHER HR15	$379
BROTHER HR25	$649
BROTHER HR35	$879
BROTHER 2024L	$969
PANASONIC 1090	$235
PANASONIC 1091	$315
PANASONIC 1092	$445
PANASONIC 3151	$535
TOSHIBA 1340	$599
TOSHIBA 1351	$1359

VERSABUSINESS SERIES

The Most Powerful Business Software Ever!

Model I, III & IV

VERSARECEIVABLES	$84.95	VERSAPAYROLL	$84.95
VERSAPAYABLES	$84.95	VERSAINVENTORY	$84.95
VERSALEDGER II	$129.95		

THE HOME ACCOUNTANT

The #1 best selling program for home and small business accounting is now available for TRS-80 Model 3. Handles up to 99 accounts, five checkbooks, multiple income accounts, and can split transactions to any number of accounts. Prints net worth statements, income statements, as well as custom designed reports. Displays a bar chart and trend for any selected category. (by Continental Software, requires Model 3, 2 drives, 48K). $62.95.

PRINTER BUFFERS

FOR MOST COMPUTERS

QUADRAM MICROFAZER

Parallel to Parallel w/8K	$149.00
Parallel to Serial w/8K	$179.00
Serial to Serial w/8K	$179.00
Serial to Parallel w/8K	179.00
Each Add's 8K Upgrade	$ 10.00

All come with pause control and copy feature, and can be upgrades to 512K.

SPRINTER

Double Your Speed

Speed-up cuts computer operation time in half, saves time and money. Fast 4 MHz Z80B CPU included, installs in 15 minutes with no soldering or cutting.

SPRINTER III for MOD III	$109.95
SPRINTER I for MOD I	$109.95

BULK DISKETTES

SSSD IN QUANTITIES OF 200 OR MORE 99¢ ea.

SSDD $1.29

MODEL IV — 64K MEMORY EXPANSION

Guaranteed 1 full year

Set of 8

4164 RAM CHIPS $39.95

w/PAL CHIP to go from 64 to 128K $64.95

16 K RAM SPECIAL MEMORY UPGRADE

4116, 200ns. Guaranteed one full year. $17.95

NOW ONLY $11.95 with the purchase of $25 or more! (while supply lasts)

Prices, Specifications, Offerings, subject to change without notice.

MICRO DATA SUPPLIES

22295 Euclid Ave.
Euclid, Ohio 44117

A SUBSIDIARY OF THE COMPUTER WAREHOUSE, INC. OF OHIO

WE'RE GIVING MAIL ORDER A GOOD NAME!

MUTUAL UNDERSTANDING

TRS-80-compatible editor/assemblers aren't as different as you might think. With some work, they can read each other's files.

Sometimes it seems that software file formats are like fingerprints: No two are alike. Try and get Multiplan to read a VisiCalc file, for example. When software authors design features such as DOS structures and file formats, many often think their ideas best and disregard what others have done. Software compatibility has been practically nonexistent.

I find this problem most evident in the source code editor/assemblers produce; different editor/assemblers write different source programs, some of them incompatible with one another. To set the record straight, I'll detail the differences among TRS-80-compatible editor/assemblers and provide tables of editor/assembler file formats and compatibility.

Incompatibilities

When you must work with source code files produced by many different editor/assemblers, file incompatibility can be a constant irritation. If you're thinking of buying an editor/assembler, your first question might be, "Will it read the files I've already written?"

Luckily, most editor/assemblers can read and write files in several different formats, so you can move from one to another without much difficulty (see Table 1). Some demand that you indicate what format you want to read, others automatically detect an input file's format and adjust accordingly.

When two editor/assemblers are incompatible, you need some way to translate files from one format to another. Generally, it's easy to write a short Basic program to do so, but you need to know what file format each assembler uses in its default mode. I've compiled such information in Table 2; Table 3 lists editor/assembler manufacturers.

	File Formats						
Editor/ Assembler	**EDTASM**	**Series 1**	**M-ZAL**	**EDAS IV Pro-Create ALDS**	**ALE**	**Zen**	**MACRO-80**
ALDS		R		R/W	R		
ALE	R	R	R	R/W	R/W	R	R
EDAS IV	R/W	R/W		R.W	R		R/W
EDTASM	R/W						
INTASM	R/W						
M-ZAL	R/W	R	R/W	R/W			R/W
Pro-Create	R/W	R/W		R/W	R		R/W
Series 1		R/W					
Zen	R	R		R			
Zeus	R/W	R		R/W	R	R	

ALE includes a utility that reads several different file formats. It can only write files in its own formats.

M-ZAL includes a utility program that converts between several different file formats. However, its editor only reads and writes M-ZAL format.

INTASM and Zeus can also read and write files in their own, partially-assembled formats.

Table 1. Editor/assembler compatibility. Although they have different default formats, several editor/assemblers are capable of reading (R) and writing (W) source codes in several different formats.

In the Beginning: EDTASM

The EDTASM supplied with NEWDOS/80 2.1 was the first popular disk-based editor/assembler for the Model I. Apparat merely altered Radio Shack's tape-based EDTASM so that it ran in a disk environment. The upgraded EDTASM supplied with NEWDOS/80 2.0 is essentially the same program with a few more bells and whistles.

EDTASM stores source code on disk with exactly the same format as the original EDTASM used on tape. Each file starts with a 7-byte identification field. Then it stores each line, along with its line number, in a quasi-ASCII format. A control-Z character (1A hexadecimal [hex]) marks the end of the file; this is a standard end-of-file marker in many different operating systems on many different computers.

The EDTASM identification field, found at the beginning of a file, is a byte of 0D3 hex followed by six characters of the file name (padded on the right with ASCII spaces). This ID field is necessary on tape so the tape loader can identify a file anywhere on a cassette; it is unnecessary on a disk file and no assembler uses it except EDTASM.

Each line of EDTASM source code begins with a five-digit ASCII line number with the high bit of each byte set. Therefore, the number for line 00210, for example, is stored as B0 B0 B2 B1 B0 (all in hex) instead of the conventional 30 30 32 31 30 that would appear in a normal ASCII file. An ASCII space (20 hex) always follows the line number and text of the line. Each line ends with a carriage return character, 0D hex.

A Slight Improvement: Series 1 Editor/Assembler

Radio Shack's Series 1 Editor/Assembler produces source code files 7 bytes shorter than EDTASM, but this change only makes files produced by the two programs incompatible.

The biggest difference is that Series 1 files don't begin with an identification field. Also,

Circle 18 on Reader Service card.

From Computer Plus to YOU . . .

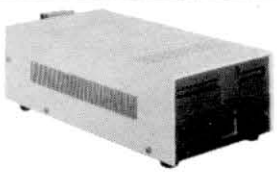
PLUS after PLUS after PLUS

Tandy 200 24K $739
Model 100 8K $339
Model 100 24K $510

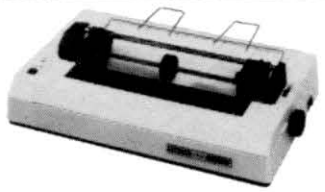
Color Computer II
w/16K Ext. Basic $135
w/64K Ext. Basic $179

Tandy 1000 $999
Tandy 1200 $2195

Smith Corona L-1000
$259



Color Computer Disk Drive
Drive 0 $279 Drive 1 $169



DMP105 $160

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS	
Tandy 1000 1 Drive 128K	999.00
Tandy 1200 10 Meg. 256K	2195.00
Tandy 2000 2 Drive 256K	2100.00
Tandy 2000 10 Meg. 256K	3350.00
Model IV Portable 64K	970.00
Model IV Desktop 64K	970.00
PRINTERS	
Radio Shack DMP-110	299.00
Radio Shack DMP-430	660.00
Radio Shack DWP-220 Daisy Wheel	469.00
Radio Shack TRP-100 Portable	229.00
Silver Reed EXP-550 Daisy Wheel	430.00
Star Powertype Daisy Wheel	345.00
Star SG-10	245.00
Star SG-15	410.00
Star SD-10	365.00
Panasonic P-1091	295.00
CITOH Prowriter 8510AP	320.00
CITHO 7500	230.00
Okidata 92	389.00
Okidata 93	625.00
Epson	CALL

Tandy 1000/1200 ACCESSORIES	
Tandy 1000 Disk Drive Kit	215.00
256K Ram Board (inc. 128K & DMA)	245.00
512K Ram Board (includes 128K)	205.00
128K Ram Upgrade Kit (Tandy)	135.00
128K Ram Upgrade Kit (NEC)	98.00
300 Baud Modem Board	145.00
RS-232 Serial Board	89.00
Hard Disk Controller Board	265.00
Digi-Mouse/Clock Board	89.00
Tandy VM-2 Green Monitor	139.00
Tandy CM-2 RGB Color Monitor	449.00
Tandy VM-3 TTL Green Monitor	179.00
Tandy 1200 Text Monitor Adapt.	179.00
Tandy 1200 Color/Graphics Adapt	240.00
MODEMS	
Radio Shack DCM-3	52.00
Radio Shack DC Modem IB	89.00
Radio Shack DC Modem II	160.00
Radio Shack DC Modem 2212	315.00
Hayes Smartmodem II 300 Baud	215.00
Hayes Smartmodem 1200 Baud	429.00
Novation J-Cat 300 Baud	115.00

MODEL III/IV ACCESSORIES	
PTC-64K Printer Buffer	199.00
Model III/IV Drive 0 Kit	465.00
Model III/IV Drive 1 Kit	220.00
Model III/IV Hi-Res Board	229.00
Model III/IV RS-232 Board	99.00
Model IV 64K Upgrade Kit	79.00
FOR EVERYONE	
Radio Shack Powerline Filter	45.00
CCR-81 Cassette Recorder	52.00
CCR-82 Cassette Recorder	43.00
C-20 Digital Cassette Tapes (10pk)	9.95
Verbatim SSDD Plastic Box (10pk)	24.95
Verbatim DDDD Plastic Box (10pk)	34.95
Generic SSDD Diskettes (10pk)	17.95
NEC 64K Ram Chips (set of 8)	49.00
Radio Shack 16K Ram Chips (8)	25.00
Locking Disk Box (holds 70)	19.95
Flip N File Disk 50	15.00
Fanfold CleanEdge Paper (2600)	35.00

Radio Shack software 10% off.
Send for complete listing of
brand name software and hardware.

CALL TOLL FREE
1-800-343-8124

- *LOWEST POSSIBLE PRICES*
- *BEST POSSIBLE WARRANTY*
- *KNOWLEDGEABLE SALES STAFF*
- *TIMELY DELIVERY*
- *SHOPPING CONVENIENCE*

VISA · MasterCard

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (617) 486-3193

TRS-80 is a registered trademark of Tandy Corp.

instead of a space after each line number, the Series 1 inserts a tab character (09 hex). Except for those two minor differences, Series 1 and EDTASM files are identical.

Both EDTASM and Series 1 file formats are inefficient; an assembler doesn't need to save source code line numbers, especially in a 5-byte ASCII form, because the assembler doesn't use those numbers. Therefore, the authors of other editor/assemblers have sought more economical ways to store source code in disk files.

The Most Unusual: M-ZAL

The M-ZAL editor/assembler produces the most unusual source code and its format is the most difficult to change. The first 2 bytes of an M-ZAL source file contain the length of the file plus 5CF0 hex in normal least-significant byte/most-significant byte (LSB/MSB) order. This unusual number is not arbitrary; it's the address of M-ZAL's text buffer.

M-ZAL stores each line of source code with the line number condensed to 2 bytes (again in LSB/MSB integer form) followed by a single byte containing the length of the line. Because it stores the line length in the file, M-ZAL doesn't need (and doesn't store) a carriage return at the end of each line. Each M-ZAL file ends with 2 bytes of 0FF hex, to indicate an impossible line number of FFFF hex (or 65535 decimal).

The result is that an M-ZAL file is somewhat shorter than its EDTASM equivalent. M-ZAL saves 4 bytes per line, plus 4 bytes in its header, but uses an extra byte to mark the end of the file.

The ASCII Difference: EDAS IV, Pro-Create, ALDS, ALE, and Zen

Most of the other popular editor/assemblers have dispensed with line numbers entirely in their storage format. EDAS IV, Pro-Create, and ALDS use identical formats: They store what you type into the editor exactly as an ASCII word processor

Original source program (saved as TEST/SRC). I modified this program to fit the syntax of ALDS and Zen.

```
00100 ;A Short Text Program
00110           ORG     6000H
00120 START     LD      HL,(8000H)
00130           LD      A,L
00140           END
```

Assembler	File Header	Line Header	Line Text	File Terminator
ALDS (69 bytes)	none		;A_Short_Test_Program 0D % PSECT % 6000H 0D START % LD % HL,(8000H) 0D % LD % A,L 0D % END 0D	 1A
ALE (66 bytes)	none		;A_Short_Test_Program 0D % ORG % 6000H 0D START % LD % HL,(8000H) 0D % LD % A,L 0D % END 0D	
EDAS IV (67 bytes)	none		;A_Short_Test_Program 0D % ORG % 6000H 0D START % LD % HL,(8000H) 0D % LD % A,L 0D % END 0D	 1A
EDTASM (Apparat) (104 bytes)	D3 TEST_	B0 B0 B1 B0 B0 _ B0 B0 B1 B1 B0 _ B0 B0 B1 B2 B0 _ B0 B0 B1 B3 B0 _ B0 B0 B1 B4 B0 _	;A_Short_Test_Program 0D % ORG % 6000H 0D START % LD % HL,(8000H) 0D % LD % A,L 0D % END 0D	 1A
M-ZAL (80 bytes)	3C 5D	64 00 15 6E 00 0A 78 00 13 82 00 07 8C 00 04	;A_Short_Test_Program 0D % ORG % 6000H 0D START % LD % HL,(8000H) % LD % A,L % END	 FF FF
Pro-Create (67 bytes)	none		;A_Short_Test_Program 0D % ORG % 6000H 0D START % LD % HL,(8000H) 0D % LD % A,L 0D % END 0D	 1A
Series 1 (97 bytes)	none	B0 B0 B1 B0 B0 % B0 B0 B1 B1 B0 % B0 B0 B1 B2 B0 % B0 B0 B1 B3 B0 % B0 B0 B1 B4 B0 %	;A_Short_Test_Program 0D % ORG % 6000H 0D START % LD % HL,(8000H) 0D % LD % A,L 0D % END 0D	 1A

Table 2. Editor/assembler file formats. Here are the default file formats for each editor/assembler for the short program shown at the top of the box. For clarity, ASCII spaces are shown as underlines (_) and tab characters are listed as percent signs (%). All other nonalphabetic characters appear as hexadecimal values.

Circle 9 on Reader Service card.

M&E COMPUTRONICS INC.

• • EVERYTHING FOR YOUR TRS-80™ • ATARI™ • APPLE™ • PET™ • CP/M™ • XEROX™ • IBM™ • OSBORNE™ • •

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. · * ATARI is a trademark of Atari Inc. · *APPLE is a trademark of Apple Corp. · * PET is a trademark of Commodore
* CP/M is a trademark of Digital Research · *XEROX is a trademark of Xerox Corp. · * IBM is a trademark of IBM Corp. · * OSBORNE is a trademark of Osborne Corp.

BUSINESS PAC 100

100 Ready-To-Run Business Programs

★ All orders processed within 24-Hours
★ 30-Day money back guarantee

(ON CASSETTE OR DISKETTE).....Includes 128 Page Users Manual.....
Inventory Control.....Payroll.....Bookkeeping System.....Stock Calculations.....
Checkbook Maintenance.....Accounts Receivable.....Accounts Payable.....

BUSINESS 100 PROGRAM LIST

NAME	DESCRIPTION
1 RULE78	Interest Apportionment by Rule of the 78's
2 ANNUI	Annuity computation program
3 DATE	Time between dates
4 DAYYEAR	Day of year a particular date falls on
5 LEASEINT	Interest rate on lease
6 BREAKEVN	Breakeven analysis
7 DEPRSL	Straightline depreciation
8 DEPRSY	Sum of the digits depreciation
9 DEPRDB	Declining balance depreciation
10 DEPRDDB	Double declining balance depreciation
11 TAXDEP	Cash flow vs. depreciation tables
12 CHECK2	Prints NEBS checks along with daily register
13 CHECKBK1	Checkbook maintenance program
14 MORTGAGE/A	Mortgage amortization table
15 MULTMON	Computes time needed for money to double, triple, etc.
16 SALVAGE	Determines salvage value of an investment
17 RRVARIN	Rate of return on investment with variable inflows
18 RRCONST	Rate of return on investment with constant inflows
19 EFFECT	Effective interest rate of a loan
20 FVAL	Future value of an investment (compound interest)
21 PVAL	Present value of a future amount
22 LOANPAY	Amount of payment on a loan
23 REGWITH	Equal withdrawals from investment to leave 0 over
24 SIMPDISK	Simple discount analysis
25 DATEVAL	Equivalent & nonequivalent dated values for oblig.
26 ANNUDEF	Present value of deferred annuities
27 MARKUP	% Markup analysis for items
28 SINKFUND	Sinking fund amortization program
29 BONDVAL	Value of a bond
30 DEPLETE	Depletion analysis
31 BLACKSH	Black Scholes options analysis
32 STOCVAL1	Expected return on stock via discounts dividends
33 WARVAL	Value of a warrant
34 BONDVAL2	Value of a bond
35 EPSEST	Estimate of future earnings per share for company
36 BETAALPH	Computes alpha and beta variables for stock
37 SHARPE1	Portfolio selection model-i.e. what stocks to hold
38 OPTWRITE	Option writing computations
39 RTVAL	Value of a right
40 EXPVAL	Expected value analysis
41 BAYES	Bayesian decisions
42 VALPRINF	Value of perfect information
43 VALADINF	Value of additional information
44 UTILITY	Derives utility function
45 SIMPLEX	Linear programming solution by simplex method
46 TRANS	Transportation method for linear programming
47 EOQ	Economic order quantity inventory model
48 QUEUE1	Single server queueing (waiting line) model
49 CVP	Cost-volume-profit analysis
50 CONDPROF	Conditional profit tables
51 OPTLOSS	Opportunity loss tables
52 FQUOQ	Fixed quantity economic order quantity model
53 FQEOWSH	As above but with shortages permitted
54 FQEOQPB	As above but with quantity price breaks
55 QUEUECB	Cost-benefit waiting line analysis
56 NCFANAL	Net cash-flow analysis for simple investment
57 PROFIND	Profitability index of a project
58 CAP1	Cap. Asset Pr. Model analysis of project
59 WACC	Weighted average cost of capital
60 COMPBAL	True rate on loan with compensating bal. required
61 DISCBAL	True rate on discounted loan
62 MERGANAL	Merger analysis computations
63 FINRAT	Financial ratios for a firm
64 NPV	Net present value of project
65 PRINDLAS	Laspeyres price index
66 PRINDPA	Paasche price index
67 SEASIND	Constructs seasonal quantity indices for company
68 TIMETR	Time series analysis linear trend
69 TIMEMOV	Time series analysis moving average trend
70 FUPRINF	Future price estimation with inflation
71 MAILPAC	Mailing list system
72 LETWRT	Letter writing system-links with MAILPAC
73 SORT3	Sorts list of names
74 LABEL1	Shipping label maker
75 LABEL2	Name label maker
76 BUSBUD	DOME business bookkeeping system
77 TIMECLCK	Computes weeks total hours from timeclock info.
78 ACCTPAY	In memory accounts payable system-storage permitted
79 INVOICE	Generate invoice on screen and print on printer
80 INVENT2	In memory inventory control system
81 TELDIR	Computerized telephone directory
82 TIMUSAN	Time use analysis
83 ASSIGN	Use of assignment algorithm for optimal job assign.
84 ACCTREC	In memory accounts receivable system-storage ok
85 TERMSPAY	Compares 3 methods of repayment of loans
86 PAYNET	Computes gross pay required for given net
87 SELLPR	Computes selling price for given after tax amount
88 ARBCOMP	Arbitrage computations
89 DEPRSF	Sinking fund depreciation
90 UPSZONE	Finds UPS zones from zip code
91 ENVELOPE	Types envelope including return address
92 AUTOEXP	Automobile expense analysis
93 INSFILE	Insurance policy file
94 PAYROLL2	In memory payroll system
95 DILANAL	Dilution analysis
96 LOANAFFD	Loan amount a borrower can afford
97 RENTPRCH	Purchase price for rental property
98 SALELEAS	Sale-leaseback analysis
99 RRCONVBD	Investor's rate of return on convertable bond
100 PORTVAL9	Stock market portfolio storage-valuation program

☐ **TRS-80 Cassette Version** **$99.95**
☐ **TRS-80 (Mod-I or III), Pet, Apple or Atari Versions** **$99.95**
☐ **TRS-80 Mod-II, IBM, Osborne and CP/M Versions** **$149.95**

ADD $3.00 FOR SHIPPING IN UPS AREAS
ADD $4.00 FOR C.O.D. OR NON-UPS AREAS
ADD $5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

M&E COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

ASK FOR OUR 64-PAGE CATALOG
DEALER INQUIRIES INVITED

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

AMERICAN EXPRESS · VISA · MasterCard

24 HOUR ORDER LINE
(914) 425-1535

ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE
DELIVERY SUBJECT TO AVAILABILITY

Assembly Language
Development System (ALDS)
Tandy/Radio Shack
One Tandy Center
Fort Worth, TX 76102

ALE
The Alternate Source
704 N. Pennsylvania Ave.
Lansing, MI 48906

EDAS IV
Misosys
P.O. Box 4848
Alexandria, VA 22303

EDTASM
Apparat Inc.
4401 S. Tamarac Parkway
Denver, CO 80237

Instant Assembler (INTASM)
Mumford Micro Systems
Box 400-E
Summerland, CA 93067

M-ZAL
Computer Applications Unlimited
P.O. Box 214
Rye, NY 10580

Pro-Create
Misosys
P.O. Box 4848
Alexandria, VA 22303

Series 1
Tandy/Radio Shack
One Tandy Center
Fort Worth, TX 76102

Zen
The Alternate Source
704 N. Pennsylvania Ave.
Lansing, MI 48906

Zeus
Cosmopolitan Electronics Co.
5700 Plymouth Road
Ann Arbor, MI 48105

Table 3. Editor/assembler manufacturers.

Using ALDS With *80 Micro* Programs

by Hardin Brothers

Most of the Assembly-language programs in *80 Micro* use EDTASM. If you use Radio Shack's Assembly Language Development System (ALDS), you must change *80*'s listings before you type them in and run them.

All TRS-80 assemblers except ALDS use the ORG directive to initialize the location counter. If you use ALDS, change ORG to PSECT and follow the PSECT with the ORG address in the original program. This one change is all you need to convert programs to ALDS format 95 percent of the time.

Some programs, however, use EDAS and include macro definitions. ALDS supports macros but doesn't follow normal macro labeling conventions, so these programs might create some problems.

You can get around ALDS' macro incompatibility in two ways. If a macro uses a label to jump backwards, your ALDS macro can use DEFL. If the macro definition includes a forward jump to a label, calculate the number of bytes to jump and use $ + n instead of a label. The examples below should make the process clear; they list each macro definition first in EDAS form, then in ALDS form.■

```
;EDAS format:
;
FILL    MACRO   #CHAR,#NUM
        LD      B,#NUM
FL$     LD      (HL),#CHAR
        INC     HL
        DJNZ    FL$
        ENDM

;EDAS format:
;
SHIFT   MACRO   #NUM
        LD      B,#NUM
SH1$    LD      A,(HL)
        CP      61H
        JR      NC,SH2$
        SUB     20H
SH2$    INC     HL
        DJNZ    SH1$
        ENDM
```

```
;ALDS format:
;
FILL    MACRO   #0,#1
        LD      B,#1
FL      DEFL    $
        LD      (HL),#0
        INC     HL
        DJNZ    FL
        ENDM

;ALDS format:
;
SHIFT   MACRO   #0
        LD      B,#0
SH1     DEFL    $
        LD      A,(HL)
        CP      61H
        JR      NC,$+4
        SUB     20H
        INC     HL
        DJNZ    SH1
        ENDM
```

would store it. A carriage return character marks the end of each line and a control-Z marks the end of a file. The file structure doesn't have tricky features such as file headers.

The ALE assembler uses an almost identical file format, except that nothing marks the end of the file (ALE depends on DOS to find the file's end). Finally, the Zen editor uses an ASCII format similar to these others, but doesn't use tab characters. Instead, a single space separates each field of each line, and the assembler is responsible for properly formatting the source code at assembly time. Each Zen file ends with a byte of 00 hex.

Preassembled Files: Instant Assembler and Zeus

Two other popular editor/assemblers store their source files in partially assembled form. Instant Assembler (INTASM) and Zeus preassemble each line as you enter it. As a result, their normal source code files are incompatible with all other editor/assemblers (and with each other), and transforming the files into another format or deciphering them on the disk is next to impossible.

Conclusion

Even if you can load a file from one editor/assembler into another, you might still have to work to make the file assemble properly. Each editor/assembler has its own peculiar syntax, and what works with one will not necessarily work with another. Once you transfer the source code from one assembler to another, you should only need to run a few test assemblies and make some small changes. The real difficulty, transferring the source code in the first place, is a lot easier when you know what each assembler expects.■

Hardin Brothers is an associate editor and regular columnist for 80 Micro. *You can contact him through CompuServe. Go PCS-117 to the Writers' and Editors' Special Interest Group (WESIG) and leave your messages on section zero of the message board. Or write to him at 280 N. Campus Ave., Upland, CA 91786.*

Related Articles

Brothers, Hardin. "Making Your Selection: Choosing the Right Editor/Assembler," September 1984, p. 59. An examination of commercial editor/assemblers for the Models I, III, and 4.

NEW! HARD DISK FOR TANDY® 1000*

introducing The Rose® by OSICOM, Inc.

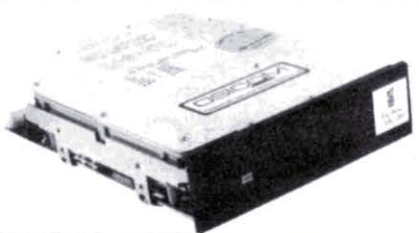
10 MB Internal
Controller, Drive Cables, & Manual
$699

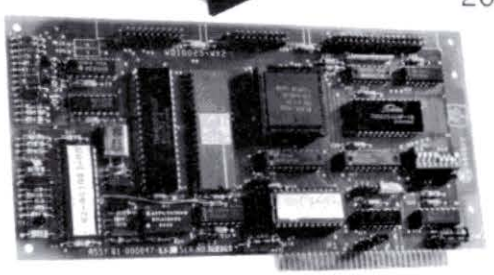
20 MB Internal
Controller, Drive Cables, & Manual
$899

10 MB External
Controller, Drive in enclosure with fan and power supply, Cables, & Manual
$975

20 MB External
Controller, Drive in enclosure with fan and power supply, Cables, & Manual
$1199

Easily user-installed - fully documented instructions.
System "boots" from hard disk without floppy diskette.
Runs Lotus, DBASE II — and Tandy 1000 software.
One year warrantee on all equipment.
Toll-free technical support hot-line.





Orders and Information:
1-800-922-0881 TOLL FREE
201-540-0144 IN NEW JERSEY

18 Bank Street
Morristown, N.J. 07960

Circle 242 on Reader Service card.

VISA master charge AMERICAN EXPRESS

COD no Surcharge. Visa & MC 3% Amex 5%

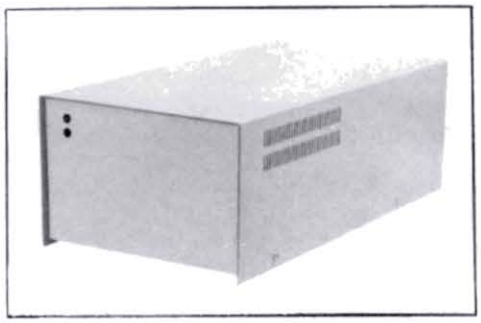
*Requires Memory Expansion Board with DMA Controller (25-1004)
Tandy is a registered trademark of Tandy Corporation

Price Changes Occur On A Daily Basis. Please Call 1-800-343-8841

PRICE BREAKTHROUGH

Price Changes Occur On A Daily Basis. Please Call 1-800-343-8841

Super Sale on New Hard Drives



Fully Warranteed

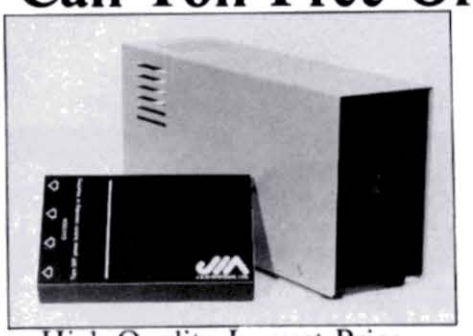
Introducing

MEGADISK™

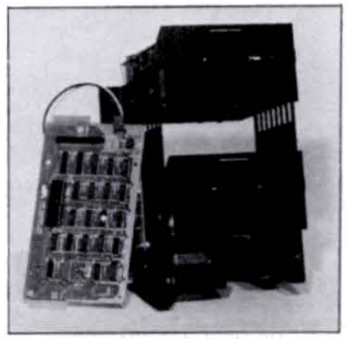
Winchester Hard Drive ready to run on the TRS 80 Model I/III/IV/4P, Color Computer, I.B.M.-PC, Apple, Franklin, Max/80, Tandy1000
Software Drivers: LDOS, NewDos/80, Dosplus, TRSDOS 6.0, CP/M

DRIVE A HARD BARGAIN™ Complete systems starting at $499.95

Call Toll Free Ordering 1-800-343-8841



High Quality Lowest Price
Drive 0, 1, 2, 3
for the
Color Computer
Starting at $244.95



Disk Drive Upgrade
for Model III/IV easy to install system
Starting at $309.95

SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425
Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10:00 am to 3:30 pm

DEALER INQUIRIES INVITED.

TERMS:
M.C./Visa/Amex and personal checks accepted at no extra charge.
C.O.D., please add $3.00.
Shipping: Please call for amount.
Not responsible for typographical errors.
Prices subject to change.

CANADA
CRC Electronics
1720 Charette
Duvernay, Laval
Montreal H7E 4L9
514/662-3227

Service! Service!
All in stock products are shipped within 24 hours of order. Repair/Warranty service is performed within 24 hours of receipt unless otherwise noted. We accept C.O.D., foreign and APO orders. School and D&B corporate P.O.s accepted.

TRS/80 Registered Trademark Tandy Corp. Apple Registered Trademark Apple Computer Corp
IBM-PC Registered IBM Corp. Franklin Registered Trademark Franklin Corp. Max/80 Registered Trademark Lobo Int.
LDOS Reg. Logical System Inc. Dosplus - Micro Systems Software Newdos/80 - Apparat Inc.

Prices Change Every Day. Please Call 1-800-343-8841 For Lower Prices.

PRICE BREAKTHROUGH

DEALER INQUIRIES INVITED

Prices Change Every Day. Please Call 1-800-343-8841 For Lower Prices.

MEGADISK™ HARD DISK DRIVE SYSTEMS — **TOLL FREE ORDERING 1-800-343-8841**

For the { **IBM/PC**, Tandy 1000, **TRS/80 Models I/III/IV/4P**, Compaq, Eagle, Sanyo, Tava, PC Workalikes, **Color Computers**, Apple/Franklin, Heath/Zenith, Max/80 — Complete with Hardware, Cables, Software and Quikfit Installation

Wow! New Low Price

5 Megabytes Internal Mount	starting at	$299.95
10 Megabytes Internal Mount	starting at	544.95
20 Megabytes Internal Mount	starting at	799.95
5 Megabytes External System	starting at	499.95
10 Megabytes External System	starting at	699.95
20 Megabytes External System	starting at	999.95
Streaming Tape Backup System — Internal Or External	starting at	499.95

DOS Systems Available: { IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, or later — Apple Franklin — DOS 3.3, Prodos; TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus 3.5, CP/M, COCO DOS, Max/80 LDOS, OS9

FULLY WARRANTIED — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841

FLOPPY DISK DRIVES, POWER SUPPLIES AND CABINETS

Our Disk Drives are UL approved — Our Floppy Drive Cabinets and Power Supplies are Underwriters Laboratory Listed and have passed the required Federal Communications Part 15 Section B-EMI/RFI tests.

Warranty on all disk drives is one full year parts and labor. Warranty on floppy disk drive power supplies is five (5) years. In warranty or out of warranty service is 24 hour turn-a-round on all disk drives and power supplies.

Tandon — Full Height Drives		
100-1	Single Sided 40 tk Bare	$125.00
	In Case with Power Supply	166.95
	Dual Drives in One Cabinet	326.95
100-2	Dual Sided 40 tk Bare	162.00
	In Case with Power Supply	206.95
	Dual Drives in One Cabinet	381.95
	Half High Drives	
65-1	Single Sided 40 tk Bare	122.00
	In Case with Power Supply	156.95
	Dual Drives in One Cabinet	306.95
65-2	**Dual Sided 40 tk Bare**	**142.00**
	In Case with Power Supply	**176.95**
	Dual Drives in One Cabinet	**346.95**
65-4	Dual Sided 80 tk Bare	162.00
	In Case with Power Supply	196.95
	Dual Drives in One Cabinet	356.95
TEAC Half High Drives		
55A	Single Sided 40 tk Bare	125.00
	In Case with Power Supply	166.95
	Dual Drives in One Cabinet	316.95
55B	Dual Sided 40 tk Bare	157.00
	In Case with Power Supply	196.95
	Dual Drives in One Cabinet	356.95
55F	Dual Sided 80 tk Bare	177.00
	In Case with Power Supply	216.95
	Dual Drives in One Cabinet	386.95
Apple/Franklin Disk Drives		
	35/40 Track in Case with Cable and Software	171.95
	Controller Card for Two Disk Drives	46.95
	Combination Price for Disk Drive and Controller	196.95
Commodore Disk Drives		236.95
Power Supplies and Cabinets 5¼" and Hard Drive Systems		starting at 42.00

COLOR COMPUTER DISK DRIVE SYSTEMS AND ADD IN PRODUCTS

35 Track Single Head Drive with Case, Power Supply, Cable Controller, Instruction Booklet, Diskettes	$244.95
Above with Dual Drives in One Cabinet	499.95
40 Track Dual Head with Case, Power Supply, Cable, Controller, Instruction Booklet, Diskettes	289.95
Above with Dual Drives in One Cabinet	429.95
128 Memory Upgrade Kit	129.95
Dual DOS Switch	19.95
With Second DOS System — JDOS, RSDOS, Micro DOS, and Booklet	59.95

TRS/80 HARDWARE

Model I Starter System — Delivered by UPS One Single Sided Disk Drive, Case, Cable, Power Supply, TRSDOS 1.3 and Manual	$195.00
Model III/IV Easy to Install Disk Drive Systems	309.95
Memory Upgrades — 4116 and 4164	starting at 1.50 ea.

ALL IN-STOCK ITEMS SHIPPED WITHIN 24 HOURS. SAME DAY SHIPPING PROVIDED BY REQUEST WITHOUT ANY EXTRA HANDLING CHARGES.

IBM - PC/XT WORKALIKE

All of our computers have: 8 slot motherboard, 640K, monochrome adapter, 2 parallel printer ports, 130 watt power supply, free software — all with our full warranty.

