

RADIO SHACK'S "FINAL FIX" REVEALED

A CWC/I PUBLICATION  
FEBRUARY 1986  
USA \$2.95 CAN \$3.95

# HOT CoCo

THE MAGAZINE FOR TANDY COLOR COMPUTER® USERS.

## The Non-Tandy Printer

You Can Make It  
Work on Your CoCo

### ■ CARTOONS

*Easy Graphics Tips  
For the Novice*

### ■ STATISTICS

*Crunch Numbers with  
The Great CoCo Swami*

### ■ SPACE WARS

*Yet Another Chance  
To Save Mankind*



PLUS: Product Reviews, Hints and  
Tips, and Technical Advice

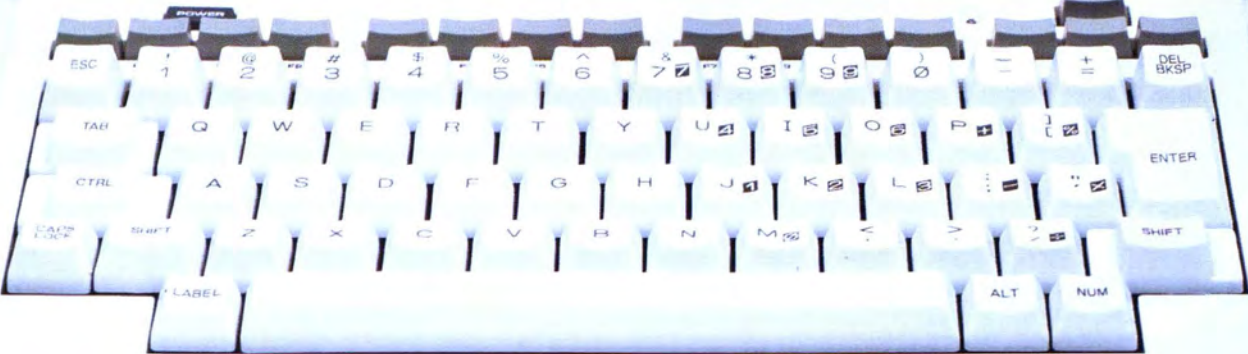


```
WORD  APPL  PLAY  UPDATE  WORK
CALCNDWR  CALENDAR
FILE  INVEN  SALES  WORK
DATA  INVEN  SALES  WORK
TELCOM
PLAN  COST  PROJECT  RETAIL  WORK
      SCRAP

Microsoft(R) Works V1.20, Copyright (1984, 1985) Microsoft Corp.
> Copy Delete List Name Options [F10] Set
Select option or type command letter
System Manager: WORD Bytes free: 5904 1/1/1985 5:29:52 AM
```

1 2 3 4 5 6 7 8 9 10

TANDY 600 PORTABLE COMPUTER





# The new disk-based Tandy 600.



## A breakthrough in portable computing power and versatility.

Finally—a portable that matches the performance of a desktop computer. Our new Tandy 600 features a 16-bit microprocessor, an 80-character by 16-line display, a built-in 3 1/2" disk drive that stores 360K of data and 32K RAM (expandable to 224K\*).

### Five Resident Applications

With the Tandy 600's larger display and expanded memory, Multiplan spreadsheet analysis can hold more information. Word processing is as easy as using MS-Word. You'll have quicker access to documents, and better storage with the built-in disk drive. File is an electronic data base for names and addresses, expenses, client billing, inventory and more. And you can keep a large number of different files on the pocket-size diskettes. With Telecom and

the Tandy 600's built-in modem, you're able to communicate with other computers over phone lines and access national information networks. Telecom will even dial the phone number of anyone listed in the File program. Calendar helps you keep track of daily tasks and activities.

The easy-to-learn resident System Manager lets you run each application, exchange information between applications and manage the files created. And you can add BASIC/ROM (26-3904, \$129.95) to write your own programs.

### Tandy . . . Clearly Superior™

If you've been looking at portable computers, compare them with the Tandy 600 (26-3901, \$1599). You'll be amazed at what it can do!

Available at over 1200  
Radio Shack Computer Centers and at  
participating Radio Shack stores and dealers.

**Radio Shack®**  
**COMPUTER CENTERS**

A DIVISION OF TANDY CORPORATION

### Send Me a Free Tandy 600 Brochure.

Radio Shack, Dept. 86-A-129  
300 One Tandy Center  
Fort Worth, TX 76102

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_



# J&M's New JFD-CP Disk Controller Speaks for Itself!

My 28-Pin EPROM socket accepts 64K device or NEW 128K JDOS 1.2.

RS DOS plugs right into this 24-pin EPROM socket. (RS DOS not included)

This new WD1773 controller chip has built-in data separator & precompensation circuits.

My gold contacts ensure high reliability.

Because they are fully buffered, my I/O lines are more dependable.

Select ROM A or ROM B with this external switch—no need to unplug controller!

You can use this 8-bit parallel port to support a Centronics compatible parallel printer or a Winchester hard drive.

JUMPERS: J1 IN—6ms head step rate; OUT—30 ms head step rate  
 J2 IN—serial printer; OUT—parallel printer  
 Jumper defaults apply only to JDOS.

## New JFD-CP DISK CONTROLLER \$149

Our new JFD-CP has redefined the state-of-the-art for Color Computer users. Gold contacts and fully buffered I/O lines ensure maximum reliability, and the JFD-CP is plug compatible with both the original COCO and the COCO-2.

## New JDOS 1.2

JDOS implements all RS DOS commands, plus many more, including:

- auto line numbering
- error trapping
- baud rate selection
- OS/9\* boot from floppy or hard drive
- Memory Minder†—the most advanced disk drive analysis system on the market (Dysan diagnostic diskette not included)

## DRIVE 0 SYSTEM \$289

Upgrade your Color Computer by adding our new JFD-CP disk controller, supercharged JDOS operating system, and a top quality drive with case and power supply: All for only \$289! Comes complete with cable and manual.

- Drive 0 System with one single side drive . . . . \$289
- Drive 0 System with one double side drive . . . \$359
- Drive 0,1 System with two single side drives . . \$429
- Drive 0,1 System with two double side drives . . \$499

## MEMORY MINDER†

Memory Minder is a disk drive test program now included in JDOS. Used with a Dysan digital diagnostic disk, Memory Minder allows you to check your drives for speed, alignment, sensitivity, hysteresis, and more! You can actually align the drives while viewing the graphics on the screen. No special equipment needed!

### DIAGNOSTIC DISKETTES

- 508-200: Tests single side disk drives . . . . . \$26
- 508-400: Tests double side disk drives . . . . . \$33

Memory Minder is available on diskette for those who don't own a JFD-CP Controller with JDOS. Includes Dysan diagnostic diskette.

- Single Side Memory Minder Package . . . . . \$79
- Double Side Memory Minder Package . . . . . \$99

\*OS/9 is a registered trademark of Microwave, Inc.  
 †Memory Minder is a registered trademark of J&M Systems, Inc.

To order, call (505) 292-4182, or send payment with order to:

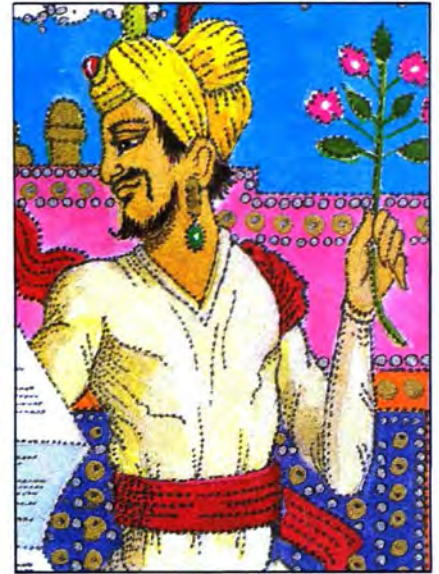


**J&M SYSTEMS, LTD.**

15100-A CENTRAL SE  
 ALBUQUERQUE, NEW MEXICO 87123  
 505/292-4182

We accept MasterCard and Visa





## ARTICLES

- 32 The Final Fix, Robert Gault**  
Overheating problems? Spurious characters on the screen? Try this remedy.
- 34 Galactic Wars, Lynn H. Davis**  
Rise through the ranks of the Federation while building an empire.
- 40 Making the Connection, Fred Blechman**  
Some printers look pretty odd to the CoCo. Here's how to make them get along.
- 46 Swami Says, Milton T. Simpson**  
Multiple-regression analysis was never so easy before.
- 55 Programs to Boot, Richard Wasserman**  
Load and execute machine-language programs in one operation.
- 56 Cartooning and Animation, Dick Myers**  
It takes only a few graphics programming tricks to master the video-screen palette.

## DEPARTMENTS

- 6 Instant CoCo Directory**
- 8 Letters to the Editor**
- 10 Doctor ASCII, Richard E. Esposito and Ralph E. Ramhoff**  
Answers to your technical questions.
- 16 Mindbusters, Richard Ramella**  
Jackpot Jerome.
- 20 The Computer Room, Scott L. Norman**  
Wrapping up odds and ends.
- 22 Reviews, edited by J. Scot Finnie**  
OS-9 Disk Fix, CBasic Compiler, Print Master, Alphabet Stew, and more.
- 72 6809 On Line, Bobby Ballard**  
Hackers or crackers?
- 74 Reader's Forum**
- 76 Product News, J. Scot Finnie**  
Tandy, Four Star Software, Computerware, and more.
- 80 The Corner Office, Jeff DeTray**

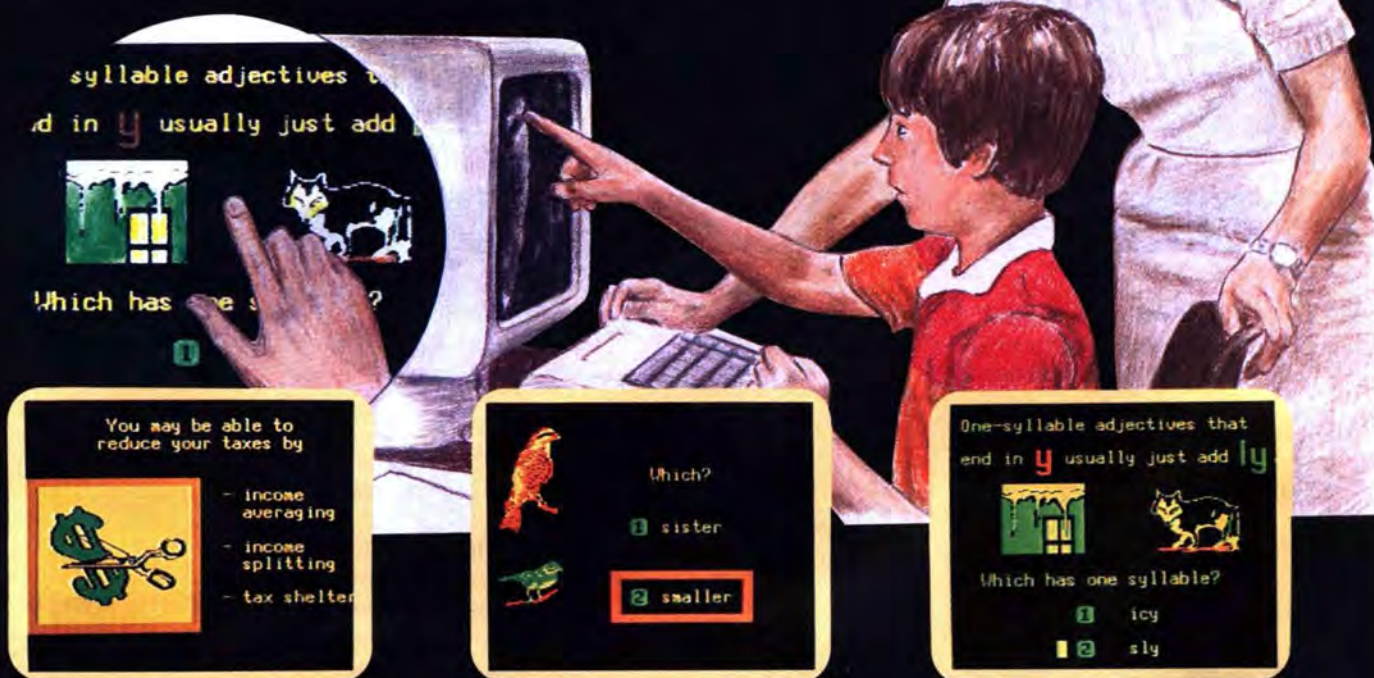


# Now! 500 new programs for the Tandy 1000! For Your TRS-80 Color Computer

Apple—Atari—Commodore—TRS 80 I, III, 4 & Color—IBM PCjr—Tandy 1000

## New Educational Programs for Grades K-12 and Adult Self-Studies

### 32 Programs Now Available on Disk for TRS Color Computers



## Interactive Tutorial Programs for Home or Classroom Use

Over 1000 programs for your selection with 32 now available on disk for the Color Computer and 500 now available for the Tandy 1000.

### "We're Your Educational Software Source"

Subject	No. of Programs
Reading Development	256 (4 on disk)
Reading Comprehension	48 (4 on disk)
Mathematics	128
Algebra	16 (16 on disk)
History	32 (4 on disk)
Spelling	16
Government	16
Physics	16 (4 on disk)

### 16 Programs in each of the following:

Children's Tales - Carpentry - Electronics  
Health Services - Office Skills - Statistics  
First Aid/Safety - Economics - Business  
Accounting - Psychology - MUCH MORE!

Apple II, TRS 80 I, III, & 4, and Commodore 64 computers require respective conversion kits (plug-in board and stereo cassette player), **\$99.00**. Atari 400/600/800/1200 computers require the Atari cassette recorder and the Dorsett 4001 Educational Master Cartridge, **\$9.95**. For the IBM PC Jr. a cassette adapter cable and a good cassette recorder are required. A Radio Shack CCR-81 or CCR-82 is recommended.

**CASSETTES: \$59.90** for an album containing a 16-program course (8 cassettes with 2 programs each); **\$8.80** for a 2-program cassette.

**DISKS: \$14.95** for a one-program disk; **\$28.95** for two disks; **\$48.95** for four disks. All disks come in a vinyl album.

### Dorsett Educational Software features:

- Interactive Learning
- User Friendly
- Multiple Choice and Typed
- Program Advance with Correct Response
- Full-time audio narration (Cassette Programs Only)
- Self-Paced Study
- High Resolution Graphics
- Easy Reading Text

For more information, or to order call:

**TOLL FREE 1-800-654-3871**  
**IN OKLAHOMA CALL (405) 288-2301**



**DORSETT**  
Educational Systems, Inc.  
Box 1226, Norman, OK 73070

Dealer Inquiries Welcome

Send for our free catalog of over 1000 Dorsett educational programs for Atari, TRS 80, Apple, IBM PCjr., Commodore, Tandy 1000, etc.



**Publisher**  
JEFF DETRAY

**Editor-in-Chief**  
MICHAEL E. NADEAU

**Managing Editor**  
MARK E. REYNOLDS

**Review/New Products Editor**  
J. SCOT FINNIE

**Copy Editor**  
MARILYN G. McMASTER

**Education Editor**  
NANCY KIPPERMAN

**Technical Editors**  
PETER PAPLASKAS,  
KEITH JOHNSON (INSTANT COCO)  
GUIER WRIGHT. (CONSULTING)

**Art Director**  
ANNE FLEMING

**Production Supervisor**  
LINDA DREW

**Advertising Director**  
PETER MONTROSS

**Advertising Coordinator**  
SUSAN E. WRIGHT

**Marketing Coordinator**  
DEBORAH McNALLY  
80 Pine Street  
Peterborough, NH 03458  
1-800-441-4403 or  
1-603-924-9471

**Advertising Representative**  
TAMARA DORIS

**Manufacturing Manager:**  
SUSAN GROSS

**Graphic Services Manager:**  
DENNIS CHRISTENSEN

**Film Preparation Supervisor:**  
ROBERT M. VILLENEUVE

**Typesetting Supervisor:**  
LINDA P. CANALE

**Typesetter:**  
DEBRA A. DAVIES

**President/CEO**  
JAMES S. POVEC

**Vice President/Finance**  
ROGER MURPHY

**Assistant General Manager**  
MATT SMITH

**Assistant to Vice President/Finance**  
DOMINIQUE SMITH

**Executive Creative Director**  
CHRISTINE DESTREMPES

**Director of Circulation**  
WILLIAM P. HOWARD

**Circulation Manager**  
FRANK S. SMITH

**Direct & Newsstand Sales Manager**  
RAINO WIREIN: 1-800-343-0728

**Director of Credit, Sales, and Collection**  
WILLIAM M. BOYER

**Founder**  
WAYNE GREEN

**Article submissions** from our readers are welcomed and encouraged. Inquiries should be addressed to: *HOT CoCo* Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include an SASE for a copy of our writer's guidelines. Payment for accepted articles is made at a rate of approximately \$50 per printed page; all rights are purchased. Authors of reviews should contact the *HOT CoCo* Review Editor, 80 Pine Street, Peterborough, NH 03458.

**Problems with Subscriptions:** Send a description of the problem and your current and/or most recent address to: *HOT CoCo*, Subscription Department, P.O. Box 975, Farmingdale, NY 11737.

**Change of Address:** Send old label or copy of old address and new address to: *HOT CoCo*, P.O. Box 975, Farmingdale, NY 11737. Please give eight weeks advance notice.

**Dealers:** Contact Raino Wirein, *HOT CoCo*, 80 Pine Street, Peterborough, NH 03458. (800)343-0728.

**Problems with Advertisers:** Send a description of the problem and your current address to: Magazine, Rt. 101 & Elm Street, Peterborough, NH 03458. ATTN: Rita B. Rivard, Customer Service Manager. If urgent, call 1-800-441-4403.



**CINSOFT**  
THE CENTRAL SOURCE FOR COCO SUPPORT

presents ...

*Holiday  
Gift  
Ideas*



**Fast Delivery...Friendly Service**

Coco Max II System	
includes ...	
<input checked="" type="checkbox"/> Deluxe Joystick and Y-cable !!	\$ 119.95
CocoMax II .....	\$ 79.95
with Y-cable .....	99.95
with Joystick .....	99.95

**LATEST VERSION!**

- Features ...
- 14 fonts
  - Shrink, Stretch Rotate
  - Multiple drives
- Upgrade available \$20

*Order today!*

**star**



**PRINTER SPECIAL!**

Star SG-10 ..... PRINTER  
Metric Industries Model 104 ..... INTERFACE  
Handsome brown vinyl ..... DUST COVER  
Spare replacement ..... RIBBON  
Starter pak of ..... PAPER



**319.00** COMPLETE  
SAVE 31.00

"Authorized Star Micronics Service Center"

**New! DELUXE JOYSTICK**

**EXCELLENT FOR COLOR COMPUTER USE IT FOR GRAPHICS, GAMES, ETC.**

CoCo owners will appreciate this high quality, durable joystick. Open gimbal design ... self-centering or free-floating operation. Mechanical trims on both axes ... eight foot cable ... firing button has lifetime 5,000,000 presses. A two-button version of the Deluxe Joystick is available for the Tandy 1000.



**\$27.50 each**  
**\$49.95/pair**

**CHOOSE FROM OUR LARGE SELECTION OF COCO PRODUCTS**

B5 ... Colorware ... Deft ... Derringer ... Diecom ...  
DynaCaic ... Elite ... HJL ... J & M ... Mark Data ...  
Metric Industries ... Michtron ... Microcom ... Microworks ...  
Tom Mix ... PBJ ... PXE ... Speech Systems ... Sugar ...  
TCE ... VIP ... Zebra ... and more!

**Yes! We have GREETING CARD DESIGNER!**

• Call •      • Shop by Modem •  
**513-396-SOFT**      **513-396-SHOP**



• Write •

**2235 Losantiville, Cincinnati, OH 45237**

SHIPPING will be charged at our ACTUAL COST  
Ohio residents add 5.5% Sales Tax    COD add 2.00

Instant CoCo is a cassette tape containing the major programs from this issue of *HOT CoCo*. Its purpose is to save you the time and effort of typing long program listings into your Color Computer. You simply load the programs from the Instant CoCo tape using your cassette recorder. The instructions for operating each program are found in the corresponding *HOT CoCo* article. Both Basic and Assembly-language programs are included on the tape.

The Instant CoCo symbol appears in *HOT CoCo*'s table of contents and on the program listing for each article with a listing used on the Instant CoCo tape. As an added extra, each tape also contains a never-before-published Bonus Program, complete with instructions.

The directory below lists all programs included on this month's Instant CoCo cassette. Shown first are the name of the article with a descriptive blurb and its author, followed by the page number in this issue where the article appears. Next comes the file name of the program on cassette. Finally, there is a brief description of the Color Computer system needed to run the program.

This month's Instant CoCo cassette is available for just \$11.47, including postage and handling, from **Instant CoCo, 80 Pine St., Peterborough, NH 03458**. See our ad on p. 64 for more details.

## Instant CoCo Directory February 1986

Side A			
Article Name/Author/Description	Page #	File Name	System
Copyright Statement	---	TITLE	16K CB
Doctor ASCII/Jackson Transfer files CoCo to CoCo via modem.	10	BIT232	32K ECB
Mindbusters/Ramella Hit the jackpot. Jerome.	16	SLOTMACH	16K ECB
Galactic Wars/Davis Defend the Federation and build an empire.	34	G-WARS	32K ECB
Swami Says/Simpson Crunch numbers via multiple regression analysis.	46	SWAMILD SWAMISEZ	16K ECB 16K ECB
Side B			
Programs to Boot/Wasserman Simplify execution of machine-language programs.	55	BOOTLDR	16K DECB
Cartooning and Animation/Myers A few Basic programming tricks will improve your graphics skills.	56	MICKEY MOONSET PA-DUTCH TRAIN BUGSPRAY BADGRMLN LILGRMLN WALKER	16K ECB 16K ECB 16K ECB 16K ECB 16K ECB 16K ECB 16K ECB 16K ECB

### \*\*\*Bonus Programs\*\*\*

Missile Attack/Amelio Defend your cities.	---	ATTACK	16K ECB
Wizards/Dawson Battle opposing wizards with magic spells.	---	WIZTWO WIZONE	16K ECB 16K ECB

CB = Color Basic, DECB = Disk Extended Color Basic, ECB = Extended Color Basic,  
(m) = machine-language program (use CLOADM)

## Back Issues

Yes, back issues of *HOT CoCo* are available for all months. This list shows the features in each issue:

**October 1983**—Animation techniques; ROM disassembly, part I.

**November 1983**—Nuclear submarine simulation; ROM-pack primer; banner printer.

**December 1983**—World capitals quiz program; talking spelling tutor; vocabulary-building program.

**March 1984**—How a disk stores information; create your own wordsearch puzzles; dental/medical bill balancer.

**June 1984**—Horse-racing and stock-market simulators.

**July 1984**—Do-it-yourself lowercase mod; variable cross-referencer; the game, Python.

**August 1984**—Basic OS-9 review; database manager program; graphics tutorials; hurricane tracker.

**September 1984**—Educational software buyer's guide; typing-teacher program; the CoCo as a marketing aid.

**November 1984**—Personal money manager program; disk-file protection utility.

**December 1984**—Disk-drive timer; disk drive maintenance tips; full-featured text-editing program.

**January 1985**—Spreadsheet program; stock-charting program; make fancy graphics with your printer.

**February 1985**—Drawing program; user's group list; Space Hawks game.

**March 1985**—Universal screen-dump program; POKE list; utilities.

**April 1985**—Telewriter-64 mods; modem comparison; satellite-tracking program.

**May 1985**—Sound digitization; blackjack program; disk-based smart terminal programs compared.

**June 1985**—How to install 64K in any CoCo; pie-chart program; custom fonts for Gemini printers.

**August 1985**—Graphics utilities; auto-line-numbering program; how to connect the CoCo to a Model 100.

You'll also find in each issue our regular features, reviews of popular software and hardware, and dozens of useful programs that are yours for the typing in.

Each back issue costs \$3.50 plus \$1 shipping and handling. On orders of 10 or more back issues, there is a flat \$10 shipping and handling fee. Quantities are limited, and we cannot guarantee that all back issues are available. Send your orders to **HOT CoCo, Back Issue Orders, 80 Pine St., Peterborough, NH 03458**. ■



# NumberJack

The HJL Numeric Keypad  
for Color Computers



## Cuts number crunching down to size

Now you can enter and revise data twice as fast in spreadsheets, accounting and other number-intensive applications with the HJL numeric keypad, NumberJack.

### A sleek addition to your personal computer

NumberJack has a streamlined, low-profile ABS enclosure that measures just 5-1/2 x 7-1/2 x 2-1/4 max. The full-travel keyswitches have the same comfortable feel and reliability that have made the HJL-57 everyone's favorite CoCo keyboard.

### Much more than numbers

Besides the ten numeric keys, you get all four cursor keys, Clear, @, decimal point, Comma, Enter, and all four standard math keys.

### Autoshifted Add and Multiply

One keystroke is all it takes to enter the Add and Multiply keys

without shifting. Meanwhile the colon and semicolon are still instantly accessible from your main keyboard. What's more, NumberJack has its own shift key to provide convenient access to all the numeric shifted symbols.

### Quick and easy installation

The completely self-contained NumberJack keypad can be installed in five minutes or less. No soldering, no drilling, and no special tools are required. Comes with complete instructions, a 3-foot plug-in cable and all necessary connectors.

### HJL performance-- You can count on it

Bounce-Proof keyswitches are rated for 50 million cycles per key minimum and mounted on a solid aluminum baseplate. Contacts are covered by a protective membrane to guard against dirt, dust, and accidental spills. The NumberJack is built so well it carries a full,

one-year warranty and the exclusive HJL Products 15-day money back guarantee.

### Works with all color computers

Including Original, F-version, CoCo 2, TDP-100 and Dragon. Some CoCo 2 computers purchased after November, 1984 will require a special adapter (\$3.00); just let us know the model number and we will add it to your order if required.

### Order yours today Just \$89.95

Cut the tedium out of numeric data work. The NumberJack gives your CoCo the input capability of machines that cost hundreds of dollars more.

**Call Toll Free**  
**1-800-828-6968**

In New York 1-800-462-4891



**PRODUCTS**

Div. of Touchstone Technology Inc.  
955 Buffalo Road • P.O. Box 24954  
Rochester, New York 14624

Telephone: (716) 235-8358

Ordering Information: Specify model (Original, F-version, or CoCo 2 model #). Payment by C.O.D., check, MasterCard or Visa. Credit card customers include complete card number and expiration date. Add \$2.00 for shipping (\$3.50 for Canada). New York state residents add 7% sales tax. Dealer inquires invited.



# Letters To The Editor

## About My MC-10

About My MC-10 is a newsletter supporting Tandy's MC-10 Micro Color Computer. We now share knowledge with over 100 contacts in four countries. I'll send you a sample issue if you send the postage. A year's subscription is \$10, and \$5 gets you 42 pages of back issues and a 100-program software catalog.

You might also be interested in one of these two MC-10 user groups:

Larry Allen  
P.O. Box 103  
Owensville, IN 47665  
  
Jose Bray  
4730 Cass St.  
San Diego, CA 92109

Larry E. Haines  
East 2924 Liberty  
Spokane, WA 99207

## More MC-10

There's still much to say about the MC-10—like 44K, for instance. If you have a Poco CoCo and want to use it, drop me a line. Let's get a user's group started.

H. Francisco  
10226 North 29th St.  
Tampa, FL 33612

## Autonom Offering

I write my own software and often get great ideas from articles published in *HOT CoCo*. I recently typed in Jeff Mikel's Autonom ("The AUTO Difference," *HOT CoCo*, August 1985, p. 40) and found it to be an excellent

## "Finding Firewood Best Buys" Fix

A mistake slipped by me as my article, "Finding Firewood Best Buys" (*HOT CoCo*, November 1985, p. 48), went to press. The word "multiply" in the fifteenth line up from the breakhead, Program Structure, on page 48 should be changed to "divide."

Delbert Baker  
Albany, OR

## Clubhouse

### Penninsula Color Computer Club

The Peninsula Colour Computer Club meets the third Wednesday of each month at the Bruce Park Hall, Frankston, Victoria 3199, Australia. You can get details between meetings by visiting the Frankston Tandy store.

Gordon Chase  
Baxter, Victoria  
Australia

## The CoCo Exchange Club

The CoCo Exchange Club serves the Philadelphia area and is open to all CoCo owners. We offer a monthly newsletter and useful tips and programs. Send a self-addressed, stamped envelope for a free newsletter and more information.

Daniel Moore  
2745 Old Cedar Grove Road  
Broomall, PA 19008

## Dayton CoCo User's Group

The Dayton CoCo User's Group now has a new address. Please reach us at the following address.

Dayton CoCo User's Group  
Steve Lewis  
4230 Cordell Drive  
Dayton, OH 45439

## Fort Knox/Radcliff, KY

Our user's group serving the Fort Knox/Radcliff area meets on the first and third Thursdays of the month at 7:30 p.m. For more information, contact the local Radio Shack store.

Bruce Metcalf  
Fort Knox, KY

## Brownsburg Color Computer Club

The Brownsburg Color Computer Club meets at 6 p.m. on the first and third Saturday's of each month at the Brownsburg United Methodist Church on the corner of State Road 267 and Tilden St., one quarter of a mile south on Highway 136. Our business meeting is held on the first Saturday, and we reserve the third Sunday for demonstrations and learning.

Leroy Perry, President  
Danville, IN

## The Island CoCo Club

The Island CoCo Club serves Long Island, New York City, and the tri-state area. For more information, phone the Colorrrama BBS at 516-277-1285, or write to the Island CoCo News, P.O. Box 1729, Huntington Station, Long Island, NY 11746.

Patrick Dwyer  
Levittown, NY 11756

utility, except that you can initialize it more than once, and it will write over existing program lines. I offer the following changes to remedy the situation. They represent an additional 51 bytes.

George J.P. Dabbene  
Ottawa, Ontario

```
00331 LDA #57 >RTS< OPCODE
00332 STA START INITIALIZATION JUST ONCE !

01201 BDLINE FCC 'DUPLICATE LINE'
01202 FCB 13
01203 FCB 0

01290 LBSR BIN2DC CONVERT TO DECIMAL AND PRINT
01291 STD <$2B SAVE FOR DUPLICATE CHECK

01411 PSHS A,B,U,X,CC SAVE REGISTERS
01412 JSR $AD01 ?LINE NUMBER USED IN PROGRAM
01413 BCS OKLINE GO IF NOT
01414 BRA DLERR ELSE DUPLICATE LINE ERROR
01415 OKLINE PULS A,B,U,X,CC RESTORE REGISTERS

01741 DLERR PULS A,B,U,X,CC RESTORE REGISTERS
01742 BSR PRNTRC PRINT CARRIAGE RETURN
01743 LDX #BDLINE X=ADDRESS OF "DUPLICATE LINE"
MESSAGE
01744 PRNTDL LDA ,X+ GET A CHARACTER OF THE MESSAGE
01745 BEQ BRKKEY IF END OF MESSAGE, EXIT
01746 JSR 41602 ELSE PRINT THE CHARACTER
01747 BRA PRNTDL AND CONTINUE THE LOOP

01770 PRNTRC LDA #13

02250 END START
02260 *EDTASM+ CSAVEM IN ZBUG
02270 *PNUMBRING 7DC8 7FCD 7DC8
```



# Telewriter-64™

## the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

### THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

*...one of the best programs for the Color Computer I have seen...*

— Color Computer News, Jan. 1982

### TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

### 64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

### 64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command. The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

### RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

### FEATURES & SPECIFICATIONS:

**Printing and formatting:** Drives any printer (LPV7/7III, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

**File and I/O Features:** ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

**Editing features:** Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

*...truly a state of the art word processor...  
outstanding in every respect.*

— The RAINBOW, Jan. 1982

### PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs \$49.95 on cassette, \$59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

**Cognitec**  
704 N. Nob St.  
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Add \$2.00 for shipping & handling. CA residents add 6% state tax.

**Now available at  
Radio Shack stores  
via express order.**

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.



# Doctor ASCII

by Richard E. Esposito and Ralph E. Ramhoff

Having technical difficulties? Consult the Doctor for an answer. Due to the volume of mail Doctor ASCII receives, we cannot guarantee that your query will be published. Please send a self-addressed, stamped envelope with all letters to Doctor ASCII, c/o HOT CoCo, 80 Pine St., Peterborough, NH 03458.

**Q.** Is there any software that will allow the CoCo to function as a DEC VT100 terminal?—**Bernadine Esposito, Columbia, MD**

**A.** HSL Designs (Dept. CS, 1933 East Yale Drive, Tempe, AZ 85283) sells VT101/VT52 source code (Flex or OS-9; 8,000 lines for \$25) for their 6809E CRT terminal board. You could modify HSL's code for a CoCo running Word-Pak and an RS-232 ACIA module.

**Q.** How can I attach the newer CoCo keyboards with the transparent ribbon cable to my older grey CoCo?—**B. P. Samuel, Cincinnati, OH**

**A.** Contact Spectrum Projects (P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, 718-441-2807). Explain that you need an adapter to connect a new-type keyboard to an older machine. These adapters are a Tandy product distributed for keyboard upgrades when the CoCo 2 was introduced.

**Q.** I use a black-and-white TV set with my CoCo. Will I get sharper letters if I switch to a direct-video monitor? How can I extend to 80 or 64 columns for word processing? Will Telewriter-64 give me the screen format I want?—**Howard D. Clark, El Paso, TX**

**A.** If you have a late-model TV that is in good shape, a monitor alone will not significantly increase display quality. If you plan to use your CoCo for extensive word processing, get PBJ's Word-Pak and a monochrome monitor with a bandwidth of at least 18 MHz. You could then use Stylograph III or Dynastar with Flex or OS-9, or the Word-Pak version of Elite-Word with Disk Extended Color Basic, and have a true 80-column display. Telewriter-64 gives a legible 51-column display and a marginal 64-column display.

**Q.** I purchased OS-9 and Basic-09. I find the documentation confusing and frustrating. Are there any publications that give a beginner a better chance?—**Ronald Mattfeld, Manchester, MD**

**A.** Add these two books to your library: *The Official OS-9 Tour Guide* (Microware Systems Corp., 1866 NW 114th St., Des Moines, IA 50322, 515-520-2535; \$18.95) and *The Complete Rainbow Guide to OS-9* (Falsoft Inc., The Falsoft Building, 9529 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059, 502-228-4492; \$19.95). Dale Puckett wrote both books.

*Eds. note—For those of you who missed our update in last month's Letters to the Editor, Doctor ASCII incorrectly stated in his October 1985 column (HOT CoCo, p. 13) and again in his Best Bets For Christmas (HOT CoCo, December 1985, p. 42) piece that SpectroSystem's ADOS only works with RSDOS version 1.0. However, ADOS is compatible with any version of Disk Basic.*

**Q.** Is there a way to read the CoCo 2's serial I/O (input/output) port from either Basic or Assembly?—**Tom Bensy, Bakersfield, CA**

**A.** Yes. Program Listing 1, BIT232, is a Basic program that loads in a machine-language program to do just that. Since the CoCo uses software control of the RS-232 port, the timing is critical and Basic is just too slow for normal baud rates.

You can use BIT232 alone for chatting with a friend via modem, or you can use the LININ and LINOUT routines from a Basic program to input/output a line of up to 256 characters to or from the RS-232 port. The SETPAR routine lets you set parameters such as the baud rate, number of bits, and so on. A unique feature of SETPAR is its ability to change handshaking modes for the LINOUT routine. You can choose either a modem (CD line) or printer (busy check on the RS-232 IN line) handshake mode. Run the program for operating instructions.

```
10 ' BIT232.BAS V1.0
20 CLS:PRINT" BIT232 PROGRAM"
30 PRINT" BY
40 PRINT" J.W.JACKSON
50 PRINT" FOR
60 PRINT" HOT COCO
70 PRINT" <C> 1984
80 GOSUB430
90 CLS:PRINT" BIT232 INFORMATION
"
100 PRINT:PRINT" EXEC BB :
110 PRINT" MACHINE LANGUAGE CON
VERSANT MODE THAT WILL ENABLE YO
U TO CHAT WITH SOMEONE ELSE FROM
YOUR KEYBOARD VIA THE RS-232. Y
OU MAY EXIT THIS MODE BY PRESSIN
G <BREAK>.
120 PRINT" EXEC BB+3:
130 PRINT" SETPAR ROUTINE - DIS
PLAY/SET THE RS-232 PARAMETERS S
UCH AS BAUD RATE, PARITY,ETC.
140 GOSUB430:CLS
150 PRINT" EXEC BB+6:
160 PRINT" LININ ROUTINE - GETS
A LINE FROM THE RS-232 INPUT IN
TO RX$. YOU MUST HAVE DEFINED RX
$ IN YOUR BASIC PROGRAM. THE INP
UT IS TERMINATED BY A CARRIAGE R
ETURN OR 256 BYTES RECEIVED.
170 PRINT" EXEC BB+9:
180 PRINT" LINOUT ROUTINE - OUT
PUTS A LINE TO THE RS-232 OUTPUT
FROM TX$.
190 GOSUB430:CLS
200 PRINT" SAMPLE PROGRAM USING
BIT232
210 PRINT:PRINT" THE FOLLOWING P
ROGRAM IS AN EXAMPLE OF CALLING
BIT232'S ROUTINES FROM A BASIC P
ROGRAM.
220 PRINT" COCO SENDS DATA TO A
PRINTER/PLOTTER THAT HAS A BLOCK
```

PROTOCOL AS FOLLOWS:

```

230 PRINT" THE COMPUTER SENDS UP
TO 256 BYTES OF DATA, TERMINATE
D BY A CARRIAGE RETURN. IF THE P
RINTER/PLOTTER CAN RECEIVE MORE
DATA, IT SENDS A CARRIAGE RETURN
TO THE COMPUTER.
240 GOSUB430
250 CLEAR 7000,&H6FFF' &H2FFF IF
16K
260 BB=&H7000' &H3000 IF 16K
270 L=&H789E-&H7000' LENGTH
280 GOSUB450' LOAD BIT232 INTO M
EMORY
290 SP=BB+3' SET PARAMETERS
300 LI=BB+6' RS-232 LINE INPUT
310 LO=BB+9' RS-232 LINE OUTPUT
320 PF=BB+18' PRINTER FLAG, IF N
ON-ZERO THE LINE OUTPUT ROUTINE
WILL CHECK USE THE RS232 INPUT L
INE AS PRINTER BUSY
330 REM THE LINE INPUT(LI) AND L
INE OUTPUT(LO) ROUTINES USE TX$
AND RX$ *** DO NOT RENAME THESE
340 TX$=STRING$(255,0):RX$=TX$
350 CLS
360 EXEC SP' SET BAUD RATE,ETC
370 PRINT:LINEINPUT" DATA TO SEN
D ".TX$
380 IF TX$=""THEN 440
390 EXEC LO
400 TX$=CHR$(13):EXEC LO' SEND C
ARRIAGE RETURN
410 EXEC LI' GET PRINTER'S RESPO
NSE
420 GOTO370
430 PRINT:INPUT" PRESS A KEY ";P
K:RETURN
440 END
450 CLS:PRINT"LOADING BIT232 INT
O MEMORY "
460 FOR I= BB TO BB+L
470 READ X
480 IF I/16 = INT(I/16) THEN PRI
NT". ";
490 POKE I,X
500 NEXT I
510 PRINT:PRINT"DONE ":GOSUB430:
GOSUB520:RETURN
520 INPUT " SAVE PROGRAM <Y/N*>
";YN$:YN$=LEFT$(YN$,1)
530 IF YN$<>"Y"THEN RETURN
540 INPUT" TO TAPE OR DISK <T/D*>
";TD$:TD$=LEFT$(TD$,1)
550 LINEINPUT" FILENAME ? ";F$:
560 IF TD$="T"THEN580
570 IF INSTR(1,F$,"/") = 0 THEN
F$=F$+"/BIN"
580 PRINT" ABOUT TO SAVE ";F$" T
O";
590 IF TD$="T" THEN PRINT"TAPE"
ELSE PRINT"DISK"
600 INPUT" IS THAT CORRECT ";YN$:
YN$=LEFT$(YN$,1):IF YN$<>"Y" TH
EN 520
610 IF TD$="T" THEN CSAVEM F$,BB
,BB+L,BB ELSE SAVEM F$,BB,BB+L,B
B
620 GOSUB430:RETURN
630 DATA 32, 35, 1, 22, 2, 131,
22, 1
640 DATA 241, 22, 2, 53, 22, 1,
7, 22
650 DATA 1, 132, 0, 0, 22, 8, 1
, 0
660 DATA 0, 0, 0, 0, 176, 0, 88
, 0
670 DATA 44, 0, 22, 0, 5, 52, 1
19, 26
680 DATA 80, 127, 255, 64, 23,
2, 90, 48
690 DATA 141, 0, 99, 23, 0, 157
, 23, 0
700 DATA 193, 23, 0, 138, 23, 0
, 161, 38
710 DATA 14, 109, 140, 206, 38,
246, 134, 1
720 DATA 181, 255, 34, 39, 39,
32, 237, 173

```

```

730 DATA 159, 160, 0, 129, 3, 3
9, 60, 109
740 DATA 140, 184, 39, 9, 246,
255, 34, 196
750 DATA 1, 193, 0, 38, 247, 23
, 1, 46
760 DATA 109, 140, 172, 38, 4,
173, 159, 160
770 DATA 2, 22, 255, 200, 23, 0
, 159, 38
780 DATA 195, 129, 32, 42, 15,
129, 13, 39
790 DATA 11, 129, 10, 39, 7, 12
9, 8, 39
800 DATA 3, 22, 255, 176, 173,
159, 160, 2
810 DATA 22, 255, 169, 53, 119,
57, 13, 10
820 DATA 32, 60, 66, 82, 69, 65
, 75, 62
830 DATA 32, 75, 69, 89, 32, 69
, 78, 68
840 DATA 83, 32, 80, 82, 79, 71
, 82, 65
850 DATA 77, 13, 10, 32, 32, 32
, 32, 32
860 DATA 32, 80, 82, 69, 83, 83
, 32, 65
870 DATA 32, 75, 69, 89, 32, 4,
134, 13
880 DATA 173, 159, 160, 2, 134,
10, 173, 159
890 DATA 160, 2, 57, 166, 128,
129, 4, 38
900 DATA 1, 57, 173, 159, 160,
2, 32, 243
910 DATA 52, 22, 134, 255, 72,
142, 255, 0
920 DATA 167, 2, 230, 132, 196,
127, 193, 127
930 DATA 38, 5, 73, 37, 243, 26
, 4, 53
940 DATA 22, 57, 173, 159, 160,
0, 39, 250
950 DATA 57, 173, 159, 160, 2,
129, 57, 47
960 DATA 4, 26, 4, 32, 8, 129,
48, 45
970 DATA 248, 128, 48, 28, 251,
57, 52, 20
980 DATA 111, 141, 254, 254, 14
1, 109, 246, 255
990 DATA 34, 197, 1, 39, 17, 23
0, 141, 254
1000 DATA 241, 202, 4, 231, 141
, 254, 235, 109
1010 DATA 141, 254, 231, 53, 20
, 57, 230, 141
1020 DATA 254, 219, 79, 141, 76
, 119, 255, 34
1030 DATA 18, 70, 90, 38, 246,
230, 141, 254
1040 DATA 204, 193, 8, 39, 4, 7
0, 92, 32
1050 DATA 248, 109, 141, 254, 1
95, 39, 24, 141
1060 DATA 48, 23, 0, 132, 246,
255, 34, 229
1070 DATA 141, 254, 182, 38, 10
, 230, 141, 254
1080 DATA 177, 202, 2, 231, 141
, 254, 171, 141
1090 DATA 24, 246, 255, 34, 197
, 1, 38, 10
1100 DATA 230, 141, 254, 158, 2
02, 1, 231, 141
1110 DATA 254, 152, 109, 141, 2
54, 148, 53, 20
1120 DATA 57, 141, 0, 174, 141,
254, 132, 48
1130 DATA 28, 48, 31, 38, 252,
57, 52, 22
1140 DATA 23, 0, 53, 246, 112,
21, 127, 255
1150 DATA 32, 141, 230, 73, 183
, 255, 32, 70
1160 DATA 18, 18, 18, 141, 220,
90, 38, 244
1170 DATA 109, 141, 254, 100, 3

```

```

9, 9, 166, 141
1180 DATA 254, 95, 183, 255, 32
, 141, 202, 134
1190 DATA 2, 230, 141, 254, 81,
183, 255, 32
1200 DATA 141, 191, 90, 38, 248
, 53, 22, 57
1210 DATA 52, 2, 230, 141, 254,
66, 39, 31
1220 DATA 231, 141, 254, 61, 23
0, 141, 254, 53
1230 DATA 133, 1, 39, 4, 108, 1
41, 254, 49
1240 DATA 70, 90, 38, 244, 166,
141, 254, 41
1250 DATA 132, 1, 73, 167, 141,
254, 34, 53
1260 DATA 2, 57, 26, 80, 158, 2
7, 236, 132
1270 DATA 16, 163, 141, 0, 125,
39, 7, 48
1280 DATA 1, 156, 29, 47, 241,
57, 175, 141
1290 DATA 0, 116, 48, 4, 174, 1
32, 95, 134
1300 DATA 1, 181, 255, 34, 38,
251, 23, 254
1310 DATA 245, 129, 8, 38, 8, 9
3, 39, 239
1320 DATA 48, 31, 90, 32, 234,
167, 128, 92
1330 DATA 193, 255, 39, 6, 129,
13, 39, 2
1340 DATA 38, 221, 174, 141, 0,
72, 231, 2
1350 DATA 57, 26, 80, 158, 27,
236, 132, 16
1360 DATA 163, 141, 0, 56, 39,
7, 48, 1
1370 DATA 156, 29, 47, 241, 57,
175, 141, 0
1380 DATA 45, 230, 2, 39, 36, 2
31, 141, 0
1390 DATA 39, 48, 4, 174, 132,
95, 109, 141
1400 DATA 253, 168, 39, 9, 182,
255, 34, 132
1410 DATA 1, 129, 0, 38, 247, 1
66, 128, 23
1420 DATA 255, 28, 92, 225, 141
, 0, 9, 38
1430 DATA 229, 57, 82, 216, 84,
216, 0, 0
1440 DATA 0, 48, 141, 0, 188, 2
3, 254, 67
1450 DATA 23, 254, 103, 23, 254
, 48, 23, 3
1460 DATA 32, 57, 48, 141, 1, 6
3, 23, 254
1470 DATA 50, 23, 254, 86, 23,
254, 90, 39
1480 DATA 241, 129, 5, 46, 237,
74, 72, 48
1490 DATA 141, 253, 104, 174, 1
34, 175, 141, 253
1500 DATA 90, 57, 48, 141, 1, 1
60, 23, 254
1510 DATA 18, 23, 254, 54, 23,
254, 58, 39
1520 DATA 241, 129, 8, 46, 237,
129, 5, 45
1530 DATA 233, 129, 6, 39, 229,
167, 141, 253
1540 DATA 60, 23, 253, 234, 23,
253, 231, 57
1550 DATA 48, 141, 2, 82, 23, 2
53, 236, 23
1560 DATA 254, 16, 23, 254, 20,
167, 141, 253
1570 DATA 37, 23, 253, 210, 57,
48, 141, 1
1580 DATA 220, 23, 253, 215, 23
, 253, 251, 23
1590 DATA 253, 255, 129, 2, 46,
239, 167, 141
1600 DATA 253, 14, 23, 253, 185
, 57, 48, 141
1610 DATA 2, 67, 23, 253, 190,
23, 253, 226

```





**Happy New Year!**

—Tandy DR0 System—

#26-3129 — \$159.95 + S & H

**Quadrature Fan Module B**

Piezo Electric — .11 Watts

Fits IN Coco — No Surge

5 CFM — Low Noise — UL

**\$26.95 + 2.50 S & H**

6809 CPU Chip — \$ 17.95

RSDOS 1.1 Disk — \$ 22.95

Extended Basic 1.1 — \$ 24.95

Gold Rom "Y" Cable — \$ 22.95

**We Stock Amdek Amdisks!**

VIP Integrated Library @ - 10%

DynaCalc (RSDOS) @ - 10%

Data Pack II (The Best Term.) @ - 10%

Business Software @ - 10%

*E.D.C. carries the most complete line of software and hardware in the market.*



**\*232 RemotePlus\*** by David Oberin

✓ Requires RS232 Pak or PBJ 2SP

✓ Remote Terminal Program

✓ Parallel to Keyboard

✓ No Lost or Garbled Data

✓ Error Trapping ✓ Software Clock

✓ Disable Break Key ✓ Inkey\$ Support

✓ New Terminal Program

✓ Conversation Mode

✓ All Ext. & Disk Commands

✓ 20 Commands Added

✓ Perfect for BBS

✓ 4 Versions Incl: Ext., I.O.I.1 & JDOS

✓ Much More - Uses 4K

**\$24.95 + 2.50 S & H** (CA. reg + tax)

See Rainbow review September issue.



**COLOR & MICRO COMPUTERS**

Software • Hardware • Support

Educational • Small Business • Games

VOICE (213) 254-6809 10 A.M.-10 P.M.

BBS (213) 258-0640 24 HRS.

300 and 1200 Baud

Extended Hours + Call before coming.

**6130 YORK BOULEVARD**

**POST OFFICE BOX 42718**

**LOS ANGELES, CA. 90042**

**MAKE CHECKS PAYABLE TO E.D.C.**

162Ø DATA	173, 159, 16Ø, 2, 129	4, 83, 13
, 7Ø, 39, 5		2Ø7Ø DATA
163Ø DATA	129, 72, 38, 234, 79,	2, 32, 32
167, 141, 252		2Ø8Ø DATA
164Ø DATA	238, 23, 253, 154, 57	2, 7Ø, 73
, 48, 141, 2		2Ø9Ø DATA
165Ø DATA	7Ø, 23, 253, 159, 23,	3, 84, 83
253, 195, 23		21ØØ DATA
166Ø DATA	253, 199, 74, 43, 24Ø	13, 1Ø, 32, 32, 32, 3
, 129, 2, 46		2, 32, 32
167Ø DATA	236, 167, 141, 252, 2	211Ø DATA
Ø5, 23, 253, 126		1, 32, 83
168Ø DATA	57, 12, 13, 1Ø, 13, 1	212Ø DATA
Ø, 13, 1Ø		6, 73, 84
169Ø DATA	13, 1Ø, 13, 1Ø, 13, 1	213Ø DATA
Ø, 32, 32		2, 32, 32
17ØØ DATA	32, 32, 32, 32, 32, 3	214Ø DATA
2, 66, 73		2, 61, 32
171Ø DATA	84, 5Ø, 51, 5Ø, 13, 3	215Ø DATA
2, 32, 32		6, 73, 84
172Ø DATA	66, 73, 84, 32, 66, 6	216Ø DATA
5, 78, 71		2, 32, 32
173Ø DATA	73, 78, 71, 32, 82, 8	217Ø DATA
3, 45, 5Ø		1Ø, 13
174Ø DATA	51, 5Ø, 13, 32, 32, 8	218Ø DATA
2, 83, 45		2, 32, 32
175Ø DATA	5Ø, 51, 5Ø, 32, 67, 7	219Ø DATA
9, 77, 77		7, 84, 32
176Ø DATA	85, 78, 73, 67, 65, 8	22ØØ DATA
4, 73, 79		9, 32, 66
177Ø DATA	78, 83, 13, 32, 32, 3	221Ø DATA
2, 32, 32		73, 84, 13, 1Ø, 32, 3
178Ø DATA	32, 32, 8Ø, 82, 79, 7	2, 32, 32
1, 82, 65		222Ø DATA
179Ø DATA	77, 13, 32, 32, 32, 3	8, 32, 61
2, 32, 32		223Ø DATA
18ØØ DATA	32, 32, 32, 32, 66, 8	3, 1Ø, 32
9, 13, 1Ø		224Ø DATA
181Ø DATA	32, 32, 32, 32, 32, 7	2, 32, 32
4, 69, 83		225Ø DATA
182Ø DATA	83, 69, 32, 87, 46, 3	8, 68, 13
2, 74, 65		226Ø DATA
183Ø DATA	67, 75, 83, 79, 78, 3	2, 32, 32
2, 13, 1Ø		227Ø DATA
184Ø DATA	13, 1Ø, 32, 32, 32, 3	2, 69, 86
2, 32, 8Ø		228Ø DATA
185Ø DATA	82, 69, 83, 83, 32, 6	69, 78, 13, 1Ø, 32, 3
5, 78, 89		2, 32, 32
186Ø DATA	32, 75, 69, 89, 4, 13	229Ø DATA
, 32, 66		, 13, 32
187Ø DATA	65, 85, 68, 32, 82, 6	23ØØ DATA
5, 84, 69		32, 32, 69, 78, 84, 6
188Ø DATA	32, 83, 69, 76, 69, 6	9, 82, 32
7, 84, 73		231Ø DATA
189Ø DATA	79, 78, 32, 13, 1Ø, 3	78, 85, 77, 66, 69, 8
2, 32, 32		2, 32, 79
19ØØ DATA	32, 32, 32, 32, 32, 3	232Ø DATA
2, 49, 32		7Ø, 32, 83, 84, 79, 8
191Ø DATA	61, 32, 32, 51, 48, 4	Ø, 32, 66
8, 13, 1Ø		233Ø DATA
192Ø DATA	32, 32, 32, 32, 32, 3	73, 84, 83, 32, 4, 13
2, 32, 32		1Ø, 13
193Ø DATA	32, 5Ø, 32, 61, 32, 3	234Ø DATA
2, 54, 48		1Ø, 32, 7Ø, 85, 76, 7
194Ø DATA	48, 13, 1Ø, 32, 32, 3	6, 32, 79
2, 32, 32		235Ø DATA
195Ø DATA	32, 32, 32, 32, 51, 3	82, 32, 72, 65, 76, 7
2, 61, 32		Ø, 32, 68
196Ø DATA	49, 5Ø, 48, 48, 13, 1	236Ø DATA
Ø, 32, 32		2, 6Ø, 7Ø
197Ø DATA	32, 32, 32, 32, 32, 3	237Ø DATA
2, 32, 52		47, 72, 62, 32, 63, 3
198Ø DATA	32, 61, 32, 5Ø, 52, 4	2, 4, 13
8, 48, 13		238Ø DATA
199Ø DATA	1Ø, 32, 32, 32, 32, 3	1Ø, 32, 83, 69, 76, 6
2, 32, 32		9, 67, 84
2ØØØ DATA	32, 32, 53, 32, 61, 3	239Ø DATA
2, 52, 56		32, 79, 85, 84, 8Ø, 8
2Ø1Ø DATA	48, 48, 13, 1Ø, 32, 3	5, 84, 32
2, 32, 32		24ØØ DATA
2Ø2Ø DATA	32, 32, 32, 32, 32, 4	77, 79, 68, 69, 32, 1
, 13, 1Ø		3, 1Ø, 32
2Ø3Ø DATA	13, 1Ø, 32, 32, 32, 8	241Ø DATA
3, 69, 76		49, 46, 32, 77, 79, 6
2Ø4Ø DATA	69, 67, 84, 32, 78, 8	8, 69, 77
5, 77, 66		242Ø DATA
2Ø5Ø DATA	69, 82, 32, 79, 7Ø, 3	13, 1Ø, 32, 5Ø, 46, 3
2, 68, 65		2, 8Ø, 82
2Ø6Ø DATA	84, 65, 32, 66, 73, 8	243Ø DATA
		73, 78, 84, 69, 82, 1
		3, 1Ø, 32
		244Ø DATA
		32, 32, 89, 79, 85, 8
		2, 32, 67
		245Ø DATA
		72, 79, 73, 67, 69, 3
		2, 63, 32
		246Ø DATA
		4, 23, Ø, 72, 23, 251
		, 59, 23
		247Ø DATA
		251, 63, 129, 8, 39,
		26, 46, 241
		248Ø DATA
		74, 43, 238, 48, 141,
		Ø, 32, 198
		249Ø DATA
		3, 61, 173, 133, 48,
		141, 253, 24Ø
		25ØØ DATA
		23, 25Ø, 248, 23, 251
		, 28, 32, 217

251Ø DATA	48, 141, 2, 16Ø, 23,	9, 84, 32	
25Ø, 236,	23	296Ø DATA	83, 84, 79, 8Ø, 32, 6
252Ø DATA	251, 16, 129, 89, 38,	6, 73, 84	
2Ø3, 57, 22		297Ø DATA	83, 13, 1Ø, 32, 53, 4
253Ø DATA	Ø, 26, 22, 252, 165,	6, 32, 83	
22, 252, 194		298Ø DATA	69, 84, 32, 8Ø, 65, 8
254Ø DATA	22, 252, 229, 22, 252	2, 73, 84	
, 247, 22, 253		299Ø DATA	89, 13, 1Ø, 32, 54, 4
255Ø DATA	13, 22, 253, 41, 48,	6, 32, 83	
141, Ø, 194		3ØØØ DATA	69, 84, 32, 68, 85, 8
256Ø DATA	23, 25Ø, 2ØØ, 57, 23,	Ø, 76, 69	
Ø, 16, 23		3Ø1Ø DATA	88, 13, 1Ø, 32, 55, 4
257Ø DATA	Ø, 74, 23, Ø, 89, 23,	6, 32, 83	
Ø, 129		3Ø2Ø DATA	69, 84, 32, 77, 79, 6
258Ø DATA	23, Ø, 1Ø1, 23, Ø, 14	8, 69, 77	
7, 57, 48		3Ø3Ø DATA	47, 8Ø, 82, 73, 78, 8
259Ø DATA	141, 1, 17Ø, 23, 25Ø,	4, 69, 82	
173, 238, 141		3Ø4Ø DATA	32, 77, 79, 68, 69, 1
26ØØ DATA	249, 233, 48, 141, 24	3, 1Ø, 32	
9, 237, 79, 17		3Ø5Ø DATA	56, 46, 32, 69, 88, 7
261Ø DATA	163, 134, 39, 14, 76,	3, 84, 13	
76, 129, 8		3Ø6Ø DATA	1Ø, 32, 42, 42, 42, 4
262Ø DATA	47, 245, 134, Ø, 238,	2, 42, 42	
134, 239, 141		3Ø7Ø DATA	42, 42, 42, 42, 42, 4
263Ø DATA	249, 2Ø9, 48, 141, 1,	2, 42, 42	
158, 48, 134		3Ø8Ø DATA	42, 42, 42, 42, 42, 4
264Ø DATA	166, 128, 173, 159, 1	2, 42, 42	
6Ø, 2, 166, 132		3Ø9Ø DATA	42, 13, 1Ø, 13, 1Ø, 3
265Ø DATA	173, 159, 16Ø, 2, 48,	2, 32, 32	
141, 1, 15Ø		31ØØ DATA	32, 89, 79, 85, 82, 3
266Ø DATA	23, 25Ø, 12Ø, 57, 48,	2, 67, 72	
141, 1, 145		311Ø DATA	79, 73, 67, 69, 32, 6
267Ø DATA	23, 25Ø, 112, 166, 14	Ø, 49, 45	
1, 249, 174, 139		312Ø DATA	56, 62, 63, 32, 4, 13
268Ø DATA	48, 173, 159, 16Ø, 2,	, 1Ø, 13	
57, 48, 141		313Ø DATA	1Ø, 32, 66, 65, 85, 6
269Ø DATA	1, 148, 23, 25Ø, 94,	8, 32, 82	
166, 141, 249		314Ø DATA	65, 84, 69, 32, 32, 3
27ØØ DATA	157, 139, 48, 173, 15	2, 32, 32	
9, 16Ø, 2, 57		315Ø DATA	32, 61, 32, 4, 48, 51
271Ø DATA	48, 141, 1, 151, 23,	, 48, 54	
25Ø, 76, 48		316Ø DATA	49, 5Ø, 5Ø, 52, 52, 5
272Ø DATA	141, 1, 165, 166, 141	6, 48, 48	
, 249, 136, 39		317Ø DATA	4, 13, 1Ø, 32, 78, 85
273Ø DATA	4, 48, 141, 1, 16Ø, 2	, 77, 66	
3, 25Ø, 59		318Ø DATA	69, 82, 32, 79, 7Ø, 3
274Ø DATA	57, 48, 141, 1, 157,	2, 66, 73	
23, 25Ø, 51		319Ø DATA	84, 83, 32, 61, 32, 4
275Ø DATA	48, 141, 1, 171, 23Ø,	, 13, 1Ø	
141, 249, 112		32ØØ DATA	32, 83, 84, 79, 8Ø, 3
276Ø DATA	134, 6, 61, 48, 133,	2, 66, 73	
23, 25Ø, 35		321Ø DATA	84, 83, 32, 32, 32, 3
277Ø DATA	57, 48, 141, 1, 172,	2, 32, 32	
23, 25Ø, 27		322Ø DATA	61, 32, 4, 13, 1Ø, 32
278Ø DATA	48, 141, 1, 186, 166,	, 68, 85	
141, 249, 82		323Ø DATA	8Ø, 76, 69, 88, 32, 3
279Ø DATA	39, 4, 48, 141, 1, 18	2, 32, 32	
2, 23, 25Ø		324Ø DATA	32, 32, 32, 32, 32, 6
28ØØ DATA	1Ø, 57, 13, 1Ø, 13, 1	1, 32, 4	
Ø, 13, 1Ø		325Ø DATA	72, 65, 76, 7Ø, 4, 7Ø
281Ø DATA	13, 1Ø, 32, 32, 32, 3	, 85, 76	
2, 32, 77		326Ø DATA	76, 4, 13, 1Ø, 32, 8Ø
282Ø DATA	69, 78, 85, 32, 83, 6	, 65, 82	
9, 76, 69		327Ø DATA	73, 84, 89, 32, 32, 3
283Ø DATA	67, 84, 73, 79, 78, 8	2, 32, 32	
3, 13, 1Ø		328Ø DATA	32, 32, 32, 32, 61, 3
284Ø DATA	32, 42, 42, 42, 42, 4	2, 4, 78	
2, 42, 42		329Ø DATA	79, 78, 69, 32, 4, 79
285Ø DATA	42, 42, 42, 42, 42, 4	, 68, 68	
2, 42, 42		33ØØ DATA	32, 32, 4, 69, 86, 69
286Ø DATA	42, 42, 42, 42, 42, 4	, 78, 32	
2, 42, 42		331Ø DATA	4, 13, 1Ø, 32, 79, 85
287Ø DATA	13, 1Ø, 32, 49, 46, 3	, 84, 8Ø	
2, 83, 72		332Ø DATA	85, 84, 32, 77, 79, 6
288Ø DATA	79, 87, 32, 83, 69, 8	8, 69, 32	
4, 84, 73		333Ø DATA	32, 32, 32, 61, 32, 4
289Ø DATA	78, 71, 83, 13, 1Ø, 3	, 77, 79	
2, 5Ø, 46		334Ø DATA	68, 69, 77, 4, 8Ø, 82
29ØØ DATA	32, 83, 69, 84, 32, 6	, 73, 78	
6, 65, 85		335Ø DATA	84, 69, 82, 4, 13, 1Ø
291Ø DATA	68, 32, 82, 65, 84, 6	, 32, 65	
9, 13, 1Ø		336Ø DATA	82, 69, 32, 89, 79, 8
292Ø DATA	32, 51, 46, 32, 83, 6	5, 32, 83	
9, 84, 32		337Ø DATA	85, 82, 69, 32, 6Ø, 8
293Ø DATA	78, 85, 77, 66, 69, 8	9, 47, 78	
2, 32, 79		338Ø DATA	42, 62, 32, 63, 32, 4
294Ø DATA	7Ø, 32, 66, 73, 84, 8	, Ø, 236	
3, 13, 1Ø			
295Ø DATA	32, 52, 46, 32, 83, 6		

for the  
**TRS-80**  
 color computer  
 64K

**NEW**

# HOME INFORMATION MANAGEMENT SYSTEM

INTEGRATED HOME DATA MANAGER with WINDOWS, ON SCREEN CALCULATOR, and CALENDAR.  
 HOME CHECKBOOK maintains multiple accounts for quick and easy analysis.  
 HOME ADDRESSBOOK up to 200 records of mailing data with search and label options.  
 HOME INVENTORY provides valuable property information recall and analysis.

AVAILABLE ON DISK ONLY... **\$24.95**  
 CHECK/MONEY ORDER + \$2.00 SHIPPING.  
 NEW YORK RESIDENTS ADD SALES TAX.

**VMC SOFTWARE**  
 P.O. BOX 326  
 CAMBRIA HTS. N.Y. 11411



## INTERCOMP SOUND Announces. . .

**SYNTRAX: A MIDI sequencer for the Color Computer.** Controls up to 16 polyphonic tracks of MIDI instruments (synthesizers, rhythm machines, etc.). **SYNTRAX** features include: interactive editor, 30,000+ note storage, transposition, clef and key signatures, chords, complex rhythms, tempo changes, independent repeats for each track, internal/external sync, all MIDI channel control data, and sequence chaining and merging. Requires 64K, disk drive, **COLOR MIDI CONNECTION**.

**COLOR MIDI CONNECTION: A MIDI hardware interface with 1 MIDI-in and 3 MIDI-out connectors.** The interface plugs into the cartridge slot and comes with a 40-pin female connector (no Y-cable needed).

**SYNTRAX** ..... \$75.00  
**COLOR MIDI CONNECTION** ..... \$98.00  
 Shipping & handling ..... \$ 3.00  
 Send check or money order to:

**INTERCOMP SOUND**  
 129 Loyalist Avenue  
 Rochester, NY 14624

END



**DISK**  
\$44.95

**NEW**

Introducing The "Super Smart"  
**DATA PACK II**

**NEW**

**TAPE**  
\$34.95

**TERMINAL COMMUNICATIONS SOFTWARE**

Also Supports The PBJ 80 Column "Word Pak", Deluxe RS-232 Pak, Parallel Printer Card and PBJ 2SP Pak

**"FEATURES"**

- No Lost Information When Using Hi-Resolution Display On Line
- ASCII Compatible File Format
- Full Text Buffering
- Terminal Baud Rates 300 to 9600
- Automatic Word Wrap Eliminates Split Words
- Full Half Duplex
- Automatic File Capture
- Programmable Word Length, Parity and Stop Bits
- Save and Load Text Buffer and Program Key Buffers to Tape or Disk
- 9 Hi-Resolution Display Formats, 28 to 255 x 24
- True Upper/lower Case Display
- Kill Graphics Option for an Extra 6K
- Supports Line Break
- Freeze Display and Review Information On Line
- Send Files Directly from Buffer or Disk
- Full Disk Support for Disk Version
- Send Control Codes from Keyboard
- Separate Printer Baud Rates 110-9600
- Display on Screen or Output Contents of Buffer to Printer
- Automatic Memory Sense 16-64K
- 9 Programmable Function Key Variable Length Macro Buffer
- Programmable Prompt Character or Delay to Send Next Line
- Programmable Control Character Trapping
- Programmable Open/Close Buffer Characters
- Automatic Key Repeat For Editing
- Program and Memory Status Displays

9 Unlimited  
Variable Length  
Macro Key Buffers

**BUFFER  
EDITOR**  
Insert, Delete  
Change or Add  
To Buffer

28-64x24  
Hi-Resolution  
Display

64K Support  
Up To 55K  
Text Buffer

**"The Source"**  
has arrived!

The Source brings the cost of Disassembler and Assembler Source code generation down to Earth.

Now you can Disassemble Color Computer machine language programs and generate beautiful, Assembler Source Code for a fraction of the cost of other Disassembler/Source Generator programs.

The Source has all the features and functions you are looking for in a Disassembler.

- Automatic label generation.
- Allows specifying FCB, FCC and FDB areas.
- Disassembles programs directly from Disk.
- Supports multiple origin disk files.
- Output complete Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler compatible source files directly to disk.
- Generated source files are in standard ASCII format that can be edited by most word processors.
- Built in Hex/Ascii dump/display to help locate FCB, FCC and FDB areas in a program.
- Fast Disassembly mode for testing & checking FCB, FCC and FDB mapped areas.
- Built in Disk Directory and Kill file commands.
- Menu display with single key commands for smooth, Easy, almost foolproof operation.

**Starship Falcon**  
Graphics Adventure Game

Six months ago a terrorist group demanded to be designated the rulers of Alpha Sigma III, under the threat of world starvation on the planet Earth. The Federation denied their demands, so they released a biological weapon which has destroyed all known edible plant species from throughout the known galaxy. To date no plant life has been able to survive on Earth. Recently, Federation undercover agents have reported a story told by a roving space trader, of a planet with abundant edible plant life. These plants have a reputation of being able to survive in all climates and in fact, are supposed to grow at an incredible rate. The Federation is desperate! If Earth's food source is not replaced soon, the Federation will have to evacuate all animal and Human life. Your mission is to go to the planet Zephyr and obtain the seed of these plants and return to Earth. Several Federation agents have been sent to obtain the seeds and none has returned! Can you get the seed and survive??? GOOD LUCK!

**32K Disk \$34.95**

**32K Disk \$21.95**

**HI-RES II**  
**SCREEN UTILITY**

**NEW IMPROVED VERSION**

- UP TO 85 CHARACTERS PER LINE READABILITY
- ADJUSTABLE AUTOMATIC KEY REPEAT
- PROTECT 1-23 SCREEN LINES
- CONTROL CODE KEYBOARD



**\$24.95** TAPE **\$29.95** DISK

ALL ORDERS SHIPPED FROM STOCK  
ADD \$2.50 POSTAGE

**CER  
COMP**

5566 RICOCHET AVENUE LAS VEGAS, NEVADA 89110

**(702) 452-0632**

PROGRAM FEATURES	Screen Enhancement		PROGRAM COMPARISON CHART
	HI-RES II NEW	HI-RES I OLD	
Upper/Lower case characters	Yes	Yes	Yes
Mixed Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Black	Buff/Black	Buff/Black
XY Coordinate Cursor	Yes	Yes	No
Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	Yes
16 32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function Switch to & from the Standard 16 by 32 Screen for full compatibility	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program Yes	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	\$24.95	\$19.95	\$29.95



VISA, MASTERCARD AND C.O.D. ACCEPTED

# "The CBASIC Compiler"

## Now anyone can create fast efficient Machine Language Programs Easily and Quickly without having to use an Editor/Assembler

CBASIC is a fully integrated, easy to use Basic program Editor and Compiler package. CBASIC is 99% syntax compatible with Disk Extended Color Basic programs, so most Basic programs can be loaded and compiled by CBASIC with little or no changes required. The compiler is an optimizing two-pass integer Basic compiler that can convert programs written in Disk Extended Color Basic into 100% pure 6809 Machine Language programs which are written directly to disk in a LOADM compatible format.

The programs generated by the compiler can be run as complete stand alone programs. A built-in linker/editor will automatically select one and only one copy of each subroutine that is required from the internal run-time library and insert them directly in the program. This eliminates the need for cumbersome, often wasteful separate "run-time" packages.

### CBASIC WAS DESIGNED FOR BOTH BEGINNING & ADVANCED USERS

CBASIC is a Powerful tool for the Beginner or Novice programmer as well as the Advanced Basic or Machine Language programmer. The Beginner or Novice programmer can write and compile programs without having to worry about Stack Pointers, DP registers, memory allocation, and so on, because CBASIC will handle it for you automatically. All they have to do is write their programs using the standard Basic statements and syntax. For the advanced Basic and Machine Language programmers, CBASIC will let you take command and control every aspect of your program, even generating machine code directly in a program for specialized routines or functions.

CBASIC adds many features not found in Color Basic, like Interrupt, Reset, and On Error handling. It also has advanced programming features that allow machine level control of the Stack and Direct Page registers, variable allocation, automatic 64K RAM control, program origin and even multiple origins. It can even have machine language code generated within a program that executes just like any other Basic program line.

### FULL COMMAND SUPPORT & SPEED

CBASIC features well over 100 Basic Commands and Functions that fully support Disk, Tape, Printer and Screen I/O. It also supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Extended Color Basic, and all with 99.9% syntax compatibility.

CBASIC is FAST. Not only will CBASIC compiled programs execute 10 to 1000 times faster than Basic, but the time it takes to develop a CBASIC program versus writing a machine language program is much, much shorter. A machine language program that might take several months to write and debug could be created using CBASIC in a matter of days or hours, even for a well experienced machine language programmer. We had a report from a CBASIC user that claimed "a Basic program that used to take 3 hours to run, now runs in 7 to 8 minutes". Another user reported a program that took 1 to 1½ hours to run in Basic, now runs in 5 to 6 minutes!!!

### MORE THAN JUST A COMPILER

CBASIC has its own completely integrated Basic Program Editor. The Editor contained in CBASIC is used to Create and/or Edit programs for the compiler. It is a full featured editor with functions designed specifically for writing and editing Basic programs. It has built-in block Move and Copy functions with automatic program renumbering. Complete, easy to use inserting, deleting, extending and overtyping of existing program lines. It is also used for Loading, Saving, Appending (merging), Killing disk files and displaying a Disk Directory. It also has automatic line number generation for use when creating programs or inserting sequential lines between existing lines. You can set the printer baud rate and direct normal or compiled listings to the printer for hard copy. The built-in editor makes program corrections and changes as easy as "falling off a log". If CBASIC finds an error when compiling, it points to the place in the program line where the error occurred. All you have to do is tell the editor what line you want to start editing and when it is displayed, move the cursor with the arrow keys to the place where the error is and correct it. Just like that, it's simple.

### HI-RES & 80 COLUMN DISPLAYS

CBASIC is the only Color Basic Compiler that includes its own Hi-Resolution 51, 64 or 85 by 24 line display. It is also the only compiler that supports both the PBJ "Word-Pak" and the Double Density 80 column cards. All of these display formats are part of the standard CBASIC compiler package. Not only can these display formats be used for normal program editing and compiling, but CBASIC will also include them in your compiled programs! If you want CBASIC to include the display driver in your program, all you have to do is use a single CBASIC command "HIRES". The run-time display driver that CBASIC includes in your program is not just a simple display, but a full-featured display package. With the Hi-Resolution display package you can mix text & graphics, change characters per line, underline, character highlight, erase to end of line or screen, home cursor, home & clear screen, protect screen lines, and much more. All commands are compatible with our HI-RES II Screen Commander so you can easily develop screen layouts using HI-RES and Color Basic before you compile your program. The same applies to using the 80 column card drivers. What other Basic compiler offers you this kind of flexibility?

### 64K RAM SUPPORT

CBASIC makes full use of the power and flexibility of the 6883 SAM (Synchronous Address Multiplexer) in the Color Computer. It will fully utilize the 96K of address space available in the Color Computer (64K installed) during program Creation, Editing and Compilation. CBASIC has a special command for automatic 64K RAM control. When used in a program, it allows the user to use the upper 32K of RAM space automatically for variables or even program storage at run-time. It will automatically switch the ROMs in and out when needed. There are also two other commands that allow you to control the upper 32K of RAM manually, under program control. No other Color Basic compiler directly supports the use of 64K RAM like CBASIC.

### ALL MACHINE LANGUAGE

CBASIC is completely written in fast efficient Machine Language, not Basic, like some other Color Basic compilers. Because of this, CBASIC can edit and compile very large programs. Even using the Hi-Resolution 51 by 24 line display, it can work with about a 34K program, and the 80 column card versions can handle almost 40K of program. Some of the other Basic compilers can only work with 16K or about 200 lines. Even working with large programs, CBASIC compiles programs with lightning fast speed. It will compile a 24K program to disk in less than 2 minutes! That's without a listing being generated. We've heard stories about some other compilers that take almost 10 minutes to compile a simple 2-3K program. You might inquire about this when you look at some of the other compilers available.

### THE FINISHED PRODUCT

Since CBASIC contains statements to support ALL of the I/O devices (Disk, Tape, Screen & Printer), Hi-Res Graphics, Sound, and Enhanced Screen displays, it is well suited for a wide range of programming applications. It generates a complete, Ready to Run machine language program. The finished product or program does not have to be interfaced to a Basic program to perform some of its functions or commands. This may seem obvious to you, but some of the other Color Basic compilers don't necessarily work this way. Some of their compiler commands need a separate Basic program in order for them to work. In some cases, require that a separate Basic program be interfaced to the compiled program to perform I/O functions, like INPUT, PRINT and so on. CBASIC doesn't do this. ALL of its commands are compiled into a single machine language program that does not require any kind of Basic program to make it work.

### COMPATIBILITY

You may be wondering about those statements we made earlier concerning 99% or 99.9% syntax compatibility. What does that other 1% consist of? The biggest part of that 1% has to do with string arrays and variables. CBASIC does not use a "String Pool" like Color Basic. It uses absolute memory addresses to locate string variables and arrays. This is why CBASIC's string processing is so fast, it also eliminates the time consuming "Garbage Collection" problem. When CBASIC allocates space for strings, it must know how much space to use for each string. When you Dimension a string variable in CBASIC, you must tell it how much space you want to save for each element. To Dimension an array of 40 strings, 64 characters each, you would DIM DAS(40,64). If a string is not dimensioned, CBASIC will automatically allocate 32 bytes for it. If you want a single string to have enough room for 200 characters you would DIM AX\$(200). For string arrays, you would still access the element you want, the same as Color Basic, to get string #30 from the array DAS, you would still use DAS(30), the only real change is in the DIM statement. For undeclared string arrays of 10 elements or less, CBASIC will automatically reserve space for 10 (0-9) strings of 32 characters. In some other Color Basic compilers, you have to declare EVERY string variable used in the program in a DIM statement. And, to create an array of 40 strings with 64 characters each, you would have to DIM AD\$(2560), and then to access string #30, you would have to multiply 30 x 64 and use a special variable name format or access it one character at a time. Not very compatible or convenient to use, and difficult at best.

### CBASIC REQUIREMENTS

CBASIC requires a minimum of 32K RAM and at least one Disk drive. We strongly recommend that you have 64K. CBASIC is compatible with all versions of Color & Extended Basic and both Disk Basic V1.0 and V1.1. Programs compiled on either system will run on systems with different ROMs. CBASIC is NOT compatible with JDOS.

### DOCUMENTATION

The Documentation provided with any program is very important to the user. This is especially true when you talk about a program as complete and complex as CBASIC. Even though CBASIC was designed to be the most User Friendly compiler on the market, we went to great lengths to provide a manual that is not only easy to use and understand, but comprehensive and complete enough for even the most sophisticated user. The manual included with CBASIC consists of approximately 120 pages of real information, not like some manuals that put just one or two short paragraphs on a page. If we did it that way, we could have easily created a three or four hundred page manual. The manual index breaks down each section of the manual and gives a 3 or 4 word description of each section and its items along with page numbers. The manual has three sections, the Editor, Compiler and Appendix. Each of these is divided into subsections, with Section and Subsection titles printed at the top of each page. If you want to, you could find the information you are looking for by simply flipping through the pages and scanning the Section titles on the top of the pages. The Manual itself is an 8½ by 11 Spiral Bound book with durable leather textured covers. Some of the reports we have had from CBASIC users describe the manual as being the Best program manual they have ever used.

### COMPARE THE DIFFERENCE

CBASIC is not just another Color Basic Compiler. It is the only complete Basic Compiler System for the Color Computer. Compare CBASIC's features to what other compilers offer and you'll see the difference. When comparing CBASIC to other compilers, you might want to keep some of these questions in mind. Does it support I/O functions? You can't write much of a program without PRINT, INPUT and so on. What about complex string statements, or string statements at all? How large of a program can you write? Can you compile a complex string like: MID\$(RIGHT\$(DAS\$(VAL(IN\$(LEN(LEN(LENS))),3),3)) Can you use two character variable names for string & numeric variables, like Basic. Does it support all the Hi-Res graphics statements including PLAY, DRAW, GET and PUT, using the same syntax as Basic? Do you ever have to use a separate Basic program? Can you take complete Basic programs and compile them without extensive changes? Will they work? How do you edit a program when it has errors compiling?

### PRICE VERSUS PERFORMANCE

The price of CBASIC is \$149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. We spent over 2 years writing and refining CBASIC, to make it the Best, most Compatible Color Basic compiler available. Most of our CBASIC users already bought one or more of the other compilers on the market and have since discarded them. We even traded in a few of them. If you want a cheap compiler, we'll sell you one of those traded in, at a good price. Before you buy a compiler, compare the performance of CBASIC against any Color Basic compiler. Dollar for Dollar, CBASIC gives you more than any other Color Basic compiler available.

### ORDERING INFORMATION

To order CBASIC by mail, send check or money order in the amount of \$149.00 plus \$3.00 for shipping and handling to the address to the address listed below.

To order by VISA, MASTERCARD or COD, call us at: (702) 452-0632 (Monday thru Saturday, 8am to 5pm PST).

**CER-COMP**  
**5566 Ricochet Ave.**  
**Las Vegas, NV 89110**  
**(702) 452-0632**



# Mindbusters

by Richard Ramella

## Hit the Jackpot!

When I was one-and-twenty  
I heard a wise man say,  
'Give pounds and crowns  
and guineas  
But not your heart away.

I have yet to decide whether by these words A.E. Housman meant: *Don't fall in love in a casino* or *Try to get the house to accept British currency for the favorable dollar exchange rate*. I think it's the former because I've never sensed anything near affection in a gambling den.

Consider, this month, the seemingly puzzle-like contraption known as the slot machine. Some people who enjoy puzzles are also attracted to lotteries and slots. They like to regard the latter device as a mechanical puzzle that can be beaten by brainpower—though, of course, it can't. In recent weeks I've had three requests for a puzzle with a slot-machine motif. I've succeeded in writing a slot-machine game like none you have ever seen. The program in the listing is called Jackpot Jerome.

When you've typed and debugged the listing (that is, if you have run it), type `POKE 65494,0` and press the enter key before trying to save it. This disables the high speed `POKE 65495,0`. If your computer won't work with the speed-up `POKE`, delete the statement from the beginning of line 140. With the speed `POKE` invoked, you can't `LLIST` the program to paper or `CSAVE` it to cassette. You might also have difficulty saving it to disk.

When you run Jackpot Jerome, you're instructed to press any key to start. This gives the randomizing routine the chance to theoretically make every run of the program different. Once you have pressed a key to begin the randomizing process, the program asks

you to be patient. A few seconds later the playing screen appears.

Jackpot Jerome is a small and friendly mechanical creature. On his chest appear three reels, each of which shows three vertical positions. In the upper right corner of the screen the figure 100 appears. Press the space bar to register a wager and select the number of rows on which you want to bet. With each press of the space bar, pointers in the shape of plus signs appear marking the rows of the three reels that must match for you to win. You can attempt to match one of one, two, or three rows. Press the space bar once followed by any key (except the break or shift keys) to bet on one row position. Press the space bar twice and any key to bet on two row positions. Pressing the space bar three times selects three positions. Each time you tap the space bar, the number in the upper right corner is reduced by one.

Once you've placed your bet, the reels spin. If you get three solid bars in a row, you win 50 points. With three open bars in a row you get 20 points. This is a true simulation. The reels have a definite arrangement, and the game works by spinning the reels randomly. I claim that the reels are arranged so you will more often go broke than raise your total to

200. It's up to you to prove me right or wrong. If you would prefer that Jerome pay out more than he takes in (something you won't find in world of casino gambling), insert this line:

```
625 IF P1 = 0 AND V1 = 5 AND P2 = 0 AND  
V2 = 5 THEN Q = 6
```

It makes Jerome pay six points for a row with consecutive open bars in the left and middle reels that ends with an empty space in the right reel.

To see the arrangement of the reels, insert the following line:

```
245 SCREEN 1,1:GOTO 245
```

When you type `RUN`, instead of the game you'll see the three reels as if they were uncoiled and laid flat on the screen. Each reel contains 19 positions made up of solid bars, open bars, and empty spaces. If three solids pay 50 and three opens pay 20, how much will you win or lose on the average for every 100 plays? For the purposes of this problem, let's assume that a hypothetical player wagers only one point (in other words, one row) on each play. I need a mathematical answer.

If this problem makes your temples pulse, be assured it has the same effect on me. If no one writes to me with the solution, the question might go forever unanswered. ■

### System Requirements

16K RAM  
Extended Color Basic

Write to Richard Ramella at 1493 Mt. View Ave., Chico, CA 95926.