/PC- 2 Floppy Drives - Monochrome Monitor, MS-DOS Monitor	$1,895.00
Color system resolution - 720h x 240v, MS-DOS	$2,295.00
5meg/XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS	$2,045.00
Color system resolution - 720h x 240v, MS-DOS	2,445.00
10meg/XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS	2,395.00
XTtra - Color system resolution - 720h x 240v, MS-DOS	2,795.00
20meg/XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS	2695.00
XTtra - Color system, MS-DOS	3,095.00
Internal Tape Backup For Any Of Above systems Add	$449.95

PRINTERS

Dot Matrix		
Citizen		$ Call
Star Micronics		
Gemini X-Series Parallel 120 CPS Near letter quality	starting at	$259.95
Delta 10/15 160 CPS	starting at	424.95
Radix 10/15 200 CPS	starting at	649.95
Panasonic 1090		249.95
Daisy Wheel		
Silver Reed 440 80 Column 12 CPS		315.95
550 132 Column 19 CPS		439.95
770 132 Column 36 CPS		895.00
Olympia 132 Column 14 CPS with Form and Tractor		399.95
Apple/Franklin Printer Interface w/Graphics and Cable		84.95
Printer Cables	starting at	19.95
Printer Paper — Microperf Edge 1000 Sheets		16.95

ELECTRICAL

Surge Protectors — Line Filters — SL Waber — 6 Outlets with Switch	$ 39.95
Uninterruptable Power Supplies	399.95

MODEMS

Volksmodem 300 Baud	$ 69.95
Signalman Mark X Autodial	123.95
Mark XII 1200/300 Baud Autodial	284.95

ADD IN BOARDS FOR THE IBM

Multi Function Board Clock 256K, Parallel Port, Serial Port, Special Software	$399.95
Floppy Disk Controller	$145.00
STB — Rio Plus 128K	299.95
Graphix Plus	283.00
Graphics Plus II	355.00
Serial Port	84.95
Monochrome Board with Parallel Printer Port	210.00
Quadram — Quadboard w/128K	289.95
Quadcolor I	215.95
Quadcolor II	439.95

MISCELLANEOUS

Diskettes in 10 Pack	**from**	**$ 12.95**
Twoprint Switches	from	99.95
Disk Drive Cables	from	16.00
Maintenance Cleaning Kits		12.00
Parallel Printer Buffers 8K		149.95
Floppy Disk Drive Cables		
1 Drive		16.00
2 Drives		18.95
Heath/Zenith 2 Drive Cables — Shielded		24.95

© 1985 SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday.

WARRANTIES — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years.

SERVICE — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

Please Call For Shipping, Handling And Insurance.

Toll Free 1-800-343-8841

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors. Prices and Specifications May Change Without Notice.

Power Play: Building Single And Dual Power Supplies

All the projects I've presented here so far require an external power supply. This month, I'll show you how to design and build two types of simple linear power supplies.

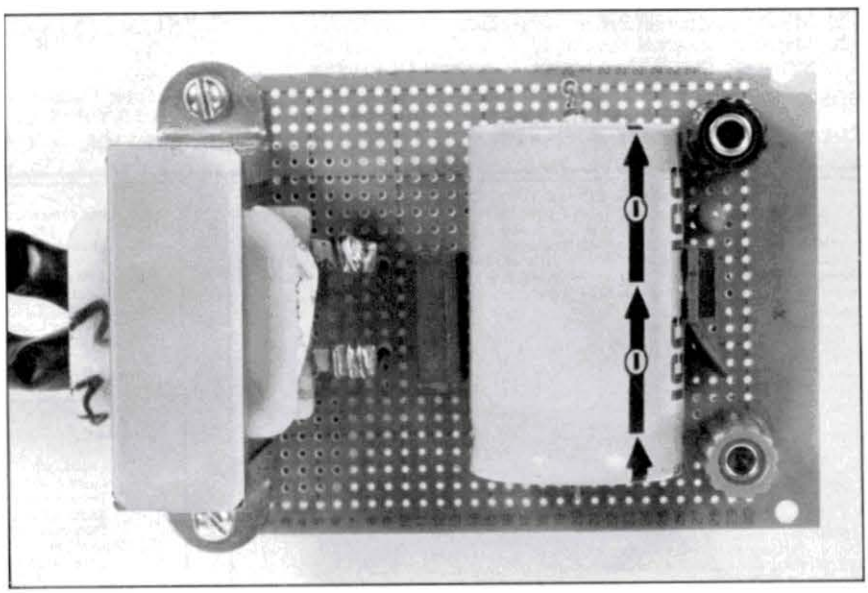


Photo 1. Single power supply.

Basic Power Supply Design

The block diagram for the basic power supply is shown in Fig. 1. The supply uses a 120-volt ac (alternating current) power source as an input, from which it derives the desired dc (direct current) output voltage.

You need a transformer to step down the 120-volt ac input to get a lower ac voltage. This ac signal then passes through a full-wave rectifier to form an alternating dc signal. Then the dc signal passes through a filter capacitor to smooth it out, creating a steady dc signal (with a slight ac ripple). The dc signal then goes through a voltage regulator to give you the precise voltage you want.

AC, DC, and RMS

Since the ac power input to the transformer is in the form of a sine wave (see Fig. 2), you can measure the voltage in a number of ways. One is to measure the voltage difference between the positive and negative peaks of the sine wave. This is called a peak-to-peak value, and is designated P-P (see Fig. 2).

Another method takes advantage of the fact that the sine wave is symmetric with respect to the X-axis (the horizontal axis). You get the peak voltage by measuring from the zero voltage line (the X-axis) to the top of the positive peak (or the bottom of the negative peak), which represents half the peak-to-peak voltage.

Since the actual voltage of an ac line constantly changes, you may wonder how you get a specific voltage from such a line, like the 120 volts in most homes and businesses. This is done by calculating an average or effective voltage value, which you can consider the dc equivalent of the ac value. This is called the root mean square or RMS value. For the simple sine wave signals you will be working with, you can calculate the RMS value by dividing the ac peak voltage by the square root of 2 (see Fig. 2). Unless specified otherwise, all ac voltages refer to the RMS value.

Consider an example. My oscilloscope shows the house ac line at 330 volts peak to peak, so the peak value is half that, or 165 volts. The RMS value is then 165/SQR(2) = 116.7 volts, where SQR(2) is the square root of 2. This is well within the acceptable tolerance for my nominal 117-volt line.

The Transformer

Transformers comprise a pair of wire coils wrapped around an iron core. One coil (the primary) induces a voltage in another (the secondary). You can use either coil as the primary, though most transformers are designed for a specific operation, with the primary predesignated. The ratio of the primary coil voltage to the secondary coil voltage is directly proportional to the ratio of the number of windings of the two coils (see Fig. 3). This allows transformers to step up (increase) or step down (decrease) the input voltage, or to leave the voltage unchanged (for isolation purposes). This project requires a step-down transformer. Note that you can transform only ac signals, not dc signals.

Rectifiers and Rectification

The power supply design calls for some way to change the alternating line current to direct current. The step-down transformer reduces the amplitude (peak-to-peak value) of the ac signal, but the signal

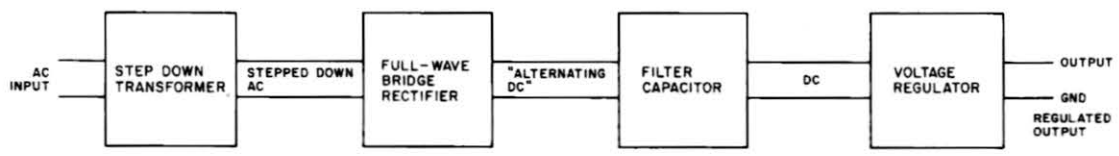


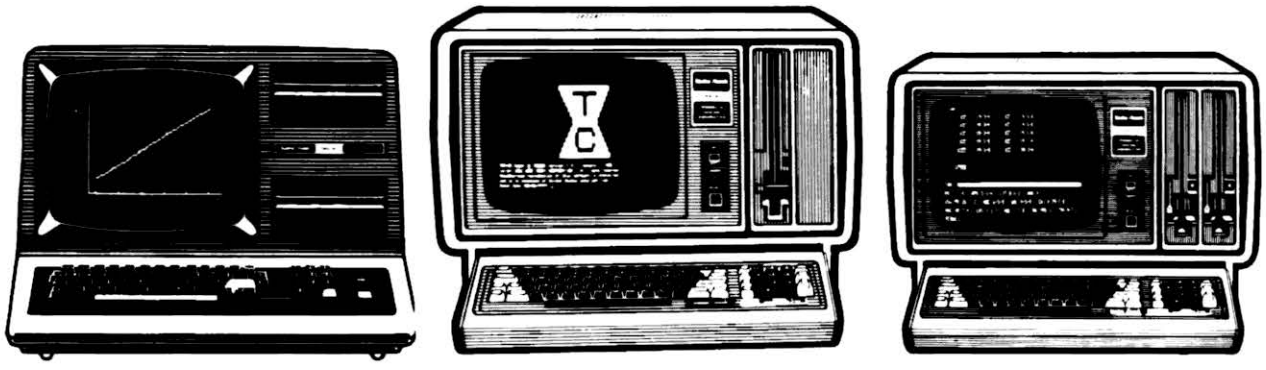
Figure 1. Power supply functional block diagram.

Circle 232 on Reader Service card.

NOCONA

ELECTRONICS

MODEL 4 **MODEL 6000** **MODEL 12**



256K MOD 2000 W/MONO MONITOR	2079.00	DMP 105 PRINTER	145.00
256K MOD 2000 W/COLOR MONITOR	2379.00	DMP 110 PRINTER	269.00
256K MOD 1200 HD 1 DR.	2009.00	DMP 120 PRINTER	349.00
128K MOD 1000 W/MONO 2 DR.	1259.00	DMP 430 PRINTER	585.00
128K MOD 1000 W/COLOR 2 DR.	1519.00	DMP 2100P PRINTER	1489.00
24K MOD 100 PORT	469.00	DWP 220 PRINTER	429.00
24K MOD 200 PORT	769.00	DWP 510 PRINTER	1139.00
64K MOD 4 2DR.	935.00	TRACTOR DWP 220	99.00
64K MODEL 4P 2DR.	935.00	TRACTOR DWP 11/510	159.00
512K MOD 6000 2DR.	3479.00	TRACTOR FEED DMP2100P	115.00
80K MOD 12 2DR.	2719.00	PARALLEL PRINTER SWITCH	96.00
15 MEG HARD DISK	1519.00	PARALLEL PRINTER CONTROLLER	179.00
35 MEG HARD DISK	2309.00	PARALLEL PRINTER CABLE	29.00

NEW DMP 2200 PRINTER 1299.00

100% RS COMPONENTS NO FOREIGN DRIVES OR MEMORY FULL WARRANTY
ALL RS SOFTWARE 20% OFF CATALOG PRICE
CASHIERS CHECK OR MONEY ORDER MUST ACCOMPANY ALL ORDERS

(817) 825-4027

NOCONA ELECTRONICS • BOX 593 • NOCONA, TX 76255

on the transformer's secondary coil is still an ac sine wave. The next step toward making this a dc value is to rectify the ac signal, that is, to permit only the positive portion of the ac signal to pass through, not the negative portion.

A diode is a simple rectifier that you can use to pass only the positive portion of an ac signal. A simple circuit showing a diode (a half-wave rectifier) in use appears in Fig. 4. The output of the circuit is a half-wave rectified signal, like that shown in Fig. 5 for an ideal diode. The diode passes the positive portions of the ac signal, but suppresses the negative portions; the output is flat (zero volts) during the time the ac signal is in the negative portion of its cycle.

The half-wave rectified output presents

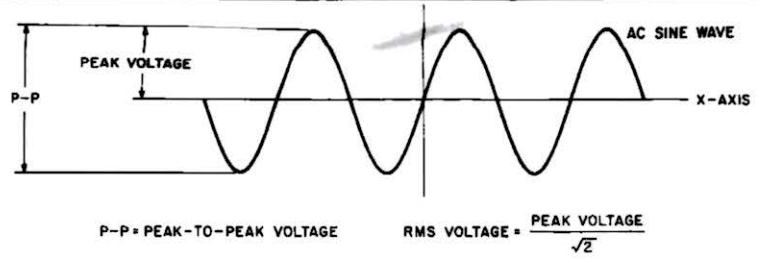


Figure 2. AC sine wave with ac voltage measurements.

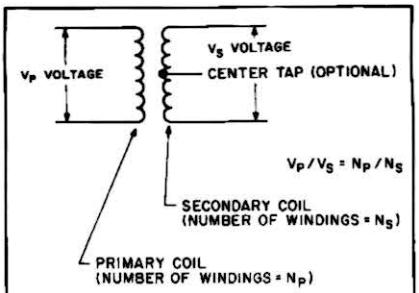


Figure 3. Transformer diagram showing coil/voltage ratio equivalence.

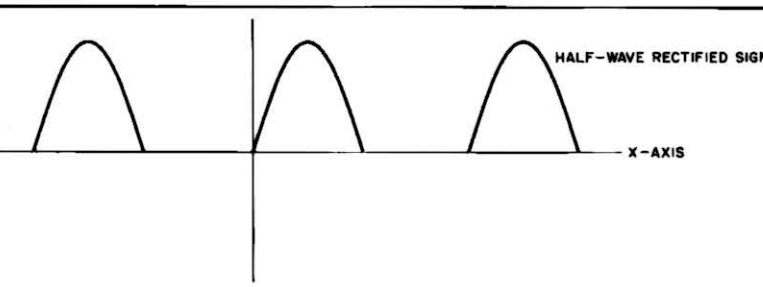


Figure 5. Half-wave rectified signal.

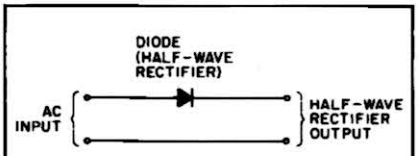


Figure 4. Circuit using diode to form a half-wave rectifier.

Circle 71 on Reader Service card.

T80-FS1 Flight Simulator

Available for Model I or Model III. $25.00 on cassette or $33.50 on disk (with enhancements) All versions require 16K.

If you order direct, please specify whether you have Model I or Model III (the media *are* different) and whether you want disk or cassette. Include $1.50 and indicate UPS or first class mail. Illinois residents add 5% sales tax. Visa and Mastercard accepted.

If you don't yet own a disk, don't fret. You can upgrade anytime. Cassette users may send back their cassette (but *not* the manual) along with $10 (first class shipping included) and receive the disk version.

See your dealer!

subLOGIC
Communications Corp.
713 Edgebrook Drive
Champaign, IL 61820
(217) 359-8482
Telex: 206995

two disadvantages: First, the repeating hump-space sequence is rather difficult to filter (smooth out). Second, you're not using the energy that is otherwise available in the negative portion of the ac cycle; you're merely suppressing it. It would be better to use a circuit that would get rid of the negative portion of the ac cycle but still make use of it. The answer is to convert the negative voltage to positive.

A circuit that does so, called a full-wave rectifier, appears in Fig. 6. The output of the full-wave rectifier is shown in Fig. 7. The negative portion of the ac cycle is brought above the X-axis to create a repeating hump pattern. This output uses all the energy from the ac signal (except that dissipated in the rectifier circuitry) and allows easier filtering than the half-wave rectifier. Figure 6 shows the full-wave rectifier consisting of four diodes. It is also now available in a single package with four leads: two for the ac inputs, one for the more-negative output, and one for the more-positive output. A drawing of a packaged full-wave rectifier as used in this month's project is shown in Fig. 8.

Filtering

After the full-wave rectifier rectifies the output, the result is what I call an alternating (uneven) dc signal. The next task is to smooth down the humps to create a smooth dc signal. You do so by putting a filter capacitor across the two output lines of the full-wave rectifier (the minus line and the plus line). This smooths out the signal, creating a dc signal with a small ac ripple. The amount of ripple is inversely proportional to the size of the filter capacitor chosen. Many sensitive computer systems use high-capacitance computer-grade filters (typically 50,000 microfarads or higher) to eliminate ripple and store some power in reserve in case of a brief (a few milliseconds) ac power outage. For your power supply design, however, capacitors of considerably smaller value will do nicely, with almost no detectable ripple.

Voltage Regulator

Once you've filtered the full-wave signal to get a smooth dc signal, you must reduce the voltage down to that desired. (For a linear regulator, the voltage entering the regulator must be at least slightly higher than the desired regulated voltage.) You use a voltage regulator to reduce the voltage. The regulator also insures that the output voltage doesn't change (appreciably) under varying load conditions. Most regulators also have a special safety feature for overload (too much current) or short-circuit protection. When the regulator reaches a certain temperature (due to excessive current draw), it shuts down to prevent damage to the regulator as well as the external circuitry. When it cools to an acceptable temperature, it restores the output.

Linear regulators aren't ideal, however. One problem is that the voltage difference between the input and output represents an internal voltage drop, and is dissipated as heat. For example, if you have an 8-volt input to a 5-volt regulator, a 3-volt voltage drop exists within the regulator. If the external load draws 1 amp of current, 1 amp also goes through the 3-volt drop. Thus, since power = current × voltage, 1 amp × 3 volts = 3 watts, which is being lost as heat within the regulator. This heat loss increases as the voltage drop increases, making the regulator much less efficient.

While you can choose among many different kinds of regulators on the market, I will use the simple three-terminal regulators in the 78XX (positive regulator) and 79XX (negative regulator) series. Although they're limited to about 1 amp of current output, they are inexpensive and simple to use. They come in two package types; the TO-3 metal can (see Fig. 9a,c) and the TO-220 plastic package (see Fig. 9b,d). I used the TO-220 package in my supplies, but you can use either. When or-

Circle 36 on Reader Service card.

NEW COPYCAT 3

NOW YOU CAN DUPLICATE VIRTUALLY ALL OF YOUR TRS-80 DISKETTES

COPYCAT 3 will allow you to make an exact duplicate of virtually all of your diskettes even if they are protected. And this includes your games and utilities. COPYCAT 3 automatically analyzes, formats, copies and verifies each track of the diskette you are duplicating. The entire process is amazingly fast, typically less than 70 seconds and even less with verify turned off.

COPYCAT 3 is intended for your personal use only, in making backup copies of your protected software.

COPYCAT 3 will run on the TRS-80 Model 3, 4 or 4P computers.

COPYCAT 3 ..... $49.95

Please add $2.00 for postage and handling. CA residents add 6% sales tax.
All orders are normally shipped the next business day via first class mail.

OMNISOFT RESEARCH
2170 W. Broadway, #501A
Anaheim, CA 92804
(714) 772-5000

MasterCard VISA

Dealer inquiries on your letterhead are welcomed.

dering, the TO-3 package generally has a K suffix (7805K) and the TO-220 generally has a T suffix (7805T). You should note the difference in pinout between the positive and the negative regulators. The schematics specify the input, output and ground pins, and you must connect the correct pins using the pinouts shown in Fig. 9.

To my knowledge, four regulators are available in the 78XX series, three in the 79XX series: 7805, 7806, 7812, 7815, and 7905, 7912, and 7915. The last two digits of the part number indicate the regulated output voltage (the 7812 is a positive 12-volt regulator).

The Design of Dual Supplies

The design of dual power supplies, those with both a positive and a negative voltage of the same magnitude (+/−12 volts, for example), is similar to single power supplies. The main difference is the use of a center-tapped transformer and a secondary regulator with twice the voltage used for a single supply. The center tap is a connection at the middle of the secondary coil, brought out for easy access.

The magnitude of the voltage between the center tap and either of the other two secondary output lines is half that of the voltage between the two ends of the secondary coil; the center tap is roughly the half-voltage point. This is used as the ground or zero-volt line in the dual supply, with the negative voltage coming from the minus terminal of the full-wave rectifier and the positive voltage coming from the plus terminal.

Building the Single And Dual Power Supplies

Although I chose a specific output voltage for both the single and the dual supplies, I'll describe the changes necessary for other voltages.

Whenever you work with high voltage, such as the 120-volt ac house current used in this month's project, be careful. Make sure you don't have the power supply plugged in when you're modifying or working on it, and insulate the transformer primary connections once the supply is complete (using electrical tape or putting the supply in an appropriate project box) to keep from accidentally touching them when you're using the supply.

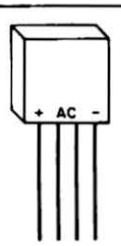


Figure 8. Packaged full-wave rectifier.

The Single Supply

The single power supply is simple to build, having a single positive or negative output voltage (see Photo 1). The schematic for the positive (+5-volt) supply is shown in Fig. 10; the negative (−5-volt) supply is similar and is shown in Fig. 11.

You can change these to other output voltages by changing the transformer and the regulator. The transformer's secondary should be specified for a voltage slightly higher than the desired regulated voltage (by at least a half volt, or so), but not much over, since the excess is dissipated

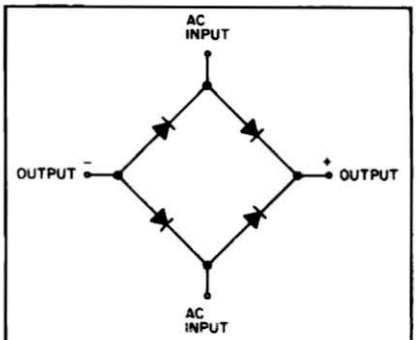


Figure 6. Full-wave rectifier circuit.

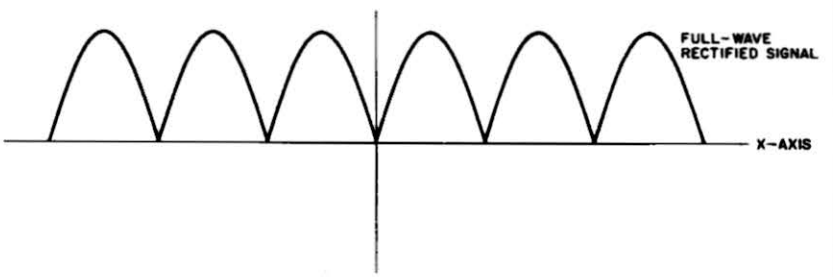


Figure 7. Full-wave rectified signal.

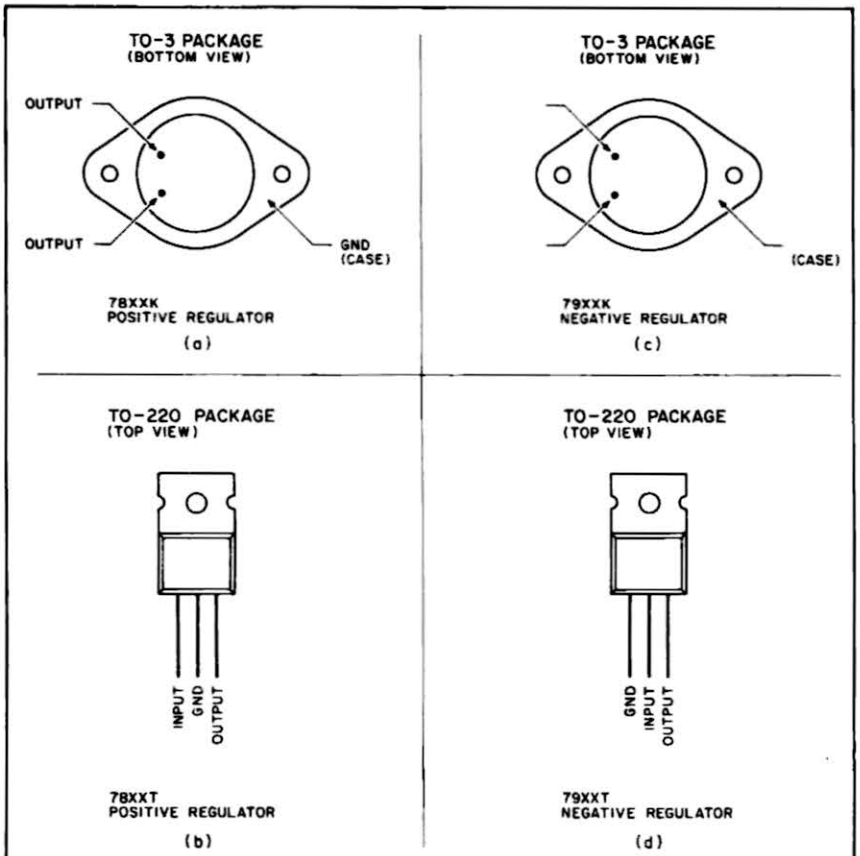


Figure 9. (a) Bottom view of TO-3 78XXK positive regulator. (b) Top view of TO-220 78XXT positive regulator. (c) Bottom view of TO-3 79XXK negative regulator. (d) Top view of TO-220 79XXT negative regulator.

as heat in the regulator. The current rating should also be somewhat greater than the 1 amp allowed by the regulator, since you lose power in the rectification, filtering, and regulation processes. For example, for a +/−12-volt supply, a transformer with 12.6 volts at 1.5 amps secondary would work.

You should put a heat sink under the regulator (though I didn't use any in my prototypes). It will dissipate the heat generated in the regulator, so that the regulator meets its maximum rated output. When putting the regulator on the sink, use heat sink compound between the regulator and the sink for better heat transfer.

A fuse on the 120-volt side of the transformer is optional, and is generally not needed since the regulator will shut down before it can draw an excessive amount of current from the transformer.

The Dual Supply

The schematic for the dual supply, consisting of both a positive and negative output of the same magnitude, is shown in Fig. 12 for a +/−12-volt supply (also see Photo 2). The transformer's center tap serves as the reference (ground or zero-volt) point, and the output voltages are

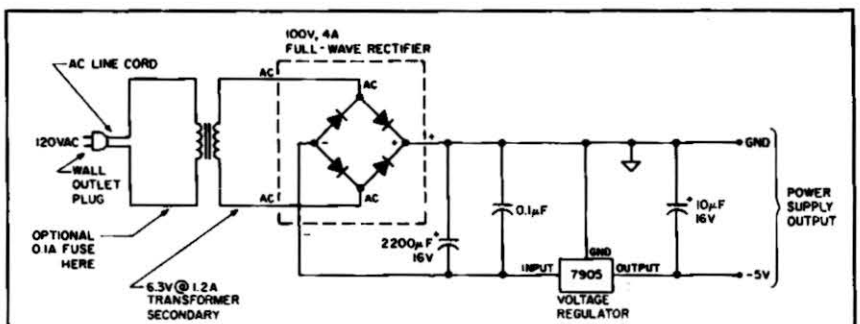


Figure 10. +5-volt power supply.

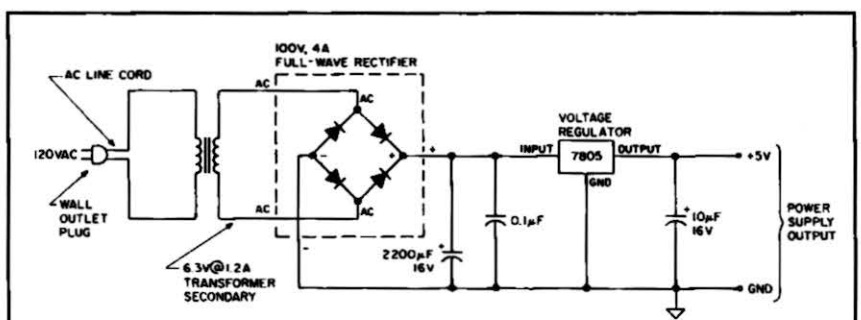


Figure 11. −5-volt power supply.

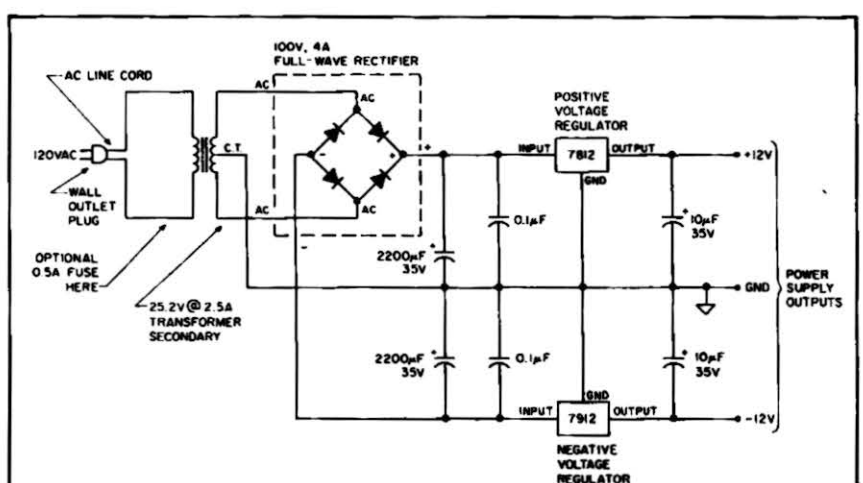


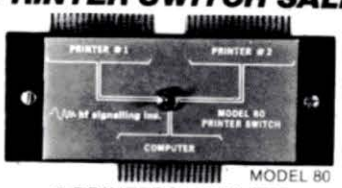
Figure 12. +/−12-volt power supply.

Circle 367 on Reader Service card.

NEW! Lower Prices!!
wabash®
six-year warranteed
DISKETTES!
$11.90/box (10)
5¼" single -side, single-density; double-density add $2/box. Add $3 per order shipping. *In Illinois add 7% sales tax.*
Library Case-$1.50 (with disk purchase)
Immediate shipment on VISA, MasterCard or Money order; add 14 days for personal checks.
CALL TOLL FREE
(800) 222-1248
In Illinois Call (312) 882-8315
DEALERS! SCHOOLS! USER GROUPS!
Call for our volume discount prices!
DIGITAL IMAGES
1185 Tower, Schaumburg IL 60195

Circle 405 on Reader Service card.

PRINTER SWITCH SALE



MODEL 80
2-PRINTERS! ON-LINE
Model 80 Line Printer Switch. Parallel printer port switch used to select between 2 printers and 1 computer. For Models I, III, 4, 4P, 1000, 1200, 2000.
Reg $66.50 **$57.**
2-COMPUTERS ON-LINE
Model 82 Line Printer Switch. Parallel printer port switch used to select between 1 printer and 2 computers.
Switches are for use with TRS-80 computers but are adaptable to any Centronics-type parallel interface. Provides card-edge connection.
Reg. $120 **$90.** 2 cables included
CABLES — Choose from a wide selection of 6 ft. in-stock cables for all models or we'll make what you need. Prices start at $19.
hf signalling inc.
3121 F. S. Dodgion Street
Independence, MO 64055
(816) 833-4448

Circle 422 on Reader Service card.

Word Processing
SIMPLIFIED
for
Super SCRIPSIT
The simple instruction book
use with TRS-80 III, IV, IVP
CLEAR, SIMPLE, EASY
• home • office • education
All you need is a super SCRIPSIT diskette.
The **only** instruction book you'll ever need.
ORDER NOW
Send check or **MO** for $16.95 includes shipping to:
Kelly Enterprises
P.O. Box 247
Holt, MI
48842-0247

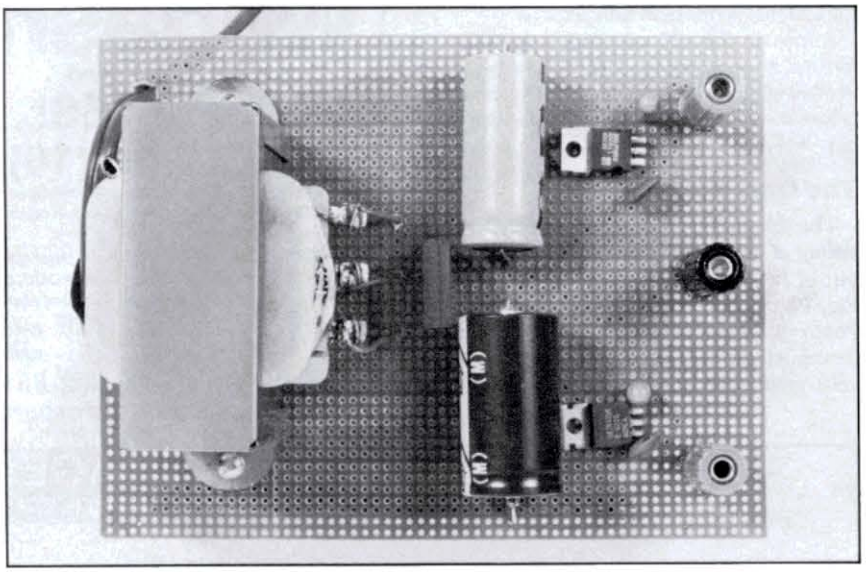


Photo 2. Dual power supply.

Quantity	Description	Distributor	Part Number	Price (Each)
1	Transformer*	RS		
1–2	Positive and/or negative voltage regulator(s)*	RS	276-1770+	1.59
1–2	2200 μF/35 volt Electrolytic capacitor†	RS	272-1020	2.49
1–2	.1 μF/50 volt Disc capacitor †	RS	272-135	0.25
1–2	10 μF/35 volt Electrolytic capacitor (PC mount)	RS	272-1025	0.59
1	100 volt/4A Full-wave bridge rectifier	RS	276-1171	1.59
2–3	Terminal post	RS	274-662	0.70
1	AC plug			
	AC line cord			

* See text.

† The 35-volt capacitor from Radio Shack can be substituted for the 16-volt capacitor specified for the + and – 5-volt supplies.

Radio Shack (RS) National Parts Division, 900 E. Northside Drive, Fort Worth, TX 76102, 817-870-5662.

Table. Parts list and ordering information.

positive and negative with respect to that line. While the voltage between the minus and plus terminals of the full-wave rectifier is roughly 25.2 volts, it is only half that between the transformer's center tap and either of the two rectifier output terminals.

Alternate Voltages

You can develop other voltage supplies by changing the transformer and the two regulators. The transformer value should be slightly higher than twice the value of the positive output voltage (a 12.6-volt center-tapped transformer works as a +/ – 5-volt supply). The current rating on the transformer's secondary should also be higher than the sum of the current output of the two regulators in the supply (for a 1-amp output, the secondary current rating should be 2.5 amps or higher).

As with the single supply described above, you should install heat sinks under the regulators.

Operating the Power Supplies

After connecting the ac line cord to the transformer's primary, and the terminal posts to the supply's regulated output(s), the power supply is ready for use by simply plugging it in. The supplies should provide up to approximately 1 amp of current output for your projects.

Conclusion

I've accumulated quite a collection of supplies over the years due to my various requirements. While the supplies designed here are limited to relatively low current, they can, nonetheless, be used with all of the projects described in the column, as well as ones planned in the future. Enjoy!■

Write to Roger C. Alford at Washtenaw Digital Systems, P.O. Box 2014, Ann Arbor, MI 48106. Please include a self-addressed, stamped envelope for a reply.

Going Back in Time

In the July 1984 Project 80 (p. 142), I described the construction of a Model III/4 real-time clock. Some people wondered what additional circuitry would be needed to use the real-time clock at the Model 4's full speed.

The schematic for the additional circuitry is shown in Fig. 13. The parts required are listed on the schematic and are available from most of the electronic distributors normally listed in Project 80 (see the Table). You need four new integrated circuits.

You need a crystal (along with three inverters) to generate an 8-MHz synchronizing clock for the Model III/4 circuitry previously described. If Radio Shack had brought the clock signal out to the input/output (I/O) bus as they should have, you wouldn't need this circuitry.

The 74LS161 4-bit binary counter does most of the work in this new circuit. When you don't have the 58174 selected (Q0/ is high), the master reset pin (MR/, pin 1) is low, clearing the four outputs (Q0–Q3). When you do select the chip, the MR/ pin goes high, allowing the counter to increment under appropriate conditions. The chip cannot count, however, until both the CEP and CET inputs are high, and the CEP input won't go high until the TRS-80 OUT/ line goes active. When this happens, the chip starts counting, using the rising edge of the 8-MHz clock.