Program Listing. Jackpot Jerome

```

100 REM * JACKPOT JEROME * TRS-8
0 EXTENDED COLOR BASIC 16K
110 REM * MINDBUSTERS/RAMELLA
120 DATA 15,10,15,30,15,50,25,30
,35,10,55,30,75,30,75,50,85,10,9
5,10,95,30,115,50,125,10,135,30,
145,10,175,10,175,30,175,50,185,
10
130 DATA 5,10,35,50,45,30,55,10,
105,50,115,10,115,30,145,50,155,
10,155,30,165,10,185,50
140 POKE 65495,0: CLS: PCLEAR 4:
PMODE 0,1: PCLS: COLOR 1,0: DIM
A(1,2),A(2,1),A(3,1),A(1,3)
),B(62),N$(10)
150 FOR X=1 TO 62: READ B(X): NE
XT
160 P$="T255V3105C": S=100: E$="
0123456789 ": SP$=CHR$(32)
170 N$(1)="C1R3U12C0E3D2L2R4":
N$(2)="C1U12C0E3R5F3D4G4L4G2D6R1
0"
180 N$(3)="C1U12C0E3R5F3D4G2L4R4
F2D6G2L6H2U2": N$(4)="C1U16C0D10
R12L4U10D20"
190 N$(5)="C1U15R10C0L10D8R6F4D4
G4L6": N$(6)="C1U12E3R6F3C0H3L6G
3D13F3R6E3U4H3L7"
200 N$(7)="C1U15C0R12D3G2D3G2D3G
2D5": N$(8)="C0U3E3R6L6H3U4E3R8F
3D4G3F3D4G3L8H3"
210 N$(9)="C0F4R6E3U13H3L6G3D4F3
R8": N$(0)="C0F4R6E4U13H3L6G4D13
"
220 PRINT "PRESS A KEY TO START"
230 L=RND(0): IF INKEY$="" THEN
230 ELSE PRINT: PRINT " P A T I E
N C E . . ."
240 FOR X=1 TO 61 STEP 2: CIRCLE
(B(X+1),B(X)),7,,.5: IF X>37 THE
N PAINT(B(X+1),B(X)),1: NEXT ELS
E NEXT
250 PCOPY 1 TO 4: PCLS
260 LINE(73,93)-(177,139),PSET,B
270 FOR N=78 TO 148 STEP 34: LIN
E(N,98)-(N+25,133),PSET,B: NEXT
280 J1=126: J=90: FOR V=143 TO 1
76 STEP 4: LINE(J,V)-(J+30,V),PS
ET: LINE(J1,V)-(J1+30,V),PSET: J
=J-1: J1=J1+1: NEXT
290 FOR V=60 TO 134 STEP 74: LIN
E(V,178)-(V+52,189),PSET,B:NEXT
300 CIRCLE(70,110),30,,.6,.5,.75
: CIRCLE(178,110),30,,.6,.75,1
310 DRAW"BM40,112;R30": DRAW"BM1
78,112;R30"
320 J1=186: J=44: FOR V=114 TO 1
50 STEP 4: LINE(J,V)-(J+16,V),PS
ET: LINE(J1,V)-(J1+18,V),PSET: J
=J-1.5: J1=J1+1.5: IF V>132 THEN
J1=J1-3: J=J+3: NEXT ELSE NEXT
330 CIRCLE(48,150),10,,1,0,.5: C
IRCLE(192,150),10,,1,0,.5
340 CIRCLE(125,93),64,,1.3,.5,1:
PAINT(125,91),1,1
350 COLOR 0,1: FOR V=103 TO 146
STEP 43: CIRCLE(V,40),20,,.8: CI
RCLE(V,40),4,,2: PAINT(V,40),0,0
: CIRCLE(V,40),3,1: NEXT
360 CIRCLE(125,65),15,,.6
370 K=40: FOR V=70 TO 80: CIRCLE
(124,V),K,,.5,0,.5: K=K-2: NEXT
380 COLOR 1,0: DRAW"BM5,15;D3F1R
2E1U10L2R4": DRAW"BM13,19;U4E3U3
R2D3F3L6R6D4"
390 DRAW "BM25,19;R4L5U10R4": DR
AW"BM33,19;U10D5E5G4F5"
400 DRAW"BM43,19;U10R3F2D2G2L3":

```

```

DRAW"BM54,19;H2U6E2R4F2D6G2L4"
410 DRAW"BM67,19;U10L4R8": DRAW"
BM5,50;D3F1R4E1U20L2R4"
420 X$="R4L4U11R2L2U10R4": DRAW"
BM16,54;"+X$: DRAW"BM25,54;U21R4
F2D4G2L4R2F3D10"
430 DRAW"BM34,54;U21R6D21L6": DR
AW"BM44,54;U21F4E4D21": DRAW"BM5
7,54"+X$
440 COLOR 0,1: SCREEN 1,1: GOSUB
680: X1=165: Y1=X1: Z1=X1
450 JH=0
460 V$=INKEY$: IF JH>0 AND S=0 T
HEN 480 ELSE IF S=0 THEN 460 ELS
E IF JH=3 THEN 470 ELSE IF V$=""
THEN 460 ELSE IF V$=CHR$(32) TH
EN JH=JH+1: S=S-1: GOSUB 680: GO
SUB 740: GOTO 460
470 IF JH=0 THEN 460
480 X2=10+INT(RND(30)/10): Y2=X2
+10+INT(RND(120)/10): Z2=Y2+10+I
NT(RND(220)/10)
490 FOR H=1 TO 22 STEP 10
500 FOR L=1 TO 10
510 PMODE 0,4
520 IF H<X2 THEN GET(0,X1)-(20,X
1+30),A1,G: X1=X1-5: IF X1=0 THE
N X1=160
530 IF H<Y2 THEN GET(20,Y1)-(40,
Y1+30),A2,G: Y1=Y1-5: IF Y1=0 TH
EN Y1=160
540 IF H<Z2 THEN GET(40,Z1)-(60,
Z1+30),A3,G: Z1=Z1-5: IF Z1=0 TH
EN Z1=160
550 PMODE 0,1
560 IF H>X2 THEN 570 ELSE PUT(80
,101)-(100,131),A1,PRESET
570 IF H>Y2 THEN 580 ELSE PUT(11
5,101)-(135,131),A2,PRESET
580 PUT(149,101)-(169,131),A3,PR
ESET
590 PLAY P$
600 NEXT L,H
610 FOR H=104 TO 124 STEP 10: F1
=F1+1: P1=PPOINT(84,H): P2=PPOIN
T(118,H): P3=PPOINT(152,H)
620 V1=PPOINT(88,H): V2=PPOINT(1
22,H): V3=PPOINT(156,H)
625 REM IF P1=0 AND V1=5 AND P2=
0 AND V2=5 THEN Q=6
630 IF P1=0 AND V1=5 AND P2=0 AN
D V2=5 AND P3=0 AND V3=5 THEN Q=
20 ELSE IF V1+V2+V3=0 THEN Q=50
640 IF Q>0 THEN GOSUB 750: Q=0
650 IF F1=JH THEN 660 ELSE NEXT
H
660 F1=0: F=0: FOR V=108 TO 140
STEP 32: FOR Q1=104 TO 124 STEP
10: CIRCLE(V,Q1),2,0: NEXT Q1,V
670 GOTO 450
680 COLOR 0,1: LINE(170,4)-(250,
30),PRESET,BF
690 S$=STR$(S): S$=MID$(S$,2): F=
LEN(S$): IF F<4 THEN S$=STRING$(
4-F,32)+S$
700 Y=1: FOR V=172 TO 244 STEP 2
0
710 K$=MID$(S$,Y,1): C=INSTR(E$,
K$): IF C=11 THEN 730
720 DRAW"BM"+STR$(V)+",24;"+N$(C
-1)
730 Y=Y+1: NEXT V: RETURN
740 T=94+(JH*10): CIRCLE(108,T),
2,1: CIRCLE(140,T),2,1: RETURN
750 FOR S=S+1 TO S+Q-1: GET(78,H
-3)-(170,H+6),BN,G: GOSUB 680
760 PUT(78,H-3)-(170,H+6),BN,PRE
SET: PLAY"T25403CEG": NEXT S: S=
S-1: RETURN
770 REM * END OF LISTING

```

HIGH SCHOOL AND COLLEGE  
MATHEMATICS  
LEARNING  
SOFTWARE

For School and Home

Apply the power of your  
Color Computer  
to improve student mastery  
and understanding of  
all high school and college math.

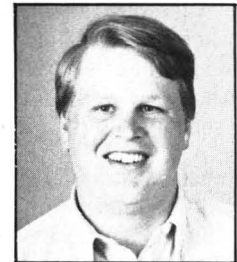
- COORDINATE DEFENSE  
(Video Game — Style Drill) ..... \$25
- PRE-ALGEBRA LEARNING PACKAGE\*  
(3 Drill and Practice Programs) ..... \$50
- ALGEBRA LEARNING PACKAGE\*  
(7 Drill and Practice Programs) ..... \$80
- TRIG PACKAGE  
(2 Program Set) ..... \$35
- STATISTICAL ANALYSIS  
(All usual data analysis) ..... \$30
- PROBABILITY GRAPHICS PACKAGE  
(3 HI-RES Simulations) ..... \$50
- 4 CALCULUS GRAPHICS PACKAGES  
(Each has 6 HI-RES Programs) ..... ea. \$75
- STATISTICS GRAPHICS PACKAGE  
(7 HI-RES Programs) ..... \$100
- BIO-MATHEMATICS  
(2 Population Growth Models) ..... \$40

\* Available in 16K Standard  
Available on Cassette or Disk

MatheGraphics Software

61 Cedar Road, Suite C  
East Northport, NY 11731  
516-368-3781

His name is Chris Schmidt.  
His call sign is KA1MPL.  
He's a new ham-radio operator.



He uses a micro at work every day.  
He learned Morse Code and radio  
theory in a month and took an FCC  
test.

For him, there's now more than hard-  
ware and software for fun. Like  
knowing what hams on bulletin  
boards really mean. Like meeting on  
the air another one of his 400,000 fel-  
low ops. Like being prepared to help  
in an emergency.

Would you like to get started? We'll  
send you the name of a ham in your  
area who'll help.

American Radio Relay League  
225 Main St., Box CS  
Newington CT 06111  
(203)666-1541

Presented as a public service by HOT CoCo and CW Communications/Peterborough



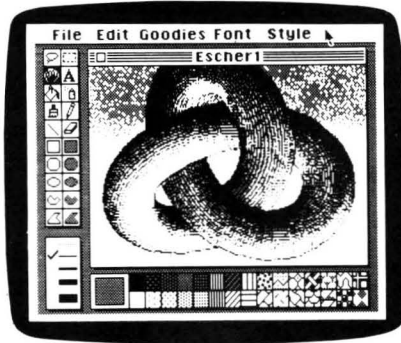
# CoCo Max

*This is one of those rare programs that will captivate everyone in your family.... No one can see CoCo Max and not want to try it!*



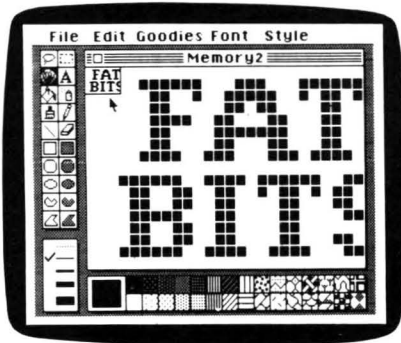
We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

It was inevitable that this exciting approach would be brought to the CoCo. With this in mind, Colorware chose to go all out and maximize this new concept for the color computer. That meant designing not just software but hardware too. It meant thousands of hours of pure machine language programming. Rarely has this much effort been applied to one product for the Color Computer.



## UNMATCHED CAPABILITY...

Because we took the maximum approach: highly optimized machine code combined with hardware, CoCo Max truly stands above the rest as the ultimate creative tool for the Color Computer. It's unrivaled performance lets you create with more brilliance and more speed than any similar system - much more than you ever imagined possible. And, you can do it in black & white or color.



All the sophisticated power of the bigger systems is there: *Icons, Pull-Down Menus, full Graphic Editing, Font Styles, and all kinds of handy tools and shortcuts.*

Plug your joystick, mouse or touch pad into CoCo Max's Hi-Res Input Unit. Then use a delightfully simple *Point-and-Click* method to get any of CoCo Max's powerful graphic tools. It has them all:

You can *Brush, Spray* or *Fill* with any *Color, Shading* or *Pattern*. Use *Rubber Band Lines* and *Shapes* (square, rectangle, circle, ellipse, etc.) to create perfect illustrations with speed and ease. There's a *Pencil*, an *Eraser* and even a selection of *Calligraphy Brushes*. And, as you can see, CoCo Max can do a lot with text. All of the newest special effects are there: *Trace Edges, Flip, Invert, Brush Mirrors*, etc. And all of the very latest super-capabilities like: *Undo*, which automatically reverses your mistakes, and *Fat Bits* which zooms you way in on any part of your subject to allow dot-for-dot precision.



## THE BIG PICTURE

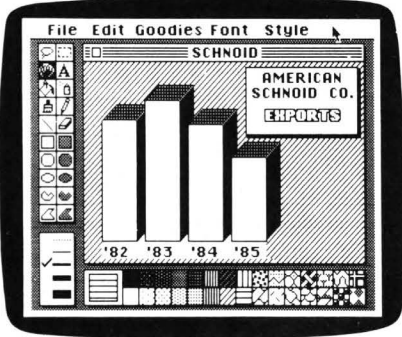
The large image box in the middle of the CoCo Max screen is actually only a window on an even larger image. Use the Point-and-Click "Hand" to effortlessly move your window over any portion of the larger image. You have a working area of up to 3-1/2 times the area of the window itself.

## FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than 1/4 page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to 1/8 page size.

## FREEDOM TO CREATE...

Anyone who wants to create anything at all on their CoCo screen or printer will certainly be very glad to meet CoCo Max. CoCo Max's friendly yet sophisticated graphic and text capabilities let you almost instantly produce illustrations, diagrams, charts,



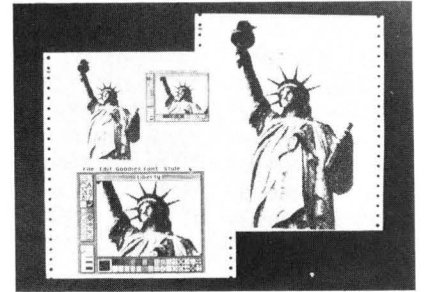
graphs, and computer art – for serious use or just for creative fun.



tion by using software schemes such as sliding windows. Although clever, these schemes yield sluggish and awkward results. Only CoCo Max does it the right way. The CoCo Max Hi-Res Input Unit plugs into your ROM slot and adds an entirely new joystick input to your computer – a precision one with a 49,152 point resolution to match the CoCo screen exactly.

Plug your same joystick, mouse or touch

You may then use CoCo Max's graphic magic on it. The DS-69 is available as an option from Colorware from \$149.95 complete with its own software on disk or tape. Using the DS-69 with a disk requires an RS multi-pak adaptor.



## COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-

# THE COCO MAX SYSTEM

## AN ABSOLUTE GUARANTEE

CoCo Max is a hardware software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 20 days for a full, courteous refund from Colorware.

## THE HARDWARE...

This is the key to CoCo Max's unmatched performance. Did you know the normal joystick input built into the Color Computer only allows access to 4,096 (64 x 64) points on the CoCo screen? Yet, the Color Computer's high resolution screen



has 49,152 (256 x 192) pixels. This means that a joystick, mouse or even a touch pad can, at best, only access about one tenth of the pixels on the CoCo screen.

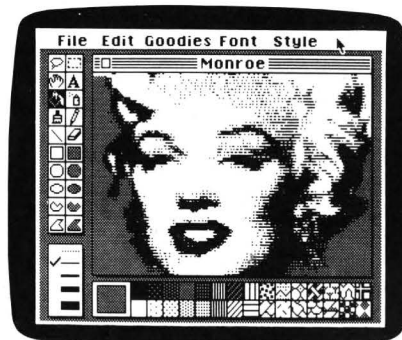
Most graphic programs ignore this hardware limitation of the Color Computer and give you only low-res control. Others attempt to overcome the limita-

pad into this new input and you have a whole new kind of control. The difference is remarkable.



## A DIGITIZER OPTION...

We studied all the video digitizers available and picked the best of them to link with CoCo Max. The DS-69 from Micro Works was our choice. This optional device lets you capture the image from any video source (video recorder, camera, etc.) on your Color Computer.



extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

**THE COMPLETE COCO MAX SYSTEM,** with software on *DISK*.....\$69.95

with software on *CASSETTE* (Available Mar '85).....\$69.95

**Y-BRANCHING CABLE**—If you have a disk system but do not have a Multi-Slot Interface, use this economical 40-pin, 1 male, 2 female cable to connect the CoCo Max Hi-Res input unit and your disk controller to your CoCo.....\$27.95

(Sorry, not compatible with JDOS)



**Colorware Inc.**  
78-03G Jamaica Ave.  
Woodhaven, NY 11421  
(718) 647-2864



## ORDERING INFORMATION

ADD \$3.00 PER ORDER FOR SHIPPING AND HANDLING.  
C.O.D.'S ADD \$3.00 EXTRA.  
SHIPPING AND HANDLING FOR CANADA IS \$5.00  
WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.  
N.Y. RESIDENTS MUST ADD SALES TAX.



# The Computer Room

by Scott L. Norman

## So Much Software, So Little Time

**T**his last full-blown issue of *HOT CoCo* finds me with plenty of unfinished business. As always, I have a number of products on hand that I've only used for a short time. Some of the stuff promises to be useful, and although I haven't had a chance to really look it over, I'll use this column to wrap up my impressions of some of the most promising new products.



I/O menu causes control to pass to the Telegraphics print routine. (Unfortunately, the new option doesn't actually appear on the menu.) If you have specified a default graphics file in the code, it will be printed; otherwise, you type in the required information at this point. You can return to the

word processor by pressing the 2 key.

Telegraphics works pretty well, although I haven't yet tried to interface it to Telewriter modified with Bob van der Poel's Telepatch—what I use every day. I'm sure it can be done.

One word of caution: When you print a letterhead, Telewriter has no way of knowing that you have used up part of a page. You have to adjust the page length (in lines) with the format menu to avoid having your text run off the bottom. That's not a problem with short notes, but you'll have to watch it with multipage documents.

### Graphics with Telewriter

Derringer Software's Telegraphics is a new utility that prints the displays that general-purpose graphics editors produce. Several routines can do that much, but Telegraphics includes the ability to interface with Basic programs. Once you realize that Telewriter's I/O menu routines are written in Basic, you can appreciate what this can lead to: Telegraphics gives Telewriter the ability to print graphics as well as text, although not in one unbroken stretch. You have to temporarily break out of the main program to call the graphics printing subroutine, but that's a minor inconvenience. At least you don't have to reload Telewriter and your text file after the image is printed.

Although Telegraphics can handle images that occupy all eight of the CoCo's graphics pages, most people will probably use it with small illustrations to produce customized stationery. You can design your own letterhead with a graphics processor and store the image as a binary disk file. Telegraphics can then convert the file to a special ASCII form that can be read and passed to your printer without disturbing anything in the CoCo's graphics area—such as Telewriter text. Users of Derringer Software's Master Design will recognize Telegraphics as the earlier program's letterhead utility.

A Basic subroutine package handles Telegraphics' printing. You have to merge it with your own Basic applications program (Telewriter's I/O menu routine, in my example) and save the modified version after setting things up for your printer's control codes. If you use a nonstandard baud rate to communicate with your printer, you'll have to insert a POKE 150 command somewhere. I put mine at the very beginning of the subroutine.

Once you have taken care of all the house-keeping, pressing L from Telewriter's binary

### A Couple from Computerware

I usually ignore commercial personal-finance software, since I use a specialized program of my own to handle the Norman family finances. There seems to be an endless market for ready-made products of this kind, however, so I'm happy to report that Computerware's personal finance system, PFS, is a handy, easy-to-use addition to the ranks.

PFS combines a family checkbook/budget keeper with a financial calculator for doing loan and investment computations. It requires 32K and at least one disk drive; you can record 1,300 transactions on the program disk, and about 3,000 on a separate data disk in a two-drive system. Either figure should be enough for the average family, since the program requires that you use a separate disk for each year's activity.

You create a new checkbook file by specifying a file name and an opening balance. Next, you set up what an accountant would call a chart of accounts: a listing of up to 48 categories by which you would like to keep track of your checks and deposits. Typical examples include salaries, rent or mortgage payments, and credit cards. At the same time, you can designate a monthly budget for each account. Knowing that you can change any of the information at any time makes this a low-pressure affair.

It's impossible to remember all those account numbers, but you can get a printed list, complete with a record of all activity for the current month, as soon as you enter your first transaction. I haven't found a way to get the list without the transaction history.

Once you've established a PFS checkbook, making an entry is simply a matter of responding to prompts and typing in the date, check number (#0 is reserved for deposits), account number, amount, and payee or income source. A given check number can be used for more than one transaction, in case you want to split a payment between several accounts. The example mentioned in the manual is a gasoline credit-card bill, which might represent both fuel and repair costs; you might like to keep separate records for the two.

You can call for a variety of reports and budget comparisons at any time. Unlike business programs, PFS doesn't get involved with closing the books at the end of the accounting period. Unfortunately, you have to wait for the entire printed version of a report; there doesn't seem to be any way to get a quick preview on the screen.

The loan and investment calculator features are easy to use. I especially appreciate the fact that they don't force you to use a weekly payment schedule. When I borrow money from my employer's credit union, I have to repay the loan from a biweekly paycheck, so I have to calculate things in terms of 26 payments per year rather than 12 or 52. PFS has no problem with that.

Another Computerware program I've had occasion to check out recently is Merge 'n Mail, a mailing-list manager. It seems functionally identical to an older product called VersaMail, with the manual cleaned up to reflect changes in the screen displays.

Merge 'n Mail can handle 700 names on a single-drive system, and 2,500 or so on four drives. It can prepare address labels for all or part of your list, using database-like commands to select entries on the basis of any data field. The fields themselves can contain either conventional name/address/telephone information, or user-defined codes for recording special pieces of data: special interests or membership status of people on a club roster, for instance. You can even print special messages on your labels.

The program also has the unique ability to find records by matching the *sound* of the last name; that is, by attempting to match the phonetic spelling. I can't imagine using this feature every day, but it just might come in handy once in a while—especially if you have a poor memory for names.

I suspect that most people will get more use out of Merge 'n Mail's ability to interface

with any word processor that produces an ASCII text file. You simply use a special set of imbedded codes to denote where data from your mailing list should be inserted into a document, and presto! instant junk mail.

## And a Hard One to Find

My last little enthusiasm presents a bit of a challenge; since the original vendor (Ilume Design, of Montreal) has slipped beneath the waves, anyone interested in buying it will have to bug the author, Jorge Mir. He may never forgive me.

The subject is Datafile, another one of those free-form data managers for which I have often expressed a weakness. It is an electronic notepad that doesn't require you to define any record structure in advance. If you can manage to keep some semblance of order in the way you enter data, however, you'll find Datafile versatile enough to sort your file, search for specified character strings, and find totals for records that contain dollar values.

The program can generate three types of printouts, including mailing labels, and lets you select the records to be printed. You can even send control codes to your printer to spruce up the appearance of the reports: an

unusual feature for this type of program.

Datafile is written in Basic, so it's not the quickest thing around. It can capitalize on the CoCo's high-speed POKE if your machine can handle it, though. I also wonder if the program wouldn't benefit from being run through a good Basic compiler.

That sounds like an interesting project, but one that will have to wait just a bit. Meanwhile, if you're interested in acquiring a useful little filing program for keeping track of hobby collections, notes for school assignments, or other personal applications, you should check with Jorge Mir on the possibilities of reviving Datafile. You can reach him at 12851 West Balboa Drive, New Berlin, WI 53151.

## Out of String Space

I'm not about to let HOT CoCo undergo its transformation without saying how much I've enjoyed doing these columns. I have to assume that someone has been reading them, too, because some of you have been good enough to write and tell me so. I doubt that my family could have forged all the letters. My track record for answering mail is far from spotless, but I do want you to know that I've appreciated your comments and

tips. Some of you have no doubt seen the results in subsequent issues.

If you still have an appetite for this sort of thing, you should know that I'll be continuing the column (or something very much like it) in 80 Micro's Color Computer section. That will be a homecoming for me: It's where I first started writing about personal computing five years ago. See you there, I hope.

Meanwhile, will the last person out of the Computer Room please turn out the lights? ■

*Scott Norman is the manager of solid-state science at GTE Laboratories in Waltham, MA. Write to him at 8 Doris Road, Framingham, MA 01701.*

### Vendors Mentioned in The Computer Room

Derringer Software  
P.O. Box 5300  
Florence, SC 29502-5300

Computerware  
4403 Manchester Ave.  
Suite 102/Box 668  
Encinitas, CA 92024

# FANTASTIC NEW GRAPHICS PROGRAMS!



## PIXGEN (by Spectacular Software)

**PIXGEN** is a revolutionary new idea in graphics creation for your Tandy Color Computer! Unlike most graphics utilities which let you draw a picture, and then save the screen as binary data, **PIXGEN** lets you design pictures and then AUTOMATICALLY compiles the machine language source code needed to redraw your picture!

But the best part is that the graphics subroutines in **PIXGEN** are SUPER FAST. Lines can be drawn 10 times faster than with ECB, and painting in 32768 DIFFERENT colors and patterns can be done as much as 150 times faster than Basic's PAINT routine!

Drawing with **PIXGEN** is a snap! One joystick controls the position of the cursor on your screen, and the joystick button performs the operation you have selected, whether it be drawing CIRCLES, LINES or HI-SPEED PAINTING. **PIXGEN** also features an UNDO command! Even a novice can have **PIXGEN** working in minutes!

**DESIGN YOUR OWN GRAPHIC ADVENTURES!!!** **PIXGEN** is a tried and true method of obtaining hi-speed detailed graphics while using as little as 400 or 500 bytes of memory per picture!

Once you've drawn your pictures, they are compiled into a binary program that can then be moved anywhere in memory!

Requires a 64K CoCo or CoCo2 with ECB or Disk Basic, and joysticks.  
TAPE...\$27.95      DISK...\$29.95



## SPACEWEB (by Spectacular Software)

**SPACEWEB** is a 32K arcade/strategy game for the CoCo that will blow you away! The time is the 23rd century, and space travel is an everyday occurrence. But during travel through hyper-space, a pilot constantly encounters cubes of energy which block his path, and entrap him. These "Spacewebs" delay the trip through hyperspace, and may prove fatal! Bounce your ship from side to side of the 30 cube, changing the colors each time you bounce, until all of the sides are the same color. But beware! Each level of play has its own time limit! Only the quick and skillful can escape!

**SPACEWEB** features 1 or 2 player action, hi-res 3D graphics, sound effects, multiple skill levels, and Top Ten High Score board.

Requires a 32K CoCo or CoCo2 and joysticks.

TAPE...\$29.95      DISK...\$29.95

## PAINT PATCH

The ultimate texture painting utility for the Basic programmer! Paint with a modified Basic Paint command that works exactly the way the normal Paint command works, in all of those colors you've seen in graphics adventures!

Work in ANY PMODE, with ANY SCREEN! With over 32,000 different colors and textures to choose from, you can paint pictures to suit your wildest dreams.

**PAINT PATCH** is a Basic subroutine which toggles your 64K CoCo into all ram mode, then fixes the Paint command to allow it to paint in textures. Then you use PAINT as you normally would, but select the paint color with 2 color codes rather than 1. A list of popular colors and textures and their color numbers is included.

Give your games and graphic adventures the PROFESSIONAL look, use **PAINT PATCH!**

Requires 64K Extended or Disk Basic.  
TAPE...\$14.95      DISK...\$14.95

## GRAFIKA

**GRAFIKA** is the drawing utility you've been waiting for! Stop wishing you had 3 hands! With **GRAFIKA**, you use only one joystick at a time, and all features provide you with prompts, to let you know what your options are.

Features include Texture Painting (as provided by **Paint Patch**), full screen scrolling, (OMNI-SCROLL), Line, Circle, Box and Pixel drawing, Color Negate, Color Manipulation, and Color Exchange, plus an automatic buffer that holds a copy of the screen in memory at all times. Then, if that last paint "leaked out", the touch of a key will restore the entire screen to it's previous condition!

Load or Save to DOS or Graphicom disks, or transfer pictures between the two. **GRAFIKA** is so easy to use, you may never have to read the instructions for it.

Available for 32K or 64K CoCo or CoCo2 with Disk Basic only.  
DISK ONLY...\$29.95

## A.S.C. CORPORATION

3529 Genessee Road  
LaPeer, Michigan 48446  
Telephone: (313) 664-3722

**GRAPHICOM** is a trademark of Cheshire Cat Computer Creations.



# Reviews

edited by J. Scot Finnie

## Contents

<b>Databank Manager</b> .....	<b>22</b>
<b>The CBasic Compiler</b> .....	<b>23</b>
<b>Print Master</b> .....	<b>26</b>
<b>Disk Fix and OS-9 Utilities</b> .....	<b>27</b>
<b>Alphabet Stew</b> .....	<b>28</b>
<b>Intermediate Mathematics</b>	
<b>United States Government</b>	
<b>Energy and the Environment</b> .....	<b>28</b>

## Review-Ratings Key

6	Unsurpassed
5	Excellent
4	Above Average
3	Acceptable
2	Needs Improvement
1	Unsatisfactory

*Ed. note—The overall ratings that appear in the review-rating graphs are an average of the ratings for all the categories rounded to the nearest quarter of a rating point.*

## Clear It with the Databank Manager

by Jeffery S. Parker

	ease of use	documentation	performance	error handling
6				
5				
4				
3				
2				
1				
<b>OVERALL RATING 4.75</b>				
Application Software				

*Databank Manager is produced by Computerware, 4403 Manchester Ave., Suite 102, Box 668, Encinitas, CA 92024, 619-436-3512. The program requires 64K, a disk drive, and Disk Extended Color Basic. It sells for \$79.95*

If you've been frustrated trying to find software for the CoCo that will let you define a database and then manipulate the data in many useful ways, Computerware's Databank Manager could be the answer. More than just a database, this software lets you actually change field data and print out a wide range of reports that can plot and combine derived information any way you want.

There are several features of this software that make it different from other databases available for the CoCo. It runs under OS-9 and makes use of that operating system's power-

ful file-handling capabilities. Users who do not have OS-9 should not balk at this; the database comes with its own OS-9 driver. And you do not need to be familiar with OS-9 procedures because the program appears to run like any other Color Computer program.

Another aspect of Databank Manager's difference from the run of the mill is that it is designed to show you information in various orders and combinations as well as hold it the way a file cabinet does. Database managers are designed to combine one set of data with another in order to derive or create more meaningful information. Databank Manager does this especially well, and it is not limited to merely emulating a filing cabinet.

If you are familiar with OS-9, you will recognize Databank Manager's use of menus as you go from screen to screen. The program only presents you with those menu options that are available at any given time. It also has excellent built-in error-trapping features, such as internal validation within data fields.

The documentation accompanying the program is very difficult reading for the novice, and requires full concentration for the experienced user. A tutorial of a sample database that is included with the program helps a good deal, but examples within the text would have been even more helpful. The tutorial is unquestionably required reading.

Some of what makes Databank Manager so powerful is the large number of options it offers for entering, storing, formatting, integrat-

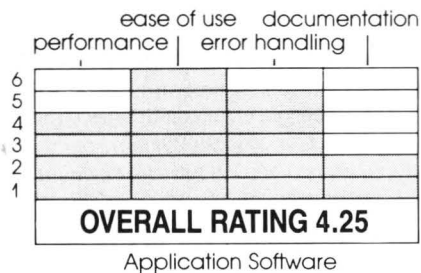
ing, and printing data. Menu areas are provided for defining a record, defining display formats, defining report formats, defining data-access methods, updating records, printing records, interfacing with the operating system (for OS-9 users who want a larger storage buffer, different directory, a shell command, and so on), and management utilities options. Be careful with this last set of options. It allows you to restructure, delete, rename, or copy a Databank Manager file. A nice aspect of these options is that they support input and output of Dynacalc files. There is also a replication feature that allows the user to repeat data fields, such as for mailing labels on tractor-feed paper.

Databank Manager is a powerful and sophisticated data-management tool. It is more easily compared with a business database-management system than with most database programs available for the CoCo. An important note to remember about this program, and what might be its biggest limitation, is that it will not sort and cannot be accessed by a derived field. The computer writes derived-field data as it runs and does not store derived data in a permanent file.

With all the capabilities of Databank Manager, if you have a need for sophisticated data management, this software is probably for you. While it is not a program that novices will learn quickly, once learned, it really becomes a powerful tool for managing data. I recommend it for serious data-management use. ■

# Seeing What CBasic Is Made Of

by Gary W. Clemens



The CBasic Compiler and Program Editing System is produced by Cer-Comp, 5566 Riccochet Ave., Las Vegas, NV 89110, 702-452-0632. The program requires 32K, Disk Extended Color Basic, and a disk drive. It sells for \$149 plus \$3 for shipping.

Remember the opening scene of the Superman TV series? "... It's a bird; it's a plane; no, it's Superman!" Well, even though the CBasic compiler and editor from Cer-Comp can't fly, like Clark Kent—it has a great many super abilities. If Lois Lane did some investigative reporting on CBasic, this is what she might find.

## Operation and Performance

CBasic has a built-in high-resolution program editor that is the normal mode for the entire editing and compiling process. The editor won't do the writing for you, but it provides just about every other feature that you could ask for. It supports a variety of screen formats, arrow-key editing, block move and copy, insert, delete, automatic line numbering, and overtyping. It also has I/O (input/output) commands to append, kill, and list files, though it does not have a Free command. You can change the printer baud rate, force line feeds, change the key-repeat delay, and set compiler directives. Although CBasic is copy protected, the package provides a means of restoring a crashed disk. And if all else fails, you can obtain a replacement for a small fee.

Cer-Comp claims that CBasic runs 10 to 1,000 times faster than interpreted Basic, so I devised several programs for testing this difference in speed. The short program in Listing 1 POKEs each graphic character to every position on the screen—about 64,000 operations. For the sake of perspective I compared routines in home-brew machine language, Basic, and CBasic. Their times were 1.5 seconds, 265 seconds, and 4.5 seconds,

respectively. CBasic is about 59 times faster than the interpreted Basic program.

Another test (Listing 2), multiplies each number from one to 1,000 by a constant and then prints it to the screen. Basic took 22.67 seconds and CBasic took 5.5 seconds to complete this task, a 4-to-1 ratio of difference in speed. The same program required 8.37 seconds of Basic and .5 seconds of CBasic without printing the numbers to the screen, a difference of 17 times.

Input/output operations show the least difference in speed because hardware is the limiting factor, not software. The program in Listing 3 reads every sector on the disk and prints it to the screen. It took Basic 172.43 seconds to run and CBasic 133.65 seconds, a 1.3 to 1 ratio of difference in speed.

The manual states that a straight FOR...NEXT loop executes almost 1,000 times faster than interpreted Basic. My check (Listing 4) executed only 31 times faster. Although according to my tests CBasic isn't as fast as its advertisements claim, it is still fast enough. It compiled a 7,311-byte program to disk in 142 seconds. Maybe it can't compete with a speeding bullet, but then, neither can machine language.

CBasic supplements Disk Extended Color Basic with several new statements, which

are listed in Table 1. You can incorporate the hi-res text screen in your program, use the upper 32K of memory, PEEK and POKE 16-bit words, have full error control, disable reset, control the stack and registers, and incorporate machine language in the program. Other statements swap variable contents, enable or disable the ROMs, and delete trailing blanks in a string. You can also chain programs together and jump to external machine-language subroutines. The PRINT@ statement works for the entire screen in any resolution.

The hi-res screen package includes more than 30 features, including protected lines, home cursor, double-size characters, underlining, and reverse characters. The cursor can be destructive or nondestructive. The hi-res screen displays 24 lines with nine optional screen widths ranging from 28 to 255 characters per line plus the standard 32-by-16 text screen. One drawback is that formats exceeding 64 characters in width are unreadable. Other screen options include selectable background colors in the hi-res format and a variable scroll rate for PBJ's Word-Pak 80-column card. CBasic also supports Double Density's Double 80 Plus 80-column card.

CBasic has a couple of weaknesses that are apparent right off the bat. It doesn't support some Extended Color Basic program statements that could be important to some users. (See Table 2.) And because CBasic is an integer compiler, it doesn't support trig, log, or floating-point statements.

## Ease of Use

Comparing Extended Color Basic's edit mode to CBasic's text editor is like comparing a World War II jeep to a modern sedan. Both get you to your destination, but what a difference in the ride. Cer-Comp souped up its editor with automatic line numbering, arrow-key editing, two-character commands, and single-key LIST control. Global commands include search and replace; block commands include copy, move, and delete. The editor has two modes, line edit and auto edit. However, there isn't much difference between them. Both accept arrow-key movement, forward and reverse scrolling, typos, insert, and delete. The scrolling feature is similar to that of EDTASM+, with the next line always printed at the bottom of the screen whether you are scrolling toward the beginning or the end of the file. The editor also improves printer control. You can set the baud rate and direct all output to the printer with keyboard commands.

CBasic doesn't need a phone booth to change from editor to super compiler, just

BASE	BUF	CALL
CHAIN	DPEEK	DPOKE
DPSET	ERL ERR	FIRQ
GEN	HIRES	IRQ (ON/OFF)
MODULE	NMI	ON ERR
ON FIRQ	ON IRQ	ON NMI
ON NOVR	ON OVR	ON RESET
ON SWI	ORG	OVEREM
RAM (ON/OFF)	RAM64K	RETI
RND	STACK	SWAP
SWI	SWITCH	SWITCH\$
TRM\$		

Table 1. New Commands from CBasic

ASC	ATN	AUDIO
CLOAD	COS	CSAVE
DEF	DEFUSR	EXP
FILES	FIX	LOAD
LOG	MEM	MERGE
NEW	PRINTUSING	RENAME
SAVE	SIN	SKIPF
SQR	TAN	USR

Table 2. The List of All Extended Color Basic Commands Missing from CBasic



type CBASIC and watch the compiler spring into action. If you don't set any external compiler directives, CBasic will use default values. Some of the compiler options are 64K mode, program-start address, variable storage in the upper 32K, and stack preservation. To compile a program, just select disk or memory mode (for debugging only) and whether you want a printed listing. CBasic checks each program line for errors and prints troublesome lines with corresponding error codes, putting arrows below the mistakes. Then the compiler lists the entire program, showing the starting memory location in front of each program line. The listing ends with a summary of the number of errors, memory allotted for variables, the memory address of each variable, program-end address, and program length.

CBasic's syntax is nearly always the same as the respective Basic statements. The major difference occurs in defining string variables and arrays. Because of the way memory is allocated, you must define each string variable or array that exceeds 32 characters in length. Some of the Boolean operators function the same as in Extended Color Basic but use different symbols.

Compiling programs that weren't written specifically for CBasic is more difficult than

the advertising implies. I have only been able to compile two of more than a dozen commercial programs without a fair amount of rewriting. The string variables will almost always have to be initialized and dimensioned, all loops must have a common exit, and timing loops must be rewritten. Because CBasic doesn't have a USR command, imbedded machine-language routines can be a problem. It is virtually impossible to pass data to them unless you can rewrite the machine language in the routines.

## Error Handling

CBasic handles goofs as easily as Superman dealt with his arch foe, Lex Luther, who always came to see the error of his ways. The editor seems crashproof. It rejects unknown or misspelled commands and locks out unused keys, replying with a beep when you use them. The only way I know of to crash the editor is to load in a program that is in binary instead of ASCII (American Standard Code Information Interchange) format.

I wasn't able to crash the compiler either, although I once had it go into an endless loop while compiling an error-laden program. What happened was that it listed the lines with errors in normal fashion and then began

listing the program over and over again. This is annoying but not a big problem because pressing the break key returns you to the ready mode. I haven't isolated the reason for this, but I think it occurred because of too many undimensioned string variables.

Speaking of errors, CBasic has several error-handling program statements that supplement Disk Extended Color Basic. With these you can direct program flow to a specified line when an error condition occurs and receive an error-code number.

## Documentation

CBasic's manual is easy to read and written with a minimum of technicalese. It covers editor commands, I/O, statement syntax, and compiler options. Appendices discuss CBasic differences, a language summary, error codes, and hi-res function codes. Each program statement, including proper usage and correct syntax, is described in the manual. The statement descriptions are adequate, but if you are just beginning to learn Basic, you'll need to study the manuals that came with your CoCo, too. CBasic's documentation consists of a reference manual, not a programming tutorial.

The editor section of the manual was writ-

# PERRY COMPUTERS

## COLOR COMPUTERS

### COMPUTERS

	LIST PRICE	OUR PRICE
26-3136 16K Extended Color Computer 2	\$ 119.95	\$ 99.00
26-3127 64K Extended Color Computer 2	219.95	175.00
26-3129 Disk Drive 0 for Color Computer	349.95	290.00
26-3130 Disk Drive 1 for Drive 0	199.95	169.00
26-1276 DMP-105 80 cps Dot Matrix	199.95	169.00
Teletwriter 64 Tape	49.95	42.00
Teletwriter 64 Disk	59.95	49.00
VIP Writer	69.95	59.00

### SOFTWARE

	LIST PRICE	OUR PRICE
VIP Database	\$ 59.95	\$ 49.00
VIP Terminal Disk	49.95	45.00
VIP Integrated Library	149.95	139.00
RADIO SHACK Software	—	15% Off
Tom Mix Software	—	CALL
Comrex SS/DD 10 Pack Disks	21.00	14.00

### MONITORS

	LIST PRICE	OUR PRICE
Comrex 12" Green Monitor	\$ 119.00	\$ 95.00
Comrex 12" Amber Monitor	129.95	110.00
Comrex 13" Color Monitor	329.95	285.00
Amdex 300A Monitor	199.95	155.00
Teknika RGB/Composite Color Monitor	399.00	295.00
VIDEO Plus Monitor Adaptor	—	32.00

CALL (517) 625-4161  
CALL TOLL FREE 1-800-248-3823

### COMPUTERS

	LIST PRICE	OUR PRICE
26-1070 Model 4D Desktop 64K	\$ 1199.00	\$ 895.00
25-1000 Tandy 1000 1 Dr. 128K	999.00	705.00
25-3000 Tandy 1200 10 Meg H.D. 256K	1999.00	1525.00
26-5103 Tandy 2000 2 Dr. 256K	2499.00	1225.00
26-5104 Tandy 2000 1 Dr. 10 Meg H.D. 256K	3950.00	1885.00
26-3860 Tandy Portable 200 24K	999.00	725.00
26-1208 CCR 81 Tape Recorder	59.95	50.00
25-1001 Tandy 1000 10 Meg. H.D. 256K	1999.00	1495.00

### PRINTERS

	LIST PRICE	OUR PRICE
Epson LX-80 Printer (Friction Feed)	\$ 299.00	\$ 250.00
Epson LX-80 Tractor Feed	49.95	40.00
OKIDATA 182 Printer	299.00	245.00
STAR SG-10 Printer	299.00	250.00
C.I.TOH 7500 Prowriter Printer	289.00	225.00
Botek Serial to Parallel Interface	69.00	59.00

### ACCESSORIES

	LIST PRICE	OUR PRICE
26-3018 Extended Basic Kit	\$ 39.95	\$ 37.00
26-3017 64K Memory Kit	59.95	51.00
26-3008 Joysticks (PAIR)	19.95	16.95
26-3012 Deluxe Joystick (EACH)	29.95	25.00
26-1178 DCM-3 Direct Connect Modem	59.95	50.00
Anchor-Signalman Modem 300/1200 Baud	399.00	275.00

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted (\$10.00 charge per carton on C.O.D. Call for further C.O.D. information.) M.C. Visa add 2%. AX add 3%. All non-defective items returned will be subject to 10% restocking fee. Defective items require return merchandise authorization. Call for R.M.A. Number before returning. Delivery is subject to product availability. Mon. Wed & Fri 9-9. Tues & Thurs 9-6. Sat 9-3.

**PERRY COMPUTERS • 124 SOUTH MAIN STREET • PERRY, MI 48872**

ten under the assumption that readers have some familiarity with either Extended Color Basic's editor or a text editor. It provides explanations of all the commands, including purpose and proper syntax, although some might require experimentation to determine correct usage.

There are a few important aids to understanding this program that have been left out of the documentation. It lacks an index, reference sheet or card, and a glossary of terms. The manual contains a list of supported statements, but not the page numbers where descriptions of them can be found.

My initial experiences using CBasic serve as a good example of the incompleteness of the documentation. The manual's introductory pages make several references to loading in your program, so I did. But when I tried to edit, the screen was filled with a wild graphics display of rapidly changing text sizes, colors, and scrolling screens. Then I discovered that you must load your program in ASCII.