Note that the WR/ line going to the 58174 is no longer the OUT/ line from the TRS-80 bus, but the Q2 line from the 74LS161 (inverted). The flip-flop (74LS74) attached to Q2's output merely serves as an inverter. The 58174 WR/

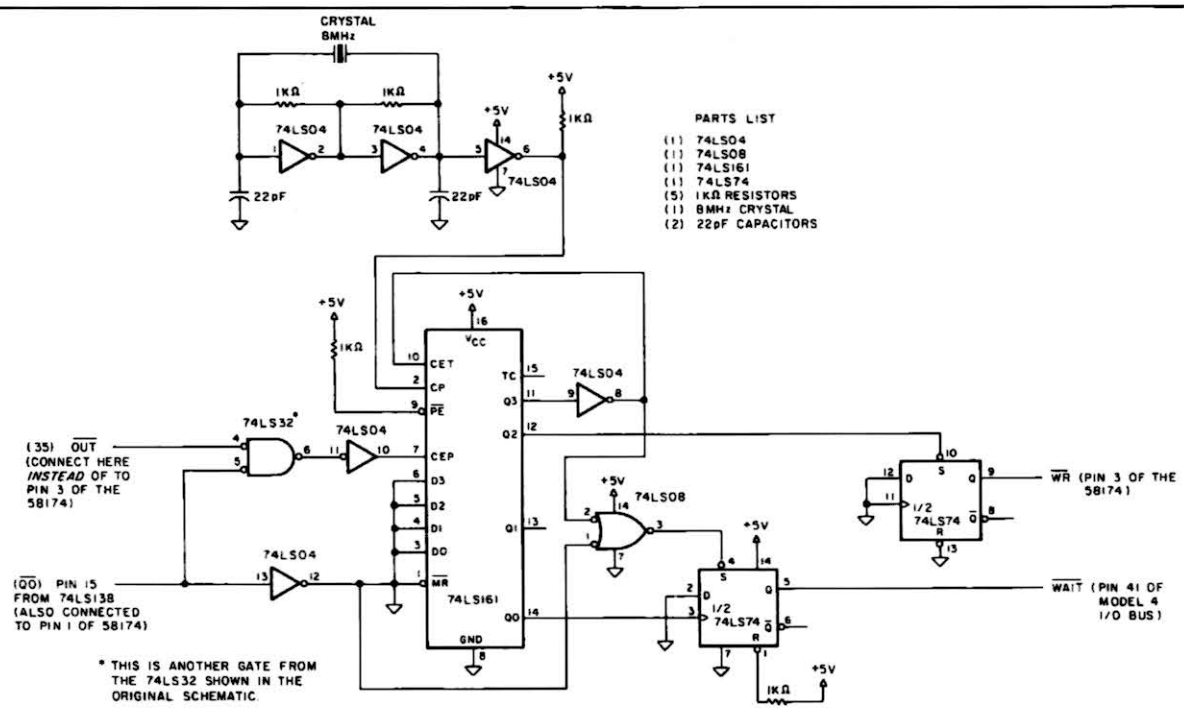


Figure 13. Circuitry to use the real-time clock at the Model 4's full speed.

The ORG should be decremented by 16. For a 48K system it would become:

ORG 0FFB0H

The RDTIME routine should become (without comments):

```
RDTIME DI
       LD   A,10H
       OUT (0ECH),A
       LD HL,TIMTBL
       .
       .
       .
       JR   NZ,RDTIME
       EI
       RET
```

The SETTIME routine should become (without comments):

```
SETIME DI
       LD   A,10H
       OUT (0ECH),A
       XOR A
       .
       .
       .
       OUT  (STPSTR),A
       EI
       RET
```

Figure 14. Program changes for Models III/4 to access real-time clock.

line is normally high (as it should be).

On receiving the first rising clock edge after the OUT/ line goes active (while the chip select is also active), the 74LS161 output increments by 1, setting the Q0 output, which in turn sets the flip-flop attached to the Q0 line. The output of this flip-flop goes to the TRS-80 WAIT/ line to generate necessary wait states. Note that no more than 125 nanoseconds (ns), one clock cycle, elapses between the time the OUT/ signal goes active and the time the WAIT/ line goes active (plus a little propagation time). This is well within the time required by the TRS-80's Z80 chip.

Q2 goes high three clock cycles after the WAIT/ goes active, bringing the 58174 WR/ line low. There will be a minimum of 375 ns (three clock cycles) after the chip select goes active before the 58174 WR/ line goes active, which is well above the 310 ns minimum requirement of the 58174. Four clock cycles later, the 58174 WR/ line goes high (Q2 goes low) and the Q3 output goes high, making the WAIT/ line unasserted. The CET line is also brought low, preventing further counting by the 74LS161. Note that the WR/ line is low for approximately 500 ns, well above the 430 ns minimum requirement of the 58174.

Nothing further happens until the chip select is unasserted, reasserting MR/, clearing the 74LS161's outputs. The whole process is entirely transparent to software. Incidentally, the read timing for the 58174 with the 4 MHz Z80 is already within specs, so modification is not necessary.

Model III/4 Code Change-Break

I also failed to describe the necessary changes to the Assembly-language code for accessing the real-time clock from the Model III/4. These systems require the computer to send a 10H value to the 0ECH register before each read or write to enable external I/O access. You must also disable the interrupts during this time, since system interrupt service routines often disable external I/O accesses. You should decrement the starting address of the machine-language code because the additional instructions require more room in memory. You should therefore modify the top-of-memory pointer (memory size) accordingly (from 0FFC0H to 0FFB0H in a 48K system). The RDTIME and SETIME entry points from Basic are also different. For a 48K system, line 80 of the Basic program becomes DEFUSR0 = &HHFFB0, while line 90 becomes DEFUSR1 = &HFFCC. The program changes required for Model III/4 operation are shown in Fig. 14.■

A Crash Course In Crash-Proofing

To paraphrase Carl Sandburg, "Why did the children put beans in their ears when the one thing we told them not to do was put beans in their ears?" In other words, why do people sometimes do the opposite of what you tell them to do?

Some people who use your programs will take delight in crashing them or in finding bugs by not following instructions. And people who don't know much about computers are good at crashing programs because they don't know what's acceptable to a program and what isn't.

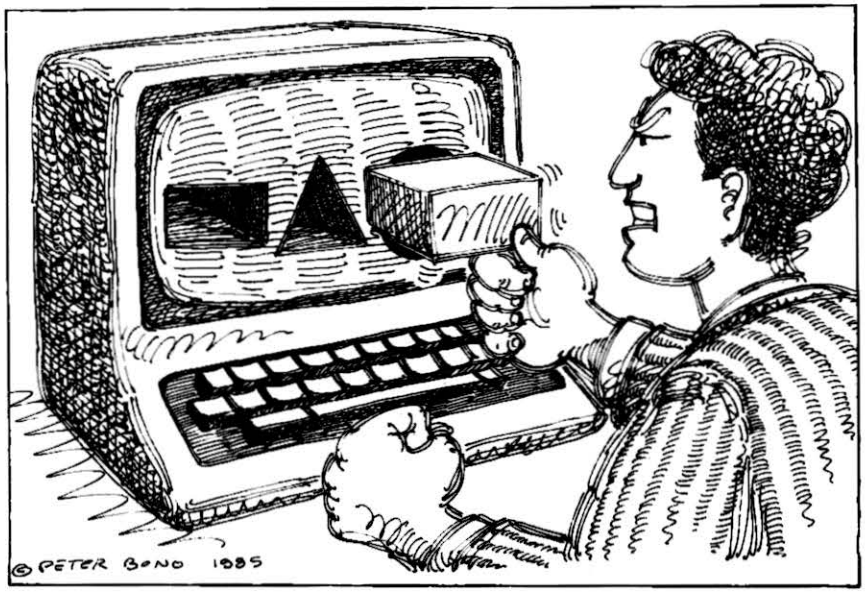


Illustration by Peter Bono

That's Not Supposed To Happen

My first Basic programs worked perfectly until others tried them. Here's an example from those early days:

```
500 INPUT "Type in a number from 0 to 127
  and press enter";X
510 SET (X,30)
```

If the user follows instructions, the program sets a pixel on the screen. If not, the program generates an illegal function call (an FC error) because an input value of less than zero or more than 127 is outside the range you can set on the X axis.

As given, the program is correct, but it allows incorrect answers. My lesson: Any program that accepts user decisions must have built-in limits.

One way to pinpoint potential crashes is to focus on every program line offering user decisions (Input and INKEY$ routines). A Basic program must be a closed environment. You can't let the user step outside the world the program defines, whether he's balancing a checkbook or traversing the terrain of an adventure game.

Limiting Responses

Your computer has the ability to reject one particular kind of unacceptable answer to a prompt. Type in the one-line program 100 INPUT A and try answering it with a character instead of a number. The computer responds ?REDO (or something similar) until you type in a number. Now try typing in INPUT A$ and your program accepts any input, but the program treats the entry as a string, not a number.

Here's a simple routine that limits user response to a prompt:

```
100 INPUT "Type in 1 or 2 and press enter";Z
110 IF Z<>1 AND Z<>2 THEN GOTO 100
120 PRINT "You chose ";Z: END
```

The program won't continue until it receives an answer within the acceptable range. A similar routine addresses string input:

```
100 INPUT "Answer YES or NO and press
  enter";A$
110 IF A$<> "YES" AND A$<> "NO"
  THEN GOTO 100
```

Be careful how you phrase If. . . Then tests. The logic of IF Z<>1 OR Z<>2 creates a mutually exclusive situation in which neither 1 nor 2 works as a choice.

If you give the user numerous choices, any whole number from 1–100 for example, the form If Z<>1 and Z<>2 and Z<>3. . . becomes too unwieldy. Try this:

```
100 INPUT "Type in a whole number from 1 to
  100 and press enter";Z
110 Z = INT(Z)
120 IF Z<1 OR Z>100 THEN GOTO 100
130 PRINT "You chose "Z: END
```

Line 110 corrects the input if the user enters a fractional amount. The program's integer function reduces a fraction to its next lowest whole number: 2.3 becomes 2, for example. Line 120 then accepts the answer if it's in the requested range.

The programming gets trickier when you want to accept some answers and not others. Change line 120 to IF Z/5 = INT (Z/5) THEN GOTO 100. Now the program accepts only numbers evenly divisible by five. Similarly, you can rule out some numbers within the accepted range: 120 IF Z = 50 OR Z<1 OR Z>100 THEN GOTO 100. This accepts any number from 1–100 except 50. The prompt must clearly state the choices.

Include precise instructions in the prompt. You can also include instructions for what to do if the user registers a wrong answer, as in the following program:

```
100 CLS
110 INPUT "Type in a number, 1 to 5, and press
  enter";X
120 X = INT(X)
130 IF X>0 AND X<6 THEN GOTO 190
140 CLS:PRINT "The number you typed is
  outside"
150 PRINT "the requested range. Please try
  again."
160 PRINT: GOTO 110
170 PRINT "Thanks. That felt good.":END
```

Line 130 shunts program execution ahead to line 190 if the answer is legal. If

System Requirements

Models III, 4, and 1000
Basic

Visit our two retail locations at:
886 Ecorse Road
Ypsilanti, MI 48197
(313) 426-5086 / (313) 482-4424

or

111 Marshall Street
Litchfield, MI 49252
(517) 542-3280

WE CARRY TANDY, RADIO SHACK, SANYO & IBM

DISPLAYED VIDEO

IMMEDIATE DELIVERY
180 Days Parts and Labor Warranty
DEALER INQUIRIES INVITED
Free Shipping in the U.S.
48 Contiguous States

TO ORDER: Call (313) 426-4086 or (313) 482-4424 or (517) 542-3280
OR WRITE: DISPLAYED VIDEO 111 MARSHALL ST., LITCHFIELD, MI 49252
(517) 542-3939 (517) 542-3947
OR 886 ECORSE RD. YPSILANTI, MI 48197
(517) 542-3939
(517) 542-3947 (517) 542-3939 TECHNICAL SUPPORT

TRS-80 is a trademark of the Tandy Corporation
IBM is a trademark of International Business Machines
Prices & Specifications subject to change without notice

COMPUTERS

TANDY 1000 W/2 drives	$1,199.	IBM W/2 double sided drives, 256K	$1,849.
TANDY 1000 W/2 drives & RGB color monitor	$1,549.	IBM W/1 double sided disk drive, one 10 meg. hard disk, 256 K	$2,695.
MODEL 4 W/2 drives (26 1069)	$985.	Monochrome monitor or color monitor display card for IBM or Tandy 1200	$225.
MODEL 4P W/2 disk drives	$895.	High resolution RGB Teknika color monitor	$325.
MODEL 4P W/2 double sided drives	$1,149.		
TANDY 1200	$1,749.		

DISK DRIVES

TEAC HALF HEIGHT DISK DRIVES

FD55a 40 trk ssdd bare	$125.	FD55a 40 trk w/case & power	$165.
FD55b 40/40 trk dsdd bare	$135.	FD55b 40/40 trk w/case & power	$175.
FD55f 80/80 trk dsdd bare	$160.	FD55f 80/80 trk w/case & power	$199.
Tandon 40 trk bare	$125.	Fullsize case & power supply	$45.
Tandon 40/40 trk bare	$160.	Slimline case & power supply	$45.
8" dual slimline case & power	$149.	Dual slimline case & power supply	$55.

PRINTERS

EPSON		STAR		JUKI	
LX80	$375.	SG10	$259.	6100 Daisywheel (parallel)	$425.
FX80+	$425.	SG15	$379.		
FX100+	$595.	SD10	$375.	6100 Daisywheel (serial)	$475.
RX100	$415.	SD15	$475.		
LQ1500 & interface	$1,125.	SR10	$560.	6300 Daisywheel	$725.
JX80	$595.	SR15	$640.	6000 Diasywheel	$220.

We stock all Radio Shack printers	Call for price
Radio Shack, IBM, TI, & Sanyo printer cables	$24.99
Printer paper 20# 2700 sheets	$29.00
Epson 80 series ribbon $8.00	Epson 100 series ribbon $10.00

PERIPHERALS

MODEMS

ANCHOR MARK XII 300/1200 baud (Hayes compatible)	$259.
ANCHOR MARK X 300/1200 baud (Hayes compatible	$125.
Volksmodem 12 & cable 300/1200 baud auto /ans au /dl	$220.
Hayes 300 baud	$205.
Hayes 1200 baud	$430.
Volks modems & cable	$69.

MONITORS

Teknika hi-res. color monitor	$325.!!
Comrex green or amber monitor	$115.
Zenith green or amber monitor	$120.

MISCELLANEOUS

Model III/4RS 232 board	$75.
Model I double density board	$85.
64k 150ns memory chips	$2.95
Power strip w/surge protection	$25.
Bulk diskettes pack of 10	$13.
Verbatim diskette pack of 10	$20.

★ DISPLAYED VIDEO ★
IS TURNING THE COMPUTER WORLD UPSIDE DOWN!!

Circle 62 on Reader Service card.

the program doesn't accept the answer, lines 150–180 indicate what's wrong and prompt the user for a new entry.

Be careful how you word error messages. Messages like "Wrong, dummy! Try again" sound funny, but they're intimidating, boring, and insulting to the user who's struggling to make a program run correctly. The best style is to blank the screen and present a clearly worded prompt again. If you include more instructions, make them nonjudgmental and encouraging.

You can direct program execution with ON X GOSUB and ON GOTO routines, too:

```
100 CLS:PRINT "MENU"
110 PRINT "1 Branch to line 200."
120 PRINT "2 Branch to line 300."
140 INPUT "Choose 1 or 2 and press enter":X
150 ON X GOTO 200, 300
160 GOTO 100
200 PRINT "You chose line 200.":END
300 PRINT "Here you are at line 300.":END
```

Notice that you haven't limited the input value of X, yet the program doesn't accept menu choices other than 1 or 2. This works because line 150, having two destinations, considers only 1 and 2 as possibilities. If it finds neither, the program falls through to line 160, which restarts the search by returning to line 100.

Error messages like "Wrong, dummy! Try again," sound funny, but they're intimidating, boring, and insulting to the struggling user.

String Solutions

An INKEY$ value always represents the string value of the keyboard button most recently pressed. Try this:

```
100 CLS: PRINT "Type in the letter A and press
  enter."
110 A$ = INKEY$
120 IF A$ = "A" THEN PRINT A$;
130 GOTO 110
```

Lines 110–130 form a loop with the possible action contained within it. The listing prints the value of A$ only if you type in the letter A. Best of all, a single keystroke does the job, rather than having to type in the answer and press the enter key:

```
100 CLS: PRINT "Will you continue <Y>es
  or <N>o?"
110 A$ = INKEY$
120 IF A$<> "Y" AND A$<> "y" AND A$<>
  "N" AND A$<> "n" THEN GOTO 110
130 PRINT "You chose "A$:END
```

Line 120 sends the program back for a new INKEY$ value if the answer is not a Y, y, N, or n. It works, but you still have a better option: Use INSTR to test for the existence of one string within another. Change line 120 to: IF A$ = "" OR INSTR("YyNn",A$) = 0 THEN GOTO 110. The new line is only slightly shorter than the original, but greater space savings and better precision result with five possible responses.

Using INSTR tests can produce problems. The person running your program might tap the correct key in lowercase. An INSTR test doesn't accept an "n" in place of an "N" or vice versa.

Also, allowing these variations puts you in the awkward position of having to consider alternate possibilities each time you test the values in the program. This short routine, put at the start of a program, can solve the problem:

```
100 INPUT "Type in the letter x and press
  enter";X$
110 IF X$ = CHR$(88) THEN PRINT "Keyboard
  must be unshifted so lowercase letters print.":
  GOTO 100
120 IF X$<>CHR$(120) THEN GOTO 100
```

If the user types in the key in uppercase, the program prompts him to respond in lowercase (line 110). In line 120, if the key isn't lowercase, the program loops back for another try. This forces the user to unshift before the program continues. Since all entries are then in lowercase, the program needn't consider uppercase entries as alternatives.

For the last example of delimited responses I'll return to the Input statement. This program accepts numeric and string answers from the same prompt. It treats input as a string, and if the response is a possible numeric value, it uses VAL to create a numeric variable with the numeric value of a string:

```
100 CLS
110 INPUT "Your choices are tango or 1":A$
120 IF A$ = "tango" THEN PRINT "Sorry, I only
  Foxtrot.": END
130 IF A$<> "1" THEN GOTO 100
140 A = VAL(A$)
150 PRINT "You chose "A:END
```

Final Entry

Don't let a user make any choice your program isn't ready to handle. Limit the choice at the point of input, before the problem gets out of hand.

Coming next month, error recovery for disallowed prompt answers. ■

You can reach Richard Ramella at 1493 Mt. View Ave., Chico, CA 95926.

Circle 134 on Reader Service card.

SAVE BIG ON COMPUTER PRODUCTS

MODEMS
HAYES
Smartmodem 300 ... 190
Smartmodem 1200 ... 459
Smartmodem 1200B ... 399
Micromodem II E ... 220
Smartcom II Software (for IBM PC) ... 90
Cables to Hayes Modems ... CALL
NOVATION
SmartCat Plus ... 320
W/Mite ... 320
J. Cat 300B direct ... 99
103 SmartCat 300B Smart ... 159
103/212 Smart 300/1200 B ... 379
AppleCat II 300 baud for Apple ... 200
212 AppleCat 300/1200B for Apple ... 390

MONITORS
AMDEK
V300G 12" green ... 122
V300A 12" amber ... 145
V310A 12" amber (for IBM) ... 160
Color 300 ... 249
Color 500 ... 369
Color 600 ... 475
SAKATA
SG1000 12" green ... 95
SA1100 12" amber ... 105
SC100 13" composite color ... 210

QUADRAM
MICROFAZER
QRMP-8 Par/Par ... 135
QRMSP-8 Ser/Par ... 139
QRMMSS-8 Ser/Ser ... 139
QRMPS-8 Par/Ser ... 139
QUADBOARD (for IBM PC)
QR 5310 (no mem. installed) ... 210
QR 5364 64K (mem. installed) ... 245
QR 4064 64K (mem. installed) ... 270
QR 8201 Quadcolor-1 ... 200
QR 8202 Quadcolor-2 (upgrade kit) ... 200
PARADISE
Multi Display Card ... 300
Modular Graphics Card ... 290
Module A or Module B ... CALL

AST
Six Pak Plus ... 250
MegaPlus II ... 270
1/0 Plus II ... 125
HERCULES
Graphics Board ... 329
Color Board ... 170

SAVE 31%-43%
OFF MFR. SUGG. RETAIL PRICES ON
PRINTERS
EPSON•OKIDATA•DIABLO
SCM•DELTA•GEMINI•NEC
•TOSHIBA•COMREX

EPSON
RX 80/RX 80 FT ... CALL
LX 80 FT ... CALL
FX 80 ... 375
FX 100 ... 350
LQ 1500 P ... CALL
PowerType letter quality ... 325
COMREX CRII letter quality ... 360

STAR MICRONICS
SG 10 ... CALL
SD 10/15 ... CALL
SR 10/15 ... CALL

OKIDATA
Oki 84 ... CALL
Oki 92 ... CALL
Oki 93 ... CALL
OkiMate 10 printer incl. interface ... 199

DISKETTES
wabash
Wabash 1111 5¼" SS/SD ... 11.00
Wabash 1212 5¼" SS/DD ... 12.00
Wabash 2222 5¼" DS/DD ... 13.00
maxell
MF-1 3½" SS/DD ... 34.00
MF-2 3½" DS/DD ... 50.00
MD-1 5¼" SS/DD ... 16.50
MD-2 5¼" DS/DD ... 21.50
MD1DD 5¼" SS 96 TPI ... 29.00
MD2DD 5¼" DS 96 TPI ... 35.00
MD2HD 5¼" DS (IBM-AT) ... 45.00
FD 1 8" SS/DD ... 32.00
FD 2 8" DS/DD ... 37.00
Dysan
Dys 12 5¼" SS/DD ... 19.00
Dys 22 5¼" DS/DD ... 25.00
Dys 33 5¼"DS 96 TPI ... 45.00
Dys 8128 8" SS/DD ... 27.00
Dys 8228 8" DS/DD ... 32.00
3M
3M3 3½" SS/DD ... 34.00
3M5 5¼" SS/DD ... 16.50
3M5 5¼" DS/DD ... 21.50
3M5 5¼" DS/DD 96 TPI ... 31.00
3M8 8" SS/DD ... 21.00
3M8 8" DS/DD ... 29.00
CALL FOR QUANTITY PRICING ON
10 OR MORE BOXES OF DISKETTES

HUGE DISCOUNTS on all DISK DRIVES
Tandon TM 100-2 ... 125
Teac FD 55B ... 129
Rana Elite I (for Apple) ... 175
Rana Elite II (for Apple) ... 335
Rana Elite III (for Apple) ... 420

CALL TOLL FREE 800-621-1269 EXCEPT Illinois, Alaska, Hawaii

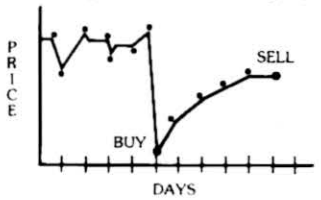
Corp. Accts. Invited. Min. Ord. $15.00. Visa or MasterCard by Mail or Phone. Mail Cashier's Check, Mon. Ord., Personal Check (2 wks. to clear) Add $4.00 1st item. (AK, HI, P.R., Canada add $10.00 first item) $1.00 ea. add'l shpg. & handl. Shipments to IL address add 7% tax. Prices subj. to change. WRITE for free catalog. RETURN POLICY: Defectives Only: Most products replaced within 30 days of purchase with identical merchandise only. Computer and large peripherals replaced only when defective on arrival (within 3 work days of delivery). Other problems covered by mfr. warranty. ALL ELEK-TEK MERCHANDISE IS BRAND NEW, FIRST QUALITY AND COMPLETE. Delivery subject to availability.

ELEK-TEK, inc. 6557 N. Lincoln Ave. Chicago, IL 60645 (312) 631-7800 (312) 677-7660

Circle 78 on Reader Service card.

Nibble Theory

A Short Term Strategy for Making a Small Profit Everyday.



Send **$39.95** for complete **"Nibble Theory" Software Package** and detailed explanation of how to nibble money out of the stock market on a daily basis. (MOD III/IV only).

DATACOVER INC.
Call or write
Dept. F
3657 HiDale • Lake Orion, MI 48035

Circle 422 on Reader Service card.

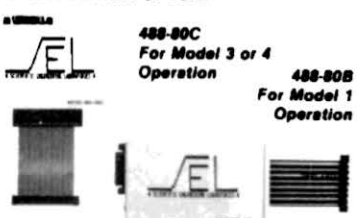
Word Processing SIMPLIFIED

for
Super SCRIPSIT
The simple instruction book
use with TRS-80 III, IV, IVP
CLEAR, SIMPLE, EASY
• home • office • education
All you need is a super SCRIPSIT diskette.
The **only** instruction book you'll ever need.
ORDER NOW
Send check or **MO** for $16.95 includes shipping to:
Kelly Enterprises
P.O. Box 247
Holt, MI
48842-0247

Circle 203 on Reader Service card.

IEEE-488 TO TRS-80* INTERFACE

Everything needed to add *powerful* BASIC GPIB-488 controller capability to TRS-80 Model 1, 3 or 4, Level 2 or DOS with a minimum of 16K.



Model 488-80B or 488-80C Price: $450
+ shipping, insurance & tax
WHEN ORDERING SPECIFY DISK OR TAPE

SCIENTIFIC ENGINEERING LABORATORIES
11 Neil Drive • Old Bethpage, NY 11804
Telephone: (516) 694-3370

**Trademark of Tandy Corp*
There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack

Circle 388 on Reader Service card.

MODEL 100 C COMPILER

Now you can write efficient programs for your TRS-80 model 100 with ease. Or, learn the essentials of C programming while traveling!

C/100 - THE "PORTABLE" C COMPILER
Cassette version $49.00
Disk/Video interface version $59.00
Model II version (run on mod II, then download object code to model 100) .. $79.00
Model III version (as above for Mod III) . $79.00

Write or call for information on other TRS-80 software.

MODELS II, 12, 16 MODELS III, 4

TRS/C C COMPILER
Full K&R with source to the function library. UNIX compatible $85.00

ZSPF EDITOR
SPF, the choice of most mainframe programmers, is now available for Z80 machines. And it's panel driven so you can customize it! $75.00

business utility software

109 minna ste 423 san francisco ca 94105

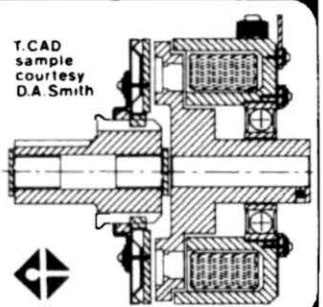
(415) 397-2000

Circle 299 on Reader Service card.

T.CAD Computer Assisted Drafting

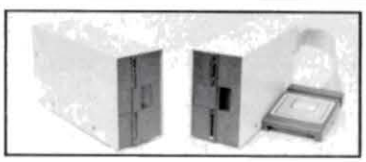
MODELS 3 / 4 / 4P / TANDY 1000 / 1200 Versatile, easy CAD-system: draw, modify, clone, save exact scaled technical plans, details. Variable cursor step, grid snap. Full size overlays. Zoom and pan. Coordinate input option. Copy, rescale, rotate, merge, clip any detail, part or entire drawing. Text labels upper/lower case ASCII. Plotter output up to 24" x 36". Single operating mode, on line help screen, more. Supported by established design firm for over a year now. February 1985 review in 80-micro calls it **Draftsman's Delight.**

xT.CAD Professional software $449.95
T.CAD Apprentice software $249.95



MICRODEX 1212 North Sawtelle Tucson, Arizona 85716 (602) 326-3502
or ask your Radio Shack Computer dealer

Circle 34 on Reader Service card.



Drive 1 139.95 — Your Choice Silver or White — 239.95 Drive 0

SUPER DRIVE SALE

Special prices on new first quality disk drives. They even have GOLD connectors on the back...Some other places charge 279.00 for dr. 1 and 349.00 for dr. 0, not us! Drive 1 is for mod I, Second Color Computer drive, or external mod III, IV. Drive 0 is your first Color Computer drive and comes complete with controller, cable and manual. Bare drives for internal mod III, IV, only 89.95! For double-sided, add 45.00 (only for those who have DS-DOS, boards and knowledge)

THE COMPUTER CENTER
901-761-4565, 5512 Poplar, Memphis, TN 38119
Add $3.90 for shipping & handling—Visa, M/C accepted—Dealer inquiries welcome

Circle 350 on Reader Service card.

WINDOWPAD for I III IV

an intergrated windowing and note processing utility. It enables the operator to (1) work independent of an application program; (2) write, recall and edit notes efficiently; and, (3) set timed Pop Up Window Memos. UP TO 8 WINDOWS CAN BE DISPLAYED AT ONE TIME.

Send your Check or Money Order to En Fleur Corp. 2494 Sun Valley Circle Silver Spring Md. 20906
$21.25 Postpaid (301) 598-4532
KEEP A EYE ON EN FLEUR!
WE'RE PRICE BUSTERS
[Md. Residents Add 5% Tax]

Opening Windows On Your Model 4

The trouble with the Model 4 is that it can't do windows, I've heard.

Of course it can. Just because no one (to my knowledge) has written a general windowing program for the Model 4 doesn't mean it can't be done. During the next few months, I'll show you how to write a program that gives complex windowing capabilities to your Model 4 with TRSDOS 6.2.

For this project, I define a window as a video display that uses only part of the screen and leaves the rest unaffected. When you're done with a window, you should be able to close it and return to the previous display with everything intact.

My definition does not imply that one program can run in memory on top of another, but merely that you can impose one display on top of another. However, by the end of this project, you'll be able to run any DOS command from within a window, on top of almost any program.

The complete window program is much too long for a single column. This month, I'll explain the crucial video driver portion of the program. I'll add the interfaces during the next two months.

The Video Driver

You can write the video driver for a windowing program several ways. I considered writing a filter for TRSDOS's *DO driver that would catch each byte as it went to the video screen and decide how to handle it. That approach would work for text, but it would handle control characters and scrolling very slowly.

Therefore, I changed the resident video driver directly. This system has several advantages: you can use most of the resident video driver with few or no changes, you can access video RAM directly, and you shouldn't lose system speed.

LOAD 80

System Requirements

Model 4
TRSDOS 6.2
Basic
Assembly language
Editor/assembler

Illustration by Phil Geraci

Program Listing 1. Model 4 window driver.

```
00110 ;             MODEL 4 WINDOW DRIVER
00120 ;             Hardin Brothers -- The Next Step
00130 ;             February 2, 1985
00140 ;-------------------------------------------------------------
00150 ;  This program patches the DOS *DO driver to support windowing
00160 ;  on the Model 4/4p under TRSDOS 6.2 only!
00170 ;
00180 ;  It modifies the *DO driver, and also uses 130 bytes of
00190 ;  the low memory driver area (0FF4h to 12FFh).
00200 ;*************************************************************
00210 ;
00220 ; Equates to call *DO driver addresses
00230 ;
00240 CRSBOL          EQU     0BF8H           ;Cursor to beginning of line
00250 CRSUP           EQU     0C2BH           ;Cursor up one screen line
00260 DO_SCROLL       EQU     0CCEH           ;Beginning of scroll routine
00270 CLREOL          EQU     0D12H           ;Clear to end of line
00280 PUT_@           EQU     0DCAH           ;Put char. in C at cursor pos'n
00290 RC_2_ADDR       EQU     0DD0H           ;Change Row/Column in HL to
00300                                         ;  video memory address
00310 ;
00320 ; Equates to patches in *DO driver
00330 ;
00340 CRSBOL2         EQU     0D16H           ;Extension to CRSBOL
00350 PT_DE_TOP       EQU     0C37H           ;Point DE to top of window
00360 CHK_LN_END      EQU     0CD1H           ;Past end of window line?
00370 GET_END         EQU     0CD8H           ;Point HL ==> end of window line
00380 CLREOL1         EQU     0CE2H           ;Extension to CLREOL
00390 ;
00400 ; SVCs used:
00410 ;
00420 @DSPLY          EQU     10
00430 @EXIT           EQU     22
00440 @HEX16          EQU     99
00450 ;
00460 ; If you use PRO-CREATE or EDAS, add the following Macro definition:
00470 ;
00480 ;SVC    MACRO   #NUM
00490 ;       LD      A,#NUM
00500 ;       RST     28H
00510 ;       ENDM
00520 ;
00530 ;-------------------------------------------------------------
00540 ;   This is the new code that will be stored in low memory.
00550 ;-------------------------------------------------------------
00560 ;
00570                 PSECT   3000H           ;Use ORG 3000H with EDAS
00580 DVR_START       JR      CRSBK           ;Create standard header
```

Listing 1 continued

Circle 204 on Reader Service card.

DiskCount Data

WHERE QUALITY PROGRAMS MEET COMPETITIVE PRICES

2701-C W. 15th•SUITE 612•PLANO, TX 75075•(214) 680-8268

All MOD III programs specified in this ad will run on the Model 4 (in the MOD III mode).

WE WILL NOT BE UNDERSOLD!

ELECTRIC WEBSTER — ONLY 119.95
by Comucopia Software

149.95 Save 20%
WITH CORRECTING FEATURE

Reviewed as the best proofreader and spelling checker on the market. Works with SCRIPSIT, LAZY WRITER, ELECTRIC PENCIL, ZORLOFF, NEWSCRIPT, COPYART, and ACORN'S SUPERSCRIPSIT. Sold with correcting feature for 149.95.

OUR PRICE	119.95
HYPHENATION OPTION*	39.95
GRAMMER & STYLE CHECKER*	39.95

MOD I/III/IV

*Note hyphenation & grammer options are not available for all word processors. Ask when ordering.

APPLICATIONS

ST-80 III	69.95
Miracle 1000/1200	279.00
Survey Analyst	195.00
Masterdirectory Mod III	29.95
Superdirectory Mod I/III	44.95
Datagraph I/III/4/Max	69.50
Datagraph Pie Chart Option	29.95
The Basic Checkbook I/III	64.95
Mterm I/III/4	59.50
Mterm MSDOS 1000/1200	74.95
Loan Amortization III	29.95
PowerMail Plus I/III/4	124.95
Text-Merge for PowerMail	49.95
PowerMail w/Text-Merge	149.95
The Home Accountant III	62.50
Inventory Control/ICS Pro	148.00
BBS-80 Bulletin Board I/III	74.99
BBS-PC MSDOS 1000/1200	225.00
Infoscan I/III (Keyword D-Base)	44.95
Ultraterm I/III	44.95
Ultraterm 2.0 w/auto-logon	59.95
TallyMaster	79.95
SPS Statistical Analysis Mod I	150.00
SPS as above for Mod III inquire	

BBS-80 — ONLY 74.95
By MicroSystems Software

RUN YOUR OWN BULLETIN BOARD

Your computer becomes a mini-communications network. BBS-80 allows a person to exchange messages or information via the telephone. Access can be completely public, private to authorized users or limited to certain individuals. BBS-80 can leave messages on another terminal acting as a rapid electronic mailman. BBS-80 provides some of the most advanced and most convenient features ever incorporated in a microcomputer bulletin board system including: Users may send private messages that may be read only by the addressee. Multi-level system security allows up to 15 levels of security in both the message base and the upload/download database. BBS-80 remembers each regular user and stores terminal information, security access levels, last message reviewed during last call, etc. Individual user passwords. Users may upload or transmit data and programs files to BBS-80. These programs may then be downloaded to other BBS-80 users. BBS-80 is self maintaining. Message space is automatically reclaimed when messages are deleted.