## Final Thoughts

CBasic is powerful, easy to use, and yet sometimes frustrating. I need some of those commands that have been left out. It is, however, one of the best integer Basic compilers

available. It is as powerful as the best of its competition and very easy to use. The price tag it carries seemed a bit steep for an integer compiler on first glance, but when you add 64K, hi-res drivers, and full-screen editing,

CBasic begins to look more like a bargain. This program has a few drawbacks, but then even Superman had a near fatal flaw in Kryptonite. ■

### Listing 1. ScrnPOKE

```
10 FOR X = 128 TO 255:FOR Y = &H404
    TO &H5FF
20 POKE Y,X
30 NEXT Y:PRINT@0,X:NEXT X
40 END
```

### Listing 2. Addnumb

```
10 CLS
20 FOR X = 1 TO 1000
30 Y = X * 11
40 PRINT@ 335,Y
50 NEXT X
60 SOUND 150,10
70 CLS
80 PRINT@ 400,"END OF TEST"
90 END
```

### Listing 3. Readdisk

```
10 DIM A$(1,128),B$(1,128)
20 FOR T = 0 TO 34
30 FOR S = 1 TO 18
40 DSKI$ I,T,S,A$,B$
50 PRINT A$:B$
60 NEXT S:NEXT T
70 SOUND 150,5:CLS:PRINT@ 330,
    "DONE"
80 END
```

### Listing 4. Fornext

```
10 CLS
20 FOR X = 1 TO 32000
30 NEXT
40 SOUND 150,10
50 END
```

## DISKETTES AND COCO SOFTWARE

5.25" DISKS EACH 10-PACK \$12.50-SSDD/DSDD \$20-DSQD  
American-made, guaranteed 100% quality, with Tyvek jackets, hub rings, and labels

CMODEM TELECOMMUNICATIONS PROGRAM \$100-FLEX,OS/9  
OBJECT-ONLY versions: EACH \$50-FLEX,OS/9  
menu-driven with terminal mode, file transfer, MODEM7, XON-XOFF, etc.  
for COCO and non-COCO; drives internal COCO modem port up to 2400 Baud

SUPER SLEUTH DISASSEMBLERS EACH \$99-FLEX \$101-OS/9  
OBJECT-ONLY versions: EACH \$50-FLEX,OS/9,COCO  
interactively generate source on disk with labels, include xref, binary editing  
specify 6800,1,2,3,5,8,9/6502 version or Z80/8080,5 version  
OS/9 version also processes FLEX format object file under OS/9  
COCO DOS available in 6800,1,2,3,5,8,9/6502 version (not Z80/8080,5) only

CROSS-ASSEMBLERS EACH \$50-FLEX,OS/9 ANY 3 \$100 ALL \$200  
specify for 180x,6502,6801,6804,6805,6809,Z8,Z80,8048,8051,8085,68000  
true, modular, free-standing cross-assemblers in C, with load/unload utilities  
8-bit (not 68000) sources included with all cross-assemblers (for \$200)

DEBUGGING SIMULATORS EACH \$75-FLEX \$100-OS/9  
OBJECT-ONLY versions: EACH \$50-COCO FLEX,COCO OS/9  
specify for 6800/1, (14)6805, 6502, 6809 OS/9, Z80 FLEX

ASSEMBLER CODE TRANSLATORS FOR 6502, 6800/1, 6809  
6502 to 6809 \$75-FLEX \$85-OS/9  
6800/1 to 6809 and 6809 to position-independence \$50-FLEX \$75-OS/9

FULL-SCREEN FLEX TSC XBASIC PROGRAMS with cursor control  
DISPLAY GENERATOR/DOCUMENTOR \$50 w/source, \$25 without  
MAILING LIST SYSTEM \$100 w/source, \$50 without  
INVENTORY WITH MRP \$100 w/source, \$50 without  
TABULA RASA SPREADSHEET \$100 w/source, \$50 without

DISK AND XBASIC UTILITY PROGRAM LIBRARY \$50-FLEX  
edit disk sectors, sort directory, maintain master catalog, do disk sorts, etc.

Computer Systems Consultants, Inc.  
1454 Latta Lane, Conyers, GA 30207  
Telephone 404-483-1717 or 4570

Most programs in source: give computer, OS, disk size.  
Contact us for full catalog, dealer, and services info.  
25% off multiple purchases of same program on one order.  
VISA and MASTER CARD accepted; US funds only, please.  
Add GA sales tax (if in GA) and 5% shipping.

FLEX tm Technical Systems Consultants; OS/9 tm Microware; COCO tm Tandy.

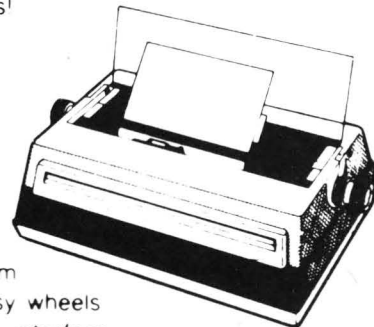


## DAISY WHEEL New Smith Corona L-1000

True letter quality printer for less than the cost of an office typewriter! Priced \$500 less than other popular daisy wheel printers!

SALE PRICE:

# \$249



### FEATURES:

- ★ Friction feed
- ★ 15 cps, 120 wpm
- ★ Changeable daisy wheels
- ★ Parallel or serial interface
- ★ Compatible with R/S, Apple, etc.



## SUNLOCK SYSTEMS

210 Connor Rd.  
Mechanicsville, Va. 23111

We accept  
MasterCard,  
Visa and CODs

### ADDITIONAL PRINTER SPECIALS

Epson	Okidata	ComrexCRII	\$299	Citoh 7500	\$239
DX10	\$249	ML83	\$499	Comrex III	399
LX80	229	ML192	369	Star SG10	239
L1500	899	ML84	649	Star P.TYPE	319
FX85	359	ML193	519	Star SR 10	499
FX185	499	ML93	509	Star SD 10	349
JX 80	499	ML182	239	Star SG 15	399
				Citoh8510SP	379
				Cannon 1092	389
				Citizen M10	279
				Tshiba 351	1099

**TO ORDER CALL TOLL FREE 800-368-9191**  
In Virginia call 804-746-1600



# The Word on Print Master

by Bobby Ballard

	ease of use	documentation	performance	error handling
6				
5				
4				
3				
2				
1				
<b>OVERALL RATING 3.75</b>				
Application Software				

*Print Master is manufactured by Dataman International, 420 Ferguson Ave. North, Hamilton, Ont., L8L 4Y9, Canada, 416-529-1319. The product requires 32K and a mouse or joystick. It sells for \$29.95 on cassette or disk plus \$2.50 for shipping. The Canadian price is \$39.95.*

First there came Graphic Master and Text Master. Now comes Print Master. This entry packs the same power of the other Master series programs, offering a versatile and adaptable printer driver that will work with any printer on the market.

Print Master was written by Scott Nudds and is actually two programs incorporated in one package. The first part, Print Master, handles the basics of loading, moving, and printing graphics. The second part, called the Customizer, allows you to set up Print Master for any printer. It customizes Print Master to match your brand of printer and lets you make other changes in the way the utility prints your files.

I was impressed with the professional packaging that Dataman provides with Print Master. It comes with a small three-ring vinyl binder that has an inside pocket for the disk. The software is equally impressive. By "pointing and clicking" with a joystick or mouse, you move through the program quickly and efficiently. All features are menu driven and lightning fast. Keyboard entry in Print Master is kept to a minimum.

On startup, the program displays a colorful title screen. It also makes good use of the CoCo's sound capabilities. There are four menus: Main Menu, File I/O, Image Dump, and Dump-a-Screen. Each of these is pictured and explained in the manual, and some are self-explanatory.

## Problems

Despite what seems to be a well-organized package, Print Master has some problems.

There are times when it becomes confusing to use. For example, in Main Menu, the first selection is "dump a picture." However, when you click this selection you get the Image Dump menu. This kind of inconsistency should be cleared up with more careful titling of menus and instructions that mean something to the user. The Image Dump menu might better be termed the the Dump Options menu. You don't really dump an image from it, you just set the options for the dump.

The manual is not much help. It shows the Image Dump screen, but the text beside it calls it the Dump Menu. The explanation in this section states "The Image Dump menu is available from both the Main Menu and the File I/O menu. If the listed parameters are correct you may click on the menu title (Image Dump) and proceed to the next level." There is no indication in the manual what the next level is or why you might want to proceed there. What the authors are trying to say is that when you are in the Image Dump menu, you can take a shortcut to the Dump-a-Screen menu by positioning the cursor directly on the words "Image Dump" and pressing the button. It is important to read the manual thoroughly before getting started. Although operation is simple, you will find the options and features confusing without doing so.

Screens are sent to the printer from the Dump-a-Screen menu. In this section you are given many options on how much of the screen you want printed. For example, you might dump a working screen, a stored screen, or part of a screen; view the working screen; select PMODE; choose text size; go back to the File I/O menu; or return to the Image Dump menu. If you have a 64K CoCo, you can also save and retrieve screens from high memory or print several screens from high memory together. Features in Print Master that don't require 64K include 90-degree rotation of pictures, the option to customize text titles for pictures, expandable height for handling CoCo Max files (a graphics program from Colorware Inc.), setting of pixel size in both height and width, and the modulus mode. The last option permits shading and changing patterns for achieving different gray scales.

## The Customizer

Print Master comes with a list of several printers in its disk directory. If yours is listed there, you will not have to customize Print Master to work with your printer. If, however, you own a printer the program does not list, you'll have to use the Customizer to set up a

driver. The printers listed in the program's directory include the CGP-115, CGP-220, DMP-105, DMP-110, DMP-200 from Tandy; Star Micronics' Gemini; and the Apple Image Writer among others.

The Customizer has features that let you do the following: change the baud rate, set the number of wires (pins) in the print head, remap the print head, add bytes to the output, set bits to remain on during output, reset the graphics mode, define a color set, define tab strings, define custom strings, isolate and replace bad output, and test or save your custom file. Although the manual touches upon each of these features, it could explain them better.

The customize feature can also be used by both 32 and 64K CoCo owners to design custom strings for producing various effects. You need a thorough working knowledge of the printer in question and a little patience to get through these features. The Customizer makes Print Master the most versatile driver on the market. It works on some of the most difficult printers to drive, including the Okidata 92/93 and color printers such as the Tandy CGP-115.

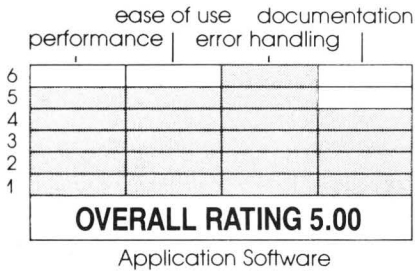
Although it is not easy to set up a custom file in Print Master, it is difficult to endow a program with powerful features and also make it easy to use. One point in the program's favor is that Dataman is helpful and courteous when you have questions or problems. I was often able to reach the author of the program directly by telephone. I've found few companies that offer Dataman's high level of service after a sale. They win my Atlas Award for the best customer support I've come across.

## The Last Word

I have mixed feelings about Print Master. With a few improvements in documentation and menus, it would be easy to give this package a very high overall rating. But because of the confusion of the documentation and the lack of consistency in the menu titles, I'll reserve that rating for later versions. Despite the program's problems, however, I have never seen a more powerful or versatile printer driver for the Color Computer. If you have several printers or one to which it is difficult to dump graphics, this may be the solution. You might also consider that if you buy new printers, owning Print Master means that you won't have to write your own driver or wait for one to be developed. And given the level of customer support from Dataman, you are likely to get this program working whatever the printer or conditions. ■

# Disk Fix and OS-9 Utilities

by Bruce N. Warner



*Disk Fix and OS-9 Utilities are available from Computerware, 4403 Manchester Ave., Suite 102, Box 668, Encinitas, CA 92024, 619-436-3512. The program requires 64K, OS-9, and a disk drive. It sells for \$29.95 plus \$2 for shipping.*

There are a lot of new utilities for your CoCo, and many of them are for OS-9. The reason for this is that Tandy Corp. announced that they plan to strongly support OS-9 in future models of the CoCo. But will new versions of the Color Computer have 40-track, double-sided disk drives like the latest Model 4's? Or will Tandy continue in their single-sided vein? There have been several fixes released for solving the CoCo's single-sided storage problems, but all the effective ones have had drawbacks, too. Enter Disk Fix and OS-9 Utilities from Computerware.

## Disk Fix

One program I've used for this purpose works well but has an annoying characteristic. If I want to share software I've written with friends who have single-sided, 35-track CoCos, I have to reset my system so that at least one drive is defined in the single-sided format and another is defined as a double-sided drive. Disk Fix provides a cure for this by taking on the form of a new command, NEWFMT, which lets you change the format of a disk directly from the command line, despite the predefined format of your system.

The best application I've found for this concerns the OS-9 Users' Group Library. I have permission to make copies of software from this library for the Northern Virginia Color Computer Club, of which I am a member. Many of the club members have single-sided, 35-track systems. In the past, in order to copy the entire disk for these members, I had to reboot my system to recognize the second drive as single sided and then DSAVE the the entire disk piped through a shell. Disk Fix lets me format the second disk as single sided

and then use Dircopy. The real beauty of this is that there is no rebooting. And OS-9 assigns files by the file-allocation table on the destination disk, which keeps the disk from even looking at the second side.

## The Rest of the Utilities

This package contains seven program utilities, seven procedure files, a device driver, and a note on using four disk drives (which can only be set up when all four drives are single sided). The procedure files do most of the work involved with installing a new OS-9 system of double-sided and/or 40-track drives. By following the directions, you'll soon find you can take full advantage of OS-9 and its storage capabilities.

Dircopy is one of the most useful of the utilities you'll find in this package. It is a cross between the COPY, DSAVE, and BACKUP commands. The differences are in its built-in flexibility. Dircopy, unlike DSAVE, allows you to perform either a partial or complete backup of one disk to another. It can also let

**"Disk Fix and OS-9 Utilities has become a welcome addition to my OS-9 library."**

you choose particular files for copying, copy the data directory only, provide an interactive option, automatically overwrite existing files, sort files in the directory into alphabetical order, copy only those files that are newer than the existing file of the same name, and update files while maintaining the date of creation and the last time the file was updated or modified. Most of these options execute by themselves once they are selected.

If you choose Dircopy's interactive mode, the utility prompts you for all options and can provide you with a help menu. Although Dircopy allows you to rewrite existing files with the automatic rewrite option, if you choose not to use this option, the utility prompts you to rewrite a file if another exists with the same name. This allows you to decide whether or not you want to rewrite a file. I found this feature to be extremely useful

when copying files onto another executable disk that already contained the OS9Boot file.

Patch is basically an interactive debug program. Its command line is executed simply by calling Patch with the file to be worked on. The best part about Patch is that it allows you to change a small portion of a program without having to examine the entire source code. By using Patch in conjunction with the standard OS-9 dump module, you can create a small debugger/disassembler.

Filelook is similar to OS-9's MDIR command. When you call MDIR with the E option, you can get a great deal of useful information on a file. Under OS-9, the DIR command does not give you quite the same detail of a file. But Filelook lets you read many of the MDIR E items without first loading the file into memory. The extra details are the size, type, revision number and name of any module contained in a disk file.

The compare command compares a disk file and memory-resident module, byte for byte. It is most useful when you are examining a module that has been changed.

Dmode lets you change the mode of any of your disk device descriptors to single- or double-sided drives: select 6-, 12-, 20-, or 30-millisecond step rates; choose from one to 40 tracks per side; and set the verify command on or off. Dmode even addresses the fact that the CoCo OS-9 device driver does not check for double-sided drives or increased step rates; Disk Fix and OS-9 Utilities provides its own Ccdisk module.

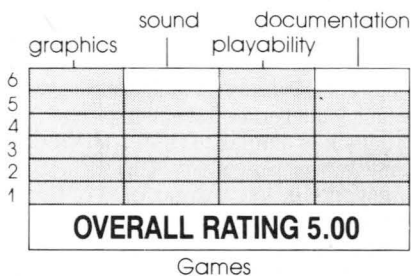
Dblboot moves the OS-9 boot file created by OS9Gen or Cobbler to the correct physical track of the drive. This is absolutely necessary for double-sided drive users.

## Some Final Thoughts

With all it has to offer, you might think that there is nothing wrong with Disk Fix and OS-9 Utilities, and you'd be almost right. The only aspect of the package that I could find fault with is that on page 14 of the manual the authors describe a process of pressing the space bar to continue after each screen fills with text. I prefer to enter the "Tmode-pause" command prior to using the Dircopy command. This will turn off the terminal's pausing after filling each screen of text. I could find nothing else that I would change in the program or its documentation. The directions are clear and to the point in all other respects. Disk Fix and OS-9 Utilities has become a welcome addition to my OS-9 library. If you decide that you want to go a step further with your disk system than Tandy has designed OS-9 to go, this is it. ■

## Getting into Alphabet Stew

by Richard Ramella



Alphabet Stew was created by Triad Pictures, P.O. Box 1299, Sequim, WA 98382, 206-683-6459. It comes in two versions for 16 or 32K, which come on the same cassette for \$17.95. It requires Extended Color Basic.

**A** 3-year-old girl just happened to be in the house the day Alphabet Stew ar-

rived. The program delighted her so much that she had to be taught not to bang on the keyboard. And though I am chronologically an adult, Triad Pictures' gently humorous alphabet program also charmed me.

With close supervision, children as young as 1 or 2 years might derive fun and valuable experience from this easy-to-use sampler. Want to hear music and see bright screens . . . follow along as a pair of cartoon legs aptly illustrate the meaning of the word zip. . . watch a volcano blow its top? It's all here in Alphabet Stew.

If I can find fault anywhere in this program, it's that the same graphics are used in some instances to illustrate more than one letter. A comical sour face depicts the meaning of both *grumpy* and *yuck*, and other pictures also do double duty. Despite my concern, this didn't seem to bother the 3-year-old.

Play of this game is simple, yet it gives very young players a nice sense of control over the

proceedings. To see a well-done example of the word *x-ray*, press the X key; or to see the *moon*, for example, press the M key. The pictures are accompanied by snippets of music and sound effects. The punctuation characters offer various bits of music. Players can also work out tunes by pressing the 1 through 0 keys, which form an octave plus two notes. The program's brief instruction booklet includes tunes children can play by pressing particular number keys. The difference between the 16 and 32K versions is that the longer program has two or more examples for each letter. The 16K version has only one.

Alphabet Stew could well be a toddler's best introduction to both the alphabet and the computer. The colorful, musical, ever-changing events of this whimsical game have a knack for maintaining a youngster's interest. And the techniques of animation are worth study by aspiring programmers. I recommend it all around. ■

## Three from Dorsett

by Dennis W. Peterson

Intermediate Mathematics, United States Government, and Energy and the Environment are manufactured by Dorsett Educational Systems, P.O. Box 1226, Norman, OK 73070, 800-654-3871, 405-288-2301 in OK. They require 16K, Color Basic, and come on cassette for \$59.90 each plus \$2.50 for shipping.

**A** major credit-card company instructs you not to leave home without its card. Teachers could say the same about Dorsett programs: Don't go to school without one. Students buy them for home use. And common sense tells you that they offer a good

value. Each \$59.90 package comes with 16 programs, one on each side of eight cassettes that come attractively packaged in a textbook-size carrying case. Dorsett even sells the cassettes separately for \$8.88 each. The company also sells 16 study booklets and 32 pre-post tests to go along with their software for \$15.95. Dorsett's library of educational software is worth checking into.

### Getting Started

The only documentation that comes with most Dorsett programs is a half sheet of typing paper that contains loading instructions and whatever information you can glean from the Dorsett courseware catalog. (An additional paragraph of information on each program comes with the Intermediate Mathematics package.) Despite this paucity of instruction,

the documentation provides all the information you need to know. Once loaded, the programs do the rest. Be sure that you have not left a disk-drive controller in your CoCo's ROM port; these cassette-based programs will not run with the controller connected.

Dorsett programs turn your computer into something like a knowledgeable lecturer. Material is presented by a pleasant, prerecorded narrator's voice that is matched by attractive screen graphics. Just as good teachers jot important points on the blackboard, the program displays them on the screen in easy-to-read print. It also keeps a record of student responses as a means of monitoring learning. The scoreboard at the end of each program reports the number of questions asked, the number of correct first-try answers, and the total number of incorrect replies.



**“Dorsett programs turn your computer  
into something like  
a knowledgeable lecturer.”**

**Intermediate Mathematics**

	meets objective	maintains interest	documentation ease of use
6			
5			
4			
3			
2			
1			
<b>OVERALL RATING 4.25</b>			
Educational Software			

This package of programs is intended for students in grades four through eight. Along with providing typical addition, subtraction, multiplication, and division lessons, it offers concepts such as weight conversion, the metric system, interpolation, and an introduction to logarithms. Forgotten your logarithms? Well Dorsett wants to teach them to your eighth grader, and why not? Maybe you could use a little boning up, too. Just because these are intermediate math programs does not mean that high schoolers and adults can't use them. Also, Dorsett doesn't expect that a seventh grader who is having trouble with decimal division should plunge headlong into interpolation with negative numbers. There is a program for decimal division, too. Intermediate Mathematics does not contain lessons on fractions, but Dorsett has another set of programs that deal with that topic.

Don't expect your student math scholar to understand everything perfectly after one trip through any of these tapes. Sometimes repeating just a portion of a tape is a better idea than running the whole thing. Some questions the programs put to students seem more intent on seeing if they are awake than stimulating serious thought. For example, the logarithms tape asks, "What is the second part of a logarithm," and offers the possible answers *mantle*, *mattress*, and *mantissa*. The second answer could be the correct one if the logarithm segment puts you to sleep. But these tapes are far more exciting to kids than the dronings of a math instructor on a sunny spring afternoon are apt to be.

**United States Government**

	meets objective	maintains interest	documentation ease of use
6			
5			
4			
3			
2			
1			
<b>OVERALL RATING 4.00</b>			
Educational Software			

This series offers students in the seventh through twelfth grades a strong outline of federal, state, and local governmental systems. It also explores the two-party system, taxation, naturalization, voting, international affairs, and the creation of the Constitution. While the scope of these programs is not on a par with that usually aimed at by 700-page-textbook writers, they do cover the essentials thoroughly and serve as a good introduction to the concepts of government for future voters in your family or classroom.

Because the lessons in this package are well organized, they help students who have difficulty culling out the most important information from textbook pages by creating an ordered mental outline. Even college students might benefit by going over these tapes. The structure they provide is excellent preparation for a political-science course. And new U.S. citizens might find this series to be invaluable.

**Energy and the Environment**

	meets objective	maintains interest	documentation ease of use
6			
5			
4			
3			
2			
1			
<b>OVERALL RATING 4.00</b>			
Educational Software			

The Energy and the Environment package targets sixth- through twelfth-grade students, but adults who are interested in ecology will find them to be informative, too.

Fifth-grade teachers might find parts of the series to be a help to their students if they relate specifically to classroom topics.

In using this package, students learn about the traditional sources of energy, their impact on the environment, alternative energy sources, and future energy needs. The lessons objectively outline the problems that must be overcome in turning to different energy sources. The overall tone is one of practical optimism, and the series explores many different energy options.

One tape, for example, treats wind energy. It points out that the wind can be harnessed to provide electrical energy, but not always at the times when it is needed. The lessons suggest that wind-generated energy could be stored by using it to convert water to hydrogen, which is then stored for future fuel use. The tape doesn't stop there, however, leaving students with too rosy a picture. It continues by pointing out the problems and disadvantages of storing hydrogen. Energy and the Environment consists of practical and objective lessons that treat a sometimes controversial topic factually.

**Conclusions**

These new Dorsett educational series are packed with great graphics, print style, and layout. It is difficult to come up with suggestions for improvement. It would be better if the narrator could slow down a little, but only if he can do so without sacrificing the well-organized information found on each cassette. In rare instances I found that the tapes dropped a narrated word or two; apparently these slips are at points where bits of the computer program have been patched to provide the computer with information.

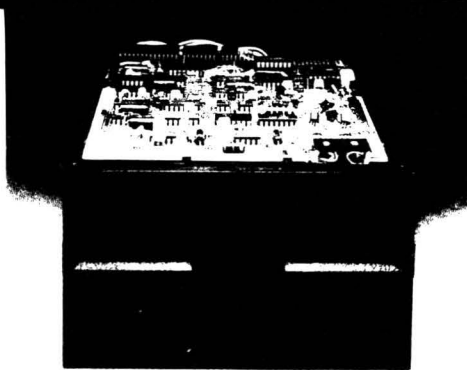
Intermediate Mathematics, United States Government, and Energy and the Environment deal with subjects that some students might find less than interesting. But they cover these topics in a way that is much more likely to maintain interest than a chalk-and-chat session with a teacher. Compared with filmstrip and audio-tape packages, these programs are dollar savers. And since they are computer programs, they provide more student interaction than many other teaching methods—especially when they are used independently in a learning center or at home. ■

# NEW DISK DRIVES

STARTING AT

**\$ 89.<sup>95</sup>**

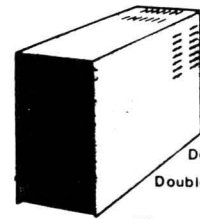
**WITH CASE &  
POWER SUPPLY  
\$129.95**



TANDON MPI TEAC

Speed 6 ms tk to tk and up  
Capacity 250k unformatted  
Tracks 40  
Warranty **now 1 YEAR**

New Low Price!



40Tks 6Ms  
Double Sided  
Double Density

40 or 80 Tracks

1/2 Hght. Teac/Panasonic



We carry only the finest quality disk drives • no seconds • no surplus

**SATISFACTION GUARANTEED!!**

ALL DRIVES FULLY TESTED & WARRANTED

Complete Disk Drive with Power Supply & Case ..... Teac ..... **\$129.95**

Two Drives in Dual Case & Power Supply ..... Teac ..... ~~\$279.95~~ **CALL**

1/2 ht double sided double density Disk Drives (Panasonic/Teac) <sup>Tracks 40</sup> **\$119.95**

1/2 ht double sided double density Disk Drive with ps & case ..... ~~\$199.95~~ **CALL**



How to use your new drive system on audio cassette

Single ps & case \$44.95 Dual 1/2 ht ps & case ..... \$54.95 Dual ps & case ... **Call**

Color Computer Controller (J&M)



**\$129.95**

**DRIVE Ø FOR RADIO SHACK COLOR COMPUTER**

TANDON, MPI OR TEAC DRIVE (SINGLE SIDED 40 TRACKS SPEED 5MS TRK TO TRK & UP)  
POWER SUPPLY and CASE, TWO DRIVE CABLE WITH ALL GOLD CONNECTORS

J&M CONTROLLER, MANUAL and DOCUMENTATION ..... ~~\$249.95~~ ..... **\$ SALE!**

**DRIVE Ø FOR RADIO SHACK COLOR COMPUTER**

PANASONIC 1/2 HEIGHT DOUBLE SIDED DOUBLE DENSITY DRIVE 500K unformatted  
POWER SUPPLY and CASE, 2 DRIVE CABLE WITH ALL GOLD CONNECTORS

J&M CONTROLLER, MANUAL and DOCUMENTATION ..... ~~\$279.95~~ ..... **Super!! SALE!**

TAKE ADDED SAVINGS ON TWO DRIVE SYSTEMS

DISKETTES with free library case .....  **\$17.95**

Unadvertised Specials .....  ..... **\$Call**

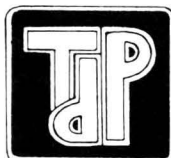
Drives cleaned, aligned & tested ..... **\$29.95**

TECHNICAL STAFF ON DUTY, PLEASE CALL FOR ASSISTANCE.

**CALL US TODAY!!  
ORDER TOLL FREE**

**(617) 278-6555  
1-800-635-0300**

\*DEALER INQUIRIES INVITED.  
**(617) 278-6555**





**TRUE DATA PRODUCTS**

9. S. Main  
Uxbridge, MA 01569  
**(617) 278-6555**

HOURS MON - SAT 9-6 (EST)

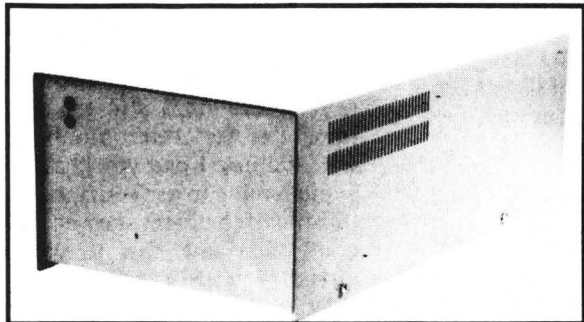
We welcome

- Visa / Master Charge  
- Checks (allow 2 weeks for clearing)
- C.O.D. Add \$2.00

# New Hard Drives

----- COMPLETE SYSTEM ----- JUST PLUG IN -----

**Call For  
BEST PRICE**



**Warranty - One Full Year**

5 to 20 Megabyte, ready to run on the TRS  
80 Model I/III/IV/4P, color computer,

**64K UPGRADES \$39<sup>95</sup>**

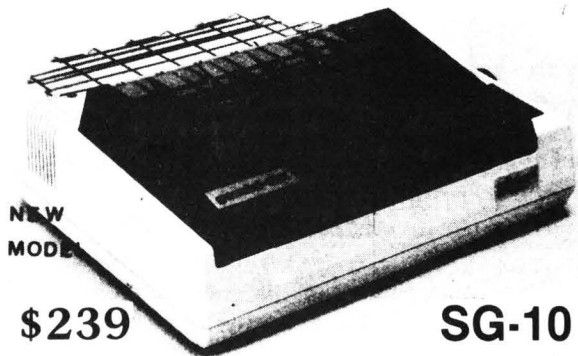
**star** PRINTERS

- 100 - 120 - 160 CPS
- Bidirectional Logic Seeking
- Friction and Tractor
- 9X9 Dot Matrix
- True Decenders
- High Res-Bit Image Block Graphics

PRINTER CABLES AND  
INTERFACES AVAILABLE  
Call for current pricing

- Super Script-Subscript
- Underlining
- Backspacing Doublestrike
- 5, 6, 8 1/2, 10, 12 and 17 Pitch
- Programmable Line Spacing
- SIX (6) MONTH WARRANTY

**GEMINI 10X** (9 Inch Carriage, 120cps) Friction and Tractor.....\$CALL  
**GEMINI 15X** (15 Inch Carriage, 120cps) Friction and Tractor.....\$CALL  
**DELTA 10** (10 Inch Carriage, 160cps) Friction and Tractor.....\$CALL  
**POWER TYPE** Letter quality



NEW  
MODE

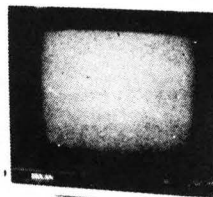
**\$239**

**SG-10**

## NEW QUALITY VIDEO MONITORS

Starting at **\$79.<sup>95</sup>**

**MONOCHROME  
COLOR MONITORS**



### VIDEO DRIVER

ENABLES YOUR COCO TO OPERATE WITH A  
VIDEO MONITOR INSTEAD OF A TELEVISION!

### SCREEN DUMP PROGRAM

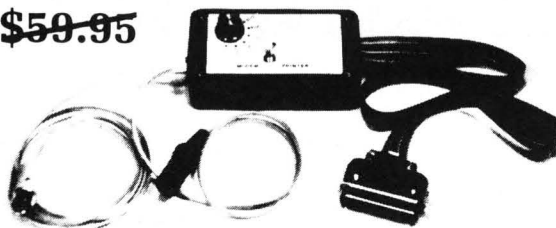
The best screen dump program for the Epson & Gemini  
printers ever!! Have the option of standard images  
or reverse w/regular or double sized pictures **\$19<sup>95</sup>**

### SP-3 INTERFACE for Color Computer

- 300-19,200 BAUD rates
- External to printer — No AC Plugs
- Built in modem/printer switch—no need for  
Y-cables or plugging/unplugging cables

**Only:**

**\$59.<sup>95</sup>**



### COMPLETE SYSTEM

**~~299~~<sup>95</sup>**

NEW  
LOW  
PRICE

now  
with  
screen  
dump

*Nothing more to buy!*

Dealer inquiries invited



**TRUE DATA PRODUCTS**

9 S. Main  
Uxbridge, MA 01569



**CALL US TODAY!!  
ORDER TOLL FREE**

**(617) 278-6555  
1-800-635-0300**



## HARDWARE

by Robert Gault

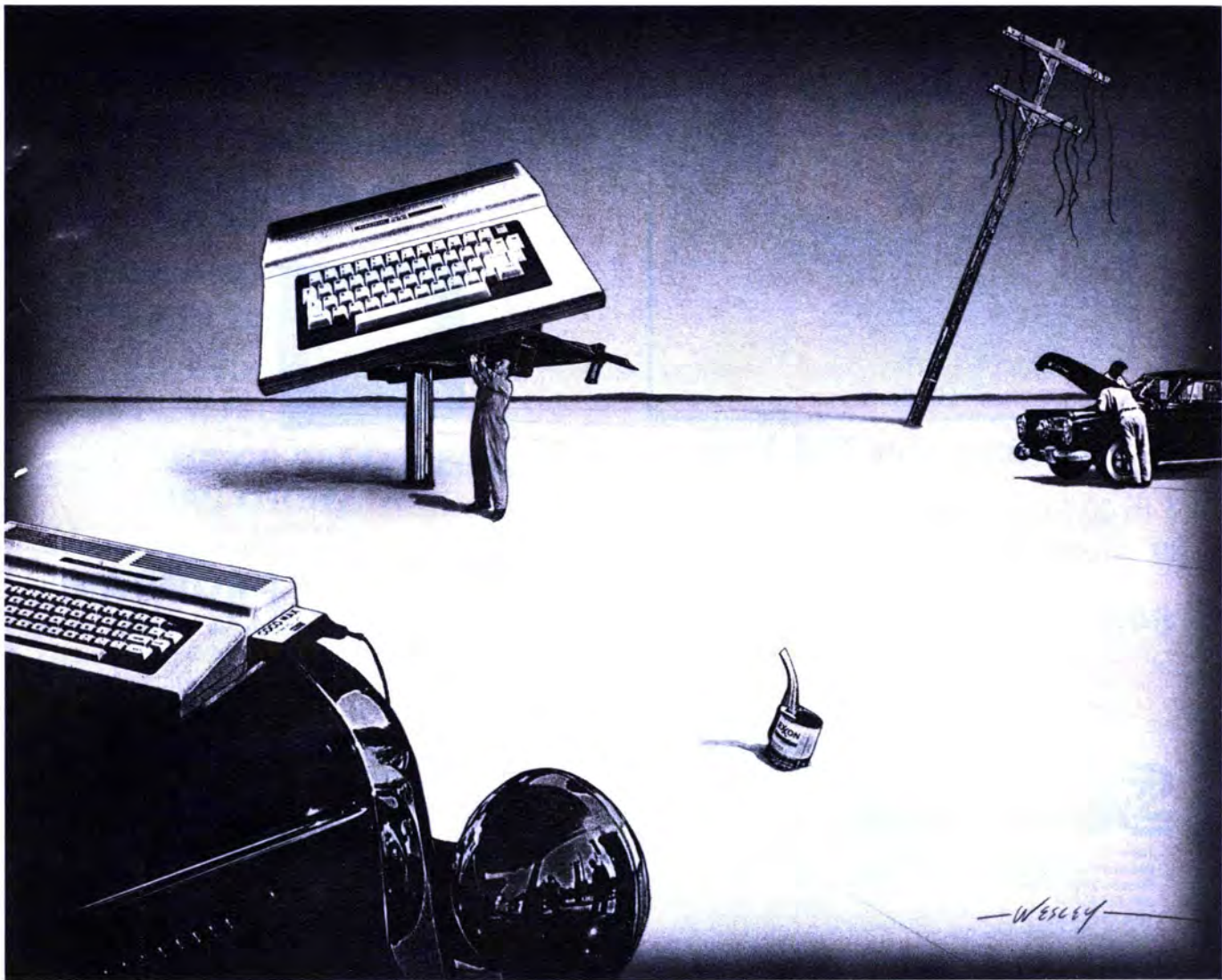


Illustration by Paul Woelken

# The Final Fix

*A couple of heatsinks or Tandy's Final Fix Kit might be the answer to your overheated CoCo.*

**S**ome model CoCos suffer from an intermittent problem. After the machine has been on for 30 minutes or more, random characters begin to appear in the second and ninth screen positions. These characters then become orange graphics blocks, and the cursor moves to the upper left corner of the screen, leaving an image behind. Pressing a key or the reset button locks up the CoCo, and you can only regain control by shutting the power off for several seconds.

Several explanations for the problem have been published and most blame the synchronous address multiplexer (SAM) chip. However, I've found that the culprit is the horizontal synchroniz-

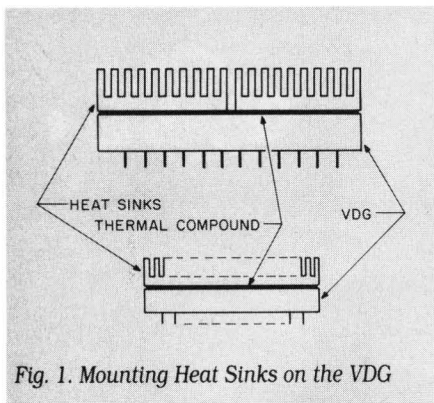


Fig. 1. Mounting Heat Sinks on the VDG

ation (HS) pulse in the video-display generator (VDG). The HS pulse is sent to the television or monitor and is crucial to the SAM's ability to coordinate the actions of memory refresh, the VDG, and the central processing unit (CPU).

Eight sequential addresses are refreshed after the high-to-low transition of the HS pulse while the monitor is in horizontal blanking. The VDG address control is modified on the rising edge of the HS pulse during the vertical-blanking pulse. (The blanking pulse turns off the monitor's electron beam until the beam reaches the start of a new line or screen.)

If the HS pulse becomes too wide, extra memory addresses are refreshed. Due to the symptoms, the nature of the fix, and the SAM and VDG specification sheets, I believe that the HS pulse is not stable enough during warmup.

Tandy's solution is to install their Final Fix Kit, a pulse generator that uses a logic gate and a binary counter. This extra circuitry is set to give a clean pulse exactly four CPU-E clock cycles wide, synchronized to the falling edge of the E clock cycle. (The original cycle is about 4.5 cycles wide.) The new circuit actually divides the VDG 3.58-MHz clock by 16 to produce the desired affect.

If your CoCo is still under warranty, you should let Tandy repair it for you. If it's not, you might try the fix I've come up with. I found that my CoCo didn't lock up when I ran it with the cover off. If it did lock up with the cover on, quickly pressing the on/off switch sometimes stabilized the machine while I was using it. Directly cooling the SAM chip with heatsinks does not correct the problem. The SAM synchronizes on the HS pulse for memory refresh; therefore, I found it necessary to stabilize the HS pulse by cooling its source (VDG). It also helps to correct the cooling flow into the computer.

You can cool the VDG by using thermal compound (Radio Shack catalog no. 276-1372) to stick two type TO-220 heatsinks (Radio Shack no. 276-1363) to the integrated circuit (see Fig. 1). If you move your computer around often, make sure that the heatsinks

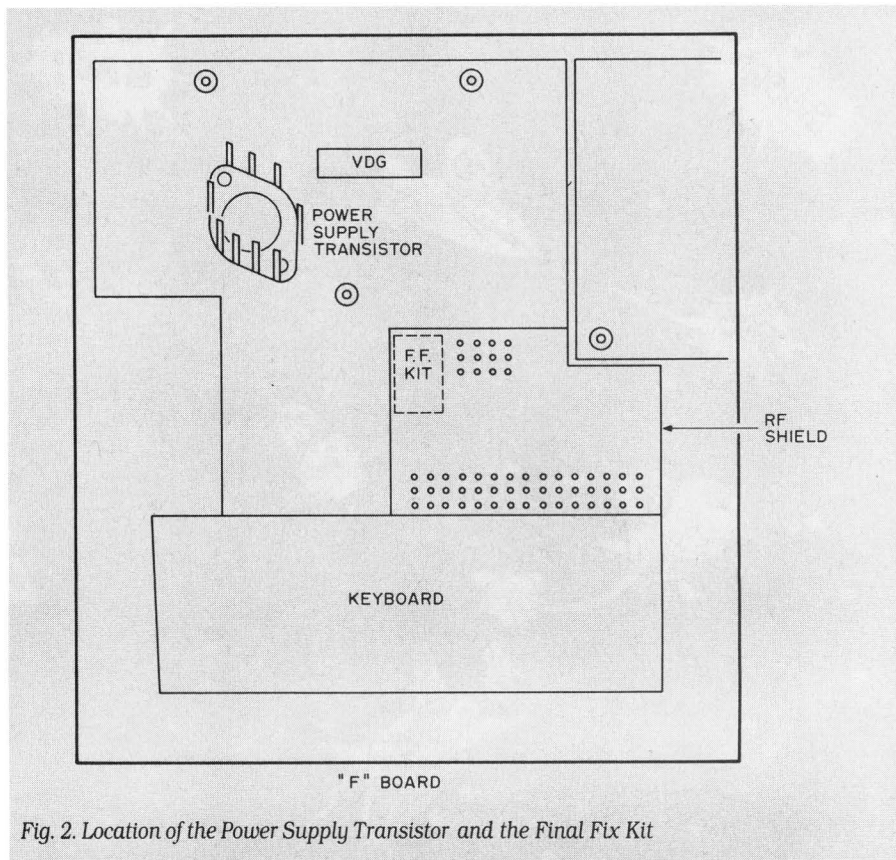


Fig. 2. Location of the Power Supply Transistor and the Final Fix Kit

don't become unglued, because they can cause dangerous short circuits if they fall off.

The only significant source of heat in a CoCo is the pass transistor in the power supply (see Fig 2). It's easy to spot by its large heatsink. Ideally, this transistor should vent directly out of the case. Instead, the heat flows through the entire unit, heating other components before escaping out the side slots. I drilled a pattern of 1/4-inch holes in the case above the transistor (see Fig. 3). Or, you could drill a 2-inch hole and cover it with wire mesh.

### Using the Tandy Kit

If you want to use Tandy's Final Fix Kit but want to do the work yourself, you can order the service bulletin and kit from Radio Shack National Parts (900 East Northside Drive, Fort Worth, TX 76102). Table 1 shows the parts you should receive.

Technical Bulletin CC:20  
26-3003B logic board AX-7089  
SN74LS12 triple-input NAND open collector IC  
SN74LS393 dual 4-bit binary counter.

Table 1. Final Fix Kit Parts List



Fig. 3. Cooling Holes in the CoCo's Cover

The kit is a 1 1/2- by 1-inch printed circuit board that contains two integrated circuits, two resistors, and one capacitor. It is easy to install: You cut one trace, bend one SAM leg, and solder five connections. The bulletin is clear and you install all parts under the RF shield (see Fig. 2).

The service bulletin refers only to F-board versions of the CoCo. If you have a different version that you feel needs the fix, you will have to use a technical service manual to locate the soldering points. ■

Address correspondence to Robert Gault, 832 North Renaud, Grosse Pointe Woods, MI 48236



by Lynn H. Davis



# Galactic Wars

**Battle the dreaded Enbots and rise through the ranks of The Federation.**

**M**y name is Hawk, Admiral Hawk. I earned my commission fighting the savage Kryons in CompuServe's MegaWars. In saving the Colonists, I fired photon torpedoes, captured planets, attacked bases, and reduced more than one enemy ship to space dust. If, like me, you enjoy strategy war games, then a bright future in the Federation could await you in Galactic Wars.

The game's objective is to accumulate points toward promotion and more powerful ships. The gameboard is 44 rows by 44 columns; the computer randomly places 50 neutral planets, 50 stars, six Enbot bases, three Enbot ships (the fighter Centauri, the destroyer Antares, and the battle cruiser Denton), six Federation bases, and three Federation ships (the destroyer Polaris, the battle cruiser Nimitz, and the Reliant).

Before entering the program, you must free extra memory by typing:

```
POKE 25,6: POKE 26,1:POKE 1536,0:NEW
You can omit the REM statements to free more memory. After running the program, it asks whether you wish to load a previously saved score and prompts for your name. You start out as a cadet. Pressing H gives you a help screen. Press enter to begin the game.
```

## Commanding the Reliant

Once the galaxy is complete, you are in control of the Reliant. The scanner on the left

of the screen is blank. The screen's right side contains the command line, the report section, and the Reliant's status indicators. A yellow report section signifies your turn. Cyan indicates that other ships are taking their turns; you receive reports on their activities. The Reliant has 2,000 force-field energy units (U shows that the shield is up, D signifies down), 3,000 maneuvering and phaser energy units, and eight photon torpedoes (T).

You have 11 options: scan, move, force field, torpedo, phaser, capture, build, dock, list, help, and save. Firing torpedoes or phasers, capturing planets, building bases, or docking advances play. You can call the other options as often as you wish (if you have the energy) without ending your turn.

**Scan:** Pressing S draws a map of the area around your ship. Blue squares are empty

## System Requirements

32K RAM  
Extended Color Basic





space, white squares are stars, green squares are neutral planets, orange squares are Federation planets, and red squares are Enbot planets. Orange rectangles are Federation bases and red rectangles are Enbot bases. Federation ships (R, P, and N) and Enbot ships (C, A, and D) are green. A black "Forbidden Zone" surrounds the galaxy.

The Reliant always appears in the middle of an 11 by 11 grid. You move, attack, and capture by designating coordinates. Coordinate 1 is the appropriate number from the column on the left; coordinate 2 is the appropriate number from the row at the top.

**Move:** Press M, and then type the coordinates for your destination square, pressing enter after each. A cadet can move only within scanner range, and you cannot move onto an occupied space. Each move uses 250 energy units, 200 if your shield is down.

**Force Field:** Pressing F raises or lowers your shield and uses 100 energy units. Keeping the shield up reduces damage from attacks by Enbot ships, bases, and planets.

**Torpedo:** Press T, and then enter the coordinates for where you want to direct your fire. Torpedoes are effective only within scanner range and pack a destructive punch of 500 units. One torpedo will destroy Enbot and neutral planets. Two will destroy an Enbot base, providing you issue no other commands between firings, as Enbot bases can rebuild themselves. If a neutral or Enbot planet fires back at you, it won't miss.

If you hit a star, it will explode, destroying everything in the immediate area. You can use this tactic to destroy Enbot bases, but don't let the Reliant get too close. The Reliant's crew prevents you from firing on Federation ships, planets, or bases. However, aborted attempts constitute a turn. Firing at an empty space costs you a torpedo. You always hit the desire coordinates, even if an object blocks the torpedo's path.

**Phasers:** Pressing P fires a phaser blast. Cadets are limited to 300 units. You must have enough energy to fire a phaser. You cannot fire at an empty space or outside the scanner's range. Phaser power can damage only Enbot ships, planets, and bases.

**Capture:** Maneuver the Reliant next to a neutral or Enbot planet or an Enbot base. Press C and provide the coordinates to attempt capture. Some planets and bases are more heavily fortified than others and might repel your attack. Each

Rank	Ship Type	Sector Moves	Shield Energy	Engine Energy	Phaser Energy	Number of Torpedoes
Cadet	Trainer	5	3000	2000	300	8
Lieutenant	Fighter	5	3500	2500	400	10
Commander	Destroyer	6	4000	3000	400	10
Admiral	Battle Cruiser	7	4500	3500	500	12

Table 2. Rank and Ship Power

attempt uses 100 energy units. The planet or base becomes orange if you are successful.

**Build:** Press B and follow the capture procedure to convert a Federation planet to a base. There is no chance of being repelled. It takes 300 energy units to build a base, and only six bases are allowed at one time.

**Dock:** Place the Reliant next to a friendly planet or base and press D to dock and replenish your energy. Docking with a Federation planet supplies four torpedoes and 1,200 energy units for the shields and engines; docking with a Federation base provides four torpedoes and 1,500 energy units. You can dock only once per turn, but repeated dockings to obtain a maximum load are allowed.

**List:** Press L for a report on the number of Federation and Enbot ships, planets, and bases. You will also see the number of neutral planets and your score.

**Help:** Pressing H brings up a brief summary of each command.

**Quit:** To quit the game, press the shift and zero keys simultaneously to enter reverse video; then press X. A game summary appears, and the program gives you the option to save your score on tape. Be sure to press the shift-zero combination to answer questions.

## The Other Ships

The other ships can move up to seven sectors at a time, battle another ship (including the Reliant), build planets and bases, and de-

stroy enemy planets and bases. The other ships' scanning range is the same as the Reliant's, but they do not have to dock to refuel. Instead, they must capture a neutral planet to replenish their shield energy. If a ship is destroyed, it loses a turn while the fleet builds a new one and commissions it in a new location.

## Winning and Losing

To win, you must convert all planets and bases to the Federation. If the Reliant is destroyed or no Federation planets or bases remain, you lose. To improve your rank and command more powerful ships, you must accumulate game points by saving them on cassette and loading them in at the start of each new game. You are a cadet if you have earned zero to 10,000 points, a lieutenant with 10,001 to 50,000 points, a commander with 50,001 to 100,000 points, and an admiral with over 100,000 points. Table 1 gives points and penalties for outcomes of moves, and Table 2 shows how points affect the type of ship you command.

If you accidentally press the break key during a game, type GOTO 490 and press enter. You will be back in the battle without losing points or changing the status of the gameboard. If you want to speed up the action of the other ships and your CoCo accepts the high-speed POKE, add these two lines:

```
3765 POKE 65495,0
4625 POKE 65494,0
```

## Becoming an Admiral

To be successful playing Galactic Wars, you must develop an overall plan of attack. You must decide, for example, whether to try to accumulate points by engaging in battles with enemy ships or by capturing planets. My one hint is to plan early for the closing moments of the game. Your ship has plenty of destructive power; fuel for the engines is the limiting factor. The more expertly you handle immediate and long-range planning, the sooner you will become an admiral for the Federation. ■

Lynn Davis has written articles for 80 Micro, Color Computer News, 80 U.S., and The Color Computer Magazine. Write him at 4316 Amblewood Lane, Clay, NY 13041.

Points	Action
- 50	Blow up a star
- 50	Failed attempt at capturing a planet
- 500	Destroy a neutral planet
- 1000	Destroy a Federation planet
- 1000	Quitting the game or losing the galaxy to Enbots
- 1500	Destroy a Federation base
+ 50	Each phaser or torpedo hit on Enbot base or ship
+ 100	Destroy an Enbot planet
+ 300	Destroy an Enbot base or ship with a torpedo
+ 300	Capture a planet or base
+ 400	Destroy an Enbot base or ship using phaser power
+ 600	Build a Federation planet into a base
+ 1000	Win the game

Table 1. Points Gained or Lost by the Reliant

Program Listing. Galactic Wars

```

10 DIM GA(44,44)
20 DIM IS(5,3):DIM P(11)
30 CLS(0):C1=0:R=RND(-TIMER):RB=0
40 GOSUB 5690
50 GOTO 5850
60 PL(2)=6:PL(4)=6:PL(5)=50:PL(6)=3:PL(7)=3
70 REM galaxy
80 CLS:PRINT0,STRING$(96,175);:PRINT039,"creating";CHR$(128);"the";CHR$(128);"galaxy";
90 C=0
100 C=C+1
110 IF C=1 THEN X=193:Y=50:PRINT0128,"CREATING STARS"
120 IF C=2 THEN X=129:Y=50:PRINT0"CREATING PLANETS"
130 IF C=3 THEN X=255:Y=6:PRINT0"CREATING BASES AND SHIPS"
140 IF C=4 THEN X=191:Y=6
150 IF C=5 THEN X=82:Y=1
160 IF C=6 THEN X=80:Y=1
170 IF C=7 THEN X=78:Y=1
180 IF C=8 THEN X=67:Y=1
190 IF C=9 THEN X=65:Y=1
200 IF C=10 THEN X=68:Y=1
210 FOR G=1 TO Y
220 S1=RND(44):S2=RND(44)
230 IF GA(S1,S2)>0 THEN 220
240 GA(S1,S2)=X
250 IF C>4 THEN 260 ELSE 290
260 C1=C1+1
270 IS(C1-1,2)=S1:IS(C1-1,3)=S2
280 IS(C1-1,0)=X
290 IF C=10 AND G=Y THEN 320
300 IF G=Y THEN 100
310 NEXT G
320 FOR X2=1 TO 4
330 FOR Y2=1 TO 7
340 RB=RB+1
350 READ GA(RB,0)
360 NEXT Y2,X2
370 FOR X3=1 TO 28
380 IF GA(X3,0)=RK THEN 390 ELSE 400
390 GA(0,0)=GA(X3,0):GA(0,1)=GA(X3+1,0):GA(0,2)=GA(X3+2,0):GA(0,3)=GA(X3+4,0):GA(0,4)=GA(X3+5,0):IS(0,1)=GA(X3+3,0)
400 NEXT X3
410 IS(1,1)=GA(18,0):IS(2,1)=GA(25,0)
420 IS(3,1)=GA(11,0):IS(4,1)=GA(18,0):IS(5,1)=GA(25,0)
430 RESTORE
440 DATA 1,5,3000,2000,300,8,0
450 DATA 2,5,3500,2500,400,10,1000
460 DATA 3,6,4000,3000,400,10,5000
470 DATA 4,7,4500,3500,500,12,10000
480 REM computer display
490 CLS(0)
500 PRINT0,STRING$(15,175);:PRINT032,STRING$(15,175);
510 FOR C=64 TO 480 STEP 32
520 PRINT0C,CHR$(175);:PRINT0C+14,CHR$(175);
530 NEXT C
540 PRINT0481,STRING$(13,175);
550 FOR C=15 TO 79 STEP 32
560 PRINT0C,STRING$(17,191);
570 NEXT C
580 FOR C=111 TO 399 STEP 32

```

```

590 PRINT0C,STRING$(17,159);
600 NEXT C
610 FOR C=1455 TO 1471
620 POKE C,207:POKE C+32,207:POKE C+64,207
630 NEXT C
640 PRINT03,"scanner";:PRINT016,"command";:PRINT047,"> READY":PRINT0112,"report";:PRINT0432,"status";
650 SH$="U"
660 PRINT0464,"U";:PRINT0472,"T ";
670 PRINT0496,"E";:PRINT0504,"RELIANT";
680 R$=INKEY$
690 PRINT0466,IS(0,1);:PRINT0475,GA(0,4);:PRINT0498,GA(0,2);
700 IF FLAG=0 THEN BS=1000
710 IF R$="S" AND FLAG=1 THEN FLAG=0
720 IF R$="S" THEN 910
730 IF R$="M" AND FLAG=1 THEN FLAG=0
740 IF R$="M" THEN GOSUB 1380
750 IF R$="F" AND FLAG=1 THEN FLAG=0
760 IF R$="F" THEN GOSUB 1560
770 IF R$="T" THEN GOSUB 1650:GOSUB 3760
780 IF R$="P" THEN GOSUB 2480:GOSUB 3760
790 IF R$="C" AND FLAG=1 THEN FLAG=0
800 IF R$="C" THEN GOSUB 2980:GOSUB 3760
810 IF R$="L" AND FLAG=1 THEN FLAG=0
820 IF R$="L" THEN GOSUB 3230
830 IF R$="D" AND FLAG=1 THEN FLAG=0
840 IF R$="D" THEN GOSUB 3370:GOSUB 3760
850 IF R$="B" AND FLAG=1 THEN FLAG=0
860 IF R$="B" THEN GOSUB 3610:GOSUB 3760
870 IF R$="H" THEN GOSUB 4700
880 IF R$="X" THEN ME=7:GOTO 4820
890 GOTO 680
900 REM scanner
910 PRINT049,"SCAN"
920 GOSUB 4640
930 LA=IS(0,2)-5:LO=IS(0,3)-5
940 FOR TR=65 TO 449 STEP 32
950 PRINT0TR,STRING$(13,163);
960 NEXT TR
970 CS=99:SM=0:SR=0
980 FOR SM=LA TO LA+10
990 CT=0
1000 FOR SR=LO TO LO+10
1010 CT=CT+1
1020 IF SM<1 OR SM>44 THEN P(CT)=128:GOTO 1050
1030 IF SR<1 OR SR>44 THEN P(CT)=128:GOTO 1050
1040 P(CT)=GA(SM,SR)
1050 NEXT SR
1060 CR=0
1070 CS=CS+32
1080 FOR CQ=CS TO CS+10
1090 CR=CR+1
1100 IF P(CR)=0 THEN PRINT0CQ,CHR$(161); ELSE PRINT0CQ,CHR$(P(CR));
1110 NEXT CQ
1120 NEXT SM

```

```

1130 CT=LA-1
1140 PL=1089
1150 POKE PL,43:POKE PL+1,43:POKE PL+32,43:POKE PL+33,43
1160 FOR PP=128 TO 448 STEP 32
1170 CT=CT+1
1180 IF CT<1 OR CT>44 THEN PRINT0PP+1,CHR$(128);:PRINT0PP+2,CHR$(128);:GOTO 1220
1190 CT$=STR$(CT)
1200 PRINT0PP,CT$;:PRINT0PP,CHR$(175);
1210 IF CT<10 THEN PRINT0PP+2,CHR$(128);
1220 NEXT PP
1230 CT=0
1240 CT=LO-1
1250 FOR PP=67 TO 77
1260 CT=CT+1
1270 CT$=STR$(CT)
1280 PRINT0PP,MID$(CT$,2,1);
1290 IF CT<1 OR CT>44 THEN PRINT0PP,CHR$(128);:PRINT0PP+32,CHR$(128);:GOTO 1320
1300 IF CT<10 THEN PRINT0PP+32,CHR$(128);:GOTO 1320
1310 PRINT0PP+32,MID$(CT$,3,1);
1320 NEXT PP
1330 FOR C5=128 TO 448 STEP 32
1340 PRINT0C5,CHR$(175);:PRINT0C5+14,CHR$(175);
1350 NEXT C5
1360 GOTO 680
1370 REM move
1380 PRINT049,""
1390 GOSUB 4640
1400 PRINT049,"MOVE SHIP"
1410 PRINT0143,"NAVIGATION READY"
1420 GOSUB 4650
1430 IF T1<1 OR T1>44 THEN PRINT0271,"OUT OF GALAXY":PRINT0303,"MOVE ABORTED":GOTO 1540
1440 IF T2<1 OR T2>44 THEN PRINT0271,"OUT OF GALAXY":PRINT0303,"MOVE ABORTED":GOTO 1540
1450 IF IS(0,2)-T1>IS(0,2) OR IS(0,2)-T1<-GA(0,1) THEN PRINT0271,"OUT OF RANGE":PRINT0303,"MOVE ABORTED":GOTO 1540
1460 IF IS(0,3)-T2>GA(0,1) OR IS(0,3)-T2<-GA(0,1) THEN PRINT0271,"OUT OF RANGE":PRINT0303,"MOVE ABORTED":GOTO 1540
1470 IF GA(T1,T2)>0 THEN PRINT0271,"COLLISION COURSE":PRINT0303,"MOVE ABORTED":GOTO 1540
1480 GA(IS(0,2),IS(0,3))=0
1490 IS(0,2)=T1:IS(0,3)=T2:GA(T1,T2)=IS(0,0)
1500 PRINT0271,"MOVED TO";T1;T2
1510 IF SH$="D" THEN GA(0,2)=GA(0,2)-200 ELSE GA(0,2)=GA(0,2)+250
1520 IF GA(0,2)<1 THEN ME=1:GOTO 4820
1530 RETURN
1540 GOSUB 4680:RETURN
1550 REM shields
1560 GOSUB 4640
1570 PRINT049,"FORCE FIELD"
1580 PRINT0143,"UP OR DOWN";:INPU T SH$
1590 IF IS(0,1)<100 THEN PRINT0207,"NOT ENOUGH ENERGY";:GOTO 1640
1600 IF SH$="U" THEN PRINT0464,"U";:PRINT0239,"SHIELDS UP"

```

```

161Ø IF SH$="D" THEN PRINT@464,"
d";:PRINT@239,"shields down"
162Ø IS(Ø,1)=IS(Ø,1)-1ØØ
163Ø REM torpedo
164Ø RETURN
165Ø PRINT@49,"TORPEDO"
166Ø GOSUB 464Ø
167Ø IF GA(Ø,4)=Ø THEN PRINT@143
,"NO TORPEDOES":PRINT@175,"LEFT,
SIR!":GOSUB 468Ø:RETURN
168Ø PRINT@143,"TORPEDO"
169Ø GOSUB 465Ø
170Ø IF T1<1 OR T1>44 OR T2<1 OR
T2>44 THEN PRINT@271,"OUT OF GA
LAXY":GOSUB 468Ø:RETURN
171Ø IF IS(Ø,2)-T1>5 OR IS(Ø,2)-
T1<-5 OR IS(Ø,3)-T2>5 OR IS(Ø,3)-
T2<-5 THEN PRINT@271,"OUT OF RA
NGE":GOSUB 468Ø:RETURN
172Ø IF GA(T1,T2)=Ø THEN PRINT@2
71,"TORPEDO LOST":PRINT@3Ø3,"@";
T1;T2:GA(Ø,4)=GA(Ø,4)-1:GOSUB 46
8Ø:RETURN
173Ø IF GA(T1,T2)=193 THEN 174Ø
ELSE 2Ø1Ø
174Ø GA(T1,T2)=Ø:GA(Ø,4)=GA(Ø,4)
-1:PLAY S2$
175Ø GA(Ø,5)=GA(Ø,5)-5Ø
176Ø PRINT@271,"STAR @";T1;T2
177Ø PRINT@3Ø3,"GOES NOVA"
178Ø SM=Ø:SR=Ø
179Ø FOR SM=T1-1 TO T1+1
180Ø FOR SR=T2-1 TO T2+1
181Ø IF SM<1 OR SM>44 OR SR<1 OR
SR>44 THEN 197Ø

```

```

182Ø IF GA(SM,SR)>Ø THEN PRINT@3
67,CHR$(128);CHR$(GA(SM,SR));CHR
$(128);"destroyed":GOSUB 468Ø
183Ø IF GA(SM,SR)=193 THEN GA(Ø,
5)=GA(Ø,5)-5Ø
184Ø IF GA(SM,SR)=129 THEN GA(Ø,
5)=GA(Ø,5)-5ØØ:PL(5)=PL(5)-1
185Ø IF GA(SM,SR)=241 THEN GA(Ø,
5)=GA(Ø,5)-1ØØØ:PL(1)=PL(1)-1
186Ø IF GA(SM,SR)=255 THEN GA(Ø,
5)=GA(Ø,5)-15ØØ:PL(2)=PL(2)-1
187Ø IF GA(SM,SR)=177 THEN GA(Ø,
5)=GA(Ø,5)+1ØØ:PL(3)=PL(3)-1
188Ø IF GA(SM,SR)=191 THEN GA(Ø,
5)=GA(Ø,5)+5ØØ:PL(4)=PL(4)-1
189Ø IF GA(SM,SR)=8Ø OR GA(SM,SR)
)=78 THEN GA(Ø,5)=GA(Ø,5)-15ØØ:P
L(7)=PL(7)-1
190Ø IF GA(SM,SR)>64 AND GA(SM,S
R)<69 THEN GA(Ø,5)=GA(Ø,5)+5ØØ:P
L(6)=PL(6)-1
191Ø IF GA(SM,SR)>64 AND GA(SM,S
R)<81 THEN 192Ø ELSE 195Ø
192Ø FOR A=1 TO 5
193Ø IF IS(A,Ø)=GA(SM,SR) THEN I
S(A,1)=Ø
194Ø NEXT A
195Ø IF GA(SM,SR)=82 THEN PRINT@
367,"reliant destroyed";:GOSUB 4
68Ø:ME=2:GOTO 482Ø
196Ø GA(SM,SR)=Ø
197Ø NEXT SR
198Ø NEXT SM
199Ø GOSUB 468Ø
2Ø0ØØ RETURN

```

```

2Ø1Ø IF GA(T1,T2)=177 OR GA(T1,T
2)=129 THEN 2Ø2Ø ELSE 215Ø
2Ø2Ø GA(Ø,4)=GA(Ø,4)-1:PLAY S2$
2Ø3Ø IF GA(T1,T2)=177 THEN GA(Ø,
5)=GA(Ø,5)+1ØØØ ELSE GA(Ø,5)=GA(
Ø,5)-5ØØ
2Ø4Ø R=RND(1Ø):IF R<=4 THEN 2Ø5Ø
ELSE 211Ø
2Ø5Ø PRINT@271,"PHASER HIT ON"
2Ø6Ø PRINT@3Ø3,"RELIANT, SIR!"
2Ø7Ø PLAY S1$
2Ø8Ø IF SH$="U" THEN IS(Ø,1)=IS(
Ø,1)-45Ø ELSE IS(Ø,1)=IS(Ø,1)-35
Ø
2Ø9Ø PRINT@466,STRING$(5,191);:P
RINT@466,IS(Ø,1);
210Ø IF IS(Ø,1)<=Ø THEN PRINT@36
7,"RELIANT DESTROYED";:GOSUB 468
Ø:ME=3:GOTO 482Ø
211Ø IF GA(T1,T2)=177 THEN PL(3)
=PL(3)-1 ELSE PL(5)=PL(5)-1
212Ø GA(T1,T2)=Ø
213Ø PRINT@335,"planet destroyed
!";:GOSUB 468Ø
214Ø RETURN
215Ø IF GA(T1,T2)=191 THEN 216Ø
ELSE 23ØØ
216Ø GA(Ø,4)=GA(Ø,4)-1:PLAY S2$
217Ø FLAG=1:BS=BS-5ØØ
218Ø GA(Ø,5)=GA(Ø,5)+5Ø
219Ø R=RND(1Ø):IF R<=4 THEN 22ØØ
ELSE 226Ø
22ØØ PRINT@271,"TORPEDO HIT ON"
221Ø PRINT@3Ø3,"RELIANT, SIR!"
222Ø PLAY S2$

```

## THE GREATEST SOFTWARE DEAL ON EARTH!

GET 12 DISKS OR TAPES A YEAR CONTAINING OVER 120 QUALITY PROGRAMS. A SUBSCRIPTION TO T & D SOFTWARE CONSISTS OF 10 READY-TO-LOAD PROGRAMS DELIVERED BY FIRST CLASS MAIL EVERY MONTH. NO, WE ARE NOT THE SAME AS THE RAINBOW ON TAPE. IN FACT, MANY SUBSCRIBERS HAVE WRITTEN IN AND SAID THAT WE ARE MUCH BETTER THAN RAINBOW ON TAPE!



### PRICES

	TAPE OR DISK
1 YEAR (12 issues)	70.00
6 MO. (6 issues)	40.00
1 ISSUE	9.00

Michigan Residents Add 4%  
Overseas Add \$10 to Subscription Price  
Personal Checks Welcome!

- ★ Color Computer Only
- ★ 16K Extended Required
- ★ Over 3000 Satisfied Customers
- ★ Back Issues Available From
- ★ July '82 (Over 400 Programs)

### ★ THIS MONTH ONLY ★

**SUBSCRIBE FOR A YEAR AND RECEIVE A FREE PACKAGE OF YOUR CHOICE**

### OUR LATEST ISSUE CONTAINED

1. HAM RADIO LOG
2. STAR TREK
3. COCO LABELER
4. THE DISK LABELER
5. SHIP WAR
6. ELECTRIC COST
7. NUKE AVENGER
8. MULTI KEY BUFFER
9. CURSOR KING
10. LAND ROVER



**T & D SUBSCRIPTION SOFTWARE**  
P.O. BOX 256C, HOLLAND, MI 49423 (616) 396-7577

### ● NEW PRICES FOR 1986

● **COLOR BANKBOOK \$19.95**

● **BUSINESS BANKBOOK**

**SYSTEM ONE  
FOR ONE DISK DRIVE**

**\$49.95**

**SYSTEM TWO  
FOR TWO DISK DRIVES**

**\$49.95**

● **SUPERDISK UTILITY**

**\$ 9.95**

● **RADIOLOG**

**\$ 9.95**

ALL PROGRAMS INCLUDE MANUALS  
ADD \$2.00 SHIPPING & HANDLING  
FLORIDA RES. ADD 5% SALES TAX

**SUNRISE  
SOFTWARE**

**8901 NW 26 ST DEPT H  
SUNRISE, FL 33322**



```

2230 IF SH$="U" THEN IS(0,1)=IS(
0,1)-250 ELSE IS(0,1)=IS(0,1)-500
2240 PRINT@466,STRING$(5,191);:P
RINT@466,IS(0,1);
2250 IF IS(0,1)<=0 THEN PRINT@33
5,"RELIANT DESTROYED";:GOSUB 468
0:ME=3:GOTO 4820
2260 IF BS<=0 THEN PRINT@335,"ba
se destroyed":PL(4)=PL(4)-1:GA(T
1,T2)=0:GA(0,5)=GA(0,5)+400
2270 IF BS>1 THEN PRINT@335,"BAS
E @"BS
2280 IF BS>1 THEN PRINT@367,"ENE
RGY UNITS."
2290 GOSUB 4680:RETURN
2300 IF GA(T1,T2)>64 AND GA(T1,T
2)<69 THEN 2310 ELSE 2420
2310 PLAY S2$
2320 IF GA(T1,T2)=67 THEN K1=3
2330 IF GA(T1,T2)=65 THEN K1=4
2340 IF GA(T1,T2)=68 THEN K1=5
2350 IS(K1,1)=IS(K1,1)-500
2360 IF IS(K1,1)<=0 THEN 2370 EL
SE 2390
2370 PRINT@271,CHR$(GA(T1,T2));"
destroyed!":GA(T1,T2)=0:GA(0,5)
=GA(0,5)+400
2380 PL(6)=PL(6)-1:GA(0,4)=GA(0,
4)-1:GOSUB 4680:RETURN
2390 PRINT@271,CHR$(GA(T1,T2));"
@"T1;T2
2400 PRINT@303,"STRENGTH"IS(K1,1)

```

```

2410 GA(0,5)=GA(0,5)+50:GA(0,4)=
GA(0,4)-1:GOSUB 4680:RETURN
2420 IF GA(T1,T2)=80 OR GA(T1,T2
)=78 THEN PRINT@271,"ATTEMPTING
TO HIT";:PRINT@303,"FRIENDLY SHI
P!":PRINT@335,"torpedo strike":P
RINT@367,"aborted!":GOSUB 4680:R
ETURN
2430 IF GA(T1,T2)=255 OR GA(T1,T
2)=241 THEN PRINT@271,"ATTEMPTIN
G TO HIT";:PRINT@303,"FRIENDLY P
LANET!":PRINT@335,"torpedo strik
e":PRINT@367,"aborted!":GOSUB 46
80:RETURN
2440 IF GA(T1,T2)=82 THEN PRINT@
271,"ATTEMPTING TO HIT";:PRINT@3
03,"YOUR OWN POSITION";
2450 PRINT@335,"torpedo strike":
PRINT@367,"aborted!"
2460 GOSUB 4680:RETURN
2470 REM phasers
2480 PRINT@49,"PHASERS"
2490 GOSUB 4640
2500 IF GA(0,2)-GA(0,3)<=0 THEN
PRINT@143,"NOT ENOUGH ENERGY";:P
RINT@175,"LEFT, SIR!":GOSUB 4680
:RETURN
2510 PRINT@143,"PHASERS"
2520 GOSUB 4650
2530 IF T1<1 OR T1>44 OR T2<1 OR
T2>44 THEN PRINT@271,"OUT OF GA
LAXY":GOSUB 4680:RETURN
2540 IF IS(0,2)-T1>5 OR IS(0,2)-
T1<-5 OR IS(0,3)-T2>5 OR IS(0,3)

```

```

-T2<-5 THEN PRINT@271,"OUT OF RA
NGE":GOSUB 4680:RETURN
2550 IF GA(T1,T2)=0 THEN PRINT@2
71,"NO TARGET":PRINT@303,"@";T1;
T2:GOSUB 4680:RETURN
2560 IF GA(T1,T2)=193 THEN PLAY
S1$:PRINT@271,"STAR UNAFFECTED":
PRINT@303,"BY PHASER BLAST!":GA(
0,2)=GA(0,2)-GA(0,3):GOSUB 4680:
RETURN
2570 IF GA(T1,T2)=129 OR GA(T1,T
2)=241 OR GA(T1,T2)=255 THEN PLA
Y S1$:PRINT@271,"PHASER ENERGY":
PRINT@303,"NEUTRALIZED BY":PRINT
@335,"FRIENDLY PLANET.":GA(0,2)=
GA(0,2)-GA(0,3):GOSUB 4680:RETUR
N
2580 IF GA(T1,T2)=80 OR GA(T1,T2
)=78 THEN PLAY S1$:PRINT@271,"PH
ASER ENERGY":PRINT@303,"NEUTRALI
ZED BY":PRINT@335,"FRIENDLY SHIP
.":GA(0,2)=GA(0,2)-GA(0,3):GOSUB
4680:RETURN
2590 IF GA(T1,T2)=82 THEN PRINT@
271,"ATTEMPTING TO HIT";:PRINT@3
03,"YOUR OWN POSITION";:PRINT@33
5,"phaser strike":PRINT@367,"abo
rted!":GOSUB 4680:RETURN
2600 IF GA(T1,T2)=177 THEN 2610
ELSE 2720
2610 GA(0,2)=GA(0,2)-GA(0,3):PLA
Y S1$
2620 GA(0,5)=GA(0,5)+100
2630 R=RND(100):IF R<=4 THEN 2640
ELSE 2690

```

Continued on p. 68

# MUL-T-SCREEN



## COLOR CHARACTER GENERATOR

### A NEW DIMENSION IN COLOR COMPUTING



- Now includes a character generator and sample graphic space game at no extra cost.
- Full 224 text and graphic characters. Underline in all PMODES. Prints vertically.
- All machine language, user transparent. Supports all BASIC, EXTENDED BASIC and DISK commands.
- Automatic loader recognizes 16K, 32K & 64K computers.
- Mix up to 5 character sizes in 4 colors all on one screen. A total of 10 sizes available from 8\*4 to 42\*24 or 32\*32 in vertical mode.
- Use up to 4 defineable window screens of any size. Also includes horizontally scrolling (crawling) one line screens.
- Includes positive & negative screen dumps in 2 sizes for R/S, Epson & Gemini printers. (Please specify)
- Special Trace Delay can be used to debug programs one line at a time (even graphics).
- A special printer control can output characters to the screen & printer simultaneously.
- A must for all color computer owners. Once you try it you won't write another program without it.

## INCENTIVE SOFTWARE

### (519) 681-0133

P.O. BOX 323  
STATION B  
LONDON ONTARIO  
CANADA N6A 4W1

P.O. BOX 7281  
PORT HURON  
MICHIGAN 48301  
U.S.A.

MINIMUM REQUIREMENT 16K BASIC  
TAPE - 24.95 US or 29.95 CDN  
DISK - 27.95 US or 32.95 CDN



Tape to Disk upgrade available for \$8US or \$10CDN. We pay postage within US & CANADA on orders over \$20; otherwise please add \$1. Other countries please add \$2. Charge orders please add \$1.

# SPECTRAL'S

## AWARD WINNING SOFTWARE

Incredible savings on collections of best selling games from Spectral!

Each Game Pac includes our most popular games at savings of up to

77% off regular price

### SPACE PAC

\$125 value for \$19.95 \*

		Reg.
Android Attack (Berzerk)	16K	14.95
Color Zap (Space Zap)	16K	9.95
Cosmic Invaders (Space Invaders)	16K	14.95
Galax Attax (Galaxians)	16K	14.95
Whirlybird Run (Scramble)	16K	9.95
Planet Invasion (Defender)	16K	14.95
Space Race (Omega Race)	16K	14.95
Space War (Interplanetary Combat)	16K	9.95
Storm Arrows (TARG)	16K	9.95
Space Sentry (Space Game)	16K	9.95

### EDUCATIONAL PAC

\$70 value for \$17.95 \*

		Reg.
Alpha Search (Alphabet Tutor)	16K	9.95
Horseplay (Vocabulary Builder)	32K	14.95
Quiz Spin (Spelling, Presidents, Math, States, Capitals)	32K	14.95
Spanish Football (Spanish Tutor)	16K	9.95
Integer Math (Elementary Math)	16K	9.95
Europe Pac (European Geography)	16K	9.95

\* add \$4.00 for disk

### ARCADE PAC

\$65 value for \$17.95 \*

		Reg.
Defense (Missile Command)	16K	14.95
Lemans (Race Car Game)	16K	9.95
Color Panic (Space Panic)	32K	14.95
Ghost Gobbler (Pac*Man)	16K	9.95
Beam Rider (Arcade Strategy)	16K	14.95

### TECH PAC

\$50 value for \$14.95 \*

		Reg.
Diskedt (Fix & Alter Disk Data)	16K	14.95
Oracle (Graphics Monitor)	32K	9.95
Color Disassembler (Crack Your ROMs)	16K	9.95
Bugout (Powerful Monitor)	16K	9.95
Join (Concatenate Your Files)	16K	4.95

### ADVENTURE PAC

\$65 value for \$14.95 \*

		Reg.
Pirates Ahoy (Pirates Adventure)	32K	9.95
Prison City (Basic Adventure with Graphics)	16K	9.95
Maze Escape (3-D Maze Adventure)	16K	14.95
Caverns of Doom (Dungeon Adventure)	16K	19.95
C-Trek (Space Adventure)	16K	9.95

## THE ULTIMATE GRAPHIC ADVENTURE

### Wizard's Castle

If you love adventure games, or even if you have never been able to get past first base in one, you will love **Wizard's Castle**! Multiple skill levels allow the beginning adventurer to enjoy a non-aggravating, enjoyable game while allowing the experienced player the choice of a highly intricate, challenging contest. Over sixty high-resolution, animated screens give **Wizard's Castle** the ultimate in visual excitement. Real time action keeps the game's characters interacting even though you may be waiting to make a move. This interaction, pioneered by Spectral in **Madness** and the **Minotaur** and **Keys of the Wizard**, insures a game of constantly changing, never-ending fun.

Don't miss out on the most challenging and enjoyable new high-resolution graphic adventure game of the year. Get **Wizard's Castle** today!

30 games for under \$30\*

Spectral has done it again! We have gathered a great collection of 30 games and put them together in our New **TREASURY PAC**. Each game retails for \$8 to \$21. That's a \$200 savings! \*Suggested price, disk, add \$4.00 **\$29.95**



(206) 581-6938



CALL 1-206-581-6938 to place your Visa or MasterCard order today!  
SEND your order with check or money order (sorry, no C.O.D.) to:

## SPECTRAL ASSOCIATES

3418 South 90th Street  
Tacoma, WA 98409

All orders shipped in two business days. Allow two weeks for delivery.  
Shipping & Handling:  
United States add 3%; \$3 minimum. Canada add 6%; \$3 minimum. Foreign add 15%; \$5 minimum. Washington State residents add 7.8% sales tax

## FEATURES

HIGH RESOLUTION GRAPHICS

64K RAM DISK BASED

GAME SAVE FEATURE

MULTIPLE SKILL LEVELS

REAL TIME ACTION **\$19.95**

disk only

TALKING GAME

ANIMATED SCREENS

DEADLY CREATURES

MAGIC SPELLS

NEW GAME RANDOMIZATION

## BOOKS

**UNLOCK THE SECRETS OF BASIC!**  
WITH THIS FULLY COMPLETE DISASSEMBLY OF THE  
COLOR BASIC ROMs

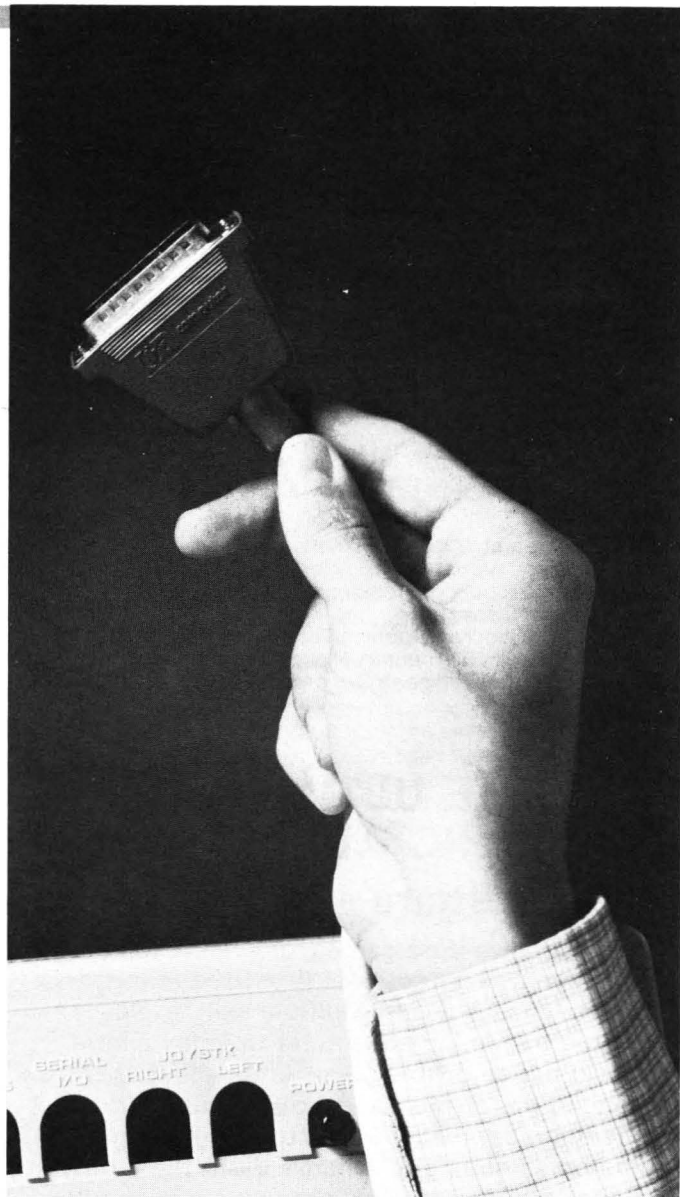
All of the innermost operating processes are exposed. This book is an indispensable tool for the programmer seeking a full, in-depth knowledge of BASIC. The **BASIC UNRAVELLED SERIES** will make it easy for you to write your own BASIC commands or modify BASIC for whatever purpose you desire.

- FULLY COMMENTED (no holes)
- ALL FCBs, FDBs AND FCCs DEFINED
- COMPLETE MEMORY MAP (no missing spaces; everything defined)
- PROGRAMMING TRICKS EXPLAINED
- EASY TO UNDERSTAND
- COVERS ALL ROM VERSIONS

COLOR BASIC UNRAVELLED	\$14.95
EXTENDED BASIC UNRAVELLED	\$14.95
DISK BASIC UNRAVELLED	\$14.95
COMPLETE 3-BOOK SET	\$32.95

by Fred Blechman

# Making the Connection



**H**ave you ever tried to connect anything but a Tandy Corp. printer to your CoCo? If so, you may have run into difficulties. But there are ways around many of the interfacing woes you might encounter with a non-Tandy printer. This article tells you how to connect and operate almost any printer with your CoCo.

The truth is that it's not possible to promise successful interfacing with every brand of printer, because, among peripherals, the printer might well be the least standardized in its connections and operations. Furthermore, the various mysteries often associated with printer interfacing are compounded by the design of the Color Computer, which has a nonstandard serial port and no parallel port. Nevertheless, the technical explanations that follow describe both serial and parallel printer operation and should offer insight into your interfacing problems. More details can be found in books devoted to these subjects.

## Serial Transmission

The flow of serial data between a computer and printer takes place on only two wires. A series of pulses are sent one at a time in a defined sequence at a specific rate. Figure 1 shows the serial pulses that in this case define the letter Z.

Eight or more *bits* (a term that came from the words *binary digits*) are usually necessary for defining a character in serial transmission. A *start bit* defines the beginning of a character transmission, followed by the *data bits*, of which there are usually seven or eight, and 1 or 2 *stop bits*. In some configurations, a *parity bit* is included as a simple

method of error checking. Together, these different kinds of bits are called the *word format*. For the CoCo, the 10-bit format is 1 start bit, 7 data bits, 2 stop bits, and no parity bit.

In order for serial transmission to work, all the pulses must be sent by the computer and received by the printer at the same speed, called the *baud rate*. The term baud rate actually means bits per second. For the CoCo, the normal or default baud rate is 600 baud (although that can be changed). Because there are 10 bits in the CoCo's character format, the transmission rate is 60 characters per second.

Data bits are usually transmitted in a standardized code called ASCII, an acronym that stands for American Standard Code for Information Interchange. In Fig. 1, the 7 data bits from left to right are 1, 0, 1, 1, 0, 1, and 0. In binary code, 1011010 is decimal 90, which represents capital Z in ASCII.

There is another thing to consider for serial transmission: Printers are notoriously slow in comparison with computers, so there must be

**Face it, connecting the CoCo to a third-party printer can be a chore.  
Read on to learn a few tricks of the trade.**



a way to turn off the flow of data from a computer when the printer can't keep up. Some printers are equipped with a 2K memory buffer or more, but even this is not always enough. The solution is *handshaking*. This is merely a voltage carried from the printer on a third wire that indicates to the computer that the printer is ready to receive. Without this go-ahead, the CoCo cannot transmit bits from the serial port.

The computer and printer must be configured for the same baud rate, word format, physical pin connections, and voltages. The computer industry often refers to these as RS-232C, a 25-wire standard for serial transmission that was originally conceived for modem communication. The problem, as mentioned above, is that many computer and printer manufacturers, Tandy included, deviate widely from the RS-232C standard.

## The CoCo Serial Interface

You don't have to know all the details because the CoCo and printer do all the coding, transmission, reception, and decoding. However, you do need to make the physical connections between the computer and printer and check to be sure they respond to each other properly. The CoCo is equipped with a four-pin serial I/O (input/output) socket. Although this socket can also be used to interface with modems or other serial devices, the focus here is on printers. The unique aspect of the CoCo's four-pin DIN socket is that it is entirely unconventional for an RS-232C interface connector. Most computers use a 25-pin DB-25 connector for serial interfacing.

Figure 2 shows the CoCo's four-pin serial socket, indicating the function of each pin. Pin 1, carrier detect, is used for modems and not for printers. Pin 2, receive data, is the handshaking pin. There must be +3 volts or more on this pin to allow serial transmission. Pin 3 is the ground. Pin 4 is the transmit-data pin.

Connecting the CoCo to most Tandy printers is easy because they also have the four-pin DIN socket. Radio Shack stores sell an inexpensive cable (catalog no. 26-3020) that plugs easily into both computer and printer. Beyond that, the only concerns are checking to be sure that the baud rate of the printer is set at 600 baud and the word format is set to 7 data bits with 1 start bit and 2 stop bits (if this is adjustable). The printer will supply the necessary handshaking voltage.

The CoCo's baud rate is easy to change with POKE statements from the keyboard or from a Basic program. Table 1 shows the POKES for setting the CoCo's baud rates. Don't imagine that a faster baud rate will increase printer output proportionally. Interrupt signals, carriage returns, and line feeds all slow down the printer. I found that when I could adjust the printer baud rate, 1,200 baud gave me the fastest "throughput" with the printers I tested.

## A Quick Test

To test things out, use the short



The Model 770 Serial-to-Parallel Converter from Tigertronics

program that follows. Change PRINT# - 2 to LPRINT for the MC-10.

```
10 PRINT"TESTING "; X
20 PRINT# - 2, "TESTING"
30 X = X + 1
40 GOTO 10
```

When you run this program, you'll see "TESTING 0" displayed on

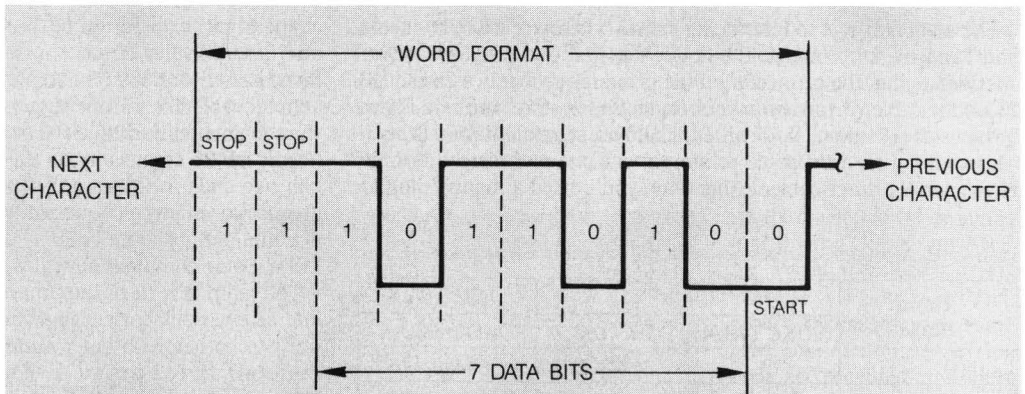


Fig. 1. The Letter Z in the Color Computer Serial Format

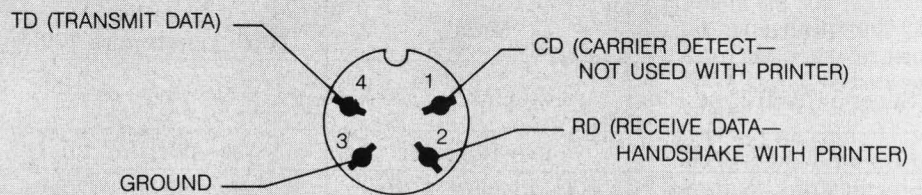


Fig. 2. Color Computer Serial I/O Connector (Looking at the Rear of the Computer)

the screen. If the printer is not providing the proper handshake, nothing else happens. If all is working correctly, the printer will print "TESTING" and the screen will continue showing the word with an ascending count.