MOD I or III

SCHOOL UTILITY AND EDUCATIONAL

Mostly Basic Educational Tape	14.99
Time Dungeon U.S. History Tape	19.95
Time Dungeon World History Tape	19.95
Test Question Data Bank	49.95
Test Generator/Drill	34.95
Football Scouting	49.95
Basketball Statistics	39.95
Baseball Statistics	39.95

GRAPHIC GAMES AND SIMULATIONS

Voyage of the Valkyrie I/III	29.95
Voyage of the Valkyrie Tape	19.95
Meltdown (Nuclear Powerplant)	19.95
Gamepak-3 (Funface, Match, etc)	29.95
Pro-Pix NFL Version	29.95
The Wizard Trivia Tester	34.95
Word Challenge	29.95
Concentration	19.95
TRS-80 Opera w/any of the above	10.00

THE HOME ACCOUNTANT — ONLY 62.50
By Continental Software

An Outstanding Financial Planner

• Maintains up to 100 budget categories • Keeps track of up to five checkbooks • Prints checks if desired • Prints a personal balance statement, income and expense summary • Prints net worth statement • Provides fast bank reconciliation • Allows the extensions on multiple diskettes • One program handle cash, checkbooks, credit cards and other liabilities and expenses • Unlimited annual transactions, fiscal or calender year • Transactions may be "split" among different budget categories • Flags transactions for tax purposes • Maintains transaction history • Provides Hi-Res graphics for any category by bar graph.

"The program itself does just about everything you'd ask of a personal finance package." -Popular Computing, November 1982

MOD III

BOOKS, WALL CHARTS & MISC

Inside Super Utility (new issue)	17.95
Super Utility Tech Manual 3.x	13.95
TRS-80 Encyclopedia I/III/4	19.95
TRS-80/Z-80 Assembly Library	31.95
TRS-80 Disk & Other Mysteries	19.95
The Custom TRS-80 & Other Myst	26.95
Microsoft Basic Decoded	26.95
Machine Language Disk I/O	26.95
Basic Disk I/O & Other Myst	26.95
How To Do It On The TRS-80	26.95
TRSDOS 2.3 Decoded & Other Mys	26.95
Basic Faster & Better	26.95
BFB Library Disk I/III	16.95
BFB Demo Disk I/III	16.95
TRSDOS 6/LDOS Programmers Guide	14.95
Green Screens I/II/III/4/4P	16.95
Diskettes SSDD 10 in Plastic Bx	19.50
Volt Guard Surge Protector	39.95
Profile 3+ Commands Wall Chart*	4.00
Visicalc Commands Wall Chart*	4.00
Superscripsit Wall Chart*	4.00
Model III Basic Wall Chart*	4.00
Model 4 Basic Wall Chart*	4.00

*Charts not shipped as separate order

WORD PROCESSORS & PRINTER DRIVERS

Lazy Writer I/III/4	119.95
Lazy Font I/III/4	44.95
M-Script I/III/4	53.50
M-Script 1000/1200 MSDOS	74.95
LeScript I/III/4/Max	104.95
Clean Slate I/III	49.95
Electric Webster (specify)	119.99
Grammar & Style (specify)	38.95
Hyphenation Opt. (specify)	38.95
PowerDriver-E Epson I/III/4	29.95
PowerDriver-P Prowriter I/III/4	29.95
PowerDriver-S Starwriter I/III/4	29.95
PowerDriver-O Okidata 92 I/III/4	29.95
PowerDriver-FX (FX/RX) I/III/4	29.95
Epson Driver Compiler	29.95
PowerScript for Scripsit I/III/4	34.95

NOTE: If your printer driver is not listed, call, we have more.

$100 FREE SPECIALS $200

Order over $100.00 and select one of the following ABSOLUTELY FREE. Order over $200.00 and you may select any two items: 80 Micro's 465 page Review Guide • Voyage of the Valkyrie • Meltdown • The Rest of 80 250 page Book • Superkeys Mod III • The Green Window CRT Screen • Varkeep & Screenpacker Plus • Master Directory Mod III • Agri-Calc Feeder Pig Module •

UTILITIES

SuperUtility Plus 3.2 I/III/4	69.95
SuperUtility Plus 4/4P	79.95
TextPress I/III (ASCII Comp.)	49.95
Ale Editor/Assembler I/III	38.95
The Toolbox for LDOS	44.95
LC Compiler/EDAS I/III or 4	124.95
ALCOR Editor CP/M TRSDOS 6 MSDOS	49.00
ALCOR Editor I/III	39.00
ALCOR Advanced Development Pkg	49.00
ALCOR C Complete System	139.00
ALCOR Multi-Basic Compiler	139.00
ALCOR Multi-Processor Assemblr	49.00
AOS Superkeys Key Macros Mod III	35.00
6.2 Plus. (Enhance TRSDOS 6.2)	36.95
The Toolbelt Mod 4	44.95
AOS Utils #1 Varkeep/Scrnpkr	49.95
Impakt for Basic I/III	34.95
Pro-Cess Mod 4	24.95
Pro-Create Mod 4	74.95
Pro-Cure Mod	39.95
Pro-Duce Mod 4	24.95
Pro-Pads Mod 4	39.95
Pro-LC Mod 4	124.95
Pro-Zcat Mod 4	24.95
Enigma Encryption Utility	34.95
Basic-S Compiler System	34.95
M-ZAL Release 3 Mod I/III	74.95
Zues Editor/Assembler I/III/4	74.95
Master Mechanics Set for LDOS	24.99
E-Basic (specify DOS)	49.95
System Diagnostic I/III/4	89.99
Bas34 (Mod III to 4 Convert)	44.95
Hypercross/XT TRSDOS /CP-M/MSDOS	79.95
Hypercross/XT 2.0	99.95
Trashman	32.50
Faster	22.95
RPM	21.50
DSMBLR III I/III	24.95
Accel 3/4 Basic Compiler I/III	94.95
Monitor 5 I/III/4	22.95
Hyperzap Disk Utility I/III/4	49.95
Superdos enhance TRSDOS 1.3	29.95
Z-Basic Compiler	79.50

INSTRUCTIONAL VIDEO TAPES

Specify VHS/BETA 36.99

Profile III Plus, SuperScripsit, VisiCalc, Newdos-80, Scripsit, TRSDOS 1.3 (Mod III), TRSDOS 6 (M-4), TRSDOS 6 Disk I/O (Mod 4), TRSDOS 1.3 Disk I/O (Mod III), Multidos, Dosplus, LDOS 5.(x), LazyWriter, PFS File, CP/M 2.2 Montezuma (M-4), Multiplan (M-4), PFS File (Mod 4) ..... 36.99 each

Level II Basic or Model III Basic ... 46.99

GRAPHICS

Powerdraw I/III	34.95
Graphit (Line Graphing)	34.95
AOS Utils. Screenpacker Plus	49.95
PowerDot II I/III Spec. Printer	54.95
Datagraph	69.50
Lazy Font I/III/4 Spec. Printer	44.95

SUPER UTILITY PLUS VERSION 3.2 — SAVE
By Powersoft

SALE ..... ONLY 69.95

MOD 4 Version Now Available

NEW SUPER UTILITY+ VERSION 3.2
Includes Operators Manual and 2nd Backup-Disk

The Book Inside SU+ 3.2 NOW ONLY 17.95

Experience a legend with the program voted as the outstanding utility of 1982 and 1983

MOD I or MOD III — Protected Media

OPERATING SYSTEMS

CP/M 2.2 Montezuma Mod 4	169.95
R-Shack HD Driver for CP/M 2.2	30.00
Dosplus 4A With M-ZAL	114.95
Dosplus 3.5 I/III	54.95
Dosplus 3.3 Mod I S or DD	29.95
Multidos 1.7 I/III	84.95
Multidos Mod 4	94.95

HYPERCROSS/XT — 79.95
By Hypersoft

COPY YOUR FILES TO/FROM TRSDOS-MSDOS-CP/M
SPECIFY MOD I DD III or 4
VERSION 2.0 NOW AVAILABLE 99.95

A NEW and OUTSTANDING TRSDOS/MSDOS/CP/M conversion utility. HYPERCROSS will work with ANY TRS-80 DOS to allow you to format and copy files back and forth on your TRS-80. The following commands are supported: FORMAT, DIR, KILL, COPY, USR (CP/M), SELECT, HELP and EXIT. HELP displays a summary list of commands. Fully menu driven. HYPERCROSS/XT is the finest program we've used. It will support the following ALIEN systems:

IBM (PC) MSDOS 1.1 2.0 and compatables, TANDY 2000, and these CP/Ms: ARDVARK, ACCESS MATRIX, ACCESS II, ALTOS, ATR 8000, CCS, CROMEMCO, DEC VT180, ROBIN, DEC RAINBOW, EAGLE, EPSON, FLORIDA GRAPHICS, HEATH HP125, IEAP, CP/M-86, KAYPRO II, 4 AND 10, LNW 80 CP/M, OBO, MAX-80, MORROW, NEC PC8001, OSBORNE, OTRONA, SANYO, SD COMPUTERS, SUPERBRAIN, TELETEK SYSTEM MASTER, TELEVIDEO, TRS-80 (LIFEBOAT, OMICRON, HOLMES, HURRICANE, and SYLE FILEBOARD), MONTEZUMA 2.2, RS CP/M +, XEROX, ZENITH, HEATH, ZORBA. ALSO 8" CP/M Standard on 8" drives.

DiskCount Data 214-680-8268

Monday - Friday 10:00 to 8:00 CST
Saturday 10:00 to 5:00 • Closed Wednesdays

Send Cash, Check or Money Order. Please add $3.00 for UPS Shipping or $4.00 for US Postage & Insurance. COD's send an additional $3.00 COD fee. All COD's will require cash or certified upon delivery. Foreign orders are welcome. All shipping charges assumed by purchaser. When ordering by mail, please specify computer model number.

Phone Your Order In Today Or Mail To:
DISKCOUNT DATA, 2701-C WEST 15th, SUITE 612, PLANO, TX 75075

MasterCard and VISA Cheerfully Accepted

Listing 1 continued

```
00590 OLDHIGH       DW      $-$             ;Linkage byte
00600               DB      2               ;Name length
00610               DEFM    'WD'            ;Define module name
00620               DW      $-$,0           ;Maintain standard form
00630 ;
00640 ;Storage space for video parameters:
00650 LEFT_COL      DB      0               ;Left edge of window
00660 SCR_TOP       DW      0F800H          ;Beginning of screen window
00670 SCR_END       DW      0FF7FH          ;End of screen window
00680 SCR_LINE      DW      0079D           ;Length of window line -1
00690 ;
00700 CRSBK         RET     Z               ;Ignore if at beginning of window
00710               DEC     DE              ;Move back a space
00720               PUSH    DE              ;Save this address
00730               CALL    CRSBOL          ;Find beginning of line
00740               EX      DE,HL           ; Address to HL
00750               DEC     HL              ;Adjust to compare
00760               POP     DE              ;Retrieve cursor address
00770               OR      A               ;Reset C-Flag
00780               SBC     HL,DE           ;Moved past left edge?
00790               RET     NZ              ;No -- Return
00800               CALL    CRSUP           ;Move up one line
00810               CALL    GET_END         ;End of window line in HL
00820               EX      DE,HL           ;New cursor addr. to DE
00830               INC     A               ;Return with Z-Flag reset
00840               RET
00850 ;
00860 MOVCRS        PUSH    HL              ;Save registers
00870               PUSH    DE
00880               CALL    PT_DE_TOP       ;DE = Top of window
00890               SBC     HL,DE           ;Below top?
00900               POP     DE              ;Retrieve present cursor addr.
00910               JR      NC,MOVCRS1      ;Go if new addr. on screen
00920               POP     HL              ;Clear stack & discard
00930               RET
00940 MOVCRS1       POP     DE              ;New addr. in DE
00950               LD      HL,(SCR_END)    ;P/u end of window
00960 REL1          EQU     $-2
00970               SBC     HL,DE           ;Past end?
00980               RET     NC              ;No -- return
00990               JP      DO_SCROLL-1     ;Lead into scroll routine
01000 ;
01010 AT_END        CALL    CHK_LN_END      ;At end of line?
01020               JR      Z,CRSFRWD2      ;Yes -- Go to next line
01030               LD      A,(0076H)       ;P/u MODOUT$
01040               JP      0CBEH           ;Continue with normal CRSFRWD
01050 ;
01060 CRSFRWD1      JP      C,DO_SCROLL-1   ;Lead to scroll if end-of-frame
```

Listing 1 continued

I developed the window program as a series of patches to the DOS video driver. Where possible, I made those patches to the resident driver. However, the whole program won't fit there, so I stored the remainder (about 120 bytes) in TRSDOS's low-memory driver area, between 0FF4 hexadecimal (hex) and 12FF hex. A series of calls and jumps connects the two parts of the program.

This program works only with TRSDOS 6.2, which I chose for two reasons. First, 6.2 is the most powerful version of Model 4 TRSDOS; even though the upgrade costs money, it's worth the price. Second, the source code for 6.2 is available from Logical Systems Inc. Without the original code and comments, patching the resident video driver would have been nearly impossible.

I wrote the program with Radio Shack's ALDS editor/assembler; if you use EDAS or Pro-Create, you need to make the changes I've explained in the listing. If you use another assembler, you may have to change the form of the macro instruction and some of the pseudo-ops.

How the Program Works

Program Listing 1 provides the window driver and the code necessary to install it. Lines 570–2480 are the actual driver; the

Circle 152 on Reader Service card.

NEW PRINTERS ADDED! FIND YOURS BELOW. Good This Month

RIBBON SALE

EXACT REPLACEMENTS

RADIO SHACK • CENTRONICS • COMMODORE • EPSON • ANADEX • BASE 2 • IBM • NEC • C. ITOH • DEC • OKIDATA • OTHERS

PRINTER (MAKE, MODEL NUMBER — Contact us if your printer is not listed. We can probably RELOAD your old cartridges.)	RIBBON SIZE (Inches by Yards)	INSERTS EZ-LOAD™ (DROP IN, NO WINDING! EXACT REPLACEMENTS made in our own shop cartridges not included)	RELOADS (You SEND your used CARTRIDGES to us. We put OUR NEW INSERTS in them)	NEW CARTRIDGES (from the various manufacturers. Subject to availability *)	SILVER DOLLAR WIND to LOAD
BASE 2 · DIP 81/82/84/85 · MPI 88/99/GX	1/2x20	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$20/2 $57/6 $ 99/12	WHY DO WE SELL THESE? This is the type ribbon you get if you order from our fellow advertisers. We sell them for less since we make them ourselves. Do you really like the mess and inconvenience of unwinding and dumping this type ribbon into a wastebasket or out on a newspaper and/or winding it into your cartridge? We don't know why these are being sold. Computers should simplify your life, not make it more complex just to save a few pennies. You are welcome to order these if you cannot afford our EZ-LOAD™ INSERTS, RELOADS, or NEW CARTRIDGES. But BEWARE! You now know how to avoid disappointment. One more caution: be sure to check the length of any ribbon BEFORE you buy it. For instance, an MX-100 ribbon should be 30 yards long, not 20 as in the MX-80
C ITOH Prowriter 1550/8510 · NEC 8023/8025	1/2x18	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$15/2 $42/6 $ 78/12	
C ITOH Starwriter F10 \ CARBON FILM BLACK	5/16	$24/6 $42/12 $234/72	$5 ea 3-11 $4 ea 12 or more	$18/3 $60/12 $348/72	
DIABLO HYTYPE II / FABRIC BLACK	5/16x17	$21/3 $78/12 $510/72	$8/1 $7 ea 2 or more	$18/2 $51/6 $ 96/12	
OKIDATA-PACEMARK 2350-2410 Black	1/2x100	$36/3 $132/12 $720/72	$20/1 $18 ea 2 or more	$32 Each	
·MICROLINE ML80/82/83/92/93	1/2x16	.....	.....	Spool $39/12	
RADIO SHACK \ MICROLINE ML84	1/2x40	.....	.....	Spool $ 84/12	
CARBON FILM · DWP-210 Black (1445)	5/16x145	$24/6 $42/12 $234/72	$5 ea 3-11 $4 ea 12 or more	$18/3 $60/12 $348/72	
DAISY WII·DWP-410-510 Black (1419)	1/4x145	$24/6 $42/12 $234/72	$5 ea 3-11 $4 ea 12 or more	$18/3 $60/12 $348/72	
Red, Green, Blue, Brown Colors (1419)	1/4x130	$30/6 $54/12 $288/72	$6 ea 3-11 $5 ea 12 or more	$21/3 $72/12 $420/72	
FABRIC (Long-Life) DWP-210 Black (1458)	5/16x17	$21/3 $78/12 $510/72	$8/1 $7 ea 2 or more	$18/2 $51/6 $ 96/12	
DAISY WII·DWP-410/510 Black (1449)	Not EZ-Load 1/4x25	$21/3 $78/12 $510/72	$8/1 $7 ea 2 or more	$18/2 $51/6 $ 96/12	
LPI-II-IV CENTRONICS 730/737/739/779 (1413)	9/16x16	$12/3 $45/12 $252/72	.....	.....	
DMP-200,120,430 (1296) (1483)	1/2x20	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$27/2 $81/6 $162/12	
DMP-500 (1482)	1/2x20	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$24/2 $72/6 $144/12	
DMP-2100 · TOSHIBA P1340,1350,51 (1442)	1/2x20	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$15/2 $42/6 $ 78/12	
DMP-100, LP VII-Commodore 1525, Gorilla Banana (1424)	Inker Loop	.....	.....	$16/2 $48/6 $ 96/12	
LP III-V (1414)	1/2x15	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$15/2 $42/6 $ 78/12	$12/3 $44/12 $252/72
DMP-400/420, LP VI-VIII (1418)	5/16x14	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$15/2 $42/6 $ 78/12	$11/3 $40/12 $228/72
EPSON-LQ 1500	1/2x14	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$22/2 $63/6 $120/12	.....
·MX/FX/RX 70/80 · IBM PC	1/2x20	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more	$14/2 $36/6 $ 66/12	$12/3 $44/12 $252/72
· MX/FX/RX 100 · IBM PC	1/2x30	$18/3 $66/12 $360/72	$8/1 $7 ea 2 or more	$18/2 $51/6 $ 96/12	$15/3 $54/12 $288/72
COMMODORE 8023-P · CENTRONICS 152-2	1/2x12	$15/3 $54/12 $288/72	$7/1 $6 ea 2 or more		
ANADEX 9000 Series	1/2x30	$18/3 $66/12 $360/72	$8/1 $7 ea 2 or more		

WORRIED ABOUT ORDERING BY MAIL? Relax. We've been in business for many years and can please the smallest and largest accounts. You receive some of the finest ribbons available made of our own exclusive IMAGE PLUS + ™ fabric and carbon film. Our ribbons fit your printer exactly. COMPARE, but BEWARE! We order all our competitor's products and are amazed at what we get. We use the latest state-of-the-art production equipment and are blessed with a fine, dedicated staff. We guarantee everything we make, period. Our ribbons are made fresh daily and our goal is to ship your order within 24 hours. Write for our brochure and price list.

Prices subject to change without notice

Bob Cone, President

SEND CHECK, MONEY ORDER, OR C.O.D. ($3.00) TO:

VISA MasterCard

BCCOMPCO

800 South 17 Box 246

SUMMERSVILLE, MO 65571

(417) 932-4196

WE PAY UPS SHIPPING on PREPAID ORDERS.
PLEASE INCLUDE STREET ADDRESS for UPS DELIVERY
FOREIGN ADD 15% U.S. FUNDS

remainder of the program installs the changes (if possible) and reports its success or failure. Much of the program will be unclear unless you have a copy of the TRSDOS source code with which to compare the listing, so you'll have to accept my word that it works.

The Model 4's memory organization is fairly complex. When a program calls the keyboard or video driver, TRSDOS switches a special bank of RAM into place from 0F400–0FFFF hex. TRSDOS uses the area from 0F400–0F7FF hex for the keyboard and operates similar to the Model I/III keyboard memory. The keyboard memory doesn't concern this program.

With the special bank in place, 0F800–0FF7F hex holds the video display. The system takes care of the switching, and it calls in the video RAM whenever TRSDOS activates the video driver. The system uses the final portion of this special memory bank, from 0FF80–0FFFF hex, for the type-ahead buffer and other storage.

TRSDOS's standard video driver assumes that the video RAM is a continuous 1,920 bytes of memory. To make the driver support windows, alter it so that it assumes that each video line is in contiguous memory and that the top and bottom of usable video memory resides at any address within the normal screen.

Therefore, I've made the first part of the window driver a storage area that holds four crucial pieces of information (lines 650–680): the column number of the left edge of the current window (between zero and 79), the beginning and ending absolute addresses of the current window, and the length of each display line in the window. The driver need only hold the addresses of the top left corner and bottom right corner of the window. But by storing the left-hand column of the window and the length of each line, the program avoids having to continually recalculate those values. The extra storage bytes use less memory than that required to do the calculations.

The remainder of the program comprises the patches necessary to make the video driver handle the screen or window on a line-by-line basis. I had to modify the routines that move the cursor back a space (CRSBKSP and CRSBK), forward a space (CRSFWRD), up or down a line (MOVCRS), clear to the end of a line (CLREOL), clear to the end of the screen (CLREOF), scroll the screen, and process a line feed character.

Part of the program resides in the low memory driver area, and part is patched over the original video driver. The installation section of the program (beginning at line 2580) checks to make sure that sufficient low memory exists. If so, it changes all absolute addresses in the program that

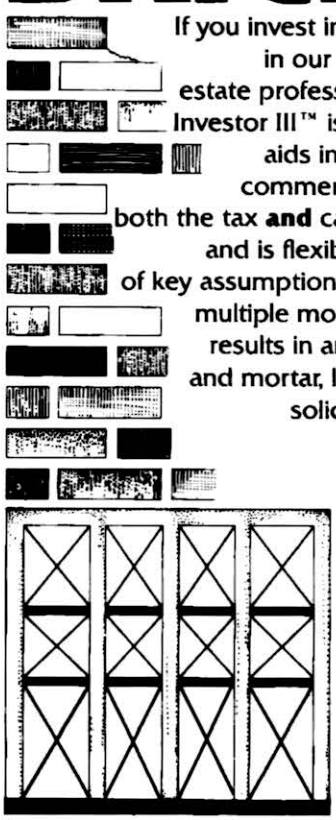
Listing 1 continued

```
01070                   CALL    CHK_LN_END      ;End of line?
01080                   RET     NC              ;No -- return
01090 CRSFRWD2          LD      HL,80D          ;Screen line size
01100                   ADD     HL,DE           ;Add to cursor pos'n
01110                   EX      DE,HL           ;Position in DE
01120                   CALL    CRSBOL          ;Move to beginning of line
01130                   JP      @CC4H           ;Test for end of frame
01140 ;
01150 SCROLL            LD      DE,(SCR_TOP)    ;Point DE to beginning of screen
01160 REL2              EQU     $-2
01170 SCR1              LD      HL,80           ;Screen line length
01180                   ADD     HL,DE           ;HL= DE + one line
01190                   PUSH    HL              ;Save for later
01200                   LD      BC,(SCR_END)    ;Get end of window
01210 REL3              EQU     $-2
01220                   DEC     BC              ;Adjust for check
01230                   OR      A               ;Clear C-Flag
01240                   SBC     HL,BC           ;Past end of window?
01250                   JR      NC,SCR_OUT      ;Yes -- done
01260                   POP     HL              ;Recover value
01270                   PUSH    HL              ;Save again
01280                   LD      BC,(SCR_LINE)   ;Get line length
01290 REL4              EQU     $-2
01300                   INC     BC              ;Make true length
01310                   LDIR                    ;Move line up
01320                   POP     DE              ;Beginning of next line
01330                   JR      SCR1            ;Do it again
01340 SCR_OUT           POP     HL              ;Clear off the stack
01350                   POP     HL
01360                   CALL    CRSBOL          ;Move to beginning of line
01370                   JP      CLREOL          ;Erase to end of line
01380 ;
01390 DVR_LEN           EQU     $-DVR_START     ;End of low-memory usage
01400 ;
01410 ;-----------------------------------------------------------------
01420 ;  Patches to the *DO Driver -- Since it doesn't move, no relocation
01430 ;  is needed.
01440 ;
01450 ;  Each patch has the beginning address, # of bytes to patch, and
01460 ;  then the bytes to patch in.
01470 ;-----------------------------------------------------------------
01480 ;
01490 PATCH1            DW      @BFCH           ;Patch CRSBOL
01500                   DB      3
01510                   JP      CRSBOL2         ;To extension
01520 ;
01530 PATCH2            DW      @C05H           ;Patch CRSHOME
01540                   DB      3
01550                   CALL    PT_DE_TOP
```

Listing 1 continued

Circle 103 on Reader Service card.

BRICKWARE



If you invest in brick and mortar, then you should invest in our brickware, Investor III™. Designed by real estate professionals to work on the IBM PC or TRS-80, Investor III™ is a comprehensive software package that aids in investment analysis of property, whether commercial or residential, small or large. It shows both the tax **and** cash aspects of an investment opportunity and is flexible enough to allow you to vary a number of key assumptions (such as cash flow, phased investments, multiple mortgages, and tax parameters) and see the results in an instant. So if you are serious about brick and mortar, look at our brickware. It will help you lay a solid foundation for your investment strategy. Contact your local dealer.

GOOD SOFTWARE CORP.

A Division of The Goodman Group, Inc.
12900 Preston Road
Dallas, Texas 75230
(214) 239-6085

Now available at Radio Shack stores through Express Order Software Program.

$249.00 Suggested Retail

Making dollars and sense out of information.

Listing 1 continued

```
01560 ;
01570 PATCH3        DW      0C23H           ;Patch CRSBKSP
01580               DB      8
01590               LD      HL,(SCR_TOP)    ;P/u top of screen
01600 REL5          EQU     $-2
01610               SBC     HL,DE           ;Still on screen?
01620               JP      CRSBK           ;Jump to extension
01630 REL6          EQU     $-2
01640 ;
01650 PATCH4        DW      0C34H           ;Patch MOVCRS
01660               DB      8
01670               JP      MOVCRS          ;Go to extension
01680 REL7          EQU     $-2
01690 ;
01700               LD      DE,(SCR_TOP)    ;PT_DE_TOP Routine
01710 REL8          EQU     $-2
01720               RET
01730 ;
01740 PATCH5        DW      0CBBH           ;Patch CRSFRWD
01750               DB      3
01760               JP      AT_END
01770 REL9          EQU     $-2
01780 ;
01790 PATCH6        DW      0CC4H           ;Patch CRSFRW0
01800               DB      8
01810               LD      HL,(SCR_END)    ;P/u end of screen
01820 REL10         EQU     $-2
01830               SBC     HL,DE           ;Off screen?
01840               JP      CRSFRWD1        ;Jump to extension
01850 REL11         EQU     $-2
01860 ;
01870 PATCH7        DW      0CCEH           ;Patch DO_SCROLL
01880               DB      37
01890               JP      SCROLL          ;Use new scroll
01900 REL12         EQU     $-2
01910 ;
01920               CALL    GET_END         ;CHK_LN_END Routine
01930               OR      A               ;Clear C-Flag
01940               SBC     HL,DE           ;Over the end?
01950               RET
01960 ;
01970               PUSH    DE              ;GET_END routine
01980               CALL    CRSBOL          ;Move to beginning of line
01990               LD      HL,(SCR_LINE)   ;P/u line length - 1
02000 REL13         EQU     $-2
02010               ADD     HL,DE           ;End-of-line addr. in HL
02020               POP     DE
02030               RET
02040 ;
02050               CALL    GET_END         ;CLREOL1 Routine
```

Listing 1 continued

refer to the low-memory modules and then transfers those modules to the low-memory driver area.

Next, the program makes the necessary patches to the resident video driver by transferring each patch section separately to the necessary locations. Finally, it reports that it has made the changes and indicates the address where the table of video parameters resides. Write down that address to use with the test program (see Program Listing 2).

After you assemble and run Listing 1, you should see no immediate change in the screen display. To define a screen window, you must change the values in the video parameter table and then move the cursor inside the new window. The demonstration program in Listing 2 lets you test the window driver.

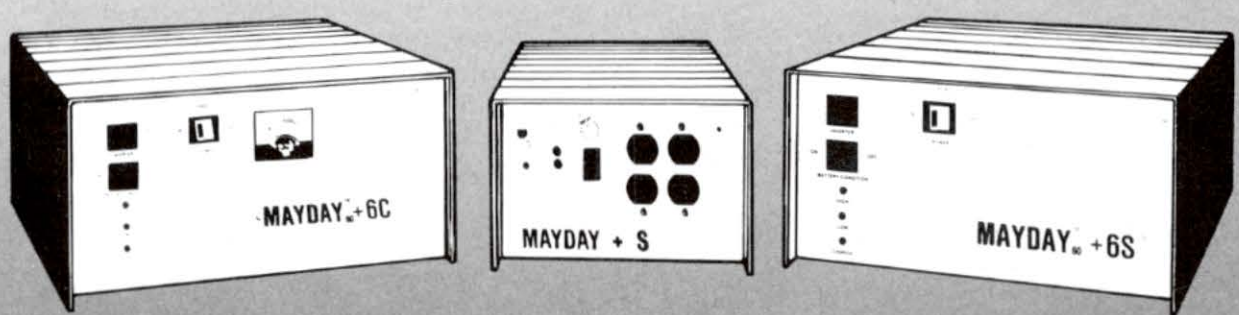
Listing 2 prompts you for the coordinates of the upper left and lower right corners of the window you want to define, sets the video parameters correctly, and then turns on inverse video for the window you have selected. Before running Listing 2, reset the value in line 70 to the address displayed when you installed the window driver.

After you define a window, you can return to TRSDOS and all programs that use the normal DOS display routines will be restricted to the window you've defined. However, programs that transfer

Circle 285 on Reader Service card.

UNINTERRUPTIBLE POWER SYSTEMS

By Sun Research



For complete protection from **Blackout, Brownout, Surge** and **Spike** specify a **MAYDAY** Uninterruptible Power System by **SUN RESEARCH.**

Eliminate costly downtime and lost data caused by those momentary power losses. Protect your software and hardware from damage caused by sudden drops in line voltage. Isolate your computer system completely from the AC wall circuit with a **MAYDAY** continuous (On-Line) Uninterruptible Power System. Give all your components clean 60Hz sine wave power for efficient operation at a price you can afford.

Available in 150, 300, 600, 1000 and 1500 VA Capacities.

MAYDAY™ Division
SUN RESEARCH, INC.
Old Bay Road, Box 210
New Durham, N.H. 03855
(603) 859-7110

buffers or lines directly to the screen with the @VDCTL supervisor call (SVC) will ignore your window. For example, Debug will stay inside the window but the LSFEDII/CMD file editor program will not.

With the window driver resident, the TRSDOS scroll-protect function won't work. I disabled that function to avoid the hangup that would occur if more lines were protected from scrolling than were available in the window.

The only program I've found so far that is incompatible with the video driver (others probably exist) is LeScript, which apparently uses part of the video driver plus its own code to handle screen displays. Other programs may do likewise. The window driver remains active until you reboot the system, so if you want to run a program that objects to the windows, you'll have to reset the computer.

The window driver is complete in Listing 1, but you need both user and program interfaces to make full use of it. I'll show you how to write and install those next month.■

Contact Hardin Brothers through CompuServe (leave your messages on section zero of the WESIG message board), or write to him at 280 N. Campus Ave., Upland, CA 91786.

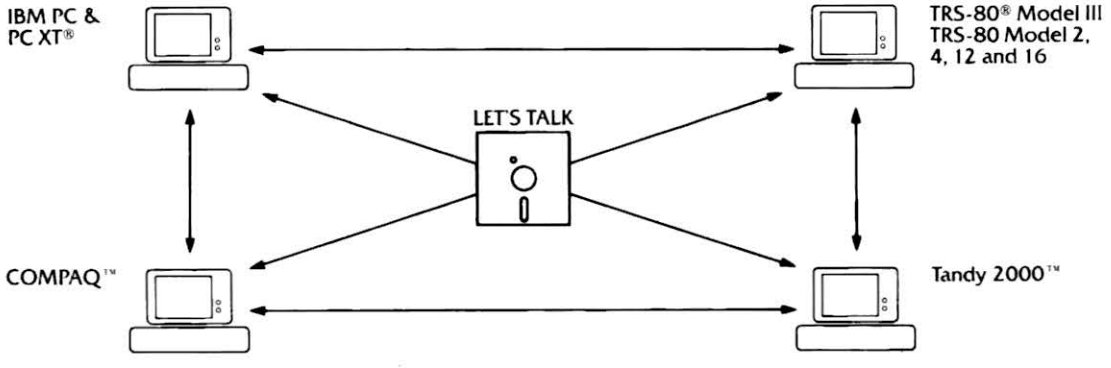
Listing 1 continued

```
02060                   LD      C,' '           ;Get a space to clear with
02070 CLREOL2           CALL    PUT_@           ;Normalize & print it
02080                   INC     DE              ;Point to next space
02090                   PUSH    HL              ;Save End-of-line addr.
02100                   SBC     HL,DE           ;Are we there yet?
02110                   POP     HL              ;Recover E-O-L addr.
02120                   JR      NC,CLREOL2      ;Loop until done
02130                   POP     DE              ;Recover cursor addr.
02140                   RET
02150 ;
02160 PATCH8            DW      0D0AH           ;Patch LINFEED
02170                   DB      6
02180                   LD      HL,(SCR_END)    ;P/u end of window
02190 REL14             EQU     $-2
02200                   SBC     HL,DE           ;Past it?
02210                   DB      36H             ;Change JR Z to JR C
02220 ;
02230 PATCH9            DW      0D13H           ;Patch CLREOL Routine
02240                   DB      10
02250                   JP      CLREOL1         ;Jump to extension
02260 ;
02270                   LD      A,(LEFT_COL)    ;CRSBOL2 Routine
02280 REL15             EQU     $-2
02290                   LD      L,A             ;Move left column to L
02300                   JP      RC_2_ADDR       ;Make into addr. and return
02310 ;
02320 PATCH10           DW      0D1FH           ;Patch CLREOF Routine
02330                   DB      23
02340 CLREOF1           PUSH    DE              ;Save cursor position
02350                   CALL    CLREOL          ;Clear to end of this line
02360                   LD      HL,80D          ;One screen line
02370                   POP     DE              ;Recover cursor addr.
02380                   ADD     HL,DE           ;Get addr. of next line
02390                   EX      DE,HL           ;  into DE
02400                   LD      HL,(SCR_END)    ;End of window?
02410 REL16             EQU     $-2
02420                   OR      A               ;Clear C-Flag
02430                   SBC     HL,DE           ;Test for end
02440                   JR      C,CLRF_OUT      ;Yes -- leave
02450                   CALL    CRSBOL          ;Cursor to beginning of line
02460                   JR      CLREOF1         ;Repeat until done
02470 CLRF_OUT          NOP                     ;Cover up old bytes
02480                   NOP
02490 ;
02500 ;*****************************************************************
02510 ;
02520 ;   Move everything into place, then return to TRSDOS
02530 ;
02540 ;   Start by installing low-memory extensions if there's room
02550 ;
```

Listing 1 continued

Circle 496 on Reader Service card.

Communications Gap? LET'S TALK™!



LET'S TALK CLOSES THE COMMUNICATIONS GAP BETWEEN TODAY'S POPULAR PERSONAL COMPUTERS.