Make sure that your printer is set to the proper interface mode. Most printers that have both serial and parallel interfaces use a switch to select one or the other. The Color Computer automatically issues a line feed with a carriage return. Check to be sure that your printer is set correctly for line feed. Switches for this are usually marked Auto LF, CR/LF, LF, or NL (new line).

If the characters printed by your printer in the quick test are incorrect, check the baud rate and word format. Sometimes the printer will work better (especially with graphics) if it is set to 8 data bits, 1 stop bit, and no parity. If the printer does not operate at all, check to see that the power is on, paper is loaded, and any switch that controls "on line" is on. If all else fails, make sure the positive voltage of the printer-ready handshake is getting back to pin 2 on the computer. Pins 3 and 4 must be connected to their corresponding numbers on the printer. Unless the cable is defective, if all these items check out, the computer and printer should be properly connected.

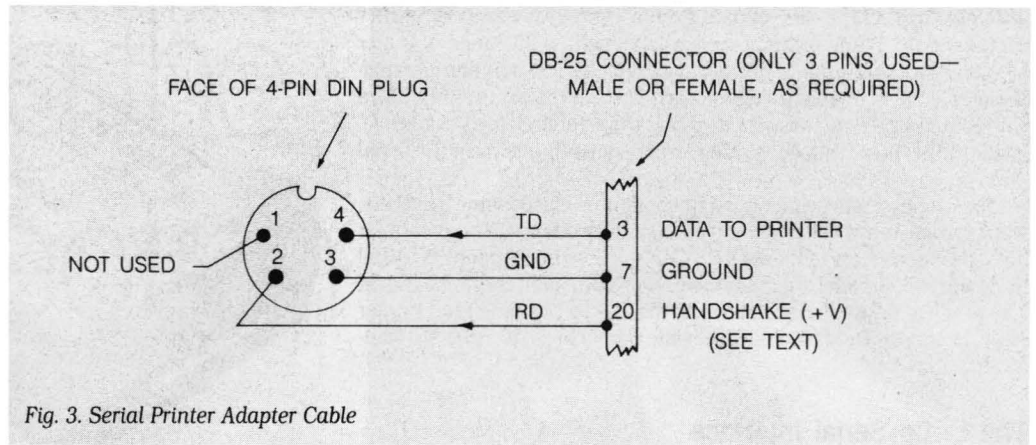


Fig. 3. Serial Printer Adapter Cable

the printer. Because most serial printers use a female DB-25 socket, you'll probably need a DB-25 male plug for your cable.

Wire the adapter cable as shown in Fig. 3. Pin 3 of the DB-25 connector is the data-input line and pin 7 is the ground on most printers. Pin 20 is usually (but not always) the handshaking line. If this doesn't work with your printer, use a voltmeter to find a positive voltage (no more than +12 volts with respect to ground) that is active when the printer is ready. Then connect this pin instead of pin 20 to pin 2 on the CoCo's serial I/O port. Use the listing and testing procedure above to check printer operation.

## Calling Up the Standard

The real challenge to interfacing comes when you try to connect a non-Tandy serial printer to the CoCo. The first thing that grabs your attention is that the connector on the printer is probably a 25-pin DB-25, so the cable you got from your Radio Shack store won't fit. Figure 3 shows the solution. You can either buy a separate 4-pin DIN connector and three-wire cable or simply cut one end from the Radio Shack serial printer cable. Either way, you'll need a mating plug for

## The Smart Cable

The Smart Cable from IQ Technologies (Model 817) allows you to interface with just about any serial printer. The universal RS-232C interface sells for \$89.95 and plugs into the CoCo's serial port with an adapter cable like the one shown in Fig. 3. The Smart Cable is a hardware logic module with a 6-foot ribbon cable that has both male and female DB-25 connectors on the end that attaches to your printer. It has two slide switches and five LEDs (light-emitting diodes): two green, two yellow, and one red. With the printer on and the computer directing output to the printer, you move the switches and watch the LEDs. Some combination will work.

The main benefit of the Smart Cable is derived when you need to interface various devices to a computer's serial output and you don't want to bother with determining the wiring for custom cables. Because only three wires are used with the CoCo, the Smart Cable might be an unneeded luxury. But it's nice to know that there is something out there that can do the job for you.

## The Parallel Course

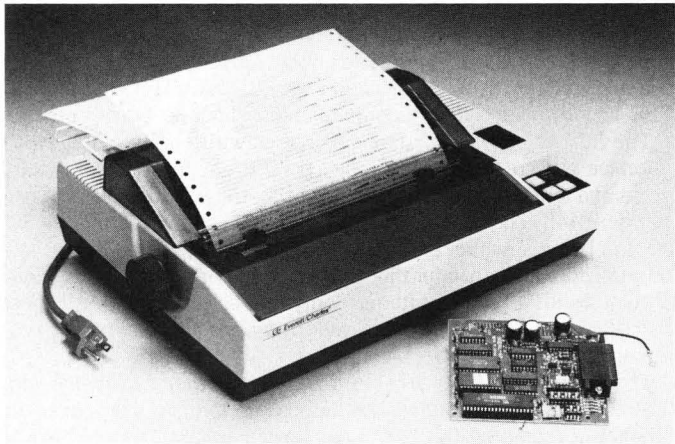
The majority of non-Tandy printers use another standard called the Centronics-compatible parallel interface. With this form of data trans-

Baud Rate	CoCo		MC-10
	POKE 149,X	POKE 150,X	POKE 16932,X
110	1	246	not available
300	0	180	244
600 (default)	0	87	118
1,200	0	40	56
2,400	0	18	26 or 27

Table 1. Changing Baud Rates

Printer	Serial	Parallel (with Tigrtronics 770)	Remarks
Super 5 CP-80 Type 1	yes—pins 3, 7, 20	no	no voltage on pin 18. serial interface optional.
Radio Shack CGP-115	yes—R/S cable	yes—pins 3, 7, 20	600 baud only
Star Micronics Delta-10	yes—pins 3, 7, 20	yes—pins 3, 7, 20	best speed at 1,200 baud.
Star Micronics STX-80	not available	yes—pins 3, 7, 20	best speed at 1,200 baud.
Scope Data Series 200	yes—pins 3, 7, 20	not available	best speed at 1,200 baud.

Table 2. Test Results from Interfacing the CoCo with Five Printers



The CP-80 Dot-Matrix Printer Shown with Separate Interface Available from Everett Charles Marketing Services



The Star Micronics STX-80 Thermal Printer

mission, 8 data bits are sent simultaneously over eight wires and control functions are sent over additional wires. See Fig. 4 for a diagram of parallel data transmission. Many Tandy printers have parallel interfaces in addition to their serial ports.

Because most new printer manufacturing (except that for Apple computers) is moving toward parallel operation, it makes sense to be able to connect your CoCo to a parallel printer. This requires a special hardware device called a *serial-to-parallel interface*, which decodes the computer's serial data and transmits it in parallel form to the printer. The output attachment of the device is a Centronics-compatible connector that plugs into any parallel printer port.

If you are in the market for a serial-to-parallel converter, try to select one that has the CoCo's unconventional four-pin DIN plug for its input connector. Otherwise, you will need the adapter described above. And be sure that if the interface is adjustable, you have it set to the baud rate and word format used by your computer. Several companies manufacture serial-to-parallel interfaces; look for their advertisements in *HOT CoCo*.

Some serial-to-parallel interfaces use external power and some depend on the +5 volts of power emanating from the printer at pin 18 of the parallel connector. Because some Epson and Mannesmann-Tally printers, among others, do not output this voltage, you might need an external power source. Connections for this purpose are usually supplied with the interface or available as an option.

### Testing in the Real World

I tested five different printers with the CoCo, in most cases using serial and parallel interfacing. For serial interfaces I used either the regular Radio Shack cable or the adapter cable shown in Fig. 3. For parallel interfacing I used a Model 770 Serial to Parallel Converter by Tigertronics, which sells for \$99.95 including parallel cable.

The Model 770 does not have the CoCo's four-pin DIN input plug; it uses a standard DB-25 female socket for signal input. I used the adapter cable. Although the Model 770 is more expensive than some other brands, it can be set to any standard baud rate and word format.

As a result, it is more universal than a converter designed just for the CoCo. However, the Model 770 does not provide the +5 volts of external power necessary with some printers. Although instructions are provided for adding this capability, I did not make the conversion, so I was unable to drive one printer through its parallel interface.

The results of the tests are shown in Table 2. Comments about each printer follow.

The CP-80 dot-matrix printer appears to be a Mannesmann-Tally Spirit marketed under another name at \$250. The CP-80 uses square pins and a mylar-film ribbon. It is not generally found in stores or magazine ads but is available directly from Everett Charles Marketing Services Inc. The CP-80 does not provide the +5 volts on pin 18 of its parallel interface, but it worked fine with the optional \$70 serial interface.

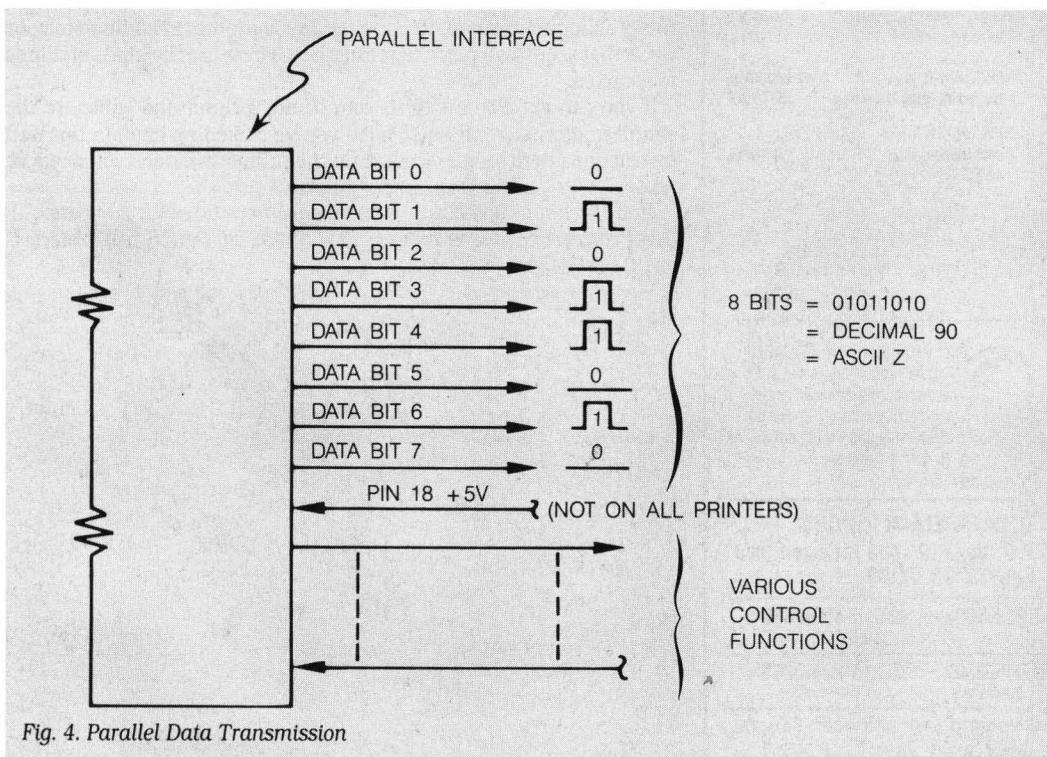


Fig. 4. Parallel Data Transmission



# The Accessible Computer Experts



# DELKER

## HARDWARE SPECIALS

Tandy 600	CALL
Tandy 3000	CALL
25-1000 Tandy 1000 2-drive	CALL
Tandy 1000 10MB Hd	CALL
26-3802 Model 100 24K	\$ 449.95
26-3860 Model 200	\$ 849.95
26-3816P 8K Upgrade Model 100	\$ 55.95
26-3127 64K Extended Coco 2	\$ 149.95
26-3129 Coco Drive	\$ 189.95
26-1161 Coco Drive 1	\$ 179.95
26-3124 Multi-Pac Interface	\$ 89.95
Video Monitor Adapters	\$ 34.95
Botek Ser/Par Interface	\$ 69.95
NAP Video Monitor (Grn Amber)	\$ 109.95
Extended Basic w/ bk	\$ 39.95
64K (DEI) Memory Upg	\$ 49.95
HJL Keyboard (D.E.F.2)	\$ 79.95
26-1276 DMP-105 Printer 80 cps	CALL
26-1278 DWP 220 Printer	CALL

## MSI SOFTWARE

MSI DISKUTIL	NEW	\$ 19.95
COLOR FINANCE II	NEW	\$ 69.95
MSI NAMEFILE		\$ 24.95
MSI CALENDAR	NEW	\$ 19.95
MSI COLOR PAYROLL	NEW	\$ 99.95
COLOR FINANCE 4		\$ 69.95

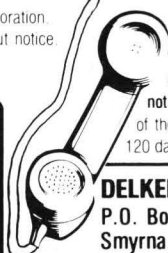
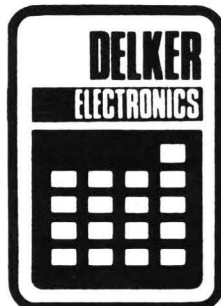
## ACCESSORIES

Volksmodem 1200	\$299.95
RS D.C. Modem IB	\$ 89.95
Novation J-Cat Modem	\$129.95
USR Password 300	\$179.95
Hayes SM 300 Modem	\$239.95
USR Password 1200	\$399.95
USR Password 2400	\$599.95
CoCo Switcher	\$ 39.95
Elephant Disks ssdd	\$ 18.95
Mach II Joystick	\$ 39.95
26-3030 OS-9 (64k)	\$ 64.95 (disk)
Basic-09 (req. OS-9)	\$ 87.95 (disk)
"C" Compiler (OS-9)	\$ 87.95 (disk)
FHL O-Pak (req. OS-9)	\$ 34.95 (disk)
Eite Word	\$ 59.95 (d&c)
Elite Calc	\$ 59.95 (d&c)
Color Term Plus	\$ 29.95 (cass)
Deft Pascal	\$ 79.95
26-3012 Deluxe Joystick	\$ 34.95
Tandy 1000 options	CALL

**NEW! Dual Double Sides Drives including case, power supply & cable** \$375.95

**NEW! 26-3128 64K Direct Video CoCo2** \$219.95

TRS-80 Trademark Tandy Corporation. Prices subject to change without notice. Write for our FREE newsletter.



Call for prices and availability of your favorite software and hardware. All advertised items subject to availability. Prices do not include shipping and handling. All of the above units are covered by our 120 day carry-in warranty.

**DELKER ELECTRONICS, INC.**  
P.O. Box 897 408 C Nissan Blvd.  
Smyrna, TN 37167

- 800-251-5008    ■ 615-459-2636 (Tennessee)
- 800-545-2502    ■ 615-254-0088 (Nashville)

Visa, Mastercard and American Express

The Tandy CGP-115 (catalog no. 26-1192) four-color graphics printer/plotter produces 40 or 80 columns of print or graphics and comes with both a four-pin DIN serial port and Centronics-compatible interface built in. The printer/plotter was listed at \$199 in catalog no. RSC-12 but was recently discounted and sold out for \$89.95.

The Star Micronics Star Delta-10 comes with both a DB-25 serial interface and a Centronics parallel port. It was introduced several years ago and has since been replaced by the SD-10 printer, which sells for \$449. The company also makes the Gemini-10X and the SG-10, the latter of which is currently listed at \$299. The STX-80 is a thermal dot-matrix printer that is small and simple with few features. It comes with a parallel interface only and sells for \$199. All these Star Micronics printers offer a parallel interface with the proper voltage at pin 18.

The Scope Data Series 200 electrostatic printer was available with a DB-25 serial interface only. This "dinosaur" industrial printer of the 1970s is a representative of the days when serial transmission was the most common means of interfacing. Before it went out of business, Scope Data was a subsidiary of Scope Inc. of Reston, VA.

## Recommendations

If you are not handy with a soldering iron and a voltmeter, you are better off with a Tandy printer and the Radio Shack four-pin DIN serial cable than third-party printers. The next best thing is a serial-to-parallel interface converter made to work with the CoCo and a parallel printer.

The biggest challenge comes when you try to interface with serial printers that don't use the four-pin DIN connector. This could be a problem, but the adapter cable from Fig. 3 is a simple solution in most cases. The areas that can cause difficulty are the variability of printer protocols (including switch settings for baud rate, word format, and line feeds) and unconventional handshaking arrangements.

When you have looked at interfacing from all sides, the controlling factor should be the features you require of your printer. The newer dot-matrix printers available from third-party manufacturers might offer particular features and a level of readability that you can't find in combination or at the same price in your Radio Shack store. These are most likely to have parallel interfaces. Many third-party daisy-wheel printers come with only RS-232C serial interfaces, although this is changing. You might have another computer in addition to your CoCo that requires a particular interface. These are the kinds of things to consider.

If you can get away with it, your Tandy printer and cable are the simplest alternative. If not, I hope you've picked up enough tips and instructions here to help you set up the printer interface you need. ■

*Fred Blechman has been writing magazine articles for 25 years. Address correspondence to him c/o HOT CoCo, 80 Pine Street, Peterborough, NH 03458.*

## List of Manufacturers

Everett Charles Marketing Services  
6101 Cherry Ave.  
Fontana, CA 92335  
714-899-2411

Tandy Corp.  
1400 One Tandy Center  
Fort Worth, TX 76102

IQ Technologies  
11811 N.E. First St.  
Bellevue, WA 98005  
206-451-0232

Tigertronics  
2734-C Johnson Drive  
Ventura, CA 93006  
805-658-7466

Star Micronics Inc.  
200 Park Ave.  
New York, NY 10166  
212-986-6770

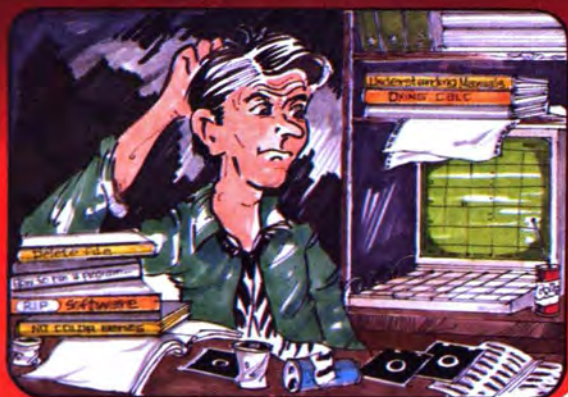


Special  
Introductory Price

introducing...

# PenPal

The Intelligent Choice...



# 69<sup>95\*</sup>

(89.95 CDN)

**A**DMIT IT! Your computer always had the power, but never the software. Now...Four Star Software presents a product unlike any other. Penpal! This is a package intelligent enough to help you reach new heights of personal productivity. Designed to be learned in less than a day, the entire program is quick and easy, powerful but elegant. A pleasure to use!

Penpal provides you with a package that combines the five most wanted computer applications into one incredibly easy-to-use integrated environment. This sets a new standard of excellence in applications software: What would you pay for a program that does it all, but does it easily?

We invite you to compare PENPAL'S list of outstanding features with any other software currently on the market for any computer! Packages like this cost hundreds more on other machines. PENPAL brings the power of a PC to your CoCo at an Unbelievable and Unbeatable price! We guarantee it...if you are not completely satisfied, return it within 30 days for a prompt refund.

For a limited time, take advantage of our low introductory price. You won't be disappointed you did!

Order your personal copy of PENPAL today to finally realize the full potential of your Color Computer. Available directly from Four Star Software or enquire at your local Computer dealer.

- Twelve function Keys and a continuously displayed reminder line make this program easy to use. No complicated key combinations or commands to remember!
- On-line help function
- Hi-res 51 x 24 display screen
- Common formats and commands in all five modules make this package easy to learn and user friendly.
- Fast and effective 255 by 255 spreadsheet is very versatile. Flexible text editor includes all common features found on others plus centering, justification, and pagination. Efficient database includes advanced indexed sorting capability and much, much more!
- Create full color, presentation quality graphs with variable size labels directly from your spreadsheet in pie, line, dot or bar formats using the Graph-it function. Incredible!
- Upload and download files, access networks, or communicate with other users with built-in Telecom feature. This is not just a simple dumb terminal package!
- Modules interface with each other to form a truly integrated package unlike any you have ever experienced. These are not just separate programs that are selectable from central menu like others offer!
- Comes in an attractive binder set, with reference and tutorial manuals. Requires 64K and minimum of one disk drive.

Order Hotline  
416-858-STAR



## Four Star Software

P.O. Box 730  
Streetsville, Ontario  
Canada L5M 2L2

Dealer enquiries welcome  
write or call for our  
free Catalogue. Add \$2.00  
for shipping and handling  
overseas order Add \$5.00





Illustration by Parker Leighton

# Swami Says

***Make sense out of numerical data using regression analysis.***

***The Great CoCo Swami tells you how.***

**T**he Great CoCo Swami can solve many of your problems. He studies the facts that you give him, and then he answers your question. By plugging the various factors into an equation, Swami can come up with a probable solution.

In truth, Swami doesn't really answer questions very well. His real forte is in analyzing numbers and making predictions based on numerical relationships. He uses a technique called regression analysis.

Swami loves to take data (facts such as: a 2-inch beam supports 2,828 pounds, a 3-inch beam supports 5,196 pounds, a 4-inch beam supports 8,000 pounds, and a 5-inch beam supports 11,000 pounds) and determine how the data sets (beam size and load rating) relate to each other. Once the relationship is established, Swami can predict the relationship of additional data sets—in this case, the load rating of other beam sizes.

Swami will give you the equation that describes the data's relationship, the constants that make the equation work, and a graphic plot of the curve the equation describes. And, if you ask politely, Swami will print out your input data and a copy of the regression-curve data. Swami will also work with a screen-dump program to produce a print-out of the data and curve graphic plot.

## **Program Organization**

Swami is not one, but two programs. I wrote Swami for a 16K Extended Basic CoCo, and he uses almost all the memory. In fact, as one





program, Swami would require a 32K computer. Program Listing 1 is Swami Load. It sets up a machine-language text routine that Swami's graphic-plot section uses. This routine is actually a modified version of "Unforgettable Characters," by William Barden, Jr., published in the November and December 1983 issues of *The Color Computer Magazine*. Swami Load automatically loads Swami (Program Listing 2) if you follow the directions as they appear on the screen.

Swami performs the analyses and all input/output functions, except for the graphics-screen printouts. The program generates a graphics screen that is stored in memory so that you can use any one of several screen-dump programs to send it to the printer. To merge a screen-dump program with Swami, edit line 5120. If, for example, you have the Gemprint program for a Gemini printer, type:

```
5120 CLEAR 200,15439:CLOADM
      "GEMPRINT":EXEC 15440:STOP
```

Change the line to accommodate your particular screen-dump program. Table 1 provides a line-by-line description of Swami.

Hardcopy, Program Listing 3, is a screen-dump program I developed for use with a DMP-120 printer. Swami, as it appears here, automatically loads Hardcopy when needed (line 5120). Swami stores the graphics screen in addresses 1536-7679. You can load another program to dump the screen as long as it does not override Extended Basic's default to PCLEAR 4.

## Using Swami

The first task at hand is entering data (lines 1000-1080). Swami can accommodate up to 60 sets of X,Y data points. All zero values are set to .000000000001 to prevent FC errors, which will result from division and exponentiation operations involving zero. Next, Swami asks you to title the graph. You can use up to 40 characters in upper- or lowercase. Lines 1200-1310 and the subroutine at line 5300 then print out your input data, if you desire.

Before Swami can go to work, you must tell him what to do. There are four different types of curves that can describe the relationships of your data sets: linear, exponential, logarithmic, and power. Swami asks you to select one of these curves.

You will want to try all four curves, so enter any one. Swami then displays the equation for the curve you choose, the curve's constants (A and B), the number of data sets you entered (n), the maximum values of X and Y, and the correlation factor (r) for the analysis.

The correlation factor is the most important information at this point, because it describes how well the data sets fit the curve you chose. A correlation factor of 1.0 is a perfect match with the equation. A -1.0 factor is a perfect inverse match. The closer the correlation factor is to zero, the worse the match. Therefore, you must try all four curves to find the one with the best correlation factor.

You can do as many analyses as you wish. Enter N when you are through, and then enter a value for X. Swami gives you the corresponding value for Y, making his predictions based on the information you have given him. The purpose of this step is to determine the largest values of X and Y that will be plotted on the graph.

Swami next plots a graph that includes the input data sets and the best-fit curve you selected. Since Swami's memory is limited, you must give him information about how you want to plot the graph. First, you enter the number of divisions you want on each axis. Second, enter the end-of-scale value for each axis. Both scales always start at zero. Next, Swami asks you to name the horizontal and vertical axes.

Finally, you must tell Swami where to place the data, since the

program could otherwise write over parts of the graph. You have four choices—one for each corner of the graph. Swami has completed his job.

## Sample Run

- Load and run Swami Load.
- Follow the screen instructions and Swami will load automatically. Once loaded, run Swami.

- Enter the data: 2, 2828 (press enter)  
3, 5196 (press enter)  
4, 8000 (press enter)  
5, 11000 (press enter)

0, 0 (press enter; zero indicates end of data entry)

- Press P to get a copy of the input data. (See top of Fig. 1.)

- Press a number, 1 to 4, to select a regression analysis. For example, try 1 for linear regression. Swami will display the general equation for a straight line, the constants (A and B), the number of data points (n), X's maximum value and Y's associated value, and most importantly, the regression coefficient (r). Note that r equals .998626—almost 1.0. It looks like you indeed have a linear curve.

Just for fun, look at the other curves, too. Press Y and enter 2 for an exponential curve. Now r equals .989717—not quite as close as a linear curve. Press Y and 3 for a logarithmic curve. This sets r equal to .98257—still further away. Finally, press Y and 4 for a power curve. The result is that r equals .99995—closer to the 1.0 than the linear curve. You now see that the input data was set up on a power curve.

But go back to the linear curve for now. Press Y and enter 1. Since you don't want to try another regression, press N. Enter 15 (X's maximum value) to find the strength of a 15-inch beam. Swami gives 38,174 as Y's value. Now go back to the power curve and enter 15 for X's maximum value. This time, Swami gives a result of 56,634—a big difference from the prediction made under linear regression.

The point is that you must check all four regressions and use the one with the r value closest to 1.0. If there is a lot of "scatter" in your input data, r's range could be from .6 to .8, or any other range for that matter. Remember, the further away the r value is from 1.0, the less accurate the prediction.

- Press Q when you are ready to create a graph of the results.

- Enter the number of scale divisions you want on each axis of the graph. Since X's maximum value is 15, use five divisions on the X axis. Since Y's maximum value is 56,634, use 60,000 for the full scale and six divisions on the Y axis.

- Enter the full-scale values: 15 for the X axis and 60,000 for the Y axis.

- Identify the units on the X axis—"Thickness in Inches" in this case.

- Identify the units on the Y axis—"Strength in Lbs" in this case. Note the length limitations, which keep everything on the screen.

- Locate the equation and constants on the graph. They take up an area approximately one-third the height and one-half the graph's width. You must therefore locate them so they do not overwrite the curve—in this case to the top left corner. Press the 1 and enter key combination twice.

- You are now at the output screen. Press 1 to admire your handiwork on the screen. If you see something you don't like—a spelling error on

## System Requirements

16K RAM  
Extended Color Basic  
Printer Optional

a label for instance—press 2. This returns you to the regression-analysis portion of the program so that you can repeat the graph with the input data already stored in memory. Pressing 3 gives you a printout of the equation, its constants, and X and Y data points for the curve. (See the middle of Fig. 1.) With this information you can plot the curve by hand.

The last step is to press 4, which accesses Hardcopy (or your own screen-dump routine). Press enter to proceed with Hardcopy. If you pressed 4 by mistake, press the clear key to return to the output screen. Once Swami starts the automatic loading of Hardcopy, he erases all memory except for the graphics screen, which is protected by Extended Basic's default to PCLEAR 4. It is important that any screen-dump program you use contains a PCLEAR 4.

Run Hardcopy once it is loaded and sit back and watch your printer. It should take about seven minutes to get a graph like the one at the bottom of Fig. 1.

If you have any problems or questions, I'll be glad to help you. ■

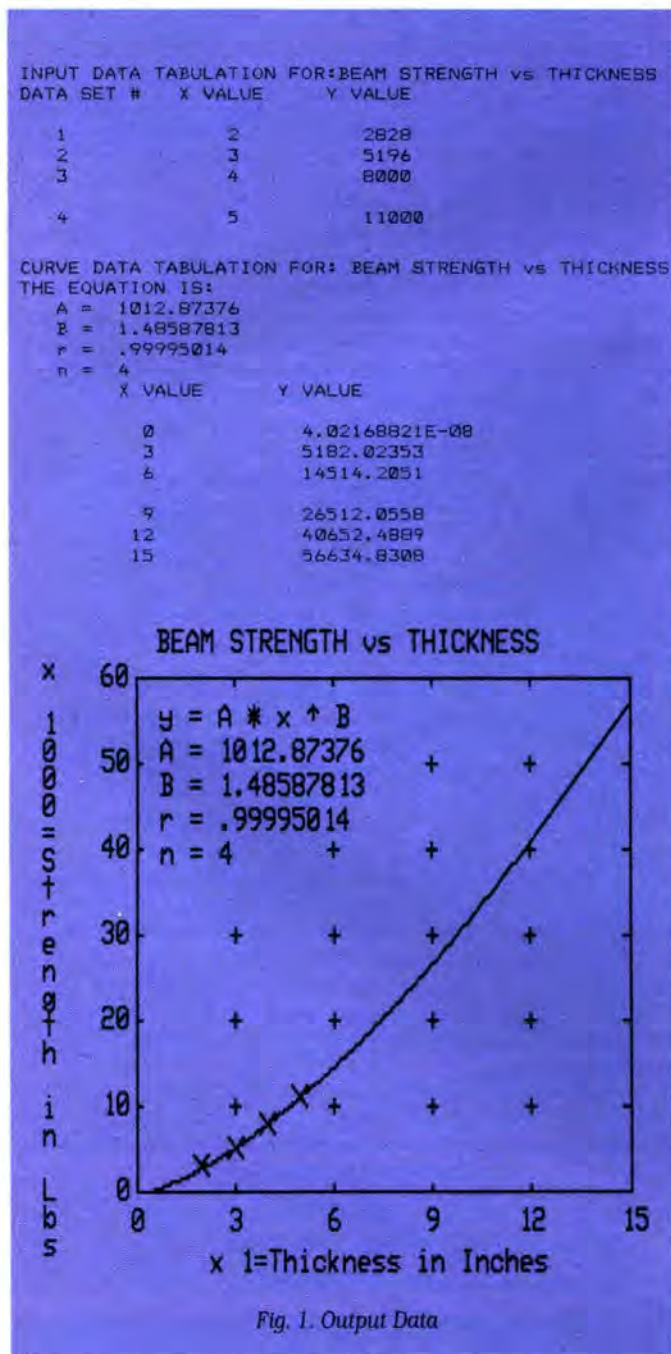


Fig. 1. Output Data

Address correspondence to Milton Simpson, 831 Hillcrest Drive, Martinsburg, WV 25401. Include a self-addressed, stamped envelope for a reply.

Program Listing 1. Swami Load

```
10 'SWAMILD**MACHINE CODE LOADER
   FOR SWAMISEZ (REGRESSION ANALYSIS
   AND GRAPHING PROGRAM)**
20 CLS:PRINT@128," SETTING-UP T
   EXT M/L ROUTINE"
```

Lines	Description
1000-1080	Data-entry routine
1200-1310	Print out data
and 5300	
2000-2180	Loop that allows repetition of the various regression-analysis computations
2190-2280	Linear-regression computation
2290-2380	Exponential-regression computation
2390-2470	Logarithmic-regression computation
2480-2560	Power-regression computation
2570	Compute constants for all regressions
2620-2650	Compute value of Y for a given X for various regressions
2660	Compare present value to stored maximum value and save the larger of the two
3000-3040	Input for number of divisions on each axis and end-of-scale values for each axis
3050	Outline graph
3070	Draw tic marks on top and bottom
3090-3100	Draw crosses at horizontal and vertical division intersections
3130	Draw tic marks on sides
3150	Direct selected curve plotting
3160-3240	Plot linear-regression curve
3250-3340	Plot exponential-regression curve
3350-330	Plot logarithmic-regression curve
3440-3550	Plot power-regression curve
3560-3610	Draw an X at each input data point
4000-4070	Locate title above graph's center
4080-4170	Select scales and multipliers for both axes
4190-4210	Calculate number of scale increments to be labeled on the horizontal axis
4230	Compute value of each label
4250	Limit length of each label to three digits
4260	Compute position of label's first character
4320	Place label information on screen
4340	Position next character of label
4360-4510	Handle vertical axis labels in same way that lines 4190-4350 handled the horizontal axis
4530	Ask for horizontal axis name
4550	Add axis name to scale multiplier
4560-4620	Place axis information on the screen at the graph's bottom
4630	Ask for vertical axis name
4630-4720	Do the same for vertical axis as lines 4530-4620 did for the horizontal axis
4740-4970	Complete plotting of the graph
5000-5330	Perform output operations
6000	Translate ASCII character code to an index number
6070	Use index number to retrieve character data from memory and place it at the screen location calculated in lines 4020-4030

Table 1. Swami Line Description



```

30 CLEAR10,&H3C9F
40 FORI=&H3CA0 TO &H3F6F:READA:P
OKEI,A:NEXT
50 DATA0,0,0,0,0,0,0,0
60 DATA31,31,31,31,31,31,31,31
70 DATA0,4,8,31,8,4,0,0
80 DATA0,4,2,31,2,4,0,0
90 DATA0,4,4,21,14,4,0,0
100 DATA4,4,4,4,0,4,0,0
110 DATA17,17,0,0,0,0,0,0
120 DATA10,10,31,10,31,10,10,0
130 DATA4,15,2,0,14,5,3,0,4,0
140 DATA12,13,2,4,8,19,3,0
150 DATA8,2,0,2,8,21,18,13,0
160 DATA12,12,8,16,0,0,0,0
170 DATA2,4,8,8,8,4,2,0
180 DATA8,4,2,2,2,4,8,0
190 DATA4,21,14,31,14,21,4,0
200 DATA0,4,4,31,4,4,0,0
210 DATA0,0,0,0,12,12,8,16
220 DATA0,0,0,31,0,0,0,0
230 DATA0,0,0,0,12,12,0,0
240 DATA0,1,2,4,8,16,0,0
250 DATA14,17,19,21,25,17,14,0
260 DATA2,6,2,2,2,2,7,0
270 DATA14,17,1,14,16,16,31,0
280 DATA14,17,1,6,1,17,14,0
290 DATA2,6,10,18,31,2,2,0
300 DATA31,16,30,1,1,17,14,0
310 DATA6,8,16,30,17,17,14,0
320 DATA31,1,2,4,8,16,16,0
330 DATA14,17,17,14,17,17,14,0
340 DATA14,17,17,15,1,2,12,0
350 DATA0,12,12,0,12,12,0,0
360 DATA0,12,12,0,12,12,8,16
370 DATA2,4,8,16,8,4,2,0
380 DATA0,0,31,0,31,0,0,0
390 DATA8,4,2,1,2,4,8,0
400 DATA14,17,1,2,4,0,4,0
410 DATA14,17,1,13,21,21,14,0
420 DATA4,10,17,17,31,17,17,0
430 DATA30,9,9,14,9,9,30,0
440 DATA14,17,16,16,16,17,14,0
450 DATA30,9,9,9,9,9,30,0
460 DATA31,16,16,30,16,16,31,0
470 DATA31,16,16,28,16,16,16,0
480 DATA15,16,16,19,17,17,15,0
490 DATA17,17,17,31,17,17,17,0
500 DATA14,4,4,4,4,4,14,0
510 DATA1,1,1,1,1,17,14,0
520 DATA17,18,20,24,20,18,17,0
530 DATA16,16,16,16,16,16,31,0
540 DATA17,27,21,21,17,17,17,0
550 DATA17,25,21,19,17,17,17,0
560 DATA14,17,17,17,17,14,0
570 DATA30,17,17,30,16,16,16,0
580 DATA14,17,17,21,18,13,0
590 DATA30,17,17,30,20,18,17,0
600 DATA14,17,16,14,1,17,14,0
610 DATA31,4,4,4,4,4,4,0
620 DATA17,17,17,17,17,17,14,0
630 DATA17,17,17,10,10,4,4,0
640 DATA17,17,17,17,21,27,17,0
650 DATA17,17,10,4,10,17,17,0
660 DATA17,17,10,4,4,4,4,0
670 DATA31,1,2,4,8,16,31,0
680 DATA4,14,21,4,4,0,0,0
690 DATA0,0,14,1,15,17,15,0
700 DATA16,16,22,25,17,25,22,0
710 DATA0,0,14,17,16,17,14,0
720 DATA1,1,13,19,17,19,13,0
730 DATA0,0,14,17,31,16,14,0
740 DATA2,5,4,14,4,4,4,0
750 DATA0,0,13,19,19,13,17,14
760 DATA16,16,22,25,17,17,17,0
770 DATA4,0,12,4,4,4,14,0
780 DATA0,1,0,1,1,1,17,14
790 DATA16,16,18,20,24,20,18,0
800 DATA12,4,4,4,4,4,14,0
810 DATA0,0,26,21,21,21,21,0
820 DATA0,0,22,25,17,17,17,0

```

```

830 DATA0,0,14,17,17,17,14,0
840 DATA0,0,22,25,25,22,16,16
850 DATA0,0,13,19,19,13,1,1
860 DATA0,0,22,25,16,16,16,0
870 DATA0,0,15,16,14,1,30,0
880 DATA4,4,31,4,4,4,4,0
890 DATA0,0,17,17,17,19,13,0
900 DATA0,0,17,17,17,10,4,0
910 DATA0,0,17,17,21,21,10,0
920 DATA0,0,17,17,4,10,17,0
930 DATA0,0,17,17,31,1,17,14
940 DATA0,0,31,2,4,8,31,0
950 DATA206,63,240,166,66,198,32
,61,227,69,52,6,230,65,84,84
960 DATA84,79,227,225,31,1,230,6
5,196,7,52,4,198,7,224,224
970 DATA92,52,4,52,4,230,196,79,
88,73,88,73,88,73,227,67
980 DATA31,2,95,166,71,89,202,1,
74,38,250,83,134,255,88,73
990 DATA106,228,38,250,52,6,198,
8,52,4,166,100,167,99,230,160
1000 DATA79,88,73,106,99,38,250,
52,6,166,132,164,99,170,228,167
1010 DATA132,166,1,164,100,170,9
7,167,1,48,136,32,50,98,106,228
1020 DATA38,216,53,178
1030 FORI=&H3F70 TO &H3FE3
1040 READA:POKEI,A:NEXT
1050 POKEI200,40
1060 CLS:PRINT" SWAMI SEZ AND M/
L TEXT LOADER":PRINT" BY: MIL
TON T. SIMPSON":PRINT"*****AC
KNOWLEDGEMENT*****"
1070 PRINT"THE TEXT ROUTINE USED
IN THIS PROGRAM IS A SLIGHTLY
MODIFIED VERSION OF 'UNFORGETT
ABLE CHAR- ACTERS' BY MR. WILLIA
M BARDEN, JR., WHICH WAS PUBLIS
HED IN THE NOVEMBER AND DECEMBER
, 1983 ISS-UES OF 'THE COLOR COM
PUTER' MAG-AZINE."
1080 PRINT"*****"
1090 PRINT"PRESS play ON THE TAP
E RECORDER.NOW SEARCHING FOR AND
LOADING: SWAMI SEZ ":PRINT"ENT
ER <RUN> AT THE 'OK' PROMPT";
1100 CLOAD "SWAMISEZ"

```

Program Listing 2. Swami

```

10 'SWAMISEZ BY MILTON T. SIMPSON
N
20 CLEAR150,&H3C9F
30 DIMP(60),Q(60)
50 PMODE4,1
60 DEFUSR0=&H3F70
1000 K=0:CLS
1010 K=K+1
1015 KK=K:IFKK=61THEN PRINT"MAX
DATA INPUT REACHED":GOTO1100
1020 PRINT "THIS IS DATA SET# ";
K
1030 PRINT"ENTER DATA: X,Y TO EN
D ENTER 0,0"
1040 INPUTP(K),Q(K)
1050 IFP(K)=0AND Q(K)=0THEN1100
1060 IFP(K)=0THENP(K)=.0000000000
001
1070 IFQ(K)=0THENQ(K)=.0000000000
001
1080 GOTO1010
1100 INPUT"ENT GRAPH TITLE 40 CH
AR M";FS
1110 IF(LEN(FS))>40THEN1100
1200 INPUT"ENTER P TO HARDCOPY I
NPUT; ANY OTHER KEY TO SKIP";AS

```

```

1210 IFA$<>"P"ANDA$<>"P"THEN2000
1220 PRINT#-2,CHR$(27);CHR$(19)+
CHR$(30)
1230 PRINT#-2,"INPUT DATA TABULA
TION FOR: P$
1240 PRINT#-2,"DATA SET # X VA
LUE Y VALUE":PRINT#-2,""
1250 FORN=1TO K-1
1260 N$=STR$(N):X$=STR$(P(N)):Y$
=STR$(Q(N))
1270 J=LEN(N$):V=LEN(X$)
1280 GOSUB5300
1290 PRINT#-2,S$;N$;T$;X$;"
";Y$
1300 IF(N/3)=INT(N/3)THENPRINT#-
2,""
1310 NEXT
2000 PCLS:CLS:PRINT" SEL REGRES
SION"
2010 PRINT@96,"LIN ENT 1":PRINT
"EXP ENT 2":PRINT"LOG ENT 3":P
RINT"PWR ENT 4"
2020 INPUT"CHOICE";I
2030 IFI>4OR I<1THEN2000
2040 O=0:G=0:L=0:M=0:Z=0:A=0:B=0
2050 ONI GOSUB2190,2290,2390,248
0
2060 CLS:PRINT" A=";D;" B=";E;"
n=";N;" r=";C:PRINT"MAX X=";A;"
MAX Y=";B
2070 AX=D:BX=E:RX=C:NX=N
2080 PRINT"EQUATION:";E$
2090 PRINT"DO ANOTHER? (Y/N)"
2100 A$=INKEY$
2110 IFA$=" "THEN2100
2120 IFA$="Y"OR A$="Y"THEN2000
2130 IFA$<>"N"AND A$<>"n"THEN210
0
2140 PRINT"TO GET LGST <Y>, ENT
LGST <X>ENT'Q' TO QUIT";:INPUTX$
2150 IFX$="Q"ORX$="q"THEN3000ELSE
EX=VAL(X$)
2160 ONI GOSUB2620,2630,2640,265
0
2170 IFX>A THEN A=X:IFY>B THENB=
Y
2180 GOTO2060
2190 FORN=1TO KK-1
2200 O=O+P(N)
2210 G=G+Q(N)
2220 L=L+P(N)*Q(N)
2230 M=M+P(N)*P(N)
2240 Z=Z+Q(N)*Q(N):GOSUB2660
2250 NEXT
2260 GOSUB2570
2270 E$="Y = A + B * x"
2280 RETURN
2290 FORN=1TO KK-1
2300 O=O+P(N)
2310 G=G+LOG(Q(N))
2320 L=L+P(N)*LOG(Q(N))
2330 M=M+P(N)*P(N)
2340 Z=Z+LOG(Q(N))*LOG(Q(N)):GOS
UB2660:NEXT
2350 GOSUB2570
2360 D=EXP(1)^D
2370 E$="Y = A * e ^ (B * x)"
2380 RETURN
2390 FORN=1TO KK-1
2400 O=O+LOG(P(N))
2410 G=G+Q(N)
2420 L=L+LOG(P(N))*Q(N)
2430 M=M+LOG(P(N))*LOG(P(N))
2440 Z=Z+Q(N)*Q(N):GOSUB2660:NEX
T
2450 GOSUB2570
2460 E$="Y = A + B * ln (x)"
2470 RETURN
2480 FORN=1TO KK-1
2490 O=O+LOG(P(N))