LET'S TALK is a complete package for fully supported communications between any of these computers. In any direction. Without additional expense.

LET'S TALK is a simple, straightforward program that transfers ASCII data files, including BASIC and VisiCalc®, from one computer to another. Precisely. Easily. Without professional, expensive data processing expertise.

LET'S TALK allows two computers to communicate directly with each other in a "conversational mode" when not actually transferring data. And, LET'S TALK can send or retrieve files of any size from unattended computers, at three different speeds.

GROWTH AND EXPANSION REQUIRE OPEN COMMUNICATION. LET'S TALK.

GOOD SOFTWARE CORP

Making dollars and sense out of information.

Now available at Radio Shack stores through
Express Order Software Program.

TRS-80 is a registered trademark of Tandy Corporation. Tandy 2000 is a trademark of Tandy Corporation. Visi Calc is a registered trademark of VisiCorp. IBM PC and PC XT are registered trademarks of IBM Corporation. COMPAQ is a trademark of Compaq Computer Corporation.

a division of the goodman group, inc. 12900 Preston Rd., Dallas, Texas 75230 (214) 239-6085
LET'S TALK includes all diskettes for each of the above computers. Suggested retail price $179.00 + $5.00 shipping

Listing 1 continued

```
02560 ;-------------------------------------------------
02570 ;
02580 START     LD      DE,(02B6H)      ;Get 1st addr. in driver area
02590           PUSH    DE              ;Save it for later
02600           LD      HL,DVR_LEN      ;Length of window drivers
02610           LD      BC,1300H        ;End of low-driver area
02620           ADD     HL,DE           ;HL ==> last used addr. in lowmem
02630           INC     HL              ;HL ==> Next avail. addr.
02640           PUSH    HL              ;Save it
02650           LD      (OLDHIGH),HL    ;Put into header
02660           OR      A               ;Reset C-Flag
02670           SBC     HL,BC           ;Will it fit?
02680           POP     HL
02690           JR      C,OK            ;Yes -- Go load it all
02700 ;
02710 ; Not enough room
02720 ;
02730           POP     DE              ;Clear the stack
02740           LD      HL,NOMEM        ;Point to msg
02750           SVC     @DSPLY          ;Display it
02760           SVC     @EXIT           ;And leave
02770 ;
02780 OK        LD      (02B6H),HL      ;Save new lowmem pointer
02790           LD      HL,DVR_START    ;Get start pointer
02800           PUSH    HL              ;Save it
02810           EX      DE,HL           ;Exchange registers
02820           OR      A               ;Clear C-flag
02830           SBC     HL,DE           ;Get offset
02840 ;
02850 ; Relocate internal references
02860 ;
02870           LD      IX,RELTBL       ;Point to relocation table
02880           LD      B,H             ;Move offset to
02890           LD      C,L             ; BC Register
02900 RLOOP     LD      L,(IX)          ;Get address to change
02910           LD      H,(IX+1)        ; in HL
02920           LD      A,H             ;Get MSB
02930           OR      A               ;Is it 0?
02940           JR      Z,MOVE          ;Yes -- move everything
02950           LD      E,(HL)          ;P/u contents to change
02960           INC     HL              ; in DE Register
02970           LD      D,(HL)
02980           EX      DE,HL           ;Move to HL
02990           ADD     HL,BC           ;Add offset
03000           EX      DE,HL           ;Move new addr. back to DE
03010           LD      (HL),D          ;Put it back
03020           DEC     HL
03030           LD      (HL),E          ;Bump twice to point to
03040           INC     IX              ; next address
03050           INC     IX              ;Do it again
03060           JR      RLOOP
03070 ;
03080 MOVE      POP     HL              ;Recover beginning of driver
03090           POP     DE              ;Recover destination
03100           PUSH    DE              ;And save again
03110           LD      BC,DVR_LEN      ;Bytes to move
03120           LDIR                    ;Move it all
03130 ;
03140 ;Load in patches
03150 ;
03160           LD      IX,PATCH_TBL    ;Point to table
03170 LOOP1     LD      L,(IX)          ;Get LSB of patch addr.
03180           LD      H,(IX+1)        ; and MSB
03190           INC     IX              ;Point to next patch
03200           INC     IX
03210           LD      A,H             ;Get MSB for testing
03220           OR      A               ;Is it 0?
03230           JR      Z,DONE          ;Yes -- Go
03240           LD      E,(HL)          ;P/u LSB of Patch area
03250           INC     HL
03260           LD      D,(HL)          ; and MSB
03270           INC     HL
03280           LD      B,(HL)          ;P/u patch length
03290           INC     HL              ;HL==> 1st byte of patch
03300 ;
03310 LOOP2     LD      A,(HL)          ;Get patch byte
```

Listing 1 continued

PRICES YOU CAN'T BEAT!. .

COMPUTERS

SANYO 550 - 1 (1 160K DRIVE)	$ 650
SANYO 550 - 2 (2 160K DRIVES)	680
SANYO 555 - 1 (1 320K DRIVE)	950
SANYO 555 - 2 (2 320K DRIVES)	970
SANYO 555 - 4 (2 800K DRIVES)	1100
NEC8201 (LAP PORTABLE LIKE MOD 100)	399
TANDY 1000 (IBM COMPAT.)	1025
TANDY 1200	CALL
TANDY/IBM EXPANSION BOARDS	CALL

EXPANSIONS

MODEL 3 & 4 64K UPGRADE	$ 230
HOLMES VID 8 + CPM 2.2	350
HOLMES 5" & 8" DOUBLER	125
GENERIC DOUBLER	99

COMMUNICATIONS SPECIAL

MTERM: SMART TERMINAL PROGRAM AND VOLKSMODEM: 360BD MODEM MOD ⅓ $ 99

MONITORS

TAXAN 12" AMBER	$ 119
TAXAN 12" GREEN	115
TAXAN RGB III	385

TRS 80 SOFTWARE

MTERM	$ 50
OMNITERM	63
DOS PLUS 3 - 5	49

PRINTERS

EPSON RX 80	$ 230
EPSON RX 100	375
EPSON FX 80	385
EPSON FX 100	595
C-ITOH 8510AP	329
C-ITOH 8510	345
C-ITOH 1550	520
C-ITOH A-10	479
C-ITOH F-10 40 CPS	889
C-ITOH F-10 55 CPS	1089
JUKI 6100	385
JUKI 6300	CALL
OKIDATA 82A	289
OKIDATA 83A	500
OKIDATA 92	365
OKIDATA 93	575
OKIDATA 84	650
OKIDATA 2410	1775
PANASONIC 1090	195
PANASONIC 1092	435
PANASONIC 1091	265
PANASONIC 1093	675
SILVER-REED 400	275
SILVER-REED 500	315
SILVER-REED 550	399
SILVER-REED 770	799
STAR GEMINI 10X	235
STAR GEMINI 15X	345
STAR DELTA 10	315
STAR DELTA 15	435
STAR RADIX 10	495
STAR RADIX 15	550
TOSHIBA 1340	759
TOSHIBA 1351	1199

MODEMS

HAYES: 300 BD	$ 205
HAYES: 300/1200 BD	465
ANCHOR: VOLKSMODEM 300 BD	59
ANCHOR: VOLKSMODEM 1200 BD	199
ANCHOR: MARK X AUTO 300 BD	125
ANCHOR: MARK XII AUTO 300/1200 BD	229

ACCOUNTING SPECIAL M.A.S. - 80

GENERAL LEDGER, ACCOUNTS REC., ACCOUNTS PAY., CHECK REGISTER INTEGRATED SYSTEM. ONLY $ 299

DISK DRIVES (BARE)

TANDON	50 - 1	40 TR S/S	$ 99
TANDON	55 - 4	80 TR D/S	150
TANDON	100 - 1	40 TR S/S	129
TANDON	100 - 2	40 TR D/S	160
TANDON	100 - 4	80 TR D/S	165
FULL SIZE CASES & PWR. SUP.			47
TEAC	55 B	40 TR S/S	129
TEAC	55 F	80 TR D/S	160
CHINON		40 TR S/S	129
MATSHUSHITA		40 TR D/S	160
SLIMLINE PWR. SUP. & CASE/DUAL			47/58
10 MEGA BYTE HARD DISK			$ 650

24 HOUR TOLL FREE ORDERS
VISA/MASTER CHARGE ONLY:
(800) 633-2252 EXT 720

ALL QUESTIONS: (313) 538-1112

VESPA COMPUTER OUTLET
16727 Patton Detroit MI 48219

MICHIGAN RESIDENTS ADD 4% SALES TAX. POSTAGE. CALL FOR CHARGES. (NON CERTIFIED CHECKS ALLOW 2 WEEKS TO CLEAR). MASTER CARD AND VISA ADD 3%. NO C.O.D. NO NET TERMS

Listing 1 continued

```
03320                   LD      (DE),A          ;Move into *DO driver
03330                   INC     HL              ;Bump both
03340                   INC     DE              ;  Pointers
03350                   DJNZ    LOOP2           ;Loop until patch is loaded
03360                   JR      LOOP1           ;Get next patch
03370 ;
03380 RELTBL            DW      REL1,REL2,REL3,REL4,REL5,REL6,REL7
03390                   DW      REL8,REL9,REL10,REL11,REL12,REL13
03400                   DW      REL14,REL15,REL16
03410                   DW      0               ;Mark end of table
03420 ;
03430 PATCH_TBL         DW      PATCH1,PATCH2,PATCH3,PATCH4,PATCH5
03440                   DW      PATCH6,PATCH7,PATCH8,PATCH9,PATCH10
03450                   DW      0               ;Mark end of table
03460 ;
03470 ;  Everything's in place -- report success and driver address
03480 ;
03490 DONE              POP     DE              ;Recover beg. of lowmem
03500                   LD      HL,11           ;Offset to param storage
03510                   ADD     HL,DE           ;Add it
03520                   EX      DE,HL           ;Result back in DE
03530                   LD      HL,LOWADDR      ;4-char. buffer
03540                   SVC     @HEX16          ;Convert to ASCII
03550                   LD      HL,GOOD         ;Point to success msg
03560                   SVC     @DSPLY          ;Report success
03570                   SVC     @EXIT           ;Return to TRSDOS
03580 ;
03590 NOMEM             DEFM    'Insufficient driver space available'
03600                   DB      0AH             ;Line feed
03610                   DEFM    'Installation aborted.'
03620                   DB      0DH
03630 ;
03640 GOOD              DEFM    'Window driver successfully installed.'
03650                   DB      0AH
03660                   DEFM    'Parameter table begins at '
03670 LOWADDR           DS      4               ;Room for address
03680                   DEFM    'H.'
03690                   DB      0DH
03700 ;
03710                   END     START
```

End

Program Listing 2. Window test program.

```
10 '    Window driver test program
20 '
30 '    Reset the value in line 70 to equal
40 '      the value displayed when you installed
50 '      the window driver.
60 '
70 PARAM% = &HFFF     '****NOTE**** Set this value before running program
80 INPUT "New top (row, col)"; TOP.ROW, TOP.COL
90 IF TOP.ROW < 0 OR TOP.ROW > 22 THEN GOTO 70
100 IF TOP.COL < 0 OR TOP.COL > 78 THEN GOTO 70
110 INPUT "New end (row, col)"; BOT.ROW, BOT.COL
120 IF BOT.ROW <= TOP.ROW OR BOT.ROW > 23 THEN GOTO 90
130 IF BOT.COL <= TOP.COL OR BOT.COL > 79 THEN GOTO 90
140 WIDE = BOT.COL - TOP.COL
150 SCR.TOP = &HF800
160 W.TOP = (TOP.ROW*80 + TOP.COL + SCR.TOP)
170 W.BOT = (BOT.ROW*80 + BOT.COL + SCR.TOP)
180 POKE PARAM%, TOP.COL
190 WINDOW$ = MKI$(W.TOP)
200 POKE PARAM%+1, ASC(LEFT$(WINDOW$,1))
210 POKE PARAM%+2, ASC(MID$(WINDOW$,2))
220 WINDOW$ = MKI$(W.BOT)
230 POKE PARAM%+3, ASC(LEFT$(WINDOW$,1))
240 POKE PARAM%+4, ASC(MID$(WINDOW$,2))
250 POKE PARAM%+5, WIDE
260 CLS
270 PRINT CHR$(16);CHR$(31);
```

End

Circle 227 on Reader Service card.

NEW And IMPROVED
CP/M-68K

Treat your TRS-80 Model-16 or Enhanced Model-II or -12 to our new Version 1.2 CP/M-68K, now with:

- **Keyboard Typeahead**
- **C compiler with standard and IEEE floating point**
- **Overlay loader**
- **New utilities**
- **68000 assembler**

Option languages* — CBASIC-68K, PASCAL MT+, FORTRAN-77, PASCAL-68K, BASIC-68K

Version 1.1 users; order a language and receive your version 1.2 upgrade FREE. Upgrade alone only $25.

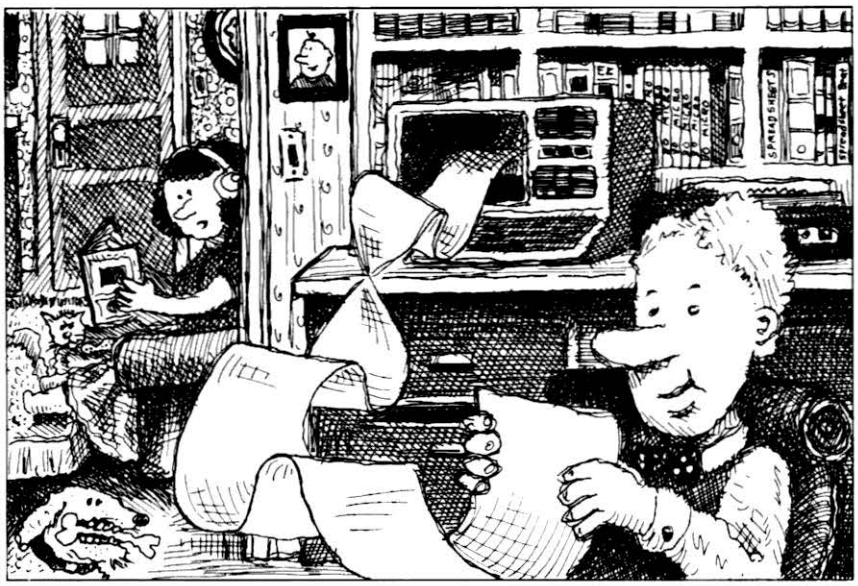
TRISOft
4102 Avenue G
Austin, Texas 78751
(512) 453-2233

VISA MasterCard

*Requires 256 kbytes minimum except for BASIC-68K.

Formatting Multiplan Files: Smoother Than SYLK

by David A. Williams



As with any program, spreadsheets should offer you some way to document the data in your file. Most spreadsheets provide a way to do this, but they generally only document column and row labels. Multiplan is no exception.

You would probably find it more useful to have a record of spreadsheet cell names, cell formats, cell formulas, and column widths. I've written a program that provides this information for Multiplan files.

Multiplan's symbolic link file format (SYLK) offers a complete worksheet record, and it's great for linking Multiplan with applications programs. However, deciphering its printouts is difficult (see Fig. 1). My program, Documenter, takes SYLK files and prints them out in an easy-to-read, permanent format (see Fig. 2).

Documenter runs on the Model 4 with Multiplan 1.06 and on the Models 1000 and 1200 with Multiplan 1.2.

Figure 1 represents Multiplan's SYLK file format; Fig. 2 is its Documenter version. I've suppressed the Multiplan labels and separated the other information into four categories: cell names, cell formats, cell formulas, and column widths. You can print any combination of these by making the appropriate selection from Documenter's printout menu (see Fig. 3).

To use my program, enter Basic and load Documenter. Documenter prompts you for the name of a Multiplan file, which must be in the SYLK format. It loads the file, processes it, displays the printout menu, and waits for you to choose options.

How Documenter Works

The Multiplan manual explains the SYLK format in detail. Multiplan uses codes to identify the different kinds of information in the file. Documenter uses these codes to separate data into the four categories mentioned above.

As Documenter reads a file, it processes and stores data in the array MP$. Think of this array as a table of five columns. The first column is the row and column location associated with the data in the other four columns. If the data is global, column one is blank. The second column contains cell names, the third holds formats, the

Program Listing. Documenter.

```
10      'Program to strip Multiplan data from SYLK format files
20      CLS : CLEAR : DIM MP$(600,5)
30      LINE INPUT "Input Filename of Multiplan File..."; FILENME$
40      OPEN "I", 1, FILENME$
50      LINE INPUT# 1, WD$
60        IF WD$ = "E" THEN CLOSE : GOTO 490    'Print Routine
70        TYPE$ = LEFT$(WD$,INSTR(WD$,";")-1)
80        IF TYPE$ = "C" THEN GOTO 380 ELSE Z=0     'Formula Routine
90        IF TYPE$ = "NN" THEN GOTO 140   'Name Routine
100       IF TYPE$ = "F" THEN GOTO 210   'Format Routine
110     GOTO 50
120     '
130     'Name Routine
140     D$ = RIGHT$(WD$,LEN(WD$)-4) 'Strip first four characters
150     MP$(COUNT,2) = LEFT$(D$,INSTR(D$,";")-1)    'Save name
160     MP$(COUNT,1) = RIGHT$(D$,LEN(D$)-INSTR(D$,";")-1)    'Location
170     COUNT = COUNT + 1
180     GOTO 50
190     '
200     'Format Routine
210     IF MID$(WD$,3,1) =  "X" OR MID$(WD$,3,1) = "Y" THEN GOSUB 300
220     MP$(COUNT,1) = RW$ + COL$    'Save location
230     IF MID$(WD$,3,1) <> "W" THEN GOTO 250
240     MP$(COUNT,5) = RIGHT$(WD$,LEN(WD$)-2) : GOTO 260 'Save width
250     MP$(COUNT,3) = RIGHT$(WD$,LEN(WD$)-INSTR(2,WD$,"F")) 'Format
260     COUNT = COUNT + 1
270     GOTO 50
280     '
290     ' Row/Col Routine
300     IF MID$(WD$,3,1) = "X" THEN 320
310     RW$ = "R" + MID$(WD$,4,INSTR(4,WD$,";")-4) 'Update row number
320     X = INSTR(WD$,"X") : IF X = 0 OR X > 8 THEN RETURN
330     SC = INSTR(X,WD$,";")
340     COL$ = "C" + MID$(WD$,X+1,SC-X-1)  'Update column number
350     RETURN
360     '
370     'Formula Routine
380     GOSUB 300       'Update row, column numbers
390     K = INSTR(WD$,";K") : S = INSTR(WD$,";S")
400     IF S>0 AND K>0 AND Z=1 THEN MP$(COUNT,4)="     " + CHR$(34) : GOTO 440
410     FS = INSTR(WD$,"E") + 1 : FL = INSTR(FS,WD$,";") - FS
420     IF INSTR(WD$,";E") = 0 THEN Z=0 : GOTO 50
430     MP$(COUNT,4) = MID$(WD$,FS,FL)    'Save Formula
440     MP$(COUNT,1) = RW$ + COL$    'Save location
450     COUNT = COUNT + 1 : Z=1
460     GOTO 50
470     '
480     'Print Routine
```

Listing continued

Illustration by Vinoy Laughner

```
ID;PMP
F;D$0G10
F;W1 1 20
F;W2 4 12
F;W6 6 12
F;FG0D;C7
F;FG0D;C8
F;FG0D;C4
F;FD0C;R2
F;FD0C;R3
B;Y8;X8
NN;NInitval;ER4:6C2
NN;NRate;ER4:6C4
NN;NPresval;ER4:6C6
NN;NDays;ER4:15C7:8
NN;Ndate;ER1C3
NN;NInitdate;ER4:6C3
NN;Ntotval;ER8C5
C;Y2;X1;K"Institution"
C;X2;K"Initial"
C;X3;K"Initial"
C;X4;K"Interest"
C;X5;K"Maturity"
C;X6;K"Present"
C;X7;K"Month"
C;X8;K"Days"
C;Y3;X2;K"Value"
C;X3;K"Date"
C;X4;K"Rate"
C;X5;K"Date"
C;X6;K"Value"
C;Y4;EIF(Initval>0,Initval*
   ((1+(Rate*0.01/365))
   ^(Initval+Presval)),"");D;K""
C;Y5;S;R4;C6;K""
C;Y6;S;K""
C;Y4;X7;K1
C;X8;K0
F;Y5;X1;FI0C
C;X7;K2
C;X8;K31
C;Y6;X7;K3
C;X8;K59
C;Y7;X2;ESUM(Initval);K0
C;X4;ESUM(R[-3]C:R[-1]C);K0
C;X5;ER[-2]C-R[-1]C;K0
C;X6;ESUM(Presval);K0
C;X7;K4
C;X8;K90
C;Y8;X5;ER[-1]C[-1]*R[-1]C;K0
C;X7;K5
C;X8;K120
W;N1;A1 1
E
```

Figure 1. Printout of a Multiplan symbolic link (SYLK) file format.

```
   Multiplan File sample/sl
(a) Names

   R4:6C2            Initval
   R4:6C4            Rate
   R4:6C6            Presval
   R4:15C7:8         Days
   R1C3              date
   R4:6C3            Initdate
   R8C5              totval


(b) Formats

                     F;D$0G10
                     G0D;C7
                     G0D;C8
                     G0D;R2
                     D0C;R2
                     D0C;R3
   R5C1              I0C

(c) Formulas

   R4C6              IF(Initval>0,
                     ((1+Rate*0.01/
                     Initval*
                     365))^(Initval
                     +Presval)),"")
   R5C6                    "
   R6C6                    "
   R7C2              SUM(Initval)
   R7C4              SUM(R[-3]C:R[-1]C)
   R7C5              R[-2]C-R[-1]C
   R7C6              SUM(Presval)
   R8C5              R[-1]C[-1]*R[-1]C
(d) Column Widths

                     W1 1 20
                     W2 4 12
                     W6 6 12
```

Figure 2. Documenter version of the file shown in Fig. 1.

```
   Print Multiplan Names     (1)
                 Formats     (2)
                 Formulas    (3)
                 Widths      (4)
                 Quit        (5)

                 Pick One
```

Figure 3. Documenter's menu.

Listing continued

```
490     LINES=3 : FLAG=0
500     CLS
510     PRINT : PRINT : PRINT "Print Multiplan Names     (1)"
520     PRINT "                Formats   (2)"
530     PRINT "                Formulas  (3)"
540     PRINT "                Widths    (4)"
550     PRINT "                Quit      (5)"
560     PRINT : PRINT "                    Pick One ";
570     I$ = INKEY$ : IF I$ = "" THEN GOTO 570 ELSE PICK = VAL(I$)+1
580     CLS
590     IF PICK=6 THEN END
600     IF FLAG=1 THEN 650  'Don't repeat message
610     PRINT : PRINT "Adjust paper to top of form, <ENTER>"
620     I$=INKEY$ : IF I$ = "" THEN GOTO 620
630     LPRINT "Multiplan File ";FILENME$ : LPRINT : LPRINT
640     FLAG = 1
650     ON PICK - 1 GOTO 660, 670, 680, 690
660     LPRINT "Names" : GOTO 700
670     LPRINT "Formats" : GOTO 700
680     LPRINT "Formulas" :  GOTO 700
690     LPRINT "Column Widths"
700     LPRINT : LINES=LINES+2
710     FOR N = 0 TO COUNT - 1
720       IF MP$(N,PICK) = "" THEN 820
730       LPRINT MP$(N,1),    'Print location
740       IF LEN(MP$(N,PICK))>63 THEN 760
750       LPRINT MP$(N,PICK) : LINES = LINES + 1 : GOTO 810
760       LPRINT LEFT$(MP$(N,PICK),60)
770       IF LEN(MP$(N,PICK))>123 THEN 790
780       LPRINT "  ", MID$(MP$(N,PICK),61,63) : LINES=LINES+2 : GOTO 810
790       LPRINT "  ", MID$(MP$(N,PICK),61,60)
800       LPRINT "  ", MID$(MP$(N,PICK),121,63) : LINES = LINES +3
810       IF LINES > 53 THEN LPRINT STRING$(65-LINES,13) : LINES = 0
820     NEXT
830     IF LINES<48 THEN LPRINT STRING$(2,13) : LINES=LINES+3 : GOTO 850
840     LPRINT STRING$(65-LINES,13) : LINES=0    'Advance page
850     GOTO 500
```

End

fourth lists formulas, and the fifth defines column widths.

Four subroutines separate the desired data and keep track of the row-column location. The rest of the program formats the printed output.

Documenter Output

Multiplan stores cell names (Fig. 2a) in the order in which you originally entered them and Documenter lists them in this order.

The first cell format listed (Fig. 2b), represents the default cell format. In this case, the format code is "$," the number-of-digits argument is "0," the alignment code is "G" or general, and the default column width is 10. The next five formats apply to entire columns or rows as indicated and the final one applies only to cell R5C1.

Documenter generally lists formulas (Fig. 2c) in order by rows, but there may be exceptions. In any case the location is always listed. Documenter indents the overflow from long formulas. When you use the Copy Down or Copy Right command to duplicate formulas, Multiplan does not repeat the formulas, but only stores a reference to the original cell. Documenter detects this and prints ditto marks in these locations.

In the column widths section (Fig. 2d), column 1 is 20 characters wide, and columns 2–4 and column 6 are 12 wide. Column widths that equal the default width are not listed. ■

Write to David A. Williams at 2452 Chase Circle, Clearwater, FL 33546.

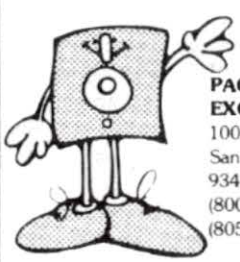
Submit your template to Spreadsheet Beat, c/o 80 Micro, 80 Pine St., Peterborough, NH 03458. We'll pay $50 for each one we publish. We'll also publish any valuable hints and patches you'd like to share.

Circle 207 on Reader Service card.

MEMOREX
FLEXIBLE DISCS

WE WILL NOT BE UNDERSOLD!! Call Free (800)235-4137 for prices and information. Dealer inquiries invited and C.O.D.'s accepted.

VISA



PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA 93401. In Cal. call (800)592-5935 or (805)543-1037

Reader Service Number		Page
374	ALPS	47
82	Aerocomp	126, 127
215	Alcor	61
136	Allen Gelder Software	56
476	Alpha Bit Communications	121
17	Alpha Products	13, 15
30	All Write	10
141	Anitek Software Products	23
383	Astro-Star	69
270	Avanti Associates	120
152	BC Compco	104
186	Blue Ridge Software	120
381	Bodex	65, 68
256	Borg Industries	35
388	Business Utility Software	101
419	Clay Watts Software	70
86	Compulogic	26
34	Computer Center, The	58, 101
133	Computer Discount of America	26
357	Computer Friends	52
18	Computer Plus	83
239	D&A Research	70
78	Data Cover	101
539	Desert Sound	69
282	DFW Computer Center	42, 123
367	Digital Images	95
204	Diskcount Data	103
62	Displayed Video	99
91	Dotwriter	9
216	EAP Company	53
85	Educational Micro Systems	35
	80 Micro	
	Back Issues	105
	Foreign Dealers	78
	Load 80 Subscription	64
	Subscription	32
	Subscription Problem	71
	Toll Free	78
45	Electric Webster	27
134	Elek-Tek, Inc.	100
350	EnFleur Corp.	101

Reader Service Number		Page
258	E-Soft	43
214	Fort Worth Computers	45, 79
103	Good Software Corp.	105
496	Good Software Corp.	107
9	H & E Computronics	CIV
9	H & E Computronics	28
9	H & E Computronics	85
405	H.F. Signalling	95
355	H.D.P	68
455	Hard Drive Specialists	119
175	Howe Software	7
321	Humphrey Instruments	51
46	Hypersoft	59
101	J & M Systems	CIII
126	JMG Software International	2, 3
534	Jameco Electronics	35
422	Kelly Enterprises	95, 101
331	K Soft	124
235	LSR Learning Associates	66
210	Lambda	125
*	Langley-St. Clair	47
2	Longview	4
250	Marymac	59
*	Micro Data Supplies	80, 81
299	Microdex Corp.	101
464	Micro Labs	112
137	Miller Microcomputer	67
107	Misosys Inc.	26
411	Montezuma Micro	36, 37
416	Montezuma Micro	116, 117
281	Nibble Notch	125
468	Nibble Notch	53
232	Nocona Electronics	91
36	Omnisoft Research	93
151	Orion Instruments	51
242	Osicom, Inc.	87
207	Pacific Exchange	71, 111
124	Perry Computers	18, 19
176	Personal Computer	115
290	Pickles & Trout	57
206	Powersoft	59

Reader Service Number		Page
306	Powersoft	51
406	Powersoft	53
384	Practical Software	122
249	Press A Software	79
76	Producer, The	24
449	Professor Jones/Frogg House	77
248	Programmers & Assoc.	45, 122
30	Prosoft	11
75	Radio Shack/Tandy	CII, 1
56	Ross Custom Electronics	70
203	Scientific Engineering Labs	71, 101
*	Software Support	88, 89
427	Sota Computing Systems Ltd.	50
213	Standard Software	124
506	Star Micronics	72, 73
71	Sublogic Communications	92
150	Summit Software Tech	46
456	Sunlock Systems	66
285	Sun Research	106
189	Tab Sales Company	115
347	Talley Communications	45
81	Total Access	20
70	Total Learning Systems	43
227	Trisoft	109
*	Vespa Computers	108
279	Zygotron	76

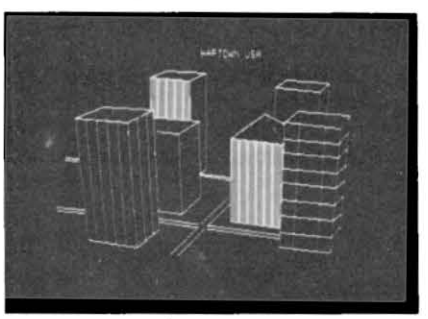
For further information from our advertisers, please use the Reader Service card.
***This advertiser prefers to be contacted directly.**

Advertising Sales (603) 924-7138
or (800) 441-4403
West Coast Sales (415) 328-3470

Circle 464 on Reader Service card.

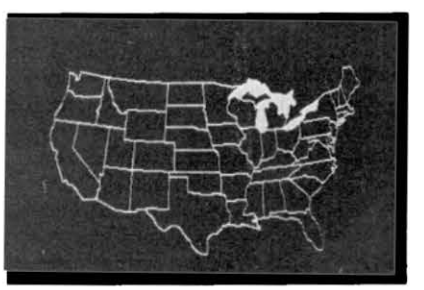
Grafyx Solution™ Save $100.00

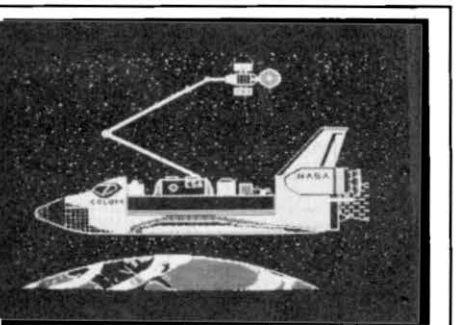
High-Resolution Graphics for Mod 4/4P/III



Superior Hardware. The Grafyx Solution provides 153,600 pixel elements which are arranged in a 640 × 240 or on the Model III a 512 × 192 matrix. Hundreds of new business, personal, engineering, and educational applications are now possible. The hi-res display can be shown on top of the standard display containing text, special characters, and block graphics. This simplifies program debugging, text labeling, and upgrading current programs to use graphics. The Grafyx Solution fits completely within any tape or disk based Model 4, 4P, or III. Installation is easy with the plug-in, clip-on board.

Superior Basic. Over 20 commands are added to the Basic language. These commands will set, clear or complement points, lines, boxes, circles, ellipses, or arcs. The hi-res screen can be printed on any of 20 popular printers or saved or loaded to disk without leaving Basic. Areas may be filled in with any of 256 patterns. Sections of the screen may be saved and then put back using any of five logical functions. Labels can be printed in any direction. The viewing area can be changed. The entire screen can be complemented or cleared. Graphics Basic provides dot densities of 640 × 240, 320 × 240, 160 × 240, and 160 × 120, all of which can be used in the same display.





Superior Software. The board comes with over 40 programs and files which make it easier to use, serve as practical applications, demonstrate its capabilities, and serve as programming examples. The software works with TRSDOS 1.3, 6.1.2, 6.2, LDOS, NEWDOS80, and DOSPLUS. The Grafyx Solution is also supported by a number of optional applications programs: Draw, Bizgraph, xT.CAD, 3D-Plot, Mathplot, Surface Plot, Biorhythm & USA, Music.

The Grafyx Solution package is shipped complete for $199.95 (reduced from $299.95). A manual for review is $15. Payment may be by check, Visa/MC, or COD. Domestic shipping is free on pre-paid orders. Texas residents add 5⅛% tax.

MICRO-LABS, INC. 214-235-0915
902 Pinecrest, Richardson, Texas 75080

Continued from p. 34

Stay in Touch With Remote Control

by Thomas L. Quindry

★★★★☆

Remote Control runs on the Models 1000 and 1200 (128K) under MS-DOS 2.X. It requires one disk drive. Kensington Microware Ltd., 251 Park Ave. S., New York, NY 10010. 212-457-5200. $180.

Easy to use: ★★★★★
Good docs: ★★★★☆
Bug free: ★★★★☆
Does the job: ★★★★★

Portable computers are great for on-the-go beeping, but their virtue has also been their limitation: Because they're portable, they lack some of your desktop's features. Kensington Microware's Remote Control provides a solution: It lets you access a Model 1000/1200 with a Model 100 from a remote site and use the MS-DOS machines' heavy-duty capabilities, like disk storage and printer and DOS functions. Back home, you can establish a direct link between the 100 and 1000 for high-speed file transfer.

In addition, you can use Remote Control on your 1000 to get Model 100-like telecommunications and text editing capabilities.

I found Remote Control a useful extension to the Model 100 for both the novice and expert. And its functional similarity to the Model 100's text editing and telecommunications programs means you don't have to learn many new commands.

Functions

Remote Control provides four programs: a host feature, where the 1000 acts as host to a remote Model 100 so you can upload and download text files, print hard copy at the host site, and execute DOS commands; a fast file transfer system to move files between your 100 and 1000; telecommunications capability; and a Model 1000 text editing program like the one on the 100.

To use Remote Control, you insert the program disk in your MS-DOS computer and boot it up. You'll see a main menu with selections for the four modes listed above, plus options to configure the MS-DOS system, return to DOS, or call a help file.

You should first run the configuration program to set up telecommunications and text editing parameters on your Model 1000. You can set up different communications ports on the 1000 as the modem and the RS-232 port, and use autodialing parameters compatible with the Hayes Smartmodem. You can also define defaults, such as a Host log-on password.

You can establish a link between the 100 and 1000 for high-speed file transfer.

The Host Mode

The Host mode requires an auto-answer modem (like the Hayes Smartmodem) with the capability to respond to a hang-up signal. Your Model 1000 must have Remote Control running when you make the phone connection, and you must enter a five-character password to get on-line. Several commands (including Help) are available remotely. The main purpose of the Host mode is for uploading and downloading files, but it also allows direct DOS access.

I was a little nervous about this. I don't mind limited access to one disk in a computer, but the Host program gives you (or any caller who successfully makes the connection) complete access to all files. An unauthorized user could easily wipe out the files of a complete hard drive. Still, there is a security measure. The Host program will hang up the phone after four unsuccessful password attempts.

File Transfer

You upload and download files at high speed through the RS-232 ports of both computers using the supplied null modem cable. Remote Control supports file transfers at up to 9,600 baud. Due to programming delays, however, I found the difference between 9,600- and 4,800-baud transfer negligible. In addition, spurious control characters entered my text when I used 9,600 baud.

The cable transfer program isn't as useful as the Host mode program, but it's faster. You have to control both the 100 and MS-DOS keyboards with the cable program, but you can operate the Host mode with only a Model 100.

Remote Control's null modem cable is only 3 feet long, hardly long enough to plug into my IBM PC and bring the Model 100 in front where I could see the IBM PC screen. A 5-foot cable would be more desirable.

I had a lot of trouble keeping the null cable plugged into the 100. Two clips that hold the connector hood on the cable don't provide enough clearance to fit in the cutout space on the 100.

I solved this by bolting the connector hood together with two #4 nuts and machine screws. Also, the connector that plugs into the 100 only has pins for those wires that it uses (nine of the 25 pins). This hardly provides enough grip to keep the connector firmly attached. When the connector fell off, the PC would lock up with a parity check error.

Telecommunications

Remote Control's Telcom for the Model 1000 uses the same commands as the Model 100. It also includes parameters for 1,200-baud communications, a document filter toggle key (to eliminate unwanted end-of-line characters), a key to change the current default directory, and a key to configure the remote control programs without breaking from the terminal mode.

Text Editor

Remote Control's Model 1000 text editor is similar to that on the 100, but with added features to format text for printouts. In addition, the editor has a find-and-replace feature, a "whoops" function (to restore inadvertently deleted text), printer or screen format commands, and several text formatting commands.

Though Remote Control provides default values for the usual formatting requirements, you can enter your own commands to customize your final printout. You can control top, bottom, left, and right margins; centering and indentation; line spacing; titles; and page numbers. A command also tests a page and forces a form feed if fewer than a set number of lines remain; you can use this to force a form feed from anywhere on the page, too.

Documentation

The manual for Remote Control is quite extensive, with over 200 medium-sized pages. One-third of the manual is specific to the 100, and another third is specific to the NEC PC-8201A computer.

The manual is split into four sections. The first is a tutorial that provides some examples of the Remote Control program. Next is a user guide that discusses each part of the program and how to use it. A reference section gives specific details about features or commands. Appendixes cover support topics, a glossary, an index, and program installation.

Copy Protection

One drawback to Remote Control is that it's distributed on a protected disk. You can copy programs from the master disk but you have to have the master disk in drive A to run it. Remote Control reads an oddly formatted sector or track before the program will work. This is similar to other MS-DOS protection schemes, like the one on Lotus 1-2-3.■

Electric Desk

★★★½

Electric Desk runs on the Tandy 1000/1200 (256K) and requires MS-DOS 2.X. Alpha Software Corp., 30 B Street, Burlington, MA 01803, 617-229-2924. $295.

Model 1000 owners who like DeskMate's integration and want a boost in power should consider Electric Desk. The program includes a data base, word processor, telecommunications, and spreadsheet.

Electric Desk presents a main menu along the screen bottom and a row of applications-specific macros at the top. You have to open Electric Desk's modules before you can use them. Once you do so and load them into memory, the program makes no further disk input/output.

On the down side, the program operates entirely in RAM and gobbles memory. On a 256K Model 1000 (the minimum), I ran out of memory after loading three one-page documents. You would need at least 384K to fully use the program's integrated functions.

Given enough memory, you can open up to 30 modules (nine data bases, nine documents, nine spreadsheets, two communication services, and a Help file).

The Document module is a simple word processor that's best suited for short text. The program lacks an easy way to indent and it deletes in blocks only. The cut-and-paste feature saves marked text to a buffer, and lets you make multiple insertions. You can also use the buffer to transfer data among modules.

The data base module automatically saves changes when you exit it. It also indexes and saves records alphabetically by field for sequential searches. You can also make random searches using relational symbols.

The spreadsheet provides a 255- by 255-cell grid with cell references in row/column format. The program identifies cells automatically, depending on whether the first character entered is a mathematical operator, a letter, or a numeric value. You can create formulas with the Point function and special macro keys by pointing to cells or ranges of cells, rather than by typing in locations.

The Communications module uses log-in scripts created on the word processor. Macro keys set up communications, call a log-in script, send and receive files, and disconnect the modem.

Electric Desk's function and cursor movement keys remain the same across applications, and you can get from one application to another without waiting for disk I/O. The package lacks the graphics capabilities of more sophisticated integrated software, but at $295 it's half the price of Symphony.

—Robert Mitchell

Express Checkouts provides capsule reviews of interesting new products, new releases of old software, and products for computers we do not cover extensively in our regular review section.

Overdrive

★★★★

Overdrive runs on the Model 4/4P (128K) and requires TRSDOS 6.2. Logical Systems Inc., 8970 N. 55th St., P.O. Box 23956, Milwaukee, WI 53223, 414-355-5454. $99.

If you're looking for faster disk input/output (I/O) and have a 128K 4/4P running TRSDOS 6.2, Overdrive can help. Overdrive loads disk data and some of TRSDOS's system modules into your alternate 64K memory (also called buffered memory), eliminating disk I/O and speeding up program execution.

When you call for data off a disk, Overdrive reads the entire data track into alternate memory. From then on, your system accesses any data almost instantly. This greatly enhances access to sequential data files and system overlays.

Overdrive uses one bank of alternate memory for each drive you buffered, with a bank of memory defined as 32K in length. You can buffer only two out of the Model 4/4P's four possible drives because of Overdrive's 64K limit.

The buffered memory uses 16K for the drive buffer and another 16K for system overlays. It also uses approximately 400 bytes of resident memory for the disk driver.

You can install Overdrive on one or both drives or you can reserve the memory for later use. If you decide to use TRSDOS 6.X's Memdisk, you can only buffer one bank of memory.

Since your system stores random files on disk in scattered order, reading an entire track into buffered memory would be ineffective and might actually slow down the system. Therefore, you should disable Overdrive's buffer when you access random files.

You need to take some precautions with Overdrive. First, you should disable all buffered drives before you invoke the System command. Second, if you use the LS-DiskDisk driver, you can't buffer both the outer and inner drive at the same time or the system will hang up.

I found Overdrive easy to learn. While the documentation consists of only four pages, it's precise and clear in explaining its use.

However, I would like to have seen two other features with Overdrive: the ability to speed up the acquisition of random-access files, and the ability to use library commands like Directory to take advantage of the increase in speed.

—David L. Engelhardt

Etch-A-Mouse

★★★★

Etch-A-Mouse runs on the Tandy 2000 (128K), and requires the Tandy CM-1 color monitor, the high-resolution graphics option, the calendar/clock board, and the Digi-Mouse. Soft Horizons, RD 1 Box 432, State Highway 83, Cape May Court House, NJ 08210. $49.

Etch-A-Mouse makes full use of the Tandy 2000's Digi-Mouse system to create color video displays in almost no time. You would need to spend hours programming to create these displays using conventional graphics techniques.

You can draw with any of 16 colors, in the Select Colors option, and a setup program lets you set printer codes for the Tandy CGP-220 color printer.

The Draw program presents you with a blank screen in your choice of background color. The status line at the bottom displays the background color currently selected and the in-use color (the color with which you're drawing).

The cursor's response to the mouse's movements is excellent, without any noticeable lag. You can change the drawing with the buttons on the mouse.

You use the arrow keys to lock one of the coordinate values (X or Y) on the screen. The Line, Circle, Box, and Box Fill commands use that mark and the current cursor location to define shapes' boundaries. You can draw the shapes' lines in several different widths, with single-pixel lines standard.

The Paint command fills any delimited area with the currently selected color, limited to the same color as the lines bordering the design.

Designs require at least 96K of memory per picture, due to the way the 2000 stores video information.

Etch-A-Mouse's help section didn't work at all and hung up the program. Fortunately, I was able to repair it.

I was also bothered by the lack of file security; it was too easy to load a file over a current picture. The program should provide a safety prompt.

Otherwise, I found the graphics capability of Etch-A-Mouse impressive; it provides more for your dollar than other Model 2000 graphics software available.

—John B. Harrell III

EXPRESS CHECKOUTS

TRSDOS 6.X Training Course

★ ★ ★

The TRSDOS 6.X Training Course runs on the Models 4/4P (64K) and requires one disk drive. Tandy/Radio Shack, One Tandy Center, Fort Worth, TX 76102. $74.95.

The TRSDOS 6.X Training Course consists of three informational text disks and a brief manual. To start, you put the first disk in drive zero and press the reset button. You choose topics on TRSDOS 6.X by responding to a series of menus and submenus. The course consists of a collection of short subjects, quizzes, and summaries. It encourages you to use the associated exercises presented in the manual.

The Training Course presents an extensive number of general study areas: how to use the training course, TRSDOS components and files, system and invisible files, file names and extensions, device specs, passwords, part specs, command parameters, creating and using simple job control language (JCL) files, and redirecting and filtering input and output. The course also covers many of the TRSDOS 6.X commands and utilities: Directory, Attribute, Auto, Format, Back-up, Copy, Purge, Remove, Rename, Free, Library, System, Memdisk, and Do.

While the above list seems impressive, the general level of detail is superficial. For example, in explaining the Back-up and Format commands, the Training Course covers the basics, but omits topics like using parameters to avoid program prompts, formatting and backing up nonsystem disks, and single drive back-ups by class.

I also thought the section on device drivers and filters lacked detail. While the Training Course handled their installation pretty well, it included no information on how you could automatically set them up with the SYSGEN command or a JCL file.

Additionally, the course explains the System command only as it applies to Memdisk. The System command is also useful in streamlining the TRSDOS operating system to the user's preference.

The Training Course's extensive use of the Model 4's limited graphics and sound capabilities greatly enhances the learning process. While the organization and interactive presentation is quite good, the bare bones attempt in covering the subject areas limits its usefulness. This course is more suited for new Model 4 owners who have limited experience.

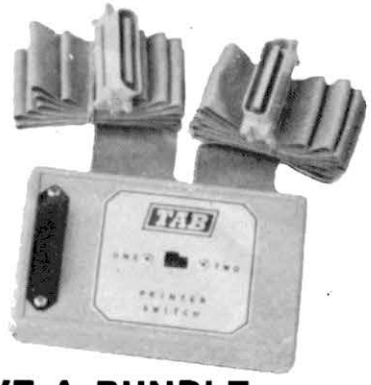
—Mark D. Goodwin

Circle 189 on Reader Service card.

TAB Sales Company

704 W. Michigan Ave. P.O. Box 8098
Pensacola, FL 32505 Florida 904/438-6507

TABCO PARALLEL Printer Switch
connect 2 printers to one computer!



PSM-C/2P—Manual printer switch. Prolongs the life of your printer/interface connectors. Saves time & money! Use your existing printer cable to connect TAB SWITCH to your computer. Comes complete with two 3.5' cables to connect your printers. Straight-forward design makes it easy to set-up & use. 1 year limited warranty.

ORDER TODAY
Only $69.95

Other models available
Dealer inquiries invited
$2.50 Shipping/Handling
Florida residents add 5% sales tax

CALL 1-800-874-1551

SAVE A BUNDLE
EPSON,
OKIDATA, BROTHER,
TABCO
Printer Switches
Custom Printer Cables
IJG Products
Elephant Memory Diskettes

Circle 176 on Reader Service card.

FILE TRANSFER
+ Conversion Utilities

Products For NEW AT

APPLE
TRS
CP/M

IBM PC/XT, JR. $129.95
Tandy 1000, 1200, 2000 .. $129.95
IBM AT $224.95

Transfer your **Apple, TRS, CP/M** to the **IBM PC** or **Compatibles.**

Transfers: (no more retyping)
- Visicalc, Multiplan
- Basic, Fortran, Cobol
- ASCII files, data files
- Word processing files

IBM PC/XT, Jr. ⟷ Tandy 2000 ..... $129.95
DISK Transporter transfers files back and forth, includes utilities.

New Products for **IBM AT**

Drives, 360KB - $275, 1.2MB - $450
Hard Drive, 20MB - $1200, 40MB -$1800
Prototype Boards & Extender Cards ..... $120/ea.
Serial Cables $85
High Capacity Disks (1.2MB) $60/10

PERSONAL COMPUTER PRODUCTS

1400 COLEMAN AVE., SUITE C-18 SANTA CLARA, CA 95050
TELEPHONE (408) 988-0164 PHONE ORDERS

IBM, TRS 80 & TANDY, APPLE, CP/M VISICALC, MULTIPLAN ARE RESPECTIVELY REGISTERED TRADEMARKS OF INTERNATIONAL BUSINESS MACHINES CORP, TANDY CORPORATION APPLE COMPUTER INC DIGITAL RESEARCH, INC., VISICORP, MICROSOFT CORP

Circle 416 on Reader Service card.

SAVE A BUNDLE

WITH ONE OF OUR BUNDLES

We have put together special bundles of software just in time to save you a bundle of money. Didn't you ever wonder why CP/M was so popular? The reason is the software availability. All programs (except EP) are for the Model 4/4P and have been optimized to install and run without hassle. For example, we have memory-mapped WordStar® and it runs circles around the standard version available elsewhere. We also added printer drivers for the Daisywheel II and the DMP-2100. Our CP/M® 2.2 is the best around. Read the reviews. You *know* the programs. You *know* the prices. This is the years' best value. You owe it to yourself to let these CP/M® programs and thousands of others (many in the public domain) start serving your needs.

Bundle #1
WordStar®
MailMerge®
SpellStar™
StarIndex™
Montezuma Micro CP/M®
$299 Delivered
RETAIL VALUE $1009

Bundle #5
Electric Pencil™
Red Pencil™
Blue Pencil™
$149 Delivered
Works with TRSDOS, NEWDOS-80, DOSPLUS and MULTIDOS (Model 1,3,4)
RETAIL VALUE $240

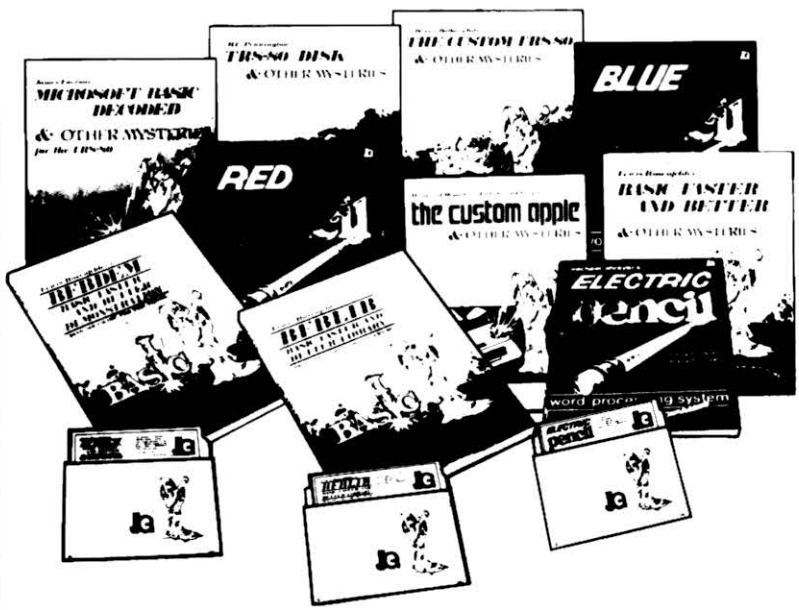
Bundle #2
WordStar®
DataStar™
ReportStar™
CalcStar™
Montezuma Micro CP/M®
$399 Delivered
RETAIL VALUE $1354

Bundle #3
WordStar®
MailMerge®
SpellStar™
StarIndex™
DataStar™
ReportStar™
CalcStar™
Montezuma Micro CP/M®
$499 Delivered
RETAIL VALUE $1699

Bundle #4
WordStar®
MailMerge™
SpellStar™
StarIndex™
dBASE II®
TurboPascal™
Montezuma Micro CP/M®
$599 Delivered
RETAIL VALUE $1553

Save A Bundle on these books and disks

Take advantage of our volume discounts. Buy any three items from this list and deduct $5 from your total order. Buy four...deduct $10. Buy five...deduct $15. Buy six...deduct $20 and so on. Buy a bunch, save a bundle. Please add $1 each for shipping. Add $5 to orders under $50 for handling.



TRS-80 Disk & Other Mysteries. The "How to" book of data recovery for the TRS-80 Model I disk operating system. 128 pages. Retail $22.50 **Now $18**

Microsoft BASIC Decoded & Other Mysteries. The complete guide to Level II and BASIC. 312pages. Retail $29.95 **Now $24**

The Custom TRS-80 & Other Mysteries. The complete guide to customizing TRS-80 Hardware and Software. 336 pages. Retail $29.95 **Now $24**

BASIC Faster & Better & Other Mysteries. The complete guide to BASIC programming tricks and techniques. 290 pages. Retail $29.95 **Now $24**

BASIC Faster & Better Library Disk. Contains 121 functions, subroutines and user routines. Search merge, compare and listing routines plus array handlers, BASIC overlays and video drivers. Retail $19.95 **Now $16**

BASIC Faster & Better Demonstration Disk. Contains 32 demos of the Library Disk contents above. Retail $19.95 **Now $24**

BASIC Disk I/O Faster & Better & Other Mysteries. Programming tips and techniques to store/retrieve data from disk. 432 pages. Retail $29.95 **Now $24**

BASIC Disk I/O Faster & Better Demonstration Disk. All of the major demo programs and library of disk I/O subroutines in 25 BASIC programs. Random, Indexed Sequential and TREESAM file handlers included. Retail $29.95 **Now $24**

Machine Language Disk I/O & Other Mysteries. A guide to machine language disk I/O for the TRS-80. 288 pages. Retail $29.95 **Now $24**

TRSDOS 2.3 Decoded & Other Mysteries. Detailed explanation of the Model I disk operating system. 298 pages. Retail $29.95 **Now $24**

How To Do It On The TRS-80. A complete applications guide to the TRS-80 Model I, II, III, 100, and Color Computer. 352 pages. Retail $29.95 **Now $24**

The Custom Apple & Other Mysteries. Who cares? Retail $29.95 **Now $19**

Due to the nature of this business, there are **NO REFUNDS** on software. We accept American Express, MasterCard, Visa and COD. Your card is not charged until we ship your order. Personal and company checks are accepted without delay (call for details). Delivered prices are for the lower nightmost 48 States only. Prices and specifications subject to change without notice. If you don't understand any of this, just give us a call and we will take the time to explain it until you do. First-timers are always welcome here.

©1984 by Montezuma Micro. WordStar®, SpellStar™, StarIndex™, MailMerge®, DataStar™, ReportStar™ and CalcStar™ belong to MicroPro® International Corporation. CP/M® belongs to Digital Research Inc. dBASE II® belongs to Ashton-Tate, Inc. All the Pencils™ belong to Michael Shrayer. Turbo Pascal™ belongs to Borland International.

MONTEZUMA MICRO

214-339-5104
Redbird Airport, Hangar #8
P.O. Box 32027
Dallas, Texas 75232

"WE KEEP YOU RUNNING"

ORDER NOW . . . TOLL FREE
800-527-0347
800-442-1310
The Toll Free lines are for orders only
Specifications subject to change without notice

Circle 416 on Reader Service card.

MONTEZUMA MICRO

P.O. Box 2169
Camp Verde (Lizard Flats)
Arizona 86322

"WE KEEP YOU RUNNING"

COMPUTERS

25-1000	1dr Model 1000 128K RAM IBM Clone	$ 1025
26-1069	2dr Model 4 64K RS232 Pure Radio Shack	1099
26-1080	64K Model 4 Portable 2dr & RS232	899
26-3127	64K Extended BASIC Color Computer 2	179
26-3134	16K Color Computer 2	99
26-3136	16K Extended BASIC Color Computer 2	135
26-3589	Pocket Computer 3 with 4K RAM	85
26-3601	Pocket Computer 2	89
26-3650	Pocket Computer 4	59
26-3801	Model 100 Portable Computer	359
26-3802	Model 100 24K Portable Computer	539
26-4004	Model 12 1-Drive	2199
26-5103	Model 2000 2-drive 128K	2124
26-5104	Model 2000 W/Hard Disk and 256K	3358
26-6021	Model 6000 2dr 512K	3824
26-6022	Model 6000 HD 512K	4674
26-6050	DT-1 Terminal	499
26-6052	DT-100 Terminal	675

MODEMS

25-1003	Model 1000 Int. Modem	153
26-1084	Model 4P Modem Board	$ 127
26-1173	DC Modem II	169
26-1174	Acoustic Coupler Modem	127
26-1175	DC Modem 1B	85
76-1176	DC-2212 High Speed Modem	339
	Anchor Mark I Modem, 300 Baud with cable	74
	Anchor 300/1200 Baud Modem with cable & PS	259
	Hayes Smartmodem, 300 Baud	233
	Hayes Smartmodem, 1200 Baud	525

PERIPHERALS

	LNW-80 2dr cabinet w/half high drives	449
	12" Green Non-Glare Video Monitor	79
	12" Amber Non-Glare Video Monitor	85
	Video cable for Model 1 keyboard-to-monitor	7
25-1010	Model 1000 Mouse & Clock/Calendar	85
25-3010	VM-3 Model 1200 Monochrome Monitor	159
25-3040	Model 1200 Monochrome Adapter	169
25-3043	Model 1200 Graphics Display Adapter	229
25-3044	Model 1200 Techmar Graphics Master	499
26-0511	Genuine RS Pantyhose Anti-Glare Device	14
26-1085	Model 4P Carrying Case	21
26-1131	Model 1/3/4 5MB Hard Disk Secondary	1299
26-1133	Model 3 15MB Hard Disk Inst Kit	85
26-1134	Model 4 15MB Hard Disk Inst Kit	68
26-1183	Model 100 Bar Code Reader	85
26-1185	Color Computer Koala Pad	51
26-1197	Mouse for Model 2000	85
26-1198	Serial to Parallel Converter	85
26-1208	CCR-81 Cassette Tape Recorder	51
26-1209	CCR-82 Cassette Tape Recorder	42
26-1326	Anti-Glare Panel, Model 2/12/16	42
26-1342	Clear Keyguard for Model 3/4	11
26-1410	Model 100 Modem Cable	17
26-1429	Automatic Power Strip/Surge Protector	59
26-1451	Non-Automatic Power Strip/Filter	42
26-1457	Anti-Glare Panel, Model 1/3/4	42
26-2226	Color Computer Deluxe RS-232 Kit	69
26-3007	Color Computer Carrying Case	17
26-3008	Color Computer Joysticks, Per Pair	21
26-3012	Color Computer Deluxe Joystick/each	34
26-3023	Color Computer 1/2 Disk Drive 1,2 or 3	237
26-3024	Color Computer Multi-Pak Interface	89
26-3025	Color Computer Mouse	43
26-3503	PC 1 Cassette Interface	9
26-3508	PC 1 Carrying Case	13
26-3608	PC 2 Carrying Case	25
26-3612	PC 2 RS-232C Interface	89
26-3615	PC 2 4K RAM Module	59
26-3616	PC 2 8K RAM Module	118
26-3651	PC 4 Cassette Interface	33
26-3653	PC 4 1K Ram Module	16
26-3654	PC 4 Carrying Case	6
26-3804	Model 100 AC Adapter	5
26-3805	Model 100 Acoustic Coupler	34
26-3809	Model 100 Carrying Case	42
26-3811	Model 100 Soft Carrying Case	34
26-3812	Model 100 Lags (pair)	4
26-4154	Model 12/16B Internal 15Mb Hard Disk Kit	2245
26-4155	Model 2/3/4/12/16 15Mb Primary Hard Disk	1695
26-4156	Model 2/3/4/12/16 15Mb Secondary Drive	1271
26-4157	Model 2/12/16 Installation Kit for 26-4155	297
26-5111	Model 2000 VM-1 Monochrome Monitor	169
26-5112	Model 2000 CM-1 Color Monitor	552

FURNITURE

26-1305	Model 3/4 System Desk	$ 152
26-1308	Universal Printer Stand	45
26-1324	Computer Table	68
26-1354	**NEW!!** Computer Stand	42
26-1355	**NEW!** Printer Stand	42
26-1356	**NEW!** System Desk	102
26-1357	**NEW!** Printer Stand	85
26-1358	**NEW!** Corner for 1356/57 Desk/Stand	34
26-1359	**NEW!** Hutch for 1356 Desk	51
26-1360	**NEW!** Printer Platform	25
26-4303	Deluxe System Desk	229
26-4305	Deluxe Printer Stand	128
26-4306	Terminal Stand	161
26-4307	Printer Stand	127
26-5115	Model 2000 Pedestal	76
26-5116	Model 2000 Floor Stand	123

PRINTERS & ACCESSORIES

26-1192	GCP-115 Color Graphics Printer	169
26-1196	GT-116 Graphics Pad	90
26-1250	DWP-410 Daisywheel Printer	583
26-1252	DMP-500 220cps Printer	1099
26-1254	DMP-200 120cps Printer	424
26-1255	DMP-120 100cps Dual Mode Printer	424
26-1257	DWP-210 Daisywheel Printer	509
26-1261	TP-10 Thermal Matrix Printer	85
26-1268	CGP-220 Color Ink Jet Printer	594
26-1269	PTC-64 64K Printer Controller (Buffer)	212
26-1270	DWP-510 Daisywheel printer	1270
26-1271	DMP-110 50cps Triple Mode Printer	339
26-1274	DMP-2100P 160cps Dual-Mode Printer	1695
26-1275	**NEW!!** TRP-100 Printer	255
26-1276	DMP-105 New Cheeep Printer	169
26-1277	DMP-430 Now Not So Cheeep Printer	765
26-1441	Bi-Directional Tractor for DWP-2100	144
26-1443	Bi-Directional Tractor for DWP-210	99
26-1447	Bi-Directional Tractor for Daisywheel II	188
26-1448	Single Bin Sheet Feeder for Daisywheel II	672
26-1455	Acoustic Cover	339
26-1459	Bi-Directional Tractor for DWP-410	63
26-1401	Model 1/3/4/4P Printer Cable	29
26-1408	RS-232C Cable	16
26-1409	Model 100 Printer Cable	13
26-1410	Model 2/12/16/2000 Printer Cable	29
26-1490	10 RS-232C Cable	25
26-1491	25 RS-232C Cable	33
26-1492	50 RS-232C Cable	46
26-1493	100 RS-232C Cable	76
26-1495	RS-232C Cable Extender	25
26-1496	RS-232C Null Modem Adapter	25
26-1498	SW-302 Parallel Printer Switch	102
26-1499	SW-303 RS-232C Selector Switch	128
26-3591	PC 3 Printer	85
26-3605	PC 2 Printer	45
26-3652	PC 4 Printer	68

C.ITOH

3520	350cps Parallel IBM Compatible	1995
8510BP1	120cps Friction/Tractor, Parallel, IBM Comp	$ 349
8510SP	Hot Dot, 180cps, Real Fast	495
8510SCP	Color High Speed printer	549
1550P	Prowriter 2, 120cps, for Wide Paper, Parallel	525
1550SP	Hot Dot, 180cps, Real Fast & Wide	675
F10-40	Starwriter, 40cps Daisywheel	899
F10-55	Printmaster, 55cps Daisywheel, FAST	1099
F10	Bi-Directional Tractor, with Plastic Cover	210
F10	Electric Single Bin Sheet Feeder, Inst. Required	775
F10	Mechanical Single Bin Sheet Feeder	499
GX-100	Gorilla Banana, 50cps	139

We have dust covers for most every printer we sell. Be sure to order one with your new printer to keep it like new.

CABLES

We manufacture a great number of different cable assemblies to connect most anything to anything else. Call us with your specific needs. We probably have it on the shelf. All at discount prices, of course.

SUPPLIES

5.25" SSDD Diskettes, Pack of 10, 1 Year Guarantee	$ 15
5.25" DSDD Diskettes, Pack of 10, 1 Year Guarantee	19
8" SSDD Diskettes, Pack of 10, 1 Year Guarantee	29
8" DSDD Diskettes, Pack of 10, 1 Year Guarantee	34
5.25" Flipsort, Holds 75 Disks	16
8.5" x 11" Tractor Paper, 20lb, 2900 Sheets	25
14" x 11" Tractor Paper, 20lb, 2900 Sheets	35
5.25" or 8" Head Cleaning Kit	9

RIBBONS

We have more ribbons than you do. Way too many types to list here. Add them to your order now. They're cheeeap too.

MONTEZUMA'S REVENGE

MODEL 3 UPGRADE
112K - CP/M - 80 COLUMN

This month Monte offers the deal of the year. The Holmes VID-80 is the only plug in printed circuit board which expands the Mod 3 display to 24 lines of 80 characters and allows operation of the CP/M 2.2 operating system with a 56K TPA. Both 80 x 24 and 64 x 16 modes are available from TRSDOS and BASIC. Reads and writes 18 different disk formats (Kaypro, Osborne, etc). A total of 112K of RAM. The extra 48K RAM can be set up as a RAM disk through software routines that are furnished with the supplied CP/M operating system. The VID-80 comes complete with easy to follow installation instructions and operational documentation. No trace cuts or soldering required. Guaranteed for one year parts and labor. Monty can ship this today.

MONTE's SPECIAL PRICE ..... $ 279

Add WordStar 3.3 ready to run for $ 100

"WE KEEP YOU RUNNING"

SOFTWARE

Note: It is Radio Shack policy that not all multiple-computer software packages contain disks for all models. Optional disks are available at slight extra charge. Be sure to ask for details when you order.

	NEW!! CP/M 2.2 by Montezuma Micro For The Model 4 Rated best by actual test. Get the good one	$ 169
	NEW!! CP/M Hard Disk Driver with Backup & Restore	30
26-0310	TRSDOS 2.3 For The Model 1	12
26-0312	TRSDOS 1.3 For The Model 3	12
26-0313	TRSDOS 6.x For The Model 4	12
26-0315	TRSDOS 6.2 Utility Disk	34
26-0316	TRSDOS 6.2 Disk Doc Ref Card	34
26-0413	Disk Drive Analyzer. Why pay more?	26
26-1507	Model 1/3 Stockpak	42
26-1510	Model 1/3 Trendex	51
26-1511	Model 3 Home Accountant	85
26-1512	Model 4 Target PlannerCalc	85
26-1513	Model 1/3 Cass. Spectaculator	42
26-1514	Model 3 Portfolio Manager	169
26-1515	pfs:file for Model 3	106
26-1516	pfs:report for Model 3	85
26-1517	pfs:report for Model 4	85
26-1518	pfs:file for Model 4	107
26-1520	Model 4 VisiCalc	85
26-1521	Model 3 VisiCalc Business Forecast	85
26-1527	Model 3/4 Formation	169
26-1530	Model 4 Multiplan	169
26-1538	**NEW!!** Model 4 Apartment Management	255
26-1539	Model 3/4 W-2 Writer	42
26-1540	Model 3/4 General Ledger	169
26-1541	Model 3/4 Accounts Receivable	169
26-1542	Model 3/4 Accounts Payable	169
26-1543	Model 3/4 Payroll	169
26-1544	Model 3/4 Invoice Writer	42
26-1545	**NEW!!** Model 3/4 Inventory Control	169
26-1559	Model 1/3 Manufacturing Inventory Control	169
26-1560	Fixed Assets	55
26-1562	Model 1/3 Profile	36
26-1563	Model 1/3 SCRIPSIT	85
26-1564	Model 1/3 Cardprogram	14
26-1565	Model 1/3 Microfile	23
26-1568	Model 1/3 Medical Office Systems	254
26-1569	Model 3 VisiCalc Enhanced Version	85
26-1577	Model 1/3 Surveying	42
26-1578	Model 1/3 Real Estate	85
26-1580	Model 1/3 Project Manager	85
26-1581	Model 1/3 Personnel Manager	85
26-1582	Model 1/3 Time Manager	85
26-1584	Model 3 Checkwriter 80	85
26-1585	Model 3 Business Checkwriter	127
26-1588	Model 1/3 Videotex Plus	42
26-1589	Model 3 MICRO/Courier	127
26-1590	Model 1/3 SuperSCRIPSIT	169
26-1591	Model 1/3 Scripsit Dictionary	85
26-1592	Model 3 Profile Plus	169
26-1593	Model 3 Profile Plus LDOS/HD Version	254
26-1594	Model 3 Desktop/Plan-80	139
26-1595	SuperSCRIPSIT For The Model 4	169
26-1596	SCRIPSIT For The Model 4	85
26-1597	Model 3 Business Graphics Pak	148
26-1598	Model 4 Videotex Plus	42
26-1600	Dictionary for the Model 4	85
26-1630	**NEW!!** TK! Solver for the Model 4	255
26-1635	**NEW!!** Model 4 Profile	212
26-1922	Model 3/4 Orchestra 80	68
26-2011	Model 1/3 EDAS, Tape Version	25
26-2012	3/4 Assembly Language Development Course	126
26-2013	EDAS, Disk Version, Model 1/3	29
26-2015	Model 3 Instruction Tapes	21
26-2017	Model 3 Assembly Language Course, Tape	34
26-2018	Model 3 Assembly Language Course, Disk	59
26-2019	TRSDOS 6.x Training Course	49
26-2022	Power Tool for the Model 1/3	43
26-2023	Plot Plot for the Model 1/3	17
26-2025	**NEW!!** Construction for the Model 4	42
26-2026	**NEW!!** COBOL Query for the Model 4	127
26-2027	**NEW!!** Graphics 90 for something	34
26-2190	Model 4 COBOL	169
26-2200	Model 3 FORTRAN	85
26-2201	Model 1 FORTRAN	85
26-2203	Model 1/3 COBOL	159
26-2204	Model 1/3 Compiler BASIC	126
26-2205	Micro PILOT	34
26-2210	Model 3 BASCOM	169
26-2211	Model 1 Alcor PASCAL	212
26-2212	Alcor PASCAL For The Model 4	212
26-2213	Model 1 LDOS (LSI version)	69
26-2214	Model 3 LDOS (LSI version)	69
26-2216	CP/M Plus For The Model 4	127
26-GOOD	The Good CP/M for the Model 4(Montezuma)	169
26-REAL	GOOD Hard Disk Driver for MM CP/M	30
26-2217	CBASIC For The Model 4 (Requires CP/M)	85
26-2218	BASCOM for the Model 4	165
26-2219	FORTRAN for the Model 4	85
26-2220-23	Videotex, various applications	26
26-2224	Compuserv/Dow Jones Sign-up Kit	17
26-2230	**NEW!!** Model 4 "C" Language	212
26-2231	Model 4 Double Duty (128K req.)	59
26-2718	Model 3 PILOT	101
26-2721	Color Computer LOGO Disk	85
26-2722	Color Computer LOGO ROM Pack	43
26-3030	OS-9 For The Color Computer	59
26-3036	BASIC - 09 For The Color Computer	85
26-3038	**NEW!!** C Compiler for the Color Computer	85
26-3130	**NEW!!** MS-DOS with BASIC for the 1200	76
26-3821	Model 100 Learning Lab	25
26-3829	**NEW!!** Model 100 Multiplan	127
26-3830	**NEW!!** Model 100 Scripsit	34
	ALL Color Computer GAMES 25% OFF Catalog Price	
	ALL PC(YDS) SOFTWARE 30% OFF Catalog Price	
26-4501	General Ledger I	129
26-4502	Inventory Management System I	119
26-4503	Payroll	229
26-4504	Accounts Receivable	179
26-4505	Accounts Payable	179
26-4508	Medical Office Systems	499
26-4509	Manufacturing Inventory Control	539
26-4510	Versafile	42
26-4511	VisiCalc	199
26-4512	Profile II	99
26-4513	Job Costing	99
26-4514	Order Entry	129
26-4515	Profile II Plus	199
26-4516	Profile Training Guide	58
26-4517	Profile Plus Upgrade	89
26-4520	Time Accountant	299
26-4526	VisiCalc Business Forcasting	69
26-4531	SCRIPSIT 2.0	299
26-4532	SCRIPSIT Utility Disk	79
26-4534	SCRIPSIT Dictionary	129
26-4536	SCRIPSIT Printer Driver	39
26-4540	Statistical Analysis	54
26-4545	Litigation Support	199
26-4550	Business Graphics Analysis Pak	199
26-4554	Accounts Receivable	39
26-4555	Menu Generator	33
26-4556	Profile Forms	99
26-4557	Profile Archive	39
26-4558	Profile Prosort	116
26-4559	Prolook	139
26-4560	WESTLAW	159
26-4580	MultiPlan, Model 2/12	212
26-4601	General Ledger	299
26-4602	Inventory Control System	199
26-4604	Accounts Receivable	299
26-4605	Accounts Payable	299
26-4607	Order Entry/ICS	299
26-4608	Sales Analysis	199
26-4612	Query COBOL	117
26-4621	Personnel Search	199
26-4701	FORTRAN	199
26-4702	EDAS	129
26-4703	COBOL	199
26-4705	Compiler BASIC	129
26-4707	COBOL Generator	499
26-4710	Program Editor	59
26-4712	Assembly Language Development System	199
26-4713	EDAS 1	39
26-4721	Videotex For The Model 2/12/16	42
26-4725	**NEW!!** BASCOM BASIC Compiler	159
26-4742	CBASIC	69
26-4802	Inventory for the Hard Disk	299
26-4831	SCRIPSIT for the Hard Disk	299
26-4834	Dictionary for the Hard Disk	139
26-4835	SCRIPSIT for Thinline Drives	263
	ALL NEW MODEL 2000 GOODIES	
26-5210	General Ledger	339
26-5212	Accounts Payable	339
26-5213	Accounts Receivable	339
26-5214	Inventory Control System	339
26-5251	BASCOM	229
26-5252	MS-DOS Assembler	85
26-5255	FORTRAN	249
26-5256	PASCAL	219
26-5257	COBOL	424
26-5260	Videotex Plus	42
26-5261	Scribble	139
26-5300	Lotus 1-2-3	399
26-5302	SuperCalc 3	299
26-5305	pfs:file	119
26-5306	pfs:report	106
26-5311	Multiplan	168
26-5314	**NEW!!** Microsoft Word	299
26-5330	Mutilate	199
26-5340	Home Accountant	106
26-5352	dBASE II	349
26-5377	Planetfall	42
	MODEL 12 & 16 68000 SOFTWARE	
26-6100	COBOL Development System	199
26-6201	General Ledger	449
26-6203	Payroll	499
26-6204	Accounts Receivable	440
26-6205	Accounts Payable	440
26-6207	Order Entry/ICS	440
26-6208	Sales Analysis	299
26-6209	Job Costing	149
26-6302	Inventory	299
26-6401	XENIX Development System	537
26-6412	Profile for XENIX	369
26-6431	Scripsit for XENIX	399
26-6450	MAC16 Macro Assembler	299
26-6451	RM/FORTRAN for Xenix	499
26-6455	COBOL for XENIX	499
26-6457	MBASIC for XENIX	199
26-6480	Multiplan, Model 16 & XENIX	269
	Electric Pencil 2.0 Model 1/3	49
	Blue Pencil Model 1/3	49
	Red Pencil, Model 1/3	39
	Modem 80 A Powerful Communications Program, M1/3	35
	Trackcess for the Model 3. The original copy program	19
	Super Utility Plus 3.2 Runs on Model 1/3/4	49