```

```

2500 G=G+LOG(Q(N))
2510 L=L+LOG(P(N))*LOG(Q(N))
2520 M=M+LOG(P(N))*LOG(P(N))
2530 Z=Z+LOG(Q(N))*LOG(Q(N)):GOS
UB2660:NEXT
2540 GOSUB2570
2545 D=EXP(1)^D
2550 E$="Y = A * X ^ B"
2560 RETURN
2570 N=KK-1
2580 E=(N*L-O*G)/(N*M-O*O)
2590 D=(G-E*O)/N
2600 C=(N*L-O*G)/SQR((N*M-O*O)*(
N*Z-G*G))
2610 RETURN
2620 Y=D+E*X:RETURN
2630 Y=D*EXP(1)^(E*X):RETURN
2640 Y=D+E*LOG(X):RETURN
2650 Y=D*X^E:RETURN
2660 IFP(N)>A THENA=P(N)
2670 IFQ(N)>B THENB=Q(N)
2680 RETURN
3000 R=200:S=150
3010 INPUT"ENT # H(20M) & V(15M)
DIV":XD,F
3015 IF XD>20OR F>15THEN3010
3020 INPUT"ENT H & V SCALES":G,J
3040 IFG<A THENPRINT"SCALE MUST
BE > LGST VALUE":GOTO3020
3050 SCREEN1,1:LINE(41,164)-(242
,14),PSET,B
3060 FORU=1TO XD-1
3065 M=INT(41+(U*200/XD))
3070 LINE(M,14)-(M,16),PSET:LINE
(M,164)-(M,162),PSET
3080 FORV=1TO F-1
3085 O=INT(14+(V*150/F))
3090 LINE(M,O-2)-(M,O+2),PSET
3100 LINE(M+2,O)-(M-2,O),PSET
3110 NEXT:NEXT
3120 FORV=1TO F-1
3125 O=INT(14+(V*150/F))
3130 LINE(41,O)-(43,O),PSET:LINE
(239,O)-(241,O),PSET
3140 NEXT
3150 ONI GOTO3160,3250,3350,3440
3160 FORL=41TO41+R*A/G
3170 X=L-40
3180 GOSUB2620
3190 Y=165-D*S/J-(Y-D)*(S/R)*(G/
J)
3200 IFY<(165-S)THEN3230
3210 IFY>164THENY=164
3215 IFY<14THENY=14
3220 PSET(L,Y)
3230 NEXT
3240 GOTO3560
3250 LINE(41,164)-(41,163),PSET
3260 W=0
3270 FORL=41TO41+R*A/G
3280 X=W
3290 GOSUB2630
3300 W=W+G/200
3310 Y=164-Y*S/J
3315 IFY<14THENY=14
3320 LINE-(L,Y),PSET
3330 NEXT
3340 GOTO3560
3350 LINE(41,164)-(42,164),PSET
3360 FORL=41TO41+R*A/G
3370 X=(L-40)*G/R
3380 GOSUB2640
3390 Y=164-INT(Y*S/J)
3400 IFY>164THENY=164
3405 IFY<14THENY=14
3410 LINE-(L,Y),PSET
3420 NEXT
3430 GOTO3560
3440 C=G/A
3450 X=R/C
3460 GOSUB2650
3470 Z=Y
3480 LINE(41,164)-(42,164),PSET
3490 FORL=41TO41+R/C STEP6
3500 X=L-40
3510 GOSUB2650
3520 Y=164-INT(Y*S*B/(J*Z))
3525 IFY<14THENY=14
3530 X=40+X
3540 LINE-(X,Y),PSET
3550 NEXT
3560 FORN=1TO KK-1
3570 X=INT(41+P(N)*R/G)
3580 Y=INT(164-Q(N)*S/J)
3590 LINE(X-3,Y-3)-(X+3,Y+3),PSE
T
3600 LINE(X-3,Y+3)-(X+3,Y-3),PSE
T
3610 NEXT
4000 E$=F$
4010 K=LEN(E$):L=K/2
4020 Y=0
4030 FORX=125-L*6TO119+L*6STEP6
4040 A$=LEFT$(E$,L)
4050 K=K-1:E$=RIGHT$(E$,K)
4060 GOSUB6000:GOSUB6070
4070 NEXT
4080 IFG=<100THENR=G:C=1
4090 IFJ=<100THENB=J:S=1
4100 IFG>100AND G=<1000THENR=G/1
0:C=10
4110 IFJ>100AND J=<1000THENB=J/1
0:S=10
4120 IFG>1000AND G=<10000THENR=G
/100:C=100
4130 IFJ>1000AND J=<10000THENB=J
/100:S=100
4140 IFG>10000AND G=<100000THENR
=G/1000:C=1000
4150 IFJ>10000AND J=<100000THENB
=J/1000:S=1000
4160 IFG>100000AND G=<1000000THE
NR=G/10000:C=10000
4170 IFJ>100000AND J=<1000000THE
NB=J/10000:S=10000
4180 GOTO4530
4190 FORMX=1TO9:XX=XD/MX
4200 IFXX=INT(XX)AND XX=<10THEN4
220
4210 NEXT
4220 Y=169:FORZ=38TO248STEP200/X
X
4230 E$=STR$(Z-38)*R/200
4240 L=LEN(E$)
4250 IFL>3THENE$=LEFT$(E$,3):GOT
O4240
4260 X=Z-(L*3+2)
4270 N=L
4280 IFZ=238THENX=X+2
4290 FORM=1TON
4300 A$=LEFT$(E$,L)
4310 L=L-1
4320 GOSUB6000:GOSUB6070
4330 E$=RIGHT$(E$,L)
4340 X=X+6
4350 NEXT:NEXT
4360 FORMX=1TO9:XX=F/MX
4370 IFXX=INT(XX)AND XX=<10THENF
=XX:GOTO4390
4380 NEXT
4390 Z=36:FORY=160TO10STEP-150/F
4400 E$=STR$((160-Y)*B/150)
4410 L=LEN(E$)
4420 IFL>5THENE$=LEFT$(E$,5):GOT
O4410
4430 X=Z-L*6
4440 N=L
4450 FORM=1TO N
4460 A$=LEFT$(E$,L)
4470 L=L-1
4480 GOSUB6000:GOSUB6070
4490 E$=RIGHT$(E$,L)
4500 X=X+6
4510 NEXT:NEXT
4520 GOTO4740
4530 SCREEN:INPUT"ENT X UNITS 3
CHAR M":E$
4540 L=LEN(E$):IFL>33THEN4530
4550 SCREEN1,1:E$="X"+STR$(C)+"=
"+E$
4560 K=LEN(E$):L=K/2
4570 Y=181
4580 FORX=137-L*6TO131+L*6STEP6
4590 A$=LEFT$(E$,L)
4600 K=K-1:E$=RIGHT$(E$,K)
4610 GOSUB6000:GOSUB6070
4620 NEXT
4630 SCREEN:INPUT"ENT Y UNITS 1
6 CHAR M":E$
4640 L=LEN(E$):IFL>16THEN4630
4650 SCREEN1,1:E$="X"+STR$(S)+"=
"+E$
4660 K=LEN(E$):L=K/2
4670 X=0
4680 FORY=96-L*8TO95+L*8STEP8
4690 A$=LEFT$(E$,L)
4700 K=K-1:E$=RIGHT$(E$,K)
4710 GOSUB6000:GOSUB6070
4720 NEXT
4730 GOTO4190
4740 PRINT"POSITION EQN&CONSTS":
INPUT"TOP=1; BOTTOM=2";H:INPUT"L
EFT=1; RIGHT=2";J
4750 IFH<1OR J<1OR H>2OR J>2THEN
4740
4760 IFJ=1THEN J=48ELSE J=124
4770 IFH=1THEN H=22ELSE H=110
4780 SCREEN1,1
4790 FORY=H TO40+H STEP10
4800 IFY=H ANDI=1THENGOSUB2270
4810 IFY=H ANDI=2THENGOSUB2370
4820 IFY=H ANDI=3THENGOSUB2460
4830 IFY=H ANDI=4THENGOSUB2550
4850 IFY=H+10THENE$="A "+STR$(A
X)
4860 IFY=H+20THENE$="B "+STR$(B
X)
4870 IFY=H+30THENE$="r "+STR$(R
X)
4880 IFY=H+40THENE$="n "+STR$(N
X)
4890 L=LEN(E$)
4900 K=L
4910 FORX=J TO J+6*(L-1)STEP6
4920 Y=Y+2:N=0:GOSUB6070
4930 Y=Y-2
4940 A$=LEFT$(E$,L)
4950 GOSUB6000:GOSUB6070
4960 K=K-1:E$=RIGHT$(E$,K)
4970 NEXT:NEXT
5000 CLS:PRINT"VIEW SCREEN 1":PR
INT"ANOTHER GRAPH 2"
5010 PRINT"HARDCOPY DATA 3":PRIN
T"HARDCOPY SCREEN 4"
5020 INPUT"<CLEAR> TO RETURN HER
E":N
5030 ONN GOTO5040,2000,5130,5070
5040 SCREEN1,1
5050 A$=INKEY$
5060 IFA$<>CHR$(12)THEN5050ELSE5
000
5070 PRINT"<ENTER> LOADS HARDCOP
Y PROGRAM; <CLEAR> ABORTS LOAD"
5080 A$=INKEY$
5090 IFA$=" "THEN5080
5100 IFA$<>CHR$(13)THEN5000
5110 CLS:PRINT"LOADING HARDCOPY,
ENT 'RUN' @ OKPROMPT"
5120 CLOAD"HARDCOPY"
5130 PRINT#-2,CHR$(27);CHR$(19)+
CHR$(30)
5140 PRINT#-2,"CURVE DATA TABULA
TION FOR: " F$

```



```

5150 PRINT#-2,"THE EQUATION IS:
"GS
5160 PRINT#-2," A = "STR$(AX)
5170 PRINT#-2," B = "STR$(BX)
5180 PRINT#-2," r = "STR$(RX)
5190 PRINT#-2," n = "STR$(NX)
5200 ZZ=0:PRINT#-2," X VA
LUE Y VALUE":PRINT#-2,"
5210 FORX=.000001TO1+G STEP.0001/XD
5220 ZZ=ZZ+1
5230 ONI GOSUB2620,2630,2640,265
0
5240 H=LEN(STR$(INT(X))):J=1
5250 GOSUB5300
5260 PRINT#-2,T$;STR$(INT(X));"
";STR$(Y)
5270 IFZZ/3=INT(ZZ/3)THENPRINT#-
2," "
5280 NEXT
5290 GOTO5000
5300 R$=" ":S$=" ":T$=" ":U$=" "
5310 FORM=1TO5-J:S$=S$+R$:NEXT
5320 FORM=1TO12-H:T$=T$+R$:NEXT
5330 RETURN
6000 N=ASC(A$)
6010 IFN=32THENN=0:RETURN
6020 IFN>8ANDN<10THENN=N-6
6030 IFN>33ANDN<90THENN=N-28
6040 IFN=94THENN=63
6050 IFN>97ANDN<122THENN=N-33
6060 RETURN
6070 POKE&H3FF0,N:POKE&H3FF1,X
6080 POKE&H3FF2,Y:POKE&H3FF7,6
6090 POKE&H3FF3,60:POKE&H3FF4,16
0
6100 POKE&H3FF5,6:POKE&H3FF6,0
6110 A=USR0(0)
6120 RETURN

```

Program Listing 3. Hardcopy

```

10 'HARDCOPY (HARDCOPY GRAPHICS
SCREEN TO PRINTER) BY: MILTON T
. SIMPSON
20 CLEAR1000,&H3442
30 CLS:PRINT@64,"ENTER (L) TO LO
AD MACHINE LANGU-AGE ROUTINE. E
NTER ANY OTHER KEY IF IT IS AL
READY LOADED":INPUTA$
40 IFAS<>"L"THEN1000
50 CLS:PRINT@64,"LOADING MACHINE
LANGUAGE ROUTINE"
60 FORI=&H3443 TO &H386C:READA:P
OKEI,A:NEXT
100 DATA142,61,255,111,128,140,6
3,255,37,249,127,60,226,127,60,2
28
110 DATA127,60,235,134,48,183,60
,225,142,60,255,191,60,236,127,6
0
120 DATA224,134,7,183,60,230,134
,1,183,60,234,142,60,240,111,128
130 DATA140,60,248,37,249,134,32
,246,60,224,251,60,225,61,251,60
140 DATA226,31,1,166,132,183,60,
227,124,60,224,182,60,224,129,2
150 DATA44,6,182,60,228,183,60,2
29,124,60,229,122,60,230,142,60
160 DATA240,134,128,183,60,231,1
6,142,0,8,198,1,247,60,232,246
170 DATA60,227,134,7,183,60,233,
244,60,231,182,60,232,61,84,182
180 DATA60,233,128,1,183,60,233,
38,245,182,60,234,61,235,132,231
200 DATA1,49,63,38,202,182,60,23
4,72,183,60,234,182,60,230,39
190 DATA132,182,60,231,68,183,60
,231,182,60,232,72,183,60,232,48
210 DATA13,182,60,229,129,1,39,1
,239,202,32,247,60,239,23,0,117
590 DATA182,60,238,141,105,182,6
0,239,141,100,48,1,49,33,16,140
600 DATA62,255,16,38,253,207,166
,164,141,84,134,13,173,159,160,2
610 DATA142,61,255,16,142,62,255
,166,128,167,160,140,62,255,37,2
47
620 DATA142,60,255,16,142,61,255
,166,128,167,160,140,61,255,37,2
47
630 DATA182,60,228,76,124,60,235
,183,60,228,129,2,39,11,182,60
640 DATA225,139,3,183,60,225,126
,55,183,127,60,228,182,60,225,13
9
650 DATA4,183,60,225,182,60,235,
129,55,16,38,252,155,57,139,128
660 DATA173,159,160,2,57,166,132
,230,164,132,96,39,49,129,96,38
670 DATA38,193,96,38,3,126,56,26
,230,169,255,0,196,3,193,3
680 DATA38,53,230,137,255,0,196,
3,193,3,39,43,246,60,239,202
690 DATA64,247,60,239,126,56,26,
193,96,38,28,230,137,255,0,196
700 DATA3,193,3,38,18,166,169,25
5,0,132,3,129,3,39,8,182
710 DATA60,238,138,64,183,60,238
,166,132,230,164,132,3,196,3,129
720 DATA3,38,38,193,3,38,3,126,5
6,108,230,169,1,0,196,96
730 DATA193,96,38,53,230,137,1,0
,196,96,193,96,39,43,246,60
740 DATA239,202,1,247,60,239,126
,56,108,193,3,38,28,230,137,1
750 DATA0,196,96,193,96,38,18,16
6,169,1,0,132,96,129,96,39
760 DATA8,182,60,238,138,1,183,6
0,238,57
1000 PMODE4,1
1010 CLS:PRINT" CHECK THE PRINTE
R'S FUNCTION SWITCHES. SWIT
CH #4 MUST BE 'ON' (UP) AND #1
, #2, & #3 MUST BE 'OFF' (D
OWN)":PRINT:PRINT" PRESS ANY
KEY TO CONTINUE"
1020 POKE150,40
1030 A$=INKEY$
1040 IFAS=" "THEN1030
1050 PRINT:PRINT" TO COPY ONTO
PRINTER ENTER 1 TO DISPLAY VI
DEO DATA ENTER 2"
1060 PRINT:PRINT" PRESS <CLEAR>
TO RETURN HERE."
1070 INPUT "CHOICE";C
1080 IFC<1 ORC>2THEN CLS:GOTO105
0
1090 ONC GOTO1100,1220
1100 PRINT#-2,CHR$(27);CHR$(20)+
CHR$(18)
1110 SCREEN1,1
1120 EXEC&H3443
1130 SCREEN0
1140 CLS
1150 PRINT" "
1160 PRINT" CHECK THE PRINTER'S
FUNCTION SWITCHES. SWITCHES
#3 & #4 MUST BE 'ON' (UP) AN
D #1 & #2 MUST BE 'OFF' (DOWN)
":PRINT:PRINT" PRESS ANY KEY TO
CONTINUE"
1170 POKE150,87
1180 A$=INKEY$
1190 IFAS=" "THEN1180
1200 PRINT#-2,CHR$(30)
1210 END
1220 SCREEN1,1
1230 A$=INKEY$:IFAS=" "THEN1230
1240 CLS:GOTO1050

```

Price Changes  
Occur On A  
Daily Basis.  
Please Call  
1-800-343-8841



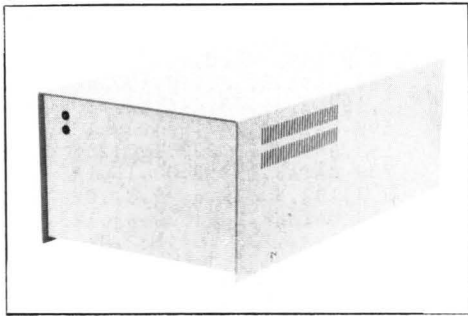
Price Changes  
Occur On A  
Daily Basis.  
Please Call  
1-800-343-8841

**PRICE BREAKTHROUGH**

CO

## **"CALL FOR UNADVERTISED SPECIALS"**

### **Super Sale on New Hard Drives**



## **MEGADISK™**

Winchester Hard Drive Ready to  
run on the TRS 80 Model I/III/IV/4P,  
Color Computer, I.B.M.-PC, TANDY 1000,  
Max/80.

Software Drivers: LDOS, NEWDOS/80,  
DOSPLUS, OS9, TRSDOS 6.0, CP/M, COCODOS

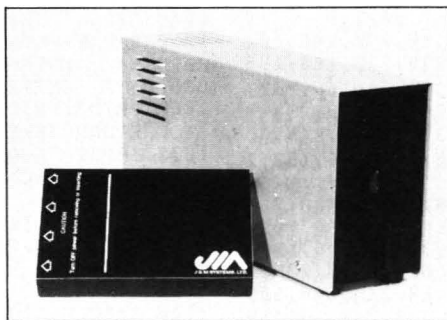
**MEGAPLEX your Megadisk starting at \$499.95**

**Fully Warranted**

**DRIVE A HARD BARGAIN™** starting at ~~\$499.95~~

Call for New low price

**Call Toll Free Ordering 1-800-343-8841**



**High Quality Lowest Price  
Drive 0, 1, 2, 3  
for the  
Color Computer  
Starting at \$219.95**

## **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.  
Shipping: Please call for amount.  
Not responsible for typographical errors.  
Prices subject to change.

### **CANADA**

1720 CHARETTE STREET  
BUBERNAY, LAVAL, CANADA H7E4L9  
514-662-3224

### **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.*

IBM-PC Registered IBM Corp.  
LDOS Reg. Logical System Inc.

FRANKLIN REGISTERED TRADEMARK FRANKLIN CORP.  
DOSPLUS — MICRO SYSTEMS SOFTWARE

APPLE REGISTERED TRADEMARK APPLE COMPUTER CORP.  
MAX/80 REGISTERED TRADEMARK LOBO  
NEWDOS/80 — APPARAT



Prices Change  
Every Day.  
Please Call  
1-800-343-8841  
For Lower Prices.

# PRICE BREAKTHROUGH

Prices Change  
Every Day.  
Please Call  
1-800-343-8841  
For Lower Prices.

**DEALER INQUIRIES INVITED**

**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, Tava, PC Workalikes, Color Computers, Heath/Zenith, Max/80

Complete with Hardware, Cables, Software and Quickfit Installation

5 Megabytes Internal Mount IBM/PC .....	starting at \$ 279.95
10 Megabytes Internal Mount IBM/Tandy 1000 .....	starting at 389.95
20 Megabytes Internal Mount IBM/Tandy 1000 .....	starting at 489.95
5 Megabytes External System .....	CALL <del>399.95</del>
10 Megabytes External System .....	FOR <del>749.95</del>
20 Megabytes External System .....	PRICES <del>899.95</del>
Tape Backup System — Internal Or External (IBM/PC) .....	starting at 449.95

**DOS Systems Available:** { IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, or later  
TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus, CP/M, COCO DOS, Max/80 LDOS, OS9

**FULLY WARRANTIED — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841**

Wow! New Low Prices

CALL FOR UNADVERTISED SPECIALS

**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-around on all disk drives and power supplies.**

<b>Full Height — Tandon</b>	
100-1 Single Sided 40 tk Bare .....	\$ 99.95
In Case with Power Supply .....	139.95
Dual Drives in One Cabinet .....	239.95
100-2 Dual Sided 40 tk Bare .....	109.95
In Case with Power Supply .....	149.95
Dual Drives in One Cabinet .....	259.95
<b>Half High Drives — Tandon/TEAC</b>	
Single Sided 40 tk Bare .....	79.95
In Case with Power Supply .....	119.95
Dual Drives in One Cabinet .....	209.95
<b>Dual Sided 40 tk Bare .....</b>	<b>109.05</b>
<b>In Case with Power Supply .....</b>	<b>149.95</b>
<b>Dual Drives in One Cabinet .....</b>	<b>259.95</b>
<b>Apple/Franklin Disk Drives</b>	
35/40 Track in Case with Cable and Software .....	129.95
<b>Commodore Disk Drives</b> .....	
Power Supplies and Cabinets 5 1/4" and Hard Drive Systems .....	236.95 starting at 42.00

\*\*\*\*\* MEGADISK SPECIAL \*\*\*\*\*

**With a 10 megabyte system, you can purchase a complete IBM or PC compatible host, adapter, software and cable for only \$15.00!! P.S. Ask about the MEGAPLEXER.**

**IBM - PC/XT WORKALIKE**

**All of our computers have: 8 slot motherboard, 640K, monochrome adapter, parallel printer port, 130 watt power supply, free software, monitor, serial port, clock calendar — all with our full warranty.**

/PC - 2 Floppy Drives - Monochrome Monitor, MS-DOS .....	\$1,299.00
5meg/XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS .....	\$1,599.00
10meg/XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS .....	1,799.00
20meg/XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS .....	1,995.00
Internal Tape Backup For Any Of Above systems Add .....	\$449.95
Color for above systems .....	500.00

**COLOR COMPUTER DISK DRIVE SYSTEMS AND ADD IN PRODUCTS**

40 Track Single Head Drive with Case, Power Supply, Cable .....	\$219.95
Controller, Instruction Booklet, Diskettes .....	289.95
Above with Dual Drives in One Cabinet .....	259.95
40 Track Dual Head with Case, Power Supply, Cable, .....	379.95
Controller, Instruction Booklet, Diskettes .....	29.95
Dual DOS Switch .....	69.95
With Second DOS System — JDOS, RSDOS, and Booklet .....	69.95

**PRINTERS**

Dot Matrix	\$ Call
Citizen .....	starting at \$259.95
Star Micronics — S.G. Series .....	249.95
Panasonic 1090 .....	315.95
Daisy Wheel	439.95
Silver Reed 440 80 Column 12 CPS .....	895.00
550 132 Column 19 CPS .....	399.95
770 132 Column 36 CPS .....	84.95
Olympia 132 Column 14 CPS with Form and Tractor Feed .....	starting at 19.95
Apple/Franklin Printer Interface w/Graphics and Cable .....	16.95
Printer Cables .....	16.95
Printer Paper — Microperf Edge 1000 Sheets .....	16.95

**MODEMS**

Volkmodem 300 Baud .....	\$ 69.95
Signalman Mark X Autodial .....	123.95
Mark XII 1200/300 Baud Autodial .....	284.95

**ELECTRICAL**

Surge Protectors — Line Filters — SL Waber — 6 Outlets with Switch .....	\$ 39.95
Uninterruptable Power Supplies .....	399.95

**MISCELLANEOUS**

Diskettes in 10 Pack .....	from \$ 9.95
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	16.00
1 Drive .....	18.95
2 Drives .....	24.95
Heath/Zenith 2 Drive Cables — Shielded .....	24.95

**ALL IN-STOCK ITEMS SHIPPED WITHIN 24 HOURS. SAME DAY SHIPPING PROVIDED BY REQUEST WITHOUT ANY EXTRA HANDLING CHARGES.**

**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**

**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.

# Presenting... instant CoCo's Best Programs of '84

Here they are—29 **HOT CoCo** programs that came through 1984 with flying colors!

**The Best of '84**—29 first class, ready-to-run, Color Computer\* programs from **HOT CoCo**, all on one high-quality cassette, complete with easy-to-read documentation!

It's all here: graphics, utility, and game programs, as well as applications for business, home, and education. The perfect complement to your **instant CoCo** library, and the ideal software package for every Tandy Color Computer user.

And you get the entire **Best of '84** package for just \$16.47—that's 29 programs for less than 60 cents each!

**The Best of '84** honor roll features such outstanding programs as: Stock Transactions Tracker • Variable Cross-Reference • Graphics Builder • Personal Money Manager • Flashcards .

Outstanding variety, top quality. The best programs from an entire year of **HOT CoCo**! It's a package so incredible, we know you'll be delighted.

Become one of the first to own **HOT CoCo's Best of '84** by returning the coupon or attached order card today.

And while you're at it, you can order another class act—**The Best of '83**, still available in limited quantities! (1983 magazines needed for documentation).

For faster service, call **TOLL FREE 1-800-258-5473**. In NH, dial 1-924-9471.

\* Tandy Color Computer is a registered trademark of Radio Shack, a division of Tandy Corp.



**YES!** Send me 29 first class programs on a **Best of '84** cassette for just \$16.47.

( ) I also want a copy of **Best of '83** for \$16.47.

( ) Payment Enclosed ( ) AE ( ) MC ( ) VISA

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

instant CoCo • 80 Pine Street • Peterborough, NH 03458

2-86B





# Programs to

*Load and execute machine-language programs with one command.*

# Boot

There is a quicker way to load and execute machine-language programs. My Boot-Loader Maker (BLM) program (see Listing) lets you do so with a simple RUN"file name" command. You must sacrifice one block of disk space for each program for which you create a boot loader. BLM will work with most machine-language programs, but not all. If you have trouble making a working boot loader for a particular program, simply KILL the boot loader.

After you run BLM, it asks you if you want

to make boot loaders for all the machine-language programs on the disk. If you answer "yes," BLM automatically generates a boot loader for every program with a .BIN extension. If you answer "no," BLM asks if you

want to create boot loaders for each program with a .BIN extension one at a time.

BLM creates Basic boot loader programs saved in the ASCII format. The short program contains the commands:

LOADM"file name" EXEC

Despite its limitations, BLM is a practical, easy-to-use utility. ■

Address correspondence to Richard Wasserman, 2795 East 63rd St., Brooklyn, NY 11234.

## System Requirements

16K RAM  
Disk Extended Color Basic  
Disk Drive

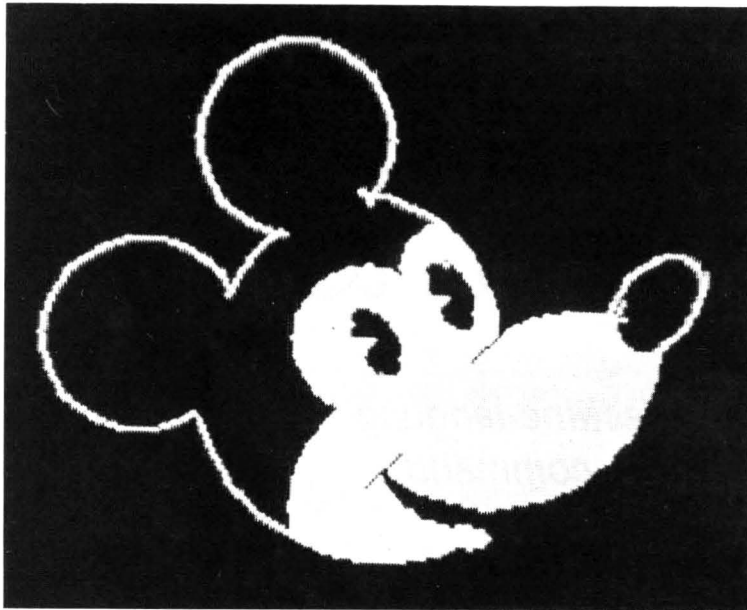
### Program Listing. Boot Loader Maker

```

1Ø CLEAR 1ØØØ
2Ø CLS
3Ø PRINT"      ML BOOT-LOADER MA
KER"
4Ø PRINT"      BY RICHARD WASSER
MAN"
5Ø PRINTSTRING$(32,"-");
6Ø INPUT"WOULD YOU LIKE TO MAKE
      BOOT-STRAP LOADERS FOR
ALL OF THE ML PROGRAMS ON YOUR
DISK (Y/N)";Q$
7Ø IF Q$="Y" THEN HI=11Ø
8Ø INPUT"INSERT TARGET DISK AND
      PRESS          <ENTER>";Q$
12Ø FOR Y=3 TO 11
13Ø DSKI$ Ø,17,Y,A$,B$
14Ø A$=A$+LEFT$(B$,114)
15Ø FOR P=Ø TO 7
16Ø V=P*32
17Ø W$=MID$(A$,V+1,8)
18Ø T$=MID$(A$,V+9,3)
19Ø IF ASC(MID$(A$,V+1,1))=Ø THE
N 25Ø
2ØØ IF ASC(W$)=255 THEN 26Ø
21Ø PRINTW$;"/";T$,
22Ø O$=W$+ "/" +T$
23Ø IF RIGHT$(O$,3)="BIN" THEN G
OSUB 27Ø
24Ø X=X+1
25Ø NEXT P:NEXT Y
26Ø STOP
27Ø IF HI<>11Ø THEN PRINT"MAKE B
OOT LOADER FOR ";O$;" (Y/N)";
28Ø IF HI<>11Ø THEN INPUT QW$
29Ø IF HI<>11Ø THEN IF QW$="Y" TH
EN 3ØØ ELSE RETURN
3ØØ CLS:PRINT"WORKING WITH...";O
$
31Ø J$=LEFT$(O$,8)+".BAS"
32Ø OPEN"O",#1,J$
33Ø PRINT#1,"1Ø LOADM"+CHR$(34)+
O$+CHR$(34)
34Ø PRINT#1,"2Ø EXEC"
35Ø CLOSE #1
36Ø RETURN
END

```

# Cartooning and Animation



*It takes just a little knowledge and practice to be a graphics master.*

**Y**ou would be surprised by the pleasing amount of animation and drawing that you can do with only a 16K Extended Color Basic CoCo. I'm going to show you three ways to draw figures and three ways to animate them.

First the drawing, Listing 1, Mickey, required the most difficult, time-consuming method, but it is the best for obtaining an accurate figure. You draw this type of figure by matching up curves, circles, ovals, arcs, and straight lines.

To watch Mickey grow line by line, first type in line 40, and then line 370. Now run the program. You will see the first ear. Continue typing in lines 50, 60, and so on, and run the program after entering each line. You will see Mickey build step by step.

One little trick: After you enter and run line 340, you'll notice that the PAINT command has erased two important little lines—one by the corner of the mouth and one under the right eye. By using PRESET instead of PSET in lines 350 and 360, these lines are "erased" back into the PAINTed area.

If you would like to do more of this type of drawing, go to your local art store and purchase the following:

- a pad of 12- by 9-inch tracing paper;
- a cheap compass (the kind in which you stick a pencil); and
- two or three transparent circle templates

with circles ranging from  $\frac{1}{8}$  to 3 inches, showing centerline marks around the circles.

Now for the procedure. Draw or trace the picture you want to reproduce on a sheet of tracing paper. But first turn to the graphic worksheet on page 173 of your *Going Ahead with Extended Color Basic* manual. Tape the drawing to the worksheet, making sure that your drawing does not go beyond the lines of

the worksheet. Imagine this worksheet as your video screen.

If you want to avoid ruining your manual's worksheet, carefully cut it out and make an adequate supply of copies. Then tape the original worksheet back in the manual and do your work on the copies.

After you've drawn your picture and centered and taped it to your worksheet, all the X,Y coordinates will show through on the drawing. These could be line or circle-center coordinates. Use the templates to find centers of circles and arcs. Try something simple first, such as a large figure 8. I recommend that you reread pages 41-45 of the Extended Basic manual if you have a problem.

Moonset, Listing 2, is an interesting scenic program made almost entirely of circles. (See Photo 1.) Most of the circles are squished so that they are hardly recognizable as circles, but you can see the remarkable effects of using the CIRCLE commands "oval" feature. The last lines of Moonset create the stars in the sky. Line 1080 confines the stars' area and line 1090 places them. Line 1070 calls for 200 stars. You can experiment with the number of stars.

## System Requirements

16K RAM  
Extended Color Basic

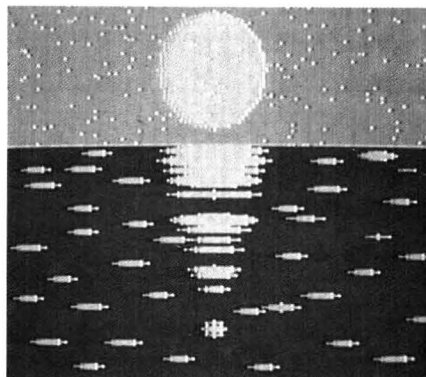


Photo 1. Moonset

## Character Drawing

Most of the programs here shift your computer into the graphics mode, as indicated by

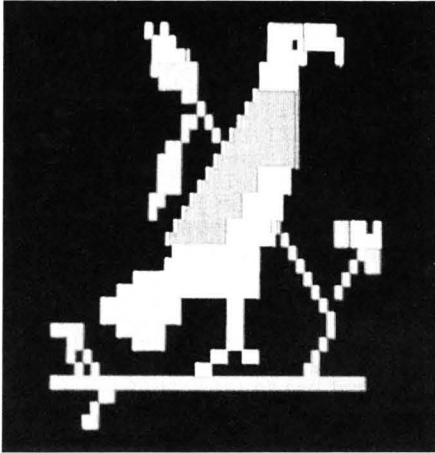


Photo 2. Pennsylvania Dutch

the PMODE and SCREEN commands at the beginning of each. But you can "draw" while still in the text mode. I call it character drawing because you do it entirely with the graphics blocks called by the CHR\$ statement. Page 276 of *Getting Started with Color Basic* shows these blocks and page 277 displays the PRINT@ screen locations where you can place them.

Type in and run Listing 3, Pennsylvania Dutch. It has a sort of needlepoint effect. (See Photo 2.) Pages 175-178 in the Color Basic manual describe the technique I used to create Listing 3. However, I did use one trick not mentioned in the manual. Page 177 tells you to character and color numbers within the parentheses after the CHR\$ statement, but I put the sum of these two numbers within parentheses.

Note the clever use of strings in lines 425-440. Line 425 sets D\$ equal to a row of five green squares. Line 430 sets E\$ equal to D\$ plus D\$, or 10 green squares. Line 435 sets F\$ equal to E\$ plus E\$, or 20 green squares. Line 440 prints F\$ (20 green squares), which appears on the screen as the tree branch. Can you see the possibilities? You can follow each step of the program by first entering line 10, and then line 1000. Next, enter lines 15, 20, 25, and so on, running the program after entering each line.

## The DRAW Method

The third technique is the DRAW method. This time I will add some animation and sound, so turn up your volume. I suggest a quick review of the DRAW command by reading pages 53-56 of the Extended Basic manual. Look at Listing 4, Train. You can draw a line step by step in any of eight directions. In

this program, line 10 sets up the graphics mode, lines 20-50 draw the train body, line 60 draws the window using the magic of the "filled box," lines 70-90 draw the tracks, and lines 100-170 draw the wheels.

Now for some action: You must heat up the boilers, so I'll show smoke building up at the stack. This is merely a series of off-center circles placed in line 180-240. Lines 250 and 260 set up and play the train whistle. Lines 270-290 outline and turn on the headlight.

Lines 300-410 move the drive shaft and are a continuous loop. The PSET command places the line at, say, 12 o'clock on the wheels. The FOR...NEXT loop holds it on the screen long enough for you to see it. Then the PRESET command erases the line. This process repeats, positioning the line at 3, 6, and finally at 9 o'clock on the wheels. The program then goes back to line 300 and start the four-position process over again. This is called PSET-PRESET animation.

## GET-PUT Animation

Listing 5, Bugspray, has sound, so turn up your volume. I drew Bugspray using the same technique as I did with Train, but this time I used GET-PUT animation. GET-PUT animation has a "jerky" effect, which makes my program spookier. You might want to study pages 66-70 of your Extended Basic manual before trying this type of programming.

Line 20 warns of an array or "invisible box" coming up. Lines 30-140 draws a spider within this array. Line 150 locates and defines the array, and 160-510 uses PUT statements between delay lines to lower the array, or spider, on a strand of web that gets longer each move. PCLS3 clears the screen for the kill scene.

I used the DRAW method on the hand and spray can and the PSET-PRESET animation technique for the spray movement. The

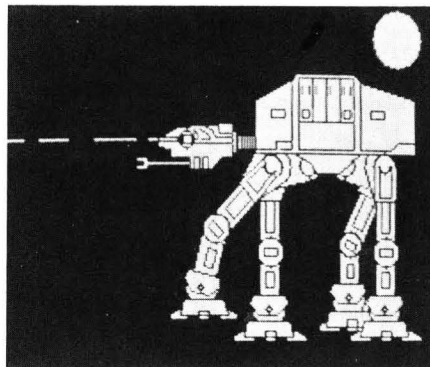


Photo 3. Walker

FOR...NEXT loops are delays, and lines 1190 and 1200 add the song.

## Any-Angle Drawing

In all the previous programs, you pushed an imaginary pencil point around the screen to create a picture. But there was one drawback: You could move in only eight different directions. Now I will use a slightly different method using X,Y coordinates. This method, in effect, tells the computer to move to point X,Y draw to another point X,Y, then draw to yet another point X,Y, and so on. For example, clear your computer and type in this:

```
10 PMODE 4,1:SCREEN 1,1:PCLS
20 DRAW"BM12,96; U20; E20; R20; F20;
   D20; G20; L20; H20; U20"
30 GOTO 30
```

Run this program; you will see an octagon composed of one line in each direction in which you are capable of going with the DRAW method discussed previously. This method tells the computer to move so many spaces up, so many spaces left, so many spaces down, and so on.

To illustrate the second DRAW method, clear your computer and type in the following:

```
10 PMODE 4,1:SCREEN 1,1:PCLS
20 DRAW"BM109,90; M123,90; M128,77;
   M133,90; M148,90; M136,99; M141,112;
   M128,103; M115,112; M120,99; M109,9
   0"
30 GOTO 30
```

Run this program; you will see a star containing lines at angles not possible with the first DRAW method. Note that I used the letter M before the coordinates to indicate "move to." You can use the blank line, no-move line, color, and scale features discussed on pages 53-60 of the Extended Basic manual with this method, too.

Listings 6, Badgrem, and 7, Lilgrem, illustrate the any-angle DRAW method.

By throwing together most of the aforementioned rules, I created the last program, Walker, complete with the theme song from the movie, *Star Wars*. (See Listing 8.)

If all this drawing and animating excites you, I suggest you read *Color Computer Graphics*, by William Barden, Jr. It is available through Radio Shack stores (catalog no. 62-2076). ■

Address correspondence to Dick Meyers,  
1403 Hidden Timber Drive, Pittsburgh, PA  
15220.

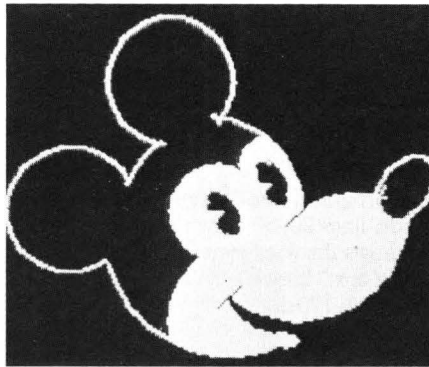


Program Listing 1. Mickey

```

5 REM MICKEY
10 PMODE 4,1
20 PCLS
30 SCREEN 1,1
40 CIRCLE(44,96),30,,,90,.16,.93
50 CIRCLE(88,42),30,,,90,.28,.12
60 CIRCLE(144,120),86,,,90,.58,.64
70 CIRCLE(118,103),60,,,90,.19,.46
80 CIRCLE(108,95),44,,,90,.76,.01
90 CIRCLE(180,140),60,,,90,.63,.79
100 CIRCLE(112,96),23,,,90,.30,.85
110 CIRCLE(136,76),15,,,90,.46,.73
120 CIRCLE(132,142),42,,,90,.47,.65
130 CIRCLE(150,94),53,,,90,.01,.39
140 CIRCLE(145,149),6,,,5,.65,.45
150 CIRCLE(140,126),25,,,85,.22,.51
160 CIRCLE(214,94),30,,,90,.55,.68
170 CIRCLE(187,73),30,,,90,.02,.16

```



```

180 CIRCLE(206,78),10,,,90,.63,.12
190 CIRCLE(197,89),10,,,90,.13,.63
200 CIRCLE(141,90),5,,,90,.90,.40
210 CIRCLE(132,77),5,,,90,.40,.90
220 CIRCLE(110,90),5,,,90,.40,.90
230 CIRCLE(119,103),5,,,90,.90,.40
240 CIRCLE(126,88),20,,,90,.83,.99
250 CIRCLE(104,102),20,,,90,.83,.99

```

```

260 CIRCLE(125,91),20,,,90,.33,.49
270 CIRCLE(148,78),20,,,90,.33,.49
280 LINE (108,96)-(114,96),PSET
290 LINE-(109,102),PSET
300 LINE(130,84)-(136,84),PSET
310 LINE-(131,90),PSET
320 PAINT(152,112)
330 PAINT(111,97)
340 PAINT(133,86)
350 LINE(153,93)-(144,101),PRESET
360 LINE(123,127)-(113,136),PRESET
370 GOTO 370

```

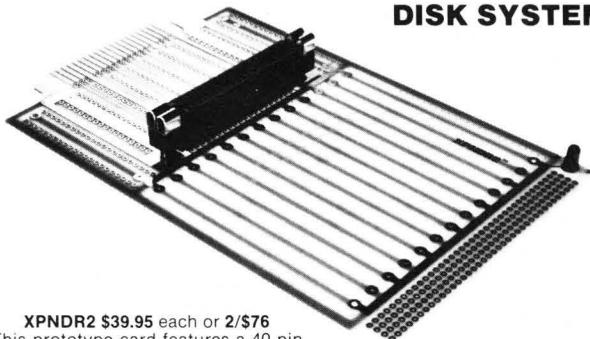
Program Listing 2. Moonset

```

5 REM MOONSET
10 PMODE 3,1:PCLS:SCREEN 1,1
20 LINE(0,72)-(256,72),PSET
30 CIRCLE(128,35),30,8
40 PAINT (128,35),8,8
50 PAINT (40,20),3,4
60 PAINT(128,191),2,4
70 CIRCLE(128,75),30,4,.11
80 PAINT(128,75),8,8
90 CIRCLE(128,80),32,4,.11
100 PAINT(128,80),8,8
110 CIRCLE(128,85),28,4,.11

```

**XPNDR2**  
for the CoCo  
DISK SYSTEM



**XPNDR2 \$39.95 each or 2/\$76**  
This prototype card features a 40 pin connector for projects requiring an on-line disk system or ROM paks. The CoCo signals are brought out to wire-wrap pins. Special gold plated spring clips provide reliable and noise-free disk operation plus solid support for vertical mounting of the controller. The entire 4.3x7 inch card is drilled for ICs. Assembled, tested and ready to run.