CP/M OPERATING SYSTEMS

	CP/M 2.2 for the Model 4. The **VERY BEST ONE**	$ 169
	Our Very Own Trick Hard Disk Driver.	
	Puts Radio Shack's in The Shade	30
	P & T CP/M 2.2m Floppy Version, Model 2/12/16	180
	P & T CP/M 2.2m for R/S Hard Disk Model 2/12/16	225

BOOKS and MANUALS

25-1501	**NEW!!** MS-DOS Reference Manual	29
25-1502	**NEW!!** MS-DOS BASIC Reference Manual	29
25-1503	**NEW!!** Model 1000 Programmers Manual	12
25-1504	**NEW!!** Model 1000 Technical Ref. Manual	25
26-2102	Model 1 Level II Manual	$ 5
26-2110	Model 4 Technical Manual	21
26-2111	Model 3 DOS Manual	6
26-2112	Model 3 BASIC Instruction Manual	5
26-2114	Sourcebook, New Edition	6
26-2115	Newsletter Book 1980	4
26-2117	Model 4 DOS Manual	15
26-2240	Newsletter Book 1981	6
26-2241	Newsletter Book 1982	9
26-3191	Color Computer Manual	5
26-3192	Extended Color Computer Manual	6
26-3193	Color Computer 1 Technical Manual	11
26-3810	Model 100 Technical Manual	8
26-3819	Model 100 Book by David A. Lien	13
26-4921	Model 2 Technical Reference Manual	26
26-4922	Model 12 Operating Manual	59
26-5403	Model 2000 Programmer's Manual	13
26-5404	Model 2000 Hardware Manual	15
26-6041	Model 16B Operating Manual	59
	TRS-80 Disk & Other Mysteries by H. C. Pennington	18
	Microsoft BASIC Decoded by James Farvour	24
	BASIC Faster & Better by Lewis Rosenfelder	24
	BASIC Faster & Better Demonstration Disk	15
	BASIC Faster & Better Library Disk	15
	BASIC Disk I/O Faster & Better by Lewis Rosenfelder	24
	BASIC Disk I/O Demonstration Disk	24
	The Custom TRS-80 by Dennis Barron, Kirst	24
	TRSDOS 2.3 Decoded by James Lee Farvour	24
	Machine Language Disk I/O by Mike Wagner	24
	How Do It On The TRS-80 by William Barden, Jr.	24
	TRS-80 Beginners Guide	13
	Inside Super Utility Plus 3.0 by Kimberly Watt	16

UPGRADES

	16K RAM 200 nsec. 1 Full Year Guarantee	$ 9
	64K RAM 200 nsec. 1 Full Year Guarantee	44
	Model 4 128K RAM Upgrade Kit with Genuine PAL	54
25-1004	Model 1000 128K RAM Upgrade Board	255
25-1005	Model 1000 2nd Disk Drive	255
	Better than above (TEAC 55B). Save $$$$	169
25-1009	Model 1000/1200 512K RAM Board	212
26-1125	Model 3 Hi-Resolution Graphics Board	153
26-1126	Model 4 Hi-Resolution Graphics Board	225
26-1127/62	Model 3/4 Drive 0 Kit	444
	Same as above except our brand. Save $$$$	319
	Famous AEROCOMP "DDC" Double Density Controller	99
26-1145	Model 1 RS232 Board	89
	Model 3/4 RS232 installation Kit less cable	69
26-1163	Radio Shack 40 Track Disk Drive	216
	Same as above except 40 track. Tandon. Save $$$	129
	MODEL 4 5Mhz Speedup Mod(not for gate array)	89
	HOLMES Model 3 4Mhz Speedup Mod	109
26-4104	Model 2 Hi-Resolution Graphics Board	424
26-4105	64K RAM Board	339
26-4167	8" Siemine Double-side Drive	339
26-5140	Model 2000 Hi-Resolution Graphics Board	305
26-5141	Model 2000 Color Graphic Dog Set	129
26-5144	Model 2000 Mouse/Clock Board	102
26-5160	Model 2000 Internal 128K Board	254
26-5161	Model 2000 External 128K Board	339
26-5162	Model 2000 128K RAM for 26-5161	128
26-6010	Model 2 or 12 to Model 16 68000 Kit	699
26-6011	Model 16 128K RAM Board	299
26-6012	Model 12 128K RAM Kit	99
26-6013	Model 16 3-User RS-232 Card	254
26-6017	Model 12 Card Cage	159

We maintain an extensively equipped service facility with a large stock of parts. Give us a call for that hard-to find item. We'll try and provide what you need.

BUY FROM US RIGHT NOW!

(Please read all this, line print, first!)

Our inventory is so large it can not be listed completely. Please call if you do not see what you want. Chances are we have it. Because of the time lag in magazine advertising, prices are subject to change without notice and are mail order only. We are not responsible for typographical errors. Your company and/or personal checks are welcome and will not delay your order. We use TeleCheck. Please observe the following requirements and your order will be shipped without delay. The check must be drawn on a USA or Canadian bank and payable in US Dollars. It must be a bank printed check and contain your street address and telephone number. The signature must **EXACTLY** match the name printed on the check. Thats all there is to it. In addition, we accept American Express, Mastercard, Visa, Cashier's Checks, Wire Transfer and we also ship COD. COD's and motor freight shipments may require a deposit. Some special items require deposits. ALL COD's require cash or cashiers check on delivery. Company and/or personal checks can NOT be accepted in payment of COD shipments. Credit cards are not charged until we ship your order. **SHIPPING CHARGES ARE NOT INCLUDED.** Please add $5 handling to all orders totaling less than $50. Add $20 handling charge to all orders over $500 shipped to Canadian addresses. No State Sales Tax collected on out-of-state shipments. If you order by 5PM your order will be shipped the NEXT DAY if stock is on hand. Responsibility of suitability of software rests with the purchaser. Due to the nature of this business there are **NO REFUNDS ON SOFTWARE. REPLACEMENTS WILL BE PROVIDED FOR DEFECTIVE SOFTWARE ITEMS,** provided we are notified within ten days of delivery of the merchandise. If you have a particular problem please call us for help and instructions.

WARRANTY

All items carry the original manufacturers' warranty. We will be happy to mail you a copy upon request.

CALL TOLL FREE FROM ANYWHERE IN THE USA

800-527-0347

800-442-1310

VISA MasterCard AMERICAN EXPRESS

Copyright 1985 by Montezuma Micro

Ad 13085

Practical Finance

The Finance Organizer/ Portfolio Minder & Record Keeper for the Models 4 (128K), 1000, 1200, and 2000 organizes your finances in six program modules.

The interest program figures compound and semiannual interest, projects mortgage costs and rent yields, and analyzes differences between mortgages. The tax program lets you enter financial data for tax records and automatically cross-references files for each transaction.

The stock program tracks up to 40 stocks, compares your portfolio against the market, and projects gains or losses. The phone directory program lets you access lists of names and addresses by business services offered and prints address labels.

Finance Organizer also includes an inventory program and appointment calendar, and converts Canadian to U.S. dollars and vice versa. It's available for $200 from Practical Software, 186 Murray Drive, Aurora, Ontario L4G 2C5, Canada, 416-727-4747.

Circle 551 on Reader Service card.

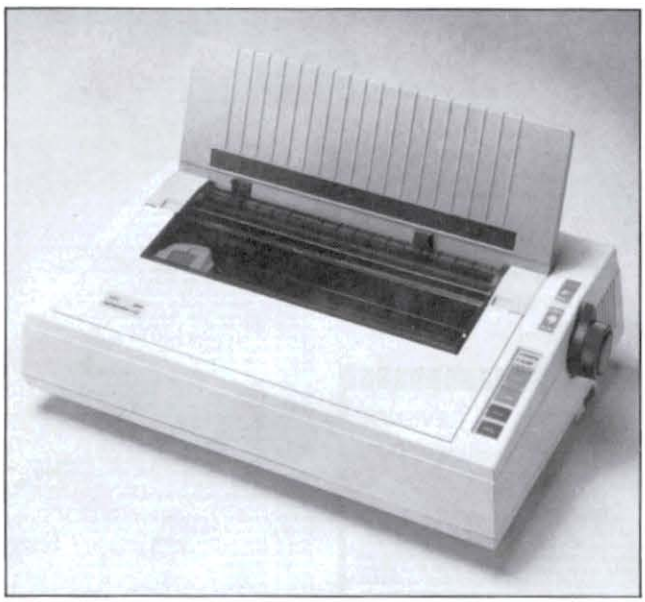
Doublecross

SuperCROSS/XT ($99.95) transfers any file or program, from the Model I/III/4 to MS-DOS or CP/M machines and back. The program transfers files from disk to disk, and requires no hardware connection between computers.

It supports all versions of MS-DOS and 65 versions of CP/M, including CP/M Plus and version 2.2. An optional program, CNVBASIC/CMD ($29.95), converts Model I/III Basic programs for use on MS/DOS and CP/M systems.

Upgrades are available for owners of HyperCROSS. For more information, contact Powersoft Products, 17060 Dallas Parkway, Suite 114, Dallas, TX 75248, 214-733-4475.

Circle 553 on Reader Service card.



The Spinwriter Elf 190 cps daisy-wheel printer.

Daisy-Wheel Press

The Spinwriter Elf bidirectional daisy-wheel printer ($595) prints up to 190 words per minute and features bold face, shadow print, and 10, 12, or 15 characters per inch spacing pitch.

The Elf provides buttons for pitch, form feed, line feed, print control, and a single-lever paper control. It runs at 55 decibels. The Elf supports Lotus 1-2-3, WordStar, dBase, PFS:File, and Multimate. A unidirectional tractor feeder is optional.

For more information, contact NEC Information Systems Inc., 1414 Massachusetts Ave., Boxborough, MA 01719, 617-264-8000.

Circle 552 on Reader Service card.

Let Your Computer Do the Walking

Instant Yellow Page Service, from American Business Lists Inc. (5639 S. 86th Circle, P.O. Box 27347, Dept. N, Omaha, NE 68127, 402-331-7169), is a 24-hour on-line data base that lets you access 6 million business phone numbers and addresses from your computer.

The data base contains instant access to every Yellow Page directory in the U.S. A subscription is $15 per month. Connect-time charges are $1 per minute and 10 cents per printed record.

Circle 554 on Reader Service card.

Family Ties

Ultimate Roots ($39) is a Model I/III/4 geneology program that organizes and prints out geneological charts.

A filer program lets you add, edit, delete, and revise information. You can then save the chart to disk, sort it, or print it out. The program gathers information on family and children, and includes source and comment sheets. You can select from hundreds of print formats.

The manual is available separately for $25, applicable toward purchase of the complete package. For more details, contact Ultimate Software, P.O. Box 1291, Hayden Lake, ID 83835, 208-772-7634.

Circle 558 on Reader Service card.

Bytes of Diplomacy

Computer Diplomacy for the Models III, 4, 1000, and 1200 is an adaptation of Avalon Hill's Diplomacy board game.

The game displays a map of Europe. Up to seven players try to conquer their opponents through war, alliances, and diplomacy. Included are a rule book, a pad of conference maps, and the program disk.

A Model III/4 version is available at Radio Shack stores for $25. The MS-DOS version ($50) requires 256K RAM and a color graphics board. For more information, contact The Avalon Hill Game Co., 4517 Harford Road, Baltimore, MD 21214, 800-638-9292.

Circle 559 on Reader Service card.

Cash In

The Regit Cash Register and Inventory Control System ($179) turns the Model III or 4 into a point-of-sale cash register, complete with a locking cash drawer.

Regit's software generates sales and inventory reports on a daily, weekly, or monthly basis. Screen characters are double-size for easy viewing. Displayed information includes price, item description, tax, and sales total. The program computes change, updates sales and inventory records, opens the cash drawer,

Circle 455 on Reader Service card.

MEGABYTES FOR MINI-BUCKS

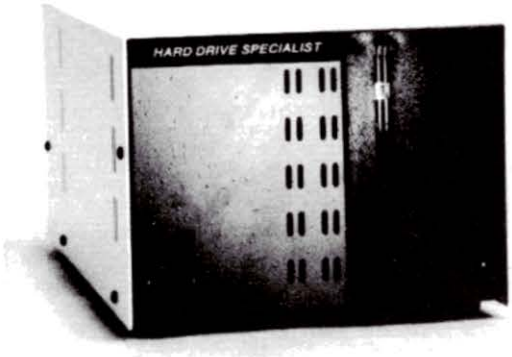
Model 1, 3, 4 Hard Drives

	Primary	Secondary
5 Megabyte —	$ 795.	$ 595.
10 Megabyte —	$1095.	$ 895.
15 Megabyte —	$1295.	$1095.
30 Megabtye —	$1895.	$1695.

(Model 1 add $50.)

TRS-80 Hard Disk Subsystem Features*

* All sizes rated after formatting
* TRS-80 Models 1,3,4, and 4P supported
* Your choice of DOSPLUS, LDOS, or TRSDOS 6.x Software Drivers included.
* Newdos 80/Version 2.5 Systems available.
* Up to two secondary drives may be added.
* Error checking and correcting controller.
* Buffered seek drives for improved access time.
* Built in power up diagnostics.
* Drives use plated media for long disk life.
* Heavy duty power supply.
* Fan cooled.
* Gold connectors used throughout for high reliability.
* 1 year warranty



Shop and compare. Hard Drive Specialist has been building hard drive systems for years and have sold thousands of subsystems to satisfied TRS-80 customers. We fully support TRS-80 Models 1,3,4, and 4P computers on available hard drive operating systems. We use the latest state-of-the-art drives and controllers. Our drives all use buffered seek logic and plated media to result in almost one-fourth the average access times found on our competitors drives. Plated media results in longer platter life and high resistance to head crashers not found on coated media drives. We utilize high construction throughout including heavy duty power supply, cooling fan and gold edge card connectors. We back our drives with a one year parts and labor warranty and we're so sure that you'll like our drive that we offer a thirty day money back guarantee. So when it comes time to buy, look beyond the price and choose the best drive. After all, we are the Hard Drive Specialist!

HDS Multiplexer

$1295.

The HDS Multiplexer allows the useage of up to 4 Model III or IV systems using Dosplus 3.5, LDOS, TRSDOS 6.x, and DOSPLUS IV on a HDS Hard Drive. The standard package includes the Master Control Unit, Host Adapters for 2 Computers and 40' of cable. Each additional Host adapter add $150. Each additional foot of cable add $1. up to 100 feet per computer.

Model 3/4 Boot Rom $39.95

Allows you to boot directly from a HDS Hard Drive using DOSPLUS. Versions available for useage with and without Multiplexer.

AS SEEN AT THE RADIO SHACK COMPUTER SHOWCASES

Tandy 1000 Hardware

Tandy 1000

TanPak

The first and only board that your Tandy 1000 may ever need. Your 1000 is very versatile, new applications and functions are being developed for it every day. And now with the HDS TanPak you can keep your options open for tomorrows technology. As you know the Tandy 1000 only has 3 expansion slots, and those are not quite PC compatible. The TanPak does the job using one expansion slot that normally would require four using Tandy boards. The TanPak includes a Serial Port, a Clock, and sockets for up to 512K of Memory Expansion. And the best part of all, it will save you some big bucks over the Tandy boards.

TanPak 128K ..... $399.

Radio Shack and Tandy are trademarks of Tandy Corporation, TanPak, and TanTel are trademarks of Compukit Corporation.

Hard Drive Kit

Put a 10 Megabyte Hard Drive inside your Tandy 1000. This Hard drive subsystem includes an interface card and a Half-Height Hard Drive that directly replaces a floppy disk drive in both size and power consumption drive.

10 Megabyte Internal Drive System ..... $895.
10 Megabyte External Drive System ..... $1095.
15 Megabyte External Drive System ..... $1395.
30 Megabyte External Drive System ..... $1895.

Disk Drives

Fast stepping add on or replacement disk drives for half the Radio Shack price ..... **$149.**

HARD DRIVE SPECIALIST

Ordering Information
Use our Watts line to place your order Via Visa, MasterCard, or Wire Transfer. Or Mail you payment directly to us. Any non-certified funds will be held until proper clearance is made. COD orders are accepted as well as purchase orders from government agencies. Most items are shipped off the shelf with the exception of hard drive products that are custom built. UPS ground is our standard means of shipping unless otherwise specified. Shipping costs are available upon request.

1-713-480-6000
Order Line 1-800-231-6671
16208 Hickory Knoll,
Houston, Texas 77059

Circle 270 on Reader Service card.

A CURE FOR THE COMMON CODE

AT LAST, YOU DON'T HAVE TO BE A PROGRAMMER TO *ACT* LIKE ONE!

The ACT III authoring system allows you to create courseware for any kind of training or instructional purpose. It is a *free-form* system that enables tutorials, simulations, drill, or any other learning format software to be developed with unmatched speed and power, whether you are an absolute novice, or an experienced Z-80 programmer.

ACT III supports and facilitates the use of hundreds of CAI options, including, but not limited to...

EXTENSIVE PERSONALIZATION, UNLIMITED BRANCHING, 100 TEXT AND GRAPHIC DISPLAY OPTIONS, CLOZE PROCESSING, AUDIO AND TIMING CONTROLS, COUNTERS, DETAILED ANSWER ANALYSIS, HINTS, ALTERNATIVE ANSWERS, PRINT FUNCTIONS, LESSON REPORTS, ANIMATION, READABILITY MEASURES, STUDENT MESSAGES, SYNTAX CHECKING, SPECIAL PROMPTS, AND DOZENS MORE...

ACT III can be purchased through this ad for $399, and allows you to simulate the function of most any other educational courseware. It contains a full functioning word processor and lesson generator, a display program, a screen artist program for special graphics, a mini data based manager, a syntax checker and a menu generator, all fully integrated for fast, easy use.

We developed this program over a three year period using professional educators and professional programmers together, and have field tested under diverse learning environments ranging in every discipline, kindergarten through post-graduate. We're sure it can meet your needs as well.

ACT III is available for the TRS-80 models III and IV. It comes with the program diskette and backup, data base diskette, tutorial and sample lesson diskette, 300 page user's manual in a stand-up binder, quick reference card, and all the support you need. You also get our 30 day, no-hassle, money back guarantee. Send for ACT III today!

☐ Please Send ACT III right away.
My check or P.O. is enclosed.

Name: _____
Address: _____
City: _____
State: _____ Zip: _____

Mail to:
Avanti Associates, Pub., Inc.
132 Allyn Street
Hartford, CT 06103

See our review in the April, '85, 80 Micro or send $1.00 for our complete product information package.

Circle 186 on Reader Service card.

NEW FOR PROFILE® USERS

PROfix*III™
RESTRUCTURE & TRANSFER UTILITY
$49.95

For PROFILE® III PLUS Model III/4 — ALSO NOW — For PROFILE PLUS Model II/12

Needs change—Experience teaches—and if you could redefine your data base today, you probably would change a few things—

WELL, NOW YOU CAN!

PROfix*III Provides you, as a user of Profile III Plus, with a powerful, easy-to-use package that allows you to reorganize your data base TO MEET TODAY'S NEEDS, and then moves your existing data into your new file structure.

• • • FEATURES • • •

- EASY TO USE—no special charts to fill out
- FAST—assembly language speed
- RE-ARRANGE FIELDS—even across segments
- DROP OR ADD FIELDS
- CHANGE FIELD LENGTHS—R/L justify data
- CHANGE NUMBER OF SEGMENTS
- CREATE SORTED FILE—drop deleted fields
- LITERAL INSERTION—specified fields
- COMPLETE USER MANUAL—with examples

TO ORDER — SEND $49.95/MODEL III/4
SEND $89.95/MODEL II/12
Plus $2.50 for Handling and Postage
Check, M.O., VISA/MC
(for charge card, give expiration date, number)
—To—

BLUE RIDGE SOFTWARE
230 Chesterfield Road
Lynchburg, VA 24502

For phone orders or more information
Call (804) 239-0574 $1.00 off on phone orders!
Virginia residents add 4% sales tax
Most orders filled within 24 hours
(allow 2 weeks for checks to clear)

Profile, TRSDOS, are a registered trademark of Tandy Corp.
LDOS is a registered trademark of Logical System Inc.

PLEASE SPECIFY VERSION

NEW PRODUCTS

The Hard Drive Specialist Multiplexer for up to four computers.

and prints a sales slip.

Program options let you customize the program to suit your needs. For more information, contact APCA Systems, P.O. Box 978, Arbuckle, CA 95912, 916-476-3356.

Circle 564 on Reader Service card.

Channels of Communication

The Hard Drive Specialist Multiplexer ($1,295) lets up to four Model I/III/4 computers access one hard disk system under LDOS, TRSDOS 6.X, DOSPLUS 3.5, or DOSPLUS 4.0.

The multiplexer includes two host adapters and 40 feet of cable. Additional cabling and host adapters are available.

Contact Hard Drive Specialist, 16208 Hickory Knoll, Houston, TX 77059, 800-231-6671 for more details.

Circle 555 on Reader Service card.

RAM Expander

Cryptonics Inc. offers an internal expansion board that adds up to 64K to the Model 100's RAM. The 32K CMOS static RAM chips plug into the Model 100's expansion bus and leave the adjacent ROM socket accessible.

You can connect a disk/video interface to the expansion bus without removing the board. The unit includes a battery. The 64K board is $425, 32K is $275, and a 32K upgrade is $200.

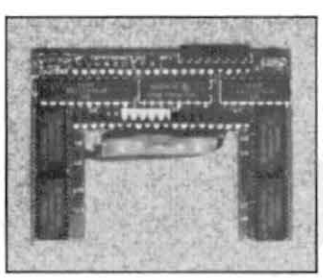
Contact Cryptonics Inc. (11711 Coley Circle, Suite 7, Fountain Valley, CA 92708, 714-540-1174) for more information.

Circle 557 on Reader Service card.

Mail Management Made Easy

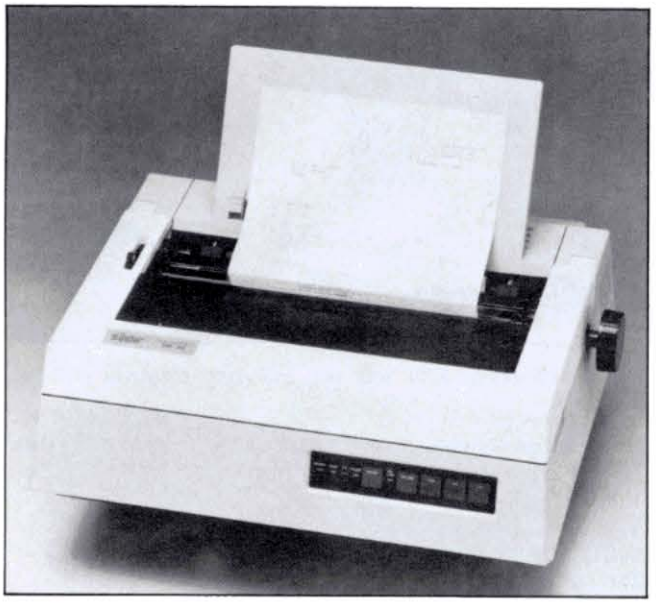
The Mailing List Software System from DHA Systems and Software (832 Jury Court, San Jose, CA 95112, 408-947-1011) sorts, selects, and merges files to create personalized form letters on MS-DOS and CP/M 80 systems.

You can print mailing labels, master lists, or phone lists. The Mailing List sorts alpha-



Plug-in CMOS chips expand Model 100 RAM to 96K.

Mailings made easy on the Model 1000 or 1200.



The Star SB-10 features high-resolution graphics in text.

betically by last name, company, zip code, or reference code. The program also includes a utility to eliminate duplicate names. Price is $79.95 plus $5 shipping.
Circle 556 on Reader Service card.

Printer Deluxe

Star Micronics' top-of-the-line SB-10 dot-matrix printer ($949) produces high-resolution graphics or text. The unit prints text at 60 or 144 characters per second and easily combines graphics and text.

The SB-10 uses a 24-wire print head and features reversible paper feed, friction and tractor feed, and a one-line memory buffer (expandable to 128K). It comes with a one-year warranty.

Contact Star Micronics Inc. (200 Park Ave., New York, NY 10166) for more information.
Circle 561 on Reader Service card.

Computing for Dollars

Get Rich: Strategies is the first in a series of personal financial planning programs for MS-DOS computers from Arrays Inc./Continental Software (11223 S. Hindry Ave., Los Angeles, CA 90045, 213-410-3977).

The program teaches basic money management skills, and tailors financial plans to individual needs. It uses worksheets for setting goals and determining net worth, calculations for solving monetary problems, and graphs for an-

Computerized finance strategies for the 1980s.

Circle 476 on Reader Service card.

NEW

MULTIDOS 80/64 - FOR THE MODEL 4

New for your Model 4...A completely unique DOS...Not a rehash of TRSDOS 6...Not just another Model III DOS...A totaly redesigned operating system for your Model 4.

- flip between 64 and 80 characters on the screen; 32 and 40 character widths also available
- runs Model III software
- use your extra 64K memory as a MEMDISK; automatically sets up MEMDISK as system disk, allowing use of the 0 drive for a data disk
- for 4P owners, never load MODELIII/A file again!
- disk I/O code written for Model 4; get fewer errors than you get using a Model III DOS
- a much faster BASIC; many enhancements and debugging tools
- over 41000 free bytes of memory in BASIC
- runs BASIC programs written for the Model III in 64 characters, or easily modified to 80 characters
- write programs using 80 character screen, function keys, and extra memory
- keyboard returns an extended character set; user controllable
- includes all the new features in 1.7 MULTIDOS

MULTIDOS 80/64 reads many disk formats, including all Model I/III DOS' and TRSDOS 6. If you're a Model III owner thinking about upgrading, this makes the transition easy.
MULTIDOS 80/64 ..... *$99.95*

NEW VERSION MULTIDOS FOR MODEL I/III $89.95

- includes a MEMDISK - set aside part of memory as a disk file
- for double-sided drives, select either one or two volume operation
- handles 8 inch drives
- all the great features of 1.6, including compatiblity with all other DOS', plus many enhancements

ZEUS EDITOR/ASSEMBLER

- supports undocumented Z80 op codes and standard pseudo-ops
- really FAST assembly
- intelligent error display - shows line number and file containing error, even when you don't print to screen
- easy line editor won't let you enter incorrect syntax
- remembers file name of source and object code; eliminates accidental overwrite
- dynamic renumber; no more "no room between lines"
- calculator mode gives answers in decimal, hex, and binary
- GET command gets files from disk with lightening speed; handles big files so fast you'll think they're small
- doesn't hog memory - lots of room for source code
- easy block move & duplication
- "pages" the screen backward & forward for easy editing
- reads and writes files in ASCII, EDTASM, and Zeus compressed format
- Model 4 version supports 80x24 lines

ZEUS for Model I, III, 4, or MAX-80 ..... **$79.95**

LAZY WRITER WORD PROCESSOR

"I would give Lazy Writer my highest recommendation..."
Stew Schneider in On-Line Today

- works with any printer
- easy to learn - used in many schools
- fast, easy-to-remember editing commands
- Mod 4 version has 80 character screen
- powerful features for advanced users
- good support - free user newsletter

Lazy Writer

LAZY WRITER FOR MODEL I, III, OR 4 ..... **$124.95**

AlphaBit Communications, Inc.

☎call (313) 581-2896

13349 Michigan Ave.
Dearborn, Michigan 48126

Circle 248 on Reader Service card.

WE HAVE THE ANSWER!

TRS-80 Model 16/6000 Accounting Software

Business Answers For Serious Business
The Programmer & Associates
Your Computer Professionals

Xenix Multi-User Software

- Accounts Receivable
- General Ledger
- Inventory/Invoicing
- Accounts Payable
- Payroll
- Job Costing
  $595
- Purchase Orders
- Order Entry
  $395
- Mail List
  $195
- Manufacturing Inventory
  $995

(Modifications are available)

The Programmer & Associates, Inc.

CALL US!

10802 Forest Lane Suite 110
Dallas Texas 75243
1-214-341-9874

Circle 384 on Reader Service card.

ATTENTION
MODEL 4
OWNERS
(soon also available in MS-DOS!)

When You Bought Your Computer, Did You Want It To:

KEEP records of a stock/option portfolio with automatic calculation and documentation of profit/loss and tax consequences, as well as profit projections and analysis?

PREPARE a printed report of your whole year's income tax totals in up to 16 categories in TWO currencies in less than six minutes?

REMIND you of all appointments for the year, including automatic memory of quarterly or annual events, such as anniversaries, dividend dates, etc.?

PROVIDE a telephone directory which includes a personal "yellow pages" and automatic mailing list?

MAINTAIN a detailed inventory of household or other goods for insurance or other purposes?

OFFER you financial projection programs such as compound interest and mortgage amortization schedules?

BUT WERE YOU DISAPPOINTED WHEN...

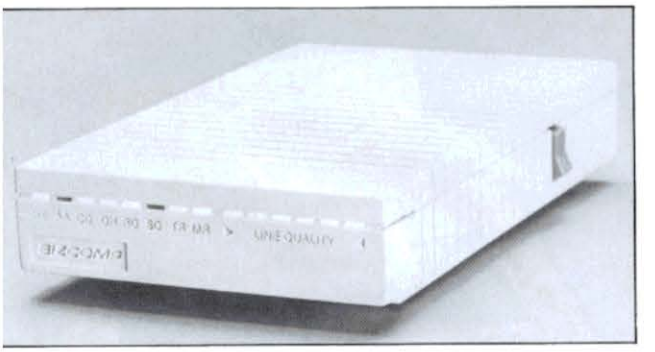
No single piece of software would do all that?
You had to make multiple entries of the same data?
You found out that data files of different programs were incompatible?
Practical Software's **Money Organizer Plus**, developed by people who share your needs, solves all these problems and more!

For a free 8 page Comprehensive Brochure:

PRACTICAL SOFTWARE

186 Murray Drive
Aurora, Ontario
Canada L4G 2C5

or call
416-727-4747



The Intellimodem EXT lets you talk and transmit without redialing.

alyzing investments over time.

Get Rich includes an instruction manual and a reference book on financial planning for $49.95.

Circle 566 on Reader Service card.

Think Modem

Bizcomp Corp. (532 Mercury Drive, Sunnyvale, CA 94086, 408-733-7800) has introduced the Intellimodem EXT 300-/1,200-baud modem.

The unit is Hayes-compatible and features an LED bar graph display of line condition. Intellimodem senses a busy signal, dial tone, remote ringing, and voice. The EXT's Voice Insert capability lets you switch between voice and data transmission without redialing. Cost is $499.

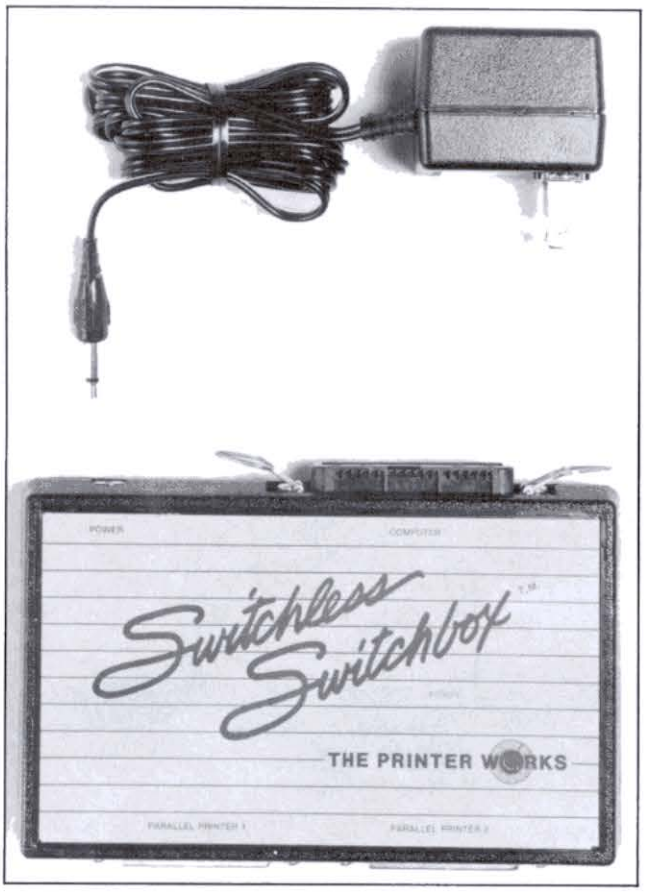
Circle 563 on Reader Service card.

Oaken Accommodations

The Dayton Classic oak computer work station ($449) provides computer storage space and a large desktop work area. The table top is 1-inch of solid oak measuring 48 by 30 inches.

The hutch (44 inches high by 12 inches deep) rests on the desk top and has compartments for a monitor, disks, and peripherals. Other features include a locking storage cabinet

The Dayton Classic work station has shelf space for your computer and peripherals.



A switchless switchbox for tandem printing.

and angled foot rest. The pieces are also available separately.

For more information, contact Dayton Continental Corp., P.O. Box 1318, S. Bend, IN 46624.

Circle 565 on Reader Service card.

Switch Printing

The Model PS3625 Switchless Switchbox ($119.95) lets you trasmit data simultaneously to two printers. The unit attaches through the parallel port and automatically directs data to an activated printer.

Switchbox switches automatically, so you can tuck the unit out of sight behind your computer. An ac adapter plug is included.

For more information, contact The Printer Works, 1961 Alpine Way, Hayward, CA 94545, 415-887-6116.

Circle 567 on Reader Service card.

Granting Asylum

Asylum ($39.95) is a three-dimensional high-resolution graphics adventure game for the Models 1000 and 1200. Graphics are animated so you can roam the halls of Asylum to view events.

Asylum, short for Adventure Syndrome Leading to Ultimate Madness, pits you against guards, other inmates, puzzling objects, and gurus as you seek to prove your sanity. The program understands full sentences and is available from Screenplay Intelligent Statements Inc. (1095 Airport Road, Minden, NV 89243, 800-334-5470).

Circle 571 on Reader Service card.

Learning About Money

Money ($39.95) is a Model I/III/4 program that drills children in monetary skills. Students choose from four lessons on pennies, nickels, dimes, quarters, half-dollars, and dollars.

The program randomly generates problems and gives positive reinforcement for correct answers. It displays correct answers after three tries. Once students score a certain per-

Circle 282 on Reader Service card.

TRS-80®
☑ CHECK OUR PRICES

ALWAYS AT SALE PRICES
WITH MANUFACTURERS WARRANTY (IN USA).

MODEL 4

MODEL 2000

CALL TOLL FREE
To get YOUR SALE PRICE-DIAL
1-800-433-SALE
(9am - 5pm C.S.T.)

COMPUTER DFW CENTER
WE SHIP FAST!
DFW COMPUTER CENTER
326 MAIN ST., GRAPEVINE
TEXAS 76051 (817)481-7283
VISA AMERICAN EXPRESS MasterCard
® REGD TANDY CORPORATION

IBM® COMPATIBLE
MODEL 4-P

NEW
MODEL 1200

Circle 331 on Reader Service card.

LOG SUPERLOG and SUPERLOG 4

KSoft's Electronic Notebooks. Free-format information management for the 90% of your information needs that won't fit into a data-base or spreadsheet. 1024 characters per page. Lightning fast search and retrieval. Interrupt activated and accessible while another program is running.

A LOG or SUPERLOG Electronic Notebook is designed to replace your diary, address book, memo pad, card file, calendar, and scratch pad — so conveniently you will use it all day long. Call today for more information or immediate shipment.

SUPERLOG 4	for Models 4 and 4P	TRSDOS 6	$119.95
SUPERLOG 3	for I, III, 4 and 4P	LDOS 5.1	$119.95
LOG	for Model I	TRSDOS 2.3	$ 49.95
LOG	for Model III	TRSDOS 1.3	$ 49.95

KSoft Inc.
318 Lakeside Drive
Brandon, MS 39042

[601] 992-2239 CIS 70075,137
MasterCard or Visa accepted
Add $5.00 for shipping and handling
Dealer inquiries welcome

(TRSDOS is a trademark of Tandy Corporation)
(LDOS is a trademark of Logical Systems Inc.)

Circle 213 on Reader Service card.

INCREASE KEYBOARD SPEED!

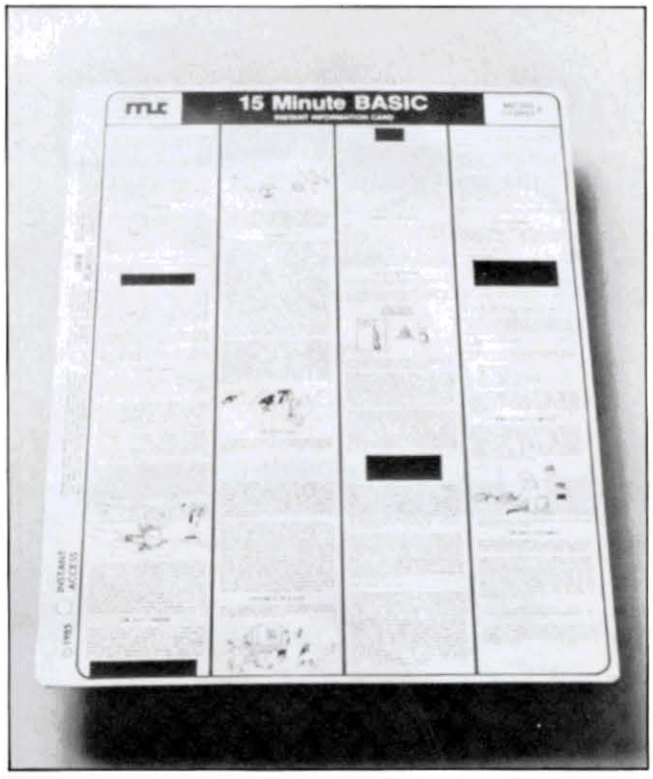
Tandy gave HyperTyper® a ★ ★ ★ ★ rating for both TRS-80 and Tandy 2000

for only **$29.95**

- ★ **HyperTyper®** is a complete software program designed to help you make the most of your computer.
- ★ **HyperTyper®** is under your control—you go at your own speed; not at the program's demand.
- ★ **HyperTyper®** uses real words, sentences and paragraphs, not nonsense syllables.
- ★ Although the text is light-hearted and fun, **HyperTyper®** is not a game, but a serious, powerful teaching tool.
- ★ This is a flexible, easy-to-learn and easy-to-use program that can aid everyone from novices to advanced typists.

STANDARD SOFTWARE
15930 S.W. Colony Place
Portland, Oregon 97224
To order by Visa/Mastercard call
1-800-547-3000 ask for Dept. 810
In Oregon and outside USA call
1-503-684-3000 (Dept 810)
TRS-80 & Tandy 2000 registered trademarks of Tandy

NEW PRODUCTS



Learn Basic with a flash of this card.

centage correct, they can play an arcade game.

The program also includes a student management system that tracks scores of up to 200 students. Money is available with a back-up disk for $54.95.

For more information, contact Gamco Industries Inc., Box 1911, Big Spring, TX 79721.

Circle 569 on Reader Service card.

Get It PFS:Right

The Complete PFS:Book, from Wordware Publishing Inc. (1104 Summit Ave., Plano, TX 75074, 214-423-0090) is an illustrated instruction book on using and integrating PFS:File, Report, Graph, Write, Proof, and Access.

Commands appear alphabetically, and subjects are arranged in short modules for easy comprehension. The book includes practical examples and illustrations, and is $19.95 in softcover.

Circle 573 on Reader Service card.

Basic Basics

Micro Logic Corp.'s Micro Chart #12, 15-Minute Basic, is a quick way to write Basic programs. Designed for new programmers, the two-sided, colored plastic card uses simple language and illustrations to get you programming.

The card covers statements, variables, formulas, strings, arrays, functions, and includes program examples. Micro Chart #4, Algorithms, is available for more advanced Basic programmers.

Charts are $5.95 each plus $1 postage from Micro Logic Corp., Dept. P, P.O. Box 174, Hackensack, NJ 07602, 201-342-6518.

Circle 568 on Reader Service card.

Remote Possibilities

Analytical Comparisons Among Means: The First Degree (ANCOM/TFD, $99.95) performs commonly overlooked statistical tests on the Models I, II, III, 4, 12, 16, 1000, 1200, and 2000.

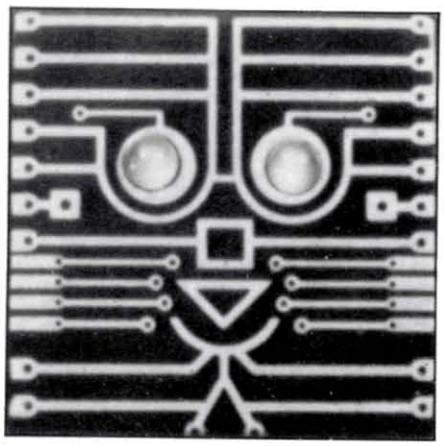
Tests include planned and post-hoc contrasts, trend analyses, simple effects analyses, and several multiple comparison tests. The package also performs analyses of variance on complete and incomplete factorial designs.

Contact Scilab Inc., Box 614, Buiderland, NY 12084, 518-355-3363 for more information.

Circle 575 on Reader Service card.

NEW PRODUCTS

DIFFERENT TRACK



Finally, a computer that won't byte.

The Computer Friend

Building a friendship with a computer is easy with Winkie, a $4.99 computer chip with a gold circuitry face and LED eyes that blink. You can wear Winkie as a pin or earring. Ask him a question and his red and green eyes flash.

By touching different parts of the chip, you can make Winkie flash green or red. Winkie is 1 inch square and comes with a user's guide that includes a biography and instructions for basic chip care.

For more information, contact Xtronix Corp. at 540 Howard St., San Francisco, CA 94105, 415-777-1419.

Circle 560 on Reader Service card.

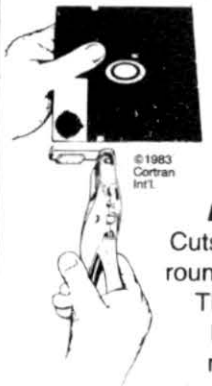
New Products Index

Reader Service Number	Company	Page
554	American Business Lists Inc.	118
564	APCA Systems	118
566	Arrays Inc./Continental Software	121
559	Avalon Hill Game Co.	118
563	Bizcomp Corp.	122
557	Cryptonics Inc.	120
565	Dayton Continental Corp.	122
556	DHA Systems and Software	120
569	Gamco Industries Inc.	123
555	Hard Drive Specialist	120
568	Micro Logic Corp.	124
552	NEC Information Systems Inc.	118
553	Powersoft Products	118
551	Practical Software	118
567	The Printer Works	123
575	Scilab Inc.	124
571	Screenplay Intelligent Statements Inc.	123
561	Star Micronics Inc.	121
558	Ultimate Software	118
573	WordWare Publishing Inc.	124
560	Xtronix Corp.	125

New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.

Circle 281 on Reader Service card.

DOUBLES DISKETTE CAPACITY!
CUTS YOUR DISK COST 50%!



Now! The back of 5¼" Diskettes can be used for data storage even with single head disk drives.

- *NIBBLE NOTCH®* Tools make it easy.
- Adds the Precise notch where it's needed.
- Doubles Diskette Space or Money Back!

NIBBLE NOTCH II

Cuts square notch and ¼" inch round "index hole." For use with TRS 80 I and III, Osborne, Kaypro, IBM and others needing an "index hole."

only **$21.90**
add $2.00 each order P&H
($5.00 foreign P&H)
Florida residents add 5% Sales Tax

SATISFACTION GUARANTEED OR YOUR MONEY BACK!

ORDER TODAY!
Toll Free 1-800-642-2536
Florida 305-493-8355
or send Check or Money Order to:

VISA MasterCard

NIBBLE NOTCH® COMPUTER PRODUCTS
4211 NW 75th TERRACE • DEPT. 2 0 • LAUDERHILL, FL 33319

Circle 210 on Reader Service card.

SOFTWARE ACCESSORIES CHECKLIST

☑ **STOR-A-BIT**
Active storage for disks & cassettes, pens & pencils. Attaches easily to your computer or typewriter with enclosed velcro kit. **$4.95**

☑ **DISKFILE**
Stores up to **50** disks vertically. Dust free protection with index dividers.
Special **$16.95** **Save $3.**

☑ **SPECIAL OFFER:**
STORAGE PAK OFFER
Includes: 1 Diskfile
1 Stor-A-Bit
10 SS/DD Polar Diskettes
Just **$29.95** per pak–
Save $9.90
(add $2.50 for DS/DD)

☑ **POLAR DISKETTES**

		Regular Price Box of 10	SPECIAL PRICE BOX OF 10	10-99 BOXES OF 10 (PER BOX OF 10)	100 & UP BOXES OF 10 (PER BOX OF 10)
5¼"	SS/DD	$17.95	$13.25	$12.50	$11.25
	DS/DD	22.95	15.95	14.95	13.50

Manufacturer's Lifetime Warranty
100% certified soft sectored with reinforced hubs

LAMBDA
Box 756, Dover NH 03820
Toll Free **1-800-258-7148** in NH 742-7717
Credit Cards/Check/Money Order
add $3.00 shipping per order
MONEY BACK GUARANTEE

VISA MasterCard

For Canadian Pricing & Orders, Call
TRINETICS LTD
1-800-267-4292

$777

5 MEG HARD DRIVE

NEW!

Comes complete with cable and choice of software driver* (CPM, LDOS, TRSDOS)

10 Megabyte Hard Drive	$899
15 Megabyte Hard Drive	1095
30 Megabyte Hard Drive	1495

SYSTEM FEATURES

- For TRS-80 Model 3-4-4P
- One Year Parts & Labor Warranty
- Size Rated After Format
- Continuous Duty Power Supply
- Error Checking & Correcting
- Continuous Duty Fan
- Size 11.5" x 12.5" x 5.0"
- All Contacts Gold Plated

*Model 3 requires LDOS
Model 4 requires TRSDOS 6.2 or Montezuma Micro CP/M 2.2

There are firms which offer benefits, experience or products seemingly too good to be true. Now why would you want to expose yourself to unhappiness when Aerocomp has a proven record of thousands of happy, satisfied TRS-80 customers. Just take a minute to look through back issues of this magazine. You won't find many companies that have been around as long as Aerocomp. We fully support TRS-80 computers and most all operating systems including CP/M 2.2. Aerocomp leads the way to low hard disk prices so you can afford to enjoy the benefits of increased storage and faster disk I/O. These units are precision engineered, tested and delivered complete and ready to use, right from our stock. Each unit is guaranteed for one year parts and labor. You can count on us to be here if you should ever need us. As always, your satisfaction is assured with our 14 day free trial offer. If, for some reason, you are dissatified with our drive merely return it for a full refund (less shipping). How can you go wrong? Specify the software driver of your choice and start enjoying your computer's real capability. Do it today! Call our toll-free number now!

See opposite page ▶▶▶▶▶▶

MODEL I DOUBLE DENSITY BOARD

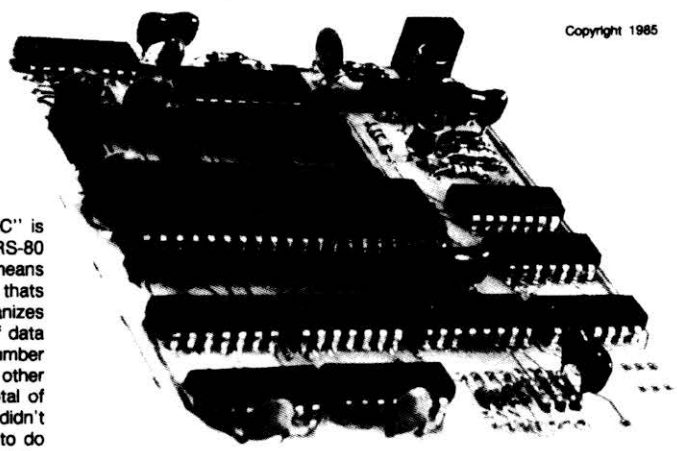
Add 80% more capacity to your disk system with the Double Density Controller (DDC) from Aerocomp.

The Story

Some products have what it takes to seem to last forever. Our "DDC" is one of those products. What it does is allow you to operate your TRS-80 Model 1 disk system in double density. In this case double density means almost doubling the storage capacity of your diskettes. Single density, thats the way Radio Shack designed your Model I expansion interface, organizes your disk into 10 sectors per track. Each sector contains 256 bytes of data for a total storage capacity of 2,560 bytes or 2.5K per track times the number of tracks your drive is capable of adressing. Double density, on the other hand, writes 18 sectors per track each containing 256 bytes for a total of 4,608 bytes or 4.5K. That is 80% more data in the same space. Why didn't Radio Shack do that in the beginning, you ask? Well it costs money to do double density because it is more difficult to do than single density and the data is harder to capture reliably. That means more cost and the Model I was meant to be a low-cost computer for the masses. Therefore, no double density for the original Model I.

The Facts

Other companies introduced double density controllers for the Model I but they were not so good. We waited and waited but, even new models failed to correct problems with data separation that kept cropping up. So we went to work and came up with a new design to cure the old problem. At last! A double density controller for the Model I with a higher probability of data recovery than with any other double density controller on the market then or since. Our analog design phase lock loop data separator has a wider capture window than the digital types the others use. This allows high resolution data centering. Our "DDC" analog circuit allows infinately variable tuning. The attack and settling times are optimum for 5.25" diskettes. The oft-stated fears of adjustment problems rumored by digital dilettantes have been proved groundless by thousands of satisfied users the world over. The bottom line here is state-of-the-art performance and reliability.



Copyright 1985

ORDER YOURS TODAY

TRS-80 Model I disk system owners who are ready for reliable double density operation will get 80% more storage per diskette; single and double density data separation with far fewer disk I/O errors; single density compatibility; simple plug-in operation. You will need a disk operating system that has the necessary double density software. All the popular DOS's (except TRSDOS) have the drivers. We have put together two special packages in the event you don't already have one of the more popular DOS's.

Please add $4 handling & shipping

"DDC" by itself	$ 99
"DDC" and LDOS	159
"DDC" and NEWDOS 80 2.0	179

☞ 40 Track
☞ 80 Track
☞ Single Head
☞ Dual Head
☞ Bare
☞ Complete
☞ Full Size
☞ Half Size

DISK DRIVES

Aerocomp leads the way to the BEST value in disk drives and related peripheral products on the market today. Sound engineering, high performance, quality construction, no-risk free trial, outstanding warranty service and a reputation for doing the right thing make your decision to buy Aerocomp the correct one. Please look over our offerings and make your selection. When you have made your choice call our toll-free number and place your order. If you need assistance in making your selection, please call our information number. It's listed in the box at the bottom of this ad along with the technical assistance number for those of you who want to get right to the nitty-gritty. Thanks, we all appreciate your business and will continue to do our very best to support you.

BARE DRIVES Add $4 S&H

These drives are completely burned-in and tested for your ultimate satisfaction. Add that extra drive today! These are new factory drives. No blems, seconds or closeouts. Instruction manual included at no extra cost. Service manuals are available. See "Miscellaneous Goodies" for info.

40tk SS full size Tandon TM100-1 .....$ 129
40tk DS full size Tandon TM100-2 169
40tk SS half high TEAC FD55-A.....129
40tk DS half high TEAC FD55-B.....169
80tk DS full size Tandon TM101-4 289
80tk DS half high TEAC FD55-F.....239
8" SS Thinline Tandon TM848-1E.....260
8" DS Thinline Tandon TM848-2E.....335

8" FLOPPY DRIVES Add $12 S&H

These 8" Thinline drives work with the Model 2 and 16 plus others that use standard drives. The rugged all-steel cabinet has an extra heavy duty power supply rated for continuous operation. A removeable air filter allows only clean air to circulate. Cabinets with single drives are supplied with a blank panel to cover the unused space. A second drive can be added at any time. Service manuals are available. See "Miscellaneous Goodies" for info.

1-8" SS Tandon TM848-1E & case.....$ 389
2-8" SS Tandon TM848-1E's & case.....649
1-8" DS Tandon TM848-1E & case.....439
2-8" DS Tandon TM848-2E's & case.....699

MISCELLANEOUS GOODIES $2 S&H

Model 1 TRSDOS 2.3 disk & manual.....$ 25
Model 3 TRSDOS 1.3 disk & manual.....25
Model 4 TRSDOS 6.2.x disk & manual.....20
LDOS (specify Model I or III).....69
NEWDOS 80 v2.0 (specify Model I or III).....99
Montezuma Micro Model 4 CP/M 2.2.....169
Tandon TM100-1/2 Service Manual.....20
Tandon TM848-1/2 Service Manual.....20
TEAC FD55A/B/F Service Manual.....20
10 SSDD disks in library box, Lifetime Guar .16
10 DSDD disks in likrary box, Lifetime Guar .19
5.25" drive power supply & enclosure.....59
8" drive pwr sply & encl w/fan 5V-24V.....150
5.25" 1-drive cable, a nice length.....19
5.25" 2-drive cable, a 44 incher.....24
5.25" 3-drive cable, just the right size.....29
5.25" 4-drive cable, the top dog.....34
5.25" Extender cable with gold contacts.....10

COMPLETE DRIVES Add $6 S&H

Fits TRS-80 Models 1,3,4 and the Color Computer plus the others that use standard drives. The drive of your choice is mounted in a sturdy, all-steel cabinet. An external gold plated drive connector allows cabling without disassembly of the cabinet. Half-high drives come in a full-size cabinet that will hold and power our half-high drives. Single drives have a panel covering the unused space allowing a second drive to be added at any time. All are shipped fully assembled ready to use. Specify silver or white enclosure.

40tk Single Side full size (TM100-1).....$ 169
40tk Double Side full size (TM100-2).....199
80tk DS full size (TM101-4).....299
1-40tk SS half-high FD-55A in dual case 169
2-40tk SS half-high FD-55A's in dual case...319
1-40tk DS half-high FD-55B in dual case 199
2-40tk DS half-high FD-55B's in dual case ..359
1-80tk DS half-high FD-55F in dual case.....219
2-80tk DS half-high FD-55F's in dual case...389

FREE TRIAL OFFER

Use your Aerocomp hardware product for up to 14 days. If you are not satisfied for **ANY REASON** (except misuse, damage or improper handling), return it (insured) in the original shipping container for a full purchase price refund, less shipping. **Sorry, this offer does not apply to software. Defective software will be replaced.** Any hardware/software specials will be prorated and the software will be charged at the regular unbundled price. We have confidence in our products and we know you will be satisfied.

WARRANTY

We offer a one year warranty on parts and labor against defects in materials and workmanship. In the event service becomes necessary for any reason you will find our service department fast, friendly and cooperative. We want to keep you happy. Out of warranty repairs are also available.

100% BURN-IN and TEST

All our products are burned-in and fully tested prior to shipment. We want you to receive an item ready-to-go. AEROCOMP means reliability!

ORDER NOW!

Call our toll-free number service and place your order. Have your American Express, Mastercharge or Visa number ready. We will not charge your card until the day we ship your order. You may order by mail using your credit card, check or money order. Personal and company checks are welcome and cause no shipping delay as long as they are bank printed and the signature exactly agrees with the name printed on the check. We will ship surface COD with no deposit but all COD's require cash or a cashier's check on delivery. Texas residents add 6% State Sales Tax. No tax collected on out of state shipments. Canadian addresses add $20 to your order if over $550 for customs documentation.

TRS-80 Model III & 4 DISK CONTROLLER and DRIVE KITS

Convert your cassette Model III or 4 to disk operation with one of our complete kits. You receive our own advanced disk controller board with gold plated edge contacts capable of 4-drive operation; our own power supply; plated steel mounting towers complete with RFI shield plus all the cables and hardware necessary. Detailed instructions are included. All you need is a screwdriver and a pair of pliers. System kits come with 40 track single-side drives or just order the basic kit and pick the drives you want from the selection in the next column.

CONTROLLER KIT.....$ 199
(Everything you need - less drives/DOS)
1 DRIVE SYSTEM.....319
2 DRIVE SYSTEM.....439
Add $8 S&H
MOUNTING KIT & POWER SUPPLY.....95
Add $8 S&H
CONTROLLER BRD. ONLY..110
RS-232 BOARD & KIT 69
Add $4 S&H

OUR FAMOUS MODEL I STARTER PACKAGE

If you have a Model I and an Expansion Interface this is what you need to get started with disks. Included is one 40 track single-side disk drive complete with matching silver case and power supply, a 2-drive cable, a TRSDOS 2.3 disk operating system and TRSDOS manual plus all insurance and delivery charges to your door (lower 48 states).

Yours for only **$ 199**

You can add our renown "DDC" double density controller to either the Radio Shack or the LNW Expansion Interface for 80% more storage capacity on your drive. Order it at the same time as our starter package above and we'll pay the shipping. Go ahead, you deserve increased density. See the opposite page for the latest technical details.

$ 99

CALL TOLL-FREE

800-527-3582 USA
800-442-1310 TEXAS

For inquiries or information or to check on or change an order call 214-339-8324

AEROCOMP
Redbird Airport, Bldg. 8
P.O. Box 24829
Dallas, TX 75224

Why Tandy Goes Undercovered

Send your questions dealing specifically with Tandy policies, products, or services, to Ask Tandy, 80 Micro, 80 Pine St., Peterborough, NH 03458. A representative at Tandy's Fort Worth, TX, headquarters supplies all responses published here.

Q: To read *80 Micro*, you'd think Radio Shack computer owners really exist. But the business press rarely mentions Tandy computers. Why?

A: *We suspect a couple of factors. First, Tandy doesn't participate in the "great war for shelf space," and several journalists have told me that's what makes news. Tandy sells its products through its own stores.*

Second, we've had "Radio Shack" on our computers, and that's the name of a retailer. We believe some publications felt that by talking about Radio Shack computers, they were giving a retail chain free publicity. The Tandy brand name should eliminate that problem.

At any rate, we're getting quite a lot of coverage lately in the trade press, compared to what we got a year or two ago. We think the situation's getting better.

Q: Why don't you produce a 64K dual-drive Model 4 in a Model 4P configuration, with the 4P's detached keyboard and the 4's 12-inch screen?

A: *The Model 4 doesn't have a detached keyboard for two reasons. First, Model I owners wanted us to "put it all in one box and get rid of all the cables." Second, schools are big Model 4 customers, and they prefer attached keyboards that can't wander off.*

A 12-inch screen would compromise the 4P's transportability. We just don't think a hybrid Model 4 would have wide enough appeal.

Q: The Tandy 1000 is a nice product, but it seems to be an extravagant PCjr. The jr is also PC-compatible, but it's less expensive than the 1000. Do the 1000's extra features merit a higher price? How compatible is the Tandy 1000 with the jr?

A: *The Tandy 1000 was designed to run PC software. At the same time, Tandy made every attempt to make it jr-compatible, too. I wouldn't call the 1000 an extravagant jr at all; I might say it's what the jr should have been. The jr's memory is limited to 512K; the 1000 expands to 640K. The 1000 uses PC-compatible expansion cards up to 10 inches long. The jr runs at half the speed of the PC and lacks a direct memory access chip (for faster processing), which the 1000 acquires with expansion to 256K.*

The bottom line is that the Tandy 1000 is a business machine, which, because of its low price, is also practical for home use. The price seems to cause people to compare the 1000 to a jr, but it's really a full PC-compatible unit.

Q: I own a Model 4, and I hate having the @ key function as a control key. When I try to type the letter "P," I'm always hitting both the @ and P keys, which puts me in print mode. Couldn't you put a stronger spring under the @ key to prevent accidentally invoking a command? Sounds like a simple and inexpensive hardware solution to me.

A: *You're right, the Model 4's keyboard probably doesn't have the world's best layout. We had to keep the @ key active as a control key to maintain software compatibility with the Model III in some cases. We inherited that problem from the Model I, in fact. I don't know whether we can install a stiffer spring, but I'll pass your suggestion on to the product manager.*

Q: It seems to me that bar codes would be an ideal way to distribute programs. Your Models 100 and 200 have bar code reading capability, and one magazine prints program listings in bar code. I just bought a Tandy 1000, and I'd like to be able to use bar codes. Will Tandy produce a bar code reader for the 1000?

A: *Program listings in current bar code formats take a tremendous amount of space. And the listings' print quality is critical; I've tried downloading with less than 100 percent success. But you're right; it's an interesting way to format listings. And if you have a graphics-capable printer, you could list your programs in bar code format and reload them with a wand. We're considering a bar code system for computers other than the 100/200, but we've reached no decision. Thanks for the input.*

Q: I have a Model III that I've intended to upgrade to a Model 4. Now that you've made lots of changes in the line and lowered the 4/4P's price, why haven't you lowered the conversion cost for me? It would cost me more than $1,540 with installation.

A: *Unfortunately, even though we have lowered the prices of upgrade kits, their combined cost is still more than that of a new Model 4. The $799 III/4 upgrade assumes you already have a disk-based Model III. It upgrades everything but your drive, cabinet, and monitor. There's a new power supply, for example. (However, we have to furnish another power supply with the cassette-to-disk kit.) It's these duplications that make the upgrade path you're considering very expensive. The kits have to cover the most requested upgrades. We just can't economically cover every possible combination.*

Q: I've experienced long delays when ordering products through my Computer Center. I read somewhere that when a salesperson orders an item from Fort Worth in the customer's name, Tandy fills the order quicker than when the order is in the store's name. Is this true?

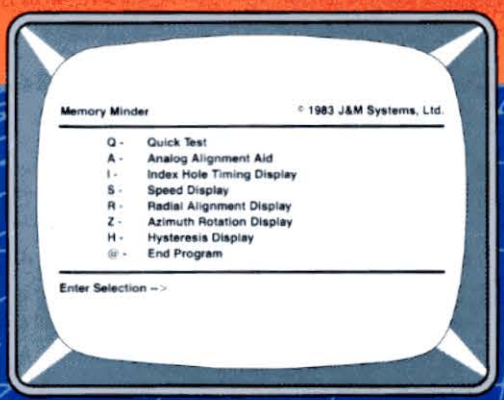
A: *I think you're confusing two classes of merchandise. Tandy lets stores stock only certain products. We ship stockable merchandise to stores at specific intervals. So, if you place an order just after one shipment goes out, you'll have to wait until we ship the next batch.*

On the other hand, if a store orders an unstockable item for a customer, we ship it within 24 hours of the order's reaching Fort Worth. That's the difference.■

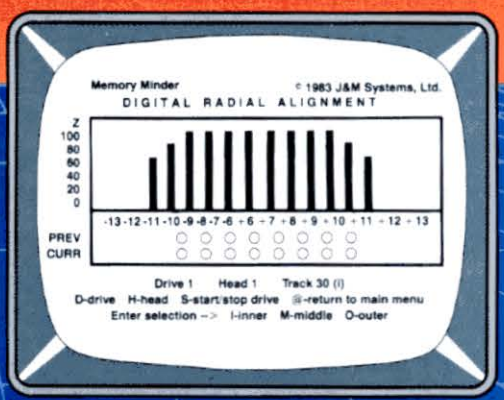
Circle 101 on Reader Service card.

MEMORY MINDER™

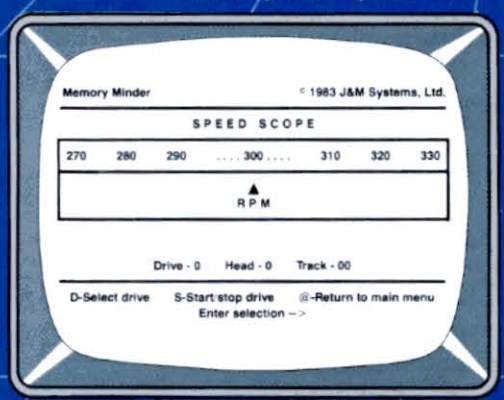
. . . A UNIQUE APPROACH TO DISK RELIABILITY!



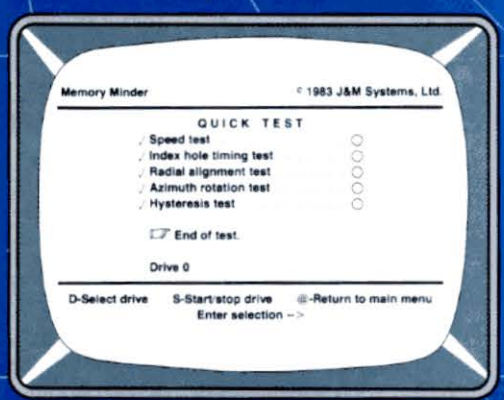
Select any one of seven tests to perform preventive maintenance or to isolate problems. Simple, single-letter commands make MM easy to use! Use MM to align the head, adjust the index hole detector, or adjust the speed.



Use the MM Radial Alignment Test to check the head alignment of your drives. No need for an oscilloscope or other expensive test equipment!



Check the motor speed of your drives. Or, you can even use the Speed Test to adjust the drive speed. No need for any test equipment!



Use the Quick Test to quickly and automatically test five of the most important performance parameters of your drive. Monitor your drives for long term drift. Isolate problems quickly and automatically!

PROTECT YOUR DATA.

Now you can make sure your data is being recorded properly by the use of the revolutionary ***Memory Minder.***

The Memory Minder from J & M Systems, tests your disk's performance and calibration without any additional equipment! It measures your disk's performance and displays it on your screen.

This is the most comprehensive disk diagnostic program available for your TRS-80 microcomputer. You can even adjust drive alignment while watching the display!

Spot problems ***before*** they endanger your data! If you own a disk drive, you ***need*** the ***Memory Minder!***

	Price #
TRS-80 Model III/4	
1 - 48 tpi Single Side (Standard)	$79
2 - 48 tpi Double Side	$89
3 - 96 tpi Double Side	$129
Includes 48 tpi & 96 tpi program diskettes	
TRS-80 Model -I	
1 - 48 tpi Single Side Single Density	$89
TRS-80 Color Computer and TDP-100	
1 - 48 tpi Single Side (Standard)	$79
2 - 48 tpi Double Side	$99

MM also available for other models

J & M SYSTEMS IS THE DRIVING FORCE!

J & M SYSTEMS, LTD.
15100-A CENTRAL SE
ALBUQUERQUE, NEW MEXICO 87123
505/292-4182

Circle 9 on Reader Service card.

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • KAYPRO™

FREE--TRS-80 Mod I,III & 4 programs supplied on DosPlus (minimum system). Complete DosPlus also available.

The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™ $99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™ $99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™ $99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™ $99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™ $149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every **VERSABUSINESS™** module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any **VERSABUSINESS™** module, you may return it within 30 days for a refund. Manuals for any **VERSABUSINESS™** module may be purchased for $25 each, credited toward a later purchase of that module.
All CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80)

To Order:
Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

* add $3 for shipping in UPS areas
* add $4 for C.O.D. or non-UPS areas
* add $5 to CANADA or MEXICO
* add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

TRS-80 trademark Tandy Corp. - APPLE trademark Apple Corp. - IBM PC trademark IBM Corp. - OSBORNE trademark Osborne Corp. - XEROX trademark Xerox Corp. - KAYPRO trademark Non-Linear Systems, Inc. - TELEVIDEO trademark Televideo Systems, Inc. - SANYO trademark Sanyo Corp. - NEC trademark NEC Corp. - DEC trademark Digital Equipment Corp. - ZENITH trademark Zenith Corp. TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc. - SUPERBRAIN trademark Intertec Corp. - CP/M trademark Digital Research - EPSTON trademark Epson Corp.