**XPNDR1 \$19.95 each or 2/\$36**  
A rugged 4.3x6.2 inch bare breadboard that brings the CoCo signals out to labeled pads. Both XPNDR cards are double-sided glass/epoxy, have gold plated edge connectors, thru-hole plating and are designed with heavy power and ground buses. They're drilled for standard 0.3 and 0.6 inch wide dual in-line wirewrap sockets; with a 0.1 inch grid on the outboard end for connectors.

**SuperGuide \$3.95 each**  
Here is a unique plastic insert that aligns and supports printed circuit cards in the CoCo cartridge port. Don't forget to **ORDER ONE FOR YOUR XPNDR CARDS.**

Included with each XPNDR card are 8 pages of APPLICATION NOTES to help you learn about chips and how to connect them to your CoCo.



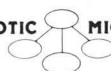
To order or for technical information call:

(206) 782-6809

weekdays 8 a.m. to noon

We pay shipping on prepaid orders. For immediate shipment send check, money order or the number and expiration date of your VISA or MASTERCARD to:

**ROBOTIC MICROSYSTEMS**



BOX 30807 SEATTLE, WA 98103

# Formaker

*the fastest, most complete office package yet!*

Totally Menu Driven  
Customize with company information  
Complete "on screen" instructions

<b>FORMS</b>	<b>STORES</b>	<b>FIGURES</b>
letter	complete forms	quantity
invoice	item list	list
quote	subquotes	net
purchase order	letters	discount
mail order	footnotes	subtotals
confirm order	customer info	tax
receipt		freight, etc.

**SEPARATE CONFIGURE PROGRAM**  
for company info  
printer options  
quote & inv. #  
w/ auto sequencing  
auto date

**PRINTS**  
form feed  
letterhead  
envelope  
multiple copy  
emphasized

**\$49** 32k ECB disc

send for more information:

**Challenger Software**

42 4th Street

Pennsburg, PA 18073

Call (215) 679-8792 (Evenings)

```

120 PAINT(128,85),8,8
130 CIRCLE(128,90),26,4,.14
140 PAINT(128,90),8,8
150 CIRCLE(128,97),26,4,.08
160 PAINT(128,97),8,8
170 CIRCLE(128,110),24,4,.15
180 PAINT(128,110),8,8
190 CIRCLE(128,115),20,4,.08
200 PAINT(128,115),8,8
210 CIRCLE(128,120),14,4,.11
220 PAINT(128,120),8,8
230 CIRCLE(128,125),16,4,.10
240 PAINT(128,125),8,8
250 CIRCLE(128,135),14,4,.15
260 PAINT(128,135),8,8
270 CIRCLE(128,138),12,4,.14
280 PAINT(128,138),8,8
290 CIRCLE(128,145),8,4,.18
300 PAINT(128,145),8,8
310 CIRCLE(128,165),6,4,.75
320 CIRCLE(128,165),5,4,.85
330 PAINT(128,165),8,8
340 CIRCLE(36,77),10,5,.25
350 PAINT(36,77),5,5
360 CIRCLE(64,94),10,5,.18
370 PAINT(64,94),5,5
380 CIRCLE(25,100),8,5,.18
390 PAINT(25,100),5,5
400 CIRCLE(176,90),10,5,.18
410 PAINT(176,90),5,5
420 CIRCLE(204,104),8,5,.20
430 PAINT(204,104),5,5
440 CIRCLE(196,76),8,5,.18
450 PAINT(196,76),5,5
460 CIRCLE(204,84),10,5,.20
470 PAINT(204,84),5,5
480 CIRCLE(228,92),10,5,.20
490 PAINT(228,92),5,5
500 CIRCLE(232,84),8,5,.18
510 PAINT(232,84),5,5
520 CIRCLE(20,84),4,5,.18
530 CIRCLE(86,104),8,5,.18
540 PAINT(86,104),5,5
550 CIRCLE(76,109),10,5,.14
560 PAINT(78,109),5,5
570 CIRCLE(64,80),8,5,.18
580 PAINT(64,80),5,5
590 CIRCLE(36,118),7,5,.18
600 PAINT(36,118),5,5
610 CIRCLE(16,128),8,5,.18
620 PAINT(16,128),5,5
630 CIRCLE(152,120),10,5,.18
640 PAINT(152,120),5,5
650 CIRCLE(172,112),8,5,.20
660 PAINT(172,112),5,5
670 CIRCLE(204,116),8,5,.19
680 PAINT(204,116),5,5
690 CIRCLE(236,124),10,5,.18
700 PAINT(236,124),5,5
710 CIRCLE(44,136),8,5,.19
720 PAINT(44,136),5,5
730 CIRCLE(84,128),8,5,.19
740 PAINT(84,128),5,5
750 CIRCLE(176,132),10,5,.17
760 PAINT(176,132),5,5
770 CIRCLE(216,140),8,5,.18
780 PAINT(216,140),5,5
790 CIRCLE(160,148),8,5,.18
800 PAINT(160,148),5,5
810 CIRCLE(200,154),10,5,.18
820 PAINT(200,154),5,5
830 CIRCLE(236,150),8,5,.18
840 PAINT(236,150),5,5
850 CIRCLE(224,172),10,5,.19
860 PAINT(224,172),5,5
870 CIRCLE(200,184),8,5,.18
880 PAINT(200,184),5,5
890 CIRCLE(180,172),10,5,.20
900 PAINT(180,172),5,5
910 CIRCLE(148,180),8,5,.18
920 PAINT(148,180),5,5
930 CIRCLE(12,160),8,5,.18
940 PAINT(12,160),5,5
950 CIRCLE(28,180),10,5,.20
960 PAINT(28,180),5,5
970 CIRCLE(68,148),10,5,.20
980 PAINT(68,148),5,5
990 CIRCLE(100,184),8,5,.18
1000 PAINT(100,184),5,5
1010 CIRCLE(108,156),8,5,.18
1020 PAINT(108,156),5,5
1030 CIRCLE(90,154),10,5,.22
1040 PAINT(90,154),5,5
1050 CIRCLE(56,172),8,5,.18
1060 PAINT(56,172),5,5
1070 FOR X=1 TO 200
1080 S1=RND(256):S2=RND(72)
1090 PSET(S1,S2,5):NEXT X
1100 GOTO 1100

```

UNLEASH  
YOUR CREATIVE GENIUS  
WITH  
**GRAFIX-3**

"PMODE 3" Graphics  
Editor for OS9


Two full graphics screens and one text screen. What you see is what you get, no space devoted to menus. Scroll in any direction, turn upside down, backward, or rotate 90 degrees. Stamps can be copied, even between screens. They can be listed or saved in hexadecimal form to use in your own programs. No more graphics worksheets!!

Draws boxes, circles, and straight lines between any two points using second cursor and easy single-key commands. Joysticks are helpful but not necessary. Pictures can be expanded or shrunk after drawing. Prints two color dumps on Okidata 82A, four colors on TRS-80 CCP-115. Screens can be left allocated for other dumps.

Whether you use GRAFIX-3 to help you write educational software or games, make cartoons and posters, or just doodle, it's a great addition to your OS9 toolbox.

Send your order to: Aardvark Software  
P.O. Box 60183  
Palo Alto, CA  
94306

Do it! At this price, you can't beat GRAFIX-3 anywhere!

**ONLY \$20.00**

## S.O.S. SMALL OPERATING SYSTEM

S.O.S. IS A SMALL OPERATING SYSTEM THAT RUNS ON A 64K RS™ COLOR COMPUTER DISK EXTENDED BASIC SYSTEM. S.O.S. CONTAINS CONFIGURABLE DRIVERS FOR ALL THE NORMAL I/O ON A SYSTEM. THIS INCLUDES KEYBOARD, SCREEN, PRINTER AND DISKS. IT LEAVES 54,000 BYTES FOR PROGRAMMING AND TEXT SPACE. S.O.S. CAN USE 35-40, OR 80 TRACK DISK DRIVES, SINGLE OR DOUBLE SIDED, ALL INTERMIXED. IT HAS 91 VECTORS OR ENTRY POINTS TO ALLOW THE USER EASY ENTRY TO THE ROUTINES OF S.O.S. THE PRINTER CAN BE CONFIGURED FOR 7 OR 8 BIT OUTPUT AND FOR <C.R.> OR <C.R. & L.F.> OR <L.F.>. PATCHES ARE AVAILABLE FOR "TELEWRITER-64", "ELITE-WORD", THE MICRO-WORKS "EDITOR", "ASSEMBLER", & "DISASSEMBLER". S.O.S. HANDLES SEQUENTIAL OR RANDOM FILES (RANDOM UP TO 32000 RECORDS). UP TO 15 FILES OPEN AT ONCE. UP TO 8 DISK DRIVES (SIDES). IF YOU HAVE THE MICRO-WORKS PACKAGES, THEN S.O.S. IS A MUST. YOU'LL NEVER GO BACK TO RUNNING OR WRITING SOFTWARE UNDER BASIC AGAIN. "TELEWRITER" UNDER S.O.S. HAS 39K OF TEXT SPACE. REPEAT KEY (FOR EXPANDED KEYBOARDS) PLUS CAN USE ALL THE CAPABILITIES OF S.O.S. PATCHES FOR OTHER PROGRAMS ARE AVAILABLE OR BEING WRITTEN FOR RS™ "EDITASM", DUGGERS GROWING "C", DEFT "PASCAL". \$49.95 + \$3.00 SHIPPING & HANDLING. N.J. RESIDENTS ADD 6% SALES TAX.

**CALL OR WRITE: SOISTMANN ENTERPRISES, INC.**  
P.O. BOX 257 P.O. BOX 330  
BUDD LAKE, N.J. 07828 WEST BERLIN, N.J. 08091  
(201) 347-0763 (609) 768-4183

Program Listing 3. Pennsylvania Dutch

```

1 REM PA-DUTCH
5 CLS(Ø)
1Ø PRINT @ 1Ø,CHR$(193);
15 PRINT @ 11,CHR$(193);
2Ø PRINT @ 18,CHR$(225);
25 PRINT @ 19,CHR$(227);
3Ø PRINT @ 2Ø,CHR$(227);
35 PRINT @ 21,CHR$(147);
4Ø PRINT @ 22,CHR$(147);
45 PRINT @ 43,CHR$(2Ø7);
5Ø PRINT @ 44,CHR$(2Ø3);
52 PRINT @ 45,CHR$(21Ø);
55 PRINT @ 5Ø,CHR$(229);
6Ø PRINT @ 51,CHR$(239);
65 PRINT @52,CHR$(231);
7Ø PRINT @53,CHR$(156);
75 PRINT @ 54,CHR$(156);
8Ø PRINT @ 55,CHR$(154);
85 PRINT @ 75,CHR$(221);
9Ø PRINT @ 76,CHR$(223);
95 PRINT @ 77,CHR$(223);
1ØØ PRINT @ 82,CHR$(159);
1Ø5 PRINT @ 83,CHR$(159);
11Ø PRINT @ 84,CHR$(154);
115 PRINT @1Ø9,CHR$(22Ø);
12Ø PRINT @ 11Ø,CHR$(21Ø);
125 PRINT @ 113,CHR$(183);
13Ø PRINT @ 114,CHR$(191);
135 PRINT @ 115,CHR$(191);
14Ø PRINT @ 116,CHR$(186);

145 PRINT @ 141,CHR$(222);
15Ø PRINT @ 142,CHR$(212);
155 A$=CHR$(191)+CHR$(191)+CHR$(191)
156 PRINT @ 145,A$;
16Ø PRINT @ 144,CHR$(183);
165 PRINT @ 148,CHR$(186);
17Ø PRINT @ 175,CHR$(183);
175 PRINT @ 2Ø6,CHR$(183);
18Ø PRINT @ 176,A$;
185 PRINT @179,CHR$(191);
19Ø PRINT @ 18Ø,CHR$(186);
195 PRINT @ 143,CHR$(21Ø);
2ØØ PRINT @171,CHR$(2Ø9);
2Ø5 PRINT @ 172,CHR$(223);
22Ø PRINT @ 2Ø3,CHR$(213);
225 PRINT @ 2Ø4,CHR$(223);
23Ø PRINT @ 235,CHR$(222);
235 PRINT @ 2Ø7,A$;
24Ø PRINT @ 21Ø,CHR$(255);
245 PRINT @211,CHR$(255);
25Ø PRINT @ 237,CHR$(183);
255 PRINT @ 238,A$;
26Ø PRINT @ 241,CHR$(255);
265 PRINT @ 242,CHR$(255);
27Ø PRINT @ 243,CHR$(25Ø);
275 PRINT @268,CHR$(183);
28Ø PRINT @ 269,A$;
285 C$=CHR$(255)+CHR$(255)+CHR$(255)
29Ø PRINT @ 272,C$;
3ØØ PRINT @ 3ØØ,CHR$(247);
3Ø5 PRINT @ 3Ø1,C$;

31Ø PRINT @3Ø4,CHR$(255);
315 PRINT @ 3Ø5,CHR$(255);
32Ø PRINT @ 331,CHR$(245);
325 PRINT @ 332,C$;
33Ø PRINT @ 335,CHR$(255);
335 PRINT @ 336,CHR$(159);
34Ø PRINT @ 337,CHR$(159);
345 PRINT @ 368,CHR$(159);
35Ø PRINT @ 4ØØ,CHR$(159);
36Ø PRINT @ 431,CHR$(156);
365 PRINT @ 433,CHR$(156);
37Ø PRINT @ 33Ø,CHR$(2Ø7);
375 PRINT @ 362,CHR$(2Ø7);
38Ø PRINT @ 363,CHR$(2Ø7);
385 PRINT @ 364,CHR$(2Ø7);
39Ø PRINT @ 395,CHR$(2Ø7);
395 PRINT @ 394,CHR$(2Ø7);
4ØØ PRINT @ 331,CHR$(2Ø7);
4Ø5 PRINT @329,CHR$(195);
41Ø PRINT @361,CHR$(2Ø7);
415 PRINT @ 393,CHR$(2Ø4);
42Ø PRINT @36Ø,CHR$(2Ø7);
425 D$=CHR$(22Ø)+CHR$(22Ø)+CHR$(22Ø)+CHR$(22Ø)+CHR$(22Ø)+CHR$(22Ø)+CHR$(22Ø)
43Ø E$=D$+D$
435 F$=E$+E$
44Ø PRINT @ 453,F$;
45Ø PRINT @ 43Ø,CHR$(147);
455 PRINT @ 422,CHR$(217);
46Ø PRINT @ 275,CHR$(217);
465 PRINT@3Ø8,CHR$(217);
47Ø PRINT @341,CHR$(217);
475 PRINT @ 437,CHR$(215);

```

**IT'S LIKE FREE DISKETTES**

Your 5 1/4" single side disks are usable on the other side. You paid for one side, why not use the other... **IT'S FREE!**

Nibble Notch will **open** your **new** disk. It's easy... won't harm existing data. Try it, you'll be glad you did!

**nibble notch II**

Cuts square notch and 1/4" round "index hole" For TRS 80 I, III, and IV, Osborne, TI, Kaypro, IBM and others needing "index hole"

Call for **HIGH QUALITY DISKETTES** as low as **99¢** ONLY **\$21.90\*** PLUS P&H

**SATISFACTION GUARANTEED OR YOUR MONEY BACK!**  
TOLL FREE 1-800-642-2536

FL (305)748-3770, 9am-6pm ET or send check or money order to:

**nibble notch** computer products

4211 NW 75th Terrace • Dept. 1 5 3 • Lauderhill, FL 33319

U.S. PAT. 4,488,358

\*Add \$2 (\$5 foreign) for postage & handling. FL residents add 5% sales tax.

**ORDER TODAY**

VISA MasterCard

**BASIC COMPILER**

WASATCHWARE believes that users of the Color Computer deserve the right to use all 64k of RAM that is available in the computer, and have fast machine language programs that use the full potential of the 6809 microprocessor. That is why the BASIC compiler, called **MLBASIC** was developed. Here are some of the reasons that make this compiler one of the best bargains in this magazine:

- Programs can use all 64k of RAM for either program storage or for large numbers of variables and arrays like A(20000)
- Full Floating Point arithmetic expressions with functions
- SUBROUTINE and CALL commands allows for structured programming and more independant program development
- Full sequential and direct access disk files allowed
- BASIC source and M.L. output I/O to disk, tape or memory
- Many new commands that expand your programming capability

**Commands Supported**

- I/O -Commands**

CLOSE	CLOADM	CSAVEM	DIR	DRIVE	DSKIS
DSKØ\$	FIELD	FILES	GET	INPUT	KILL
LSET	OPEN	PRINT	PUT	RSET	
- Program Control Commands**

CALL	END	EXEC	FOR	STEP	NEXT
GOSUB	GOTO	IF	THEN	ELSE	ERROR
ON..GO	RETURN	STOP	SUBROUTINE		
- Math Functions**

ABS	ASC	ATN	COS	CVN	EOF
EXP	FIX	INSTR	INT	LEN	LOG
LOC	LOF	PEEK	POINT	PPOINT	RND
SGN	SIN	SQR	TAN	TIMER	VAL
- String Functions**

CHR\$	INKEY\$	LEFT\$	MID\$	MKNS	RIGHT\$
STR\$	STRINGS				
- Graphic/Sound Commands**

COLOR	CLS	CIRCLE	DRAW	LINE	PAINT
PCLEAR	PCLS	PLAY	PMODE	PRESET	PSET
RESET	SCREEN	SET	SOUND		
- Other/Special Commands**

DATA	DIM	LLIST	MOTOR	POKE	READ
REM	RESTORE	RUN	TAB	VERIFY	DLD
DST	IBSHFT	LREG	PCOPY	PMODD	PTV
REAL	SREG	SWP	VECTD	VECTI	

**DON'T HESITATE...BUY MLBASIC TODAY**

64K Required **WasatchWare** 7350 Nutree Drive Salt Lake City, Utah 84121

Call (801) 943-6263

Disk - \$69.95 Include \$4.00 Shipping and Handling  
Tape - \$69.95 Utah residents add 5.75 % tax  
Both - \$74.95 Check or Money Orders Only (No C.O.D.)



```

480 PRINT @ 406,CHR$(214);
485 PRINT @487,CHR$(215);
490 PRINT @ 374,CHR$(217);
495 PRINT @ 343,CHR$(214);
500 PRINT @ 312,CHR$(214);
505 PRINT @ 313,CHR$(223);
510 PRINT @ 279,CHR$(223);
515 PRINT @ 280,CHR$(207);
520 PRINT @ 281,CHR$(199);
525 PRINT @ 456,CHR$(223);
530 PRINT @ 423,CHR$(217);
535 PRINT @390,CHR$(223);
540 PRINT @389,CHR$(220);
1000 GOTO 1000

```

#### Program Listing 4. Train

```

5 REM TRAIN
10 PMODE 4,1:PCLS:SCREEN 1,1
20 DRAW "BM44,142;E16R10E10R70U3
4R40D10L6D40"
30 DRAW "BM44,142;R20U8R22BR20R6
BR20R26BR20R6U2"
40 DRAW "BM150,98;L8U10L14D10L40
U12E5L20F5D12L6G5D16F5"
50 DRAW "BM66,107;L4D8R4"
60 LINE(156,92)-(180,108),PSET,B
F
70 LINE(0,146)-(256,146),PSET
80 LINE(0,153)-(256,153),PSET
90 LINE(0,148)-(256,148),PSET
100 CIRCLE(96,136),10

```

```

110 CIRCLE(122,136),10
120 CIRCLE(168,136),10
130 CIRCLE(74,140),5
140 CIRCLE(96,136),3
150 CIRCLE(122,136),3
160 CIRCLE(168,136),3
170 CIRCLE(74,140),1
180 LINE(122,130)-(168,130),PSE
T
190 X=76;Y=82
200 SP=0:EP=0
210 FOR R=1 TO 24 STEP .05
220 EP=EP+.02:IF EP>1 THEN EP=0
230 CIRCLE(X+R,Y-R),R,5,1,SP,EP
240 NEXT R
250 A$="L2;B;P10;L8;B;B"
260 PLAY A$
270 LINE(0,92)-(62,107),PSET
280 LINE(0,130)-(62,115),PSET
290 PAINT(30,111)
300 LINE(122,130)-(168,130),PSE
T
310 FOR J=1 TO 50:NEXT J
320 LINE(122,130)-(168,130),PRES
ET
330 LINE(116,136)-(162,136),PSE
T
340 FOR J=1 TO 50:NEXT J
350 LINE(116,136)-(162,136),PRES
ET
360 LINE(122,142)-(168,142),PSE
T
370 FOR J=1 TO 50:NEXT J

```

```

380 LINE(122,142)-(168,142),PRES
ET
390 LINE(128,136)-(174,136),PSE
T
400 FOR J=1 TO 50:NEXT J
410 LINE(128,136)-(174,136),PRES
ET
420 GOTO 300

```

#### Program Listing 5. Bugspray

```

5 REM BUGSPRAY
10 PMODE 4,1:PCLS3:SCREEN 1,1
20 DIM V(43,23)
30 CIRCLE(128,18),10,0,.6
40 CIRCLE(128,16),5,0
50 PRESET(126,16)
60 PRESET(130,16)
70 PAINT(128,22),0,0
80 DRAW "BM135,18;C0;E6R2F6"
90 DRAW "BM135,18;C0;R6F2D6"
100 DRAW "BM135,18;C0;F6D6"
110 DRAW "BM121,18;C0;H6L2G6"
120 DRAW "BM121,18;C0;G6D6"
130 DRAW "BM121,18;C0;L6G2D6"
140 LINE(128,0)-(128,12),PRESET
150 GET(107,9)-(150,32),V,G
160 PCLS3
170 LINE(128,0)-(128,22),PRESET
180 PUT(107,19)-(150,42),V,PSET
190 PCLS3
200 LINE(128,0)-(128,32),PRESET

```

## ADOS ENHANCED, EPROM-ABLE DISK BASIC

Now, you can supercharge Basic with an impressive array of extra features WITHOUT sacrificing compatibility! ADOS is compatible with virtually 100% of commercial software. Customizing utilities are provided to allow user-defined command abbreviations, baud rate, step rate, tracks per disk (35 or 40), support of double-sided drives, and more. After customizing ADOS, you can have it burned into an EPROM that plugs into the Disk Basic ROM socket, or just use it in RAM as a 64K disk utility. (EPROM + burning will cost about \$20—we provide information concerning how you can have this done.) Features include: \* repeat and edit of the last direct-mode command \* 26 definable control key abbreviations \* automatic line-number prompts \* DOS command \* lowercase command entry (a fine complement to a LowerKit or PBJ WordPak) \* COPY (filename) to (drive number) \* AE error override option \* RAM command (64K) \* RUNM command \* text echoing to printer \* ML monitor \* text file scan \* enhanced directory \* error trapping \* hires text utility included (42, 51, or 64 characters per line)

"I COULD NOT FIND ANY SOFTWARE THAT WOULD NOT RUN UNDER ADOS." —THE RAINBOW, December 1984

"I LOVE ADOS! . . . A GENUINELY FIRST RATE PRODUCT." —Color Micro Journal, February 1985

"I WON'T PART WITH MY ADOS EPROM FOR ANYTHING . . . NO COMPATIBILITY PROBLEMS." —Hot CoCo, May 1985

Disk . . . \$27.95 Hot CoCo, May 1985

COMPATIBLE WITH ALL VERSIONS OF DISK BASIC • RECOMMENDED BY HOT COCO'S DR. ASCII

### THE PEEPER ML PROGRAM TRACER

Monitor machine-language programs AS THEY ARE RUNNING! Peeper actually timeshares with the target program, giving FULL CONTROL as ML programs run. Switch instantly between watching regular program output and Peeper's trace of registers and stack on screen or printer. Inspect memory in any of 26 display modes. Execution speed can be varied from full speed to the barest crawl, or halted entirely, as programs run. Single-stepping, breakpoints, memory or register examine/change. Relocatable, supports 64K use (16K required). See February '85 review.  
Disk . . . \$23.95 Tape . . . \$21.95 Assembler source listing . . . Add 3.00

### FASTAPE THE NEXT BEST THING TO A DISK DRIVE

Fastape allows cassette I/O at 3000 baud—TWICE NORMAL SPEED. It uses the high-speed (POKE 65495,0) mode, and makes it convenient to stay in this mode throughout. Features automatic adjustment of cassette and printer parameters when speed mode is changed. Control-key functions for many Basic commands and for changing speed modes. Compatible with all file types, and can be used with Teletwriter-64 and many other tape utilities.  
Tape . . . \$21.95 (16K required). See July '83 review

**SPECTROSYSTEMS**



11111 N. Kendall Drive,  
Suite 108  
Miami, Florida 33176  
(305) 274-3899 Day or  
Eve

No delay on personal checks

Please add \$2.00 shipping. Sorry—no credit cards or COD's



## SEMIGRAPHICS SYSTEM FOR EXTENDED COLOR BASIC USERS

Powerful, yet easy to use utility to perform graphic functions in those semigraphic modes which are not supported by Extended Color Basic. Use eight colors on black background, up to a maximum resolution of 64 x 192 points. Combine text and graphics.

### GRAPHICS UTILITY FUNCTIONS

\*Set/Test Point \*Draw Lines \*Draw/Fill Rectangles  
\*Draw Circle/Ellipses \*Paint Areas \*Transform Images  
\*Pages Allocated in RAM \*Move Images Around \*Select  
SGS Modes/Colors \*Scroll/Shift Images Save/Load  
Images on Cassette or Diskette \*And Much More. . .

PLUS: User-created sounds, diagnostics, semi-Graphic screen printing (GEMINI or EPSON printers), Comprehensive Users Manual and Demo Programs. SGS is a high-speed Machine Language system which adds 22 new graphic commands to your EXTENDED COLOR BASIC, E X T E N D your CoCo graphics/animation projects with SGS by mailing your Check or Money Order TODAY!

CASSETTE. . . \$14.95

DISKETTE. . . \$17.95

### MICRO COMPUTER SYSTEMS

1404 Sunset Drive  
Friendswood, TX 77546



```

210 PUT(107,29)-(150,52),V,PSET
220 PCLS3
230 LINE(128,0)-(128,42),PRESET
240 PUT(107,39)-(150,62),V,PSET
250 PCLS3
260 LINE(128,0)-(128,52),PRESET
270 PUT(107,49)-(150,72),V,PSET
280 PCLS3
290 LINE(128,0)-(128,62),PRESET
300 PUT(107,59)-(150,82),V,PSET
310 PCLS3
320 LINE(128,0)-(128,72),PRESET
330 PUT(107,69)-(150,92),V,PSET
340 PCLS3
350 LINE(128,0)-(128,82),PRESET
360 PUT(107,79)-(150,102),V,PSE
T
370 PCLS3
380 LINE(128,0)-(128,92),PRESET
390 PUT(107,89)-(150,112),V,PSE
T
400 PCLS3
410 LINE(128,0)-(128,102),PRESE
T
420 PUT(107,99)-(150,122),V,PSET
430 PCLS3
440 LINE(128,0)-(128,112),PRESE
T
450 PUT(107,109)-(150,132),V,PSE
T
460 PCLS3
470 LINE(128,0)-(128,122),PRESE
T
480 PUT(107,119)-(150,142),V,PSE
T
490 PCLS3
500 LINE(128,0)-(128,132),PRESE
T
510 PUT(107,129)-(150,152),V,PSE
T
520 DRAW "BM184,54;C0;E25F1G25BE
1F44G1F1E25H1G25BE24H30BH9H5BH1G
3L10G7D12"
530 DRAW "BM192,35;C0;H4G2F4BH4E
4H8G6F8E2"
540 CIRCLE(175,20),6,0,1,.125,.5
550 CIRCLE(170,6),20,0,1,.08,.1
3
560 CIRCLE(190,0),16,0,1,.15,.3
570 CIRCLE(221,8),22,0,1,.31,.4
8
580 CIRCLE(212,33),6,0,1,.84,.1
8
590 CIRCLE(228,72),37,0,1,.6,.7
0
600 CIRCLE(203,52),4,0,1,.125,.6
25
610 CIRCLE(206,49),4,0,1,.625,.
125
620 LINE(201,50)-(204,47),PRESE
T
630 LINE(205,54)-(208,51),PRESE
T
640 CIRCLE(191,13),45,0,1,.125,.
21
650 LINE(204,22)-(200,33),PRESE
T
660 LINE(212,32)-(216,28),PRESE
T
670 LINE(222,44)-(237,30),PRESE
T
680 CIRCLE(242,41),12,0,1,.625,.
82
690 CIRCLE(246,7),24,0,1,.1,.24

```

```

9
700 CIRCLE(185,33),22,0,1,.62,.
7
710 CIRCLE(190,23),17,0,1,.62,.7
2
720 CIRCLE(209,98),95,0,1,.71,.7
8
730 LINE(220,4)-(256,9),PRESET
740 LINE(256,9)-(256,19),PRESET
750 LINE(213,35)-(217,31),PRESE
T
760 CIRCLE(224,19),24,0,1,.08,.
2
770 CIRCLE(243,56),19,0,1,.58,.
7
780 CIRCLE(166,7),15,0,1,.02,.2
2
790 PRESET(181,30)
800 CIRCLE(180,31),4,0,1,.625,.1
25
810 FOR I=1 TO 200:NEXT I
820 LINE(180,31)-(72,118),PRESE
T
830 LINE(180,31)-(164,172),PRESE
T
840 COLOR 5
850 FOR I=1 TO 200:NEXT I
860 LINE(180,31)-(72,118),PSET
870 LINE(180,31)-(164,172),PSET
880 FOR I=1 TO 200:NEXT I
890 LINE(180,31)-(72,118),PRESE
T
900 LINE(180,31)-(164,172),PRESE
T
910 COLOR 5
920 FOR I=1 TO 200:NEXT I
930 LINE(180,31)-(72,118),PSET
940 LINE(180,31)-(164,172),PSET
950 FOR I=1 TO 200:NEXT I
960 LINE(180,31)-(72,118),PRESE
T
970 LINE(180,31)-(164,172),PRESE
T
980 COLOR 5
990 FOR I=1 TO 200:NEXT I
1000 LINE(180,31)-(72,118),PSET
1010 LINE(180,31)-(164,172),PSE
T
1020 DRAW"BM135,183;C0;F6R2E6"
1030 PCLS3
1040 LINE(8,188)-(248,188),PRESE
T
1050 CIRCLE(128,183),10,0,.6
1060 CIRCLE(128,184),5,0
1070 PAINT(122,183),0,0
1080 PAINT(134,183),0,0
1090 DRAW"BM121,183;C0;G6L2H6"
1100 DRAW"BM121,183;C0;L6H2U6"
1110 DRAW"BM121,183;C0;H6U6"
1120 DRAW"BM135,183;C0;F6R2E6"
1130 DRAW"BM135,183;C0;R6E2U6"
1140 DRAW"BM135,183;C0;E6U6"
1150 DRAW"BM128,144;C0;E4H4E4H4E
4H4E4H4"
1160 DRAW "BM128,144;C0;F4G4F4G4
"
1170 DRAW"BM120,138;C0;H4E4H4E4H
E4E"
1180 DRAW"BM140,138;C0;H4E4H4E4H
4E4"
1190 XS="L4;F;L2;F;L4;F;L2;F;L4;
F;L2;F;L4;G+;L2;G+;L4;G;L2;G;L4;
F;L2;F;L4;E;L2;F"
1200 PLAY XS
1210 GOTO 1210

```

Program Listing 6. Badgrem

```

5 REM BAD GREMLIN
10 PMODE 4,1:PCLS1:SCREEN 1,0
15 DRAW "BM45,53;C2;M40,52;M37,4
4;M35,36;M36,24;M37,12;M39,8;M42
,2;M47,3;M48,8;M47,11;M56,24;M60
,32;M64,36;M68,38"
20 DRAW"BM46,55;C2;M41,45;M40,40
;M39,35;M39,28;M40,20;M40,18;M42
,12;M46,7"
25 DRAW"BM56,41;C2;M68,38;M71,35
;M70,34;M71,35;M70,34;M71,31;M70
,30;M71,27;M70,26;M72,25;M74,26;
M76,25;M78,27;M78,25;M80,27;M82,
26;M84,30;M86,29;M88,32;M92,37;M
94,39;M96,38"
30 DRAW"BM96,38;M105,37;M109,38;
M111,37;M113,41;M114,42;M118,40;
M119,42;M118,44;M122,43;M118,47;
M115,49;M105,52;M107,54;M107,59;
M108,62;M106,64;M104,68;M101,66;
M99,69;M98,68;M96,70;M96,68;M92,
72"
35 DRAW"BM119,46;C2;M120,47;M122
,48;M128,50;M130,49;M135,50;M139
,47;M141,49;M137,55;M128,60;M126
,64;M123,65;M120,64;M121,60;M124
,57;M128,55;M133,53;M137,50;M134
,50"
40 DRAW"BM123,64;C2;M112,71;M110
,71;M108,73;M106,75;M103,77;M100
,75;M92,73;M94,78;M92,81;M90,82;
M88,83;M89,80;M86,77"
45 DRAW"BM72,64;C2;M74,64;M73,59
;M71,61;M68,57;M67,52;M64,55;M62
,52;M61,48;M60,52;M58,50;M57,48;
M56,44;M55,40"
50 DRAW"BM96,38;C2;M95,33;M94,27
;M93,22;M92,28;M90,22;M89,28;M87
,21;M86,28;M84,22;M83,28;M80,22;
M79,24"
55 DRAW "BM73,64;C2;M76,68;M77,7
2;M76,76;M74,78;M80,77;M82,71;M8
3,76;M80,80;M78,82;M83,81;M86,78
"
60 DRAW"BM70,46;C2;M76,43;M80,42
;M84,42;M88,43;M88,41;M90,40;M93
,42;M95,41;M96,43;M100,43;M101,4
5;M99,46;M100,50;M102,52;M103,56
;M102,59;M98,62;M96,64;M94,67;M9
0,68;M88,67;M84,64;M80,59;M75,52
;M72,47;M70,46"
65 DRAW"BM91,43;C2;M91,45"
70 DRAW"BM96,45;C2;M96,46"
75 DRAW"BM70,46;C2;M76,48;M82,50
;M86,51;M92,51;M96,52;M100,56;M1
02,59"
80 DRAW"BM74,47;C2;M77,45;M83,44
"
85 DRAW"BM80,49;C2;M82,46;M85,45
"
90 DRAW"BM82,50;C2;M87,46"
95 DRAW"BM87,50;C2;M89,47"
100 DRAW"BM90,51;C2;M91,48"
105 DRAW"BM95,51;C2;M94,48"
110 DRAW"BM99,55;C2;M97,49"
115 DRAW"BM80,30;C2;NM80,36;NM79
,36;M78,31;M76,33;M78,35;M80,36;
M82,36;M83,35;M83,33;M82,32;M80,
30"
120 DRAW"BM80,30;C2;M76,30;M72,2
9;BM79,36;M77,36;M73,34;M71,32"
125 DRAW"BM110,48;C2;M112,48;M11

```

4, 49"  
 130 DRAW"BM112, 43; C2; M114, 45; M116, 47"  
 135 DRAW"BM104, 43; C2; M106, 42; M110, 42; M112, 44; M111, 46; M108, 48; M107, 47; NM107, 42; NM108, 42; M106, 46; M105, 45; M104, 43"  
 140 PAINT(111, 47), 0, 0  
 145 PAINT(74, 32), 0, 0  
 150 PSET(90, 56): PSET(90, 55)  
 155 PSET(90, 54): PSET(90, 53)  
 160 PSET(90, 57): PSET(90, 58)  
 165 PSET(91, 57): PSET(92, 56)  
 170 PSET(92, 55): PSET(93, 54)  
 175 PSET(94, 55): PSET(95, 56)  
 180 PSET(95, 57): PSET(95, 58)  
 185 PSET(95, 59): PSET(95, 60)  
 190 PSET(96, 59): PSET(97, 58)  
 195 PSET(97, 57): PSET(98, 58)  
 200 PSET(99, 59): PSET(89, 53)  
 205 PSET(88, 53): PSET(87, 54)  
 210 PSET(87, 55): PSET(86, 56)  
 215 PSET(86, 57): PSET(86, 56)  
 220 PSET(85, 55): PSET(84, 54)  
 225 PSET(84, 53): PSET(83, 53)  
 230 PSET(82, 52): PSET(81, 53)  
 235 PSET(80, 54): PSET(80, 53)  
 240 PSET(80, 52): PSET(79, 52)  
 245 PSET(78, 52): PSET(77, 52)  
 250 PSET(80, 57): PSET(80, 56)  
 255 PSET(82, 55): PSET(82, 56)  
 260 PSET(82, 56): PSET(82, 57)

265 PSET(83, 58): PSET(84, 59)  
 270 PSET(85, 60): PSET(86, 60)  
 275 PSET(87, 59): PSET(87, 60)  
 280 PSET(87, 61): PSET(87, 62)  
 285 PSET(87, 63): PSET(88, 64)  
 290 PSET(89, 63): PSET(89, 62)  
 295 PSET(90, 61): PSET(91, 60)  
 300 PSET(91, 61): PSET(91, 62)  
 305 PSET(91, 63): PSET(92, 64)  
 310 PSET(93, 63): PSET(94, 62)  
 315 PSET(95, 63): PSET(96, 64)  
 320 DRAW"BM48, 56; C2; M47, 55; M47, 54; M49, 53; M48, 52; M48, 51; M52, 50; M55, 52; M58, 53; M61, 55; M64, 57; M67, 60"  
 325 DRAW"BM20, 104; C2; M28, 108; M33, 110; M36, 109; M44, 110; M48, 112; M52, 117; M54, 118; NM56, 114; M56, 119; NM58, 118; M60, 122; M64, 124; M67, 125; N M67, 122; M71, 126; M74, 126; M67, 122; BM70, 122; M69, 121; M68, 120; M64, 119; M60, 116; M59, 113; M56, 112; M55, 108; M52, 106"  
 330 DRAW"BM45, 62; C2; M44, 61; M44, 60; M46, 59; M45, 58; M45, 57; M47, 56"  
 335 DRAW"BM45, 62; C2; M48, 64; M51, 65; M53, 67; M56, 70; M59, 72"  
 340 DRAW"BM46, 59; C2; M49, 61; M52, 62; M55, 64; M58, 67; M61, 69"  
 345 DRAW"BM47, 56; C2; M50, 58; M53, 59; M56, 61; M59, 63; M62, 65"  
 350 DRAW"BM48, 53; C2; M51, 55; M54, 5

6; M57, 58; M60, 60; M63, 62"  
 355 DRAW"BM59, 72; C2; M60, 71; M60, 69; M63, 67; M61, 65; M65, 66; M63, 62; M66, 64; M67, 62; M66, 60"  
 360 DRAW"BM45, 62; C2; M43, 64; M39, 68; M36, 69; M32, 73; M30, 76; M26, 79; M22, 82; M18, 86; M14, 88; M13, 91; M12, 94; M12, 98; M15, 102; M20, 104"  
 365 DRAW"BM55, 106; C2; M63, 105; M65, 106; M66, 108; M70, 109; M72, 114; M76, 116; M75, 115; M75, 111; M76, 116; M79, 114; M78, 113; M80, 118; M82, 115; M80, 112; M80, 109; M78, 108; M77, 108; M70, 105; M69, 105; M69, 107; M70, 103; M68, 102; NM67, 104"  
 370 DRAW"BM58, 72; C2; M52, 78; M48, 86; M44, 88; M40, 90; M34, 93; M35, 97; M37, 99; M39, 100; M43, 99; M47, 97; M51, 97; M55, 94; M59, 93; M60, 92; M62, 92; M63, 93; M74, 95; NM72, 97; M75, 94; M77, 96; NM75, 98; M80, 99; M81, 102; M78, 100; M76, 99; M74, 101; M72, 99"  
 375 DRAW"BM66, 102; C2; M64, 101; M60, 101; M58, 100; NM57, 103; M55, 101; M51, 100"  
 380 DRAW"BM56, 99; C2; M60, 98; NM60, 95; M60, 99; M62, 99; M62, 98; M72, 99"  
 385 DRAW"BM63, 92; C2; M73, 95"  
 390 DRAW"BM95, 77; C2; M98, 78; M100, 80; M101, 82"  
 395 DRAW"BM94, 79; C2; M97, 80; M99, 82; M100, 84"



# PROFESSIONAL HANDICAPPING SYSTEMS

• PRESENTED BY PROFESSOR JONES •

**GLD. Thoroughbred "Gold" Edition™**  
 A "Full" featured thoroughbred analysis designed for the professional and the 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. Create program weight based on a particular track and line 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™** **\$149.95**  
 The ONLY professional greyhound analysis available that evaluates ALL variables. w/Integrated Bettor **\$199.95** Limited Version **\$299.95**

**MHH. Master Harness Handicapper™**  
 Professional software designed to provide a thorough analysis of all trotter and pacer races in the United States and Canada. complete **\$159.95** w/Integrated Bettor **\$199.95** Limited **\$299.95**

**Professor Pix Football™**  
 Complete STATISTICAL ANALYSIS on Data Base allowing "Designated" previous games to be evaluated. Statistical Series **\$99.95** w/Win-Loss Power Ratings **\$149.95**

**NBA. Basketball™** NBA **\$99.95** w/college **\$129.95** w/power ratings **\$149.95**

**LOT. Lottery Analysis™**  
 Statistical comparison program designed to detect subtle patterns in winning numbers and digits. Lottery (3-4 digit) **\$79.95** w/Lotto (Max 99 Digit) **\$99.95**

**PC-3 Portable Computer (4k)** w/choice of Thoroughbred, Greyhound or Trotter™ **\$249.95** (Includes portable computer & program)

**M-100 Portable (32k)** w/choice of Thoroughbred, Greyhound, or Trotter and Master Bettor **\$649.95** (Includes portable computer and program)

★★★★★  
**"Your BEST BET in handicapping software..."**

Reviewed by: Whole Earth Software Guide Corona Data Systems

**Prof. Jones**  
 1940 W. State  
 Boise, ID 83702

VISA MasterCard  
**AMEX**

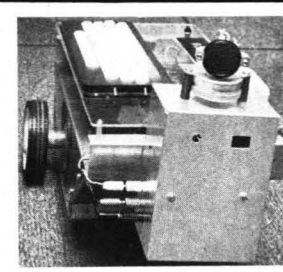
**48 HR. FREE SHIPPING**

**CALL (208) 342-6939**

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, AMEX. Prices subject to change.

## FREE CATALOG!

## Robotize Your CoCo with EMC



**YOU COULD BUILD THIS COCO POWERED ROBOT! AND MORE**

Send For Free Brochure  
 Florida Residents Add 5% Tax  
**\$3.00 Shipping & Handling**

Our unique expansion hardware enables you to create a versatile automated control system.  
 All EMC boards come fully assembled and computer tested.

**Model 100 Parallel Port (PIA)** ..... **\$49.75**  
 Features: Two 8 Bit Bi-Directional Ports, 4 Control Lines, Sample Software Provided

**Model 200 Buss Driver** ..... **\$69.75**  
 Features: TTL, Fanout of 10, 2 Card Slots and Flexible Ribbon Buss Provided. Additional Connectors Available.

**Model 400 Mother Board** ..... **\$49.75**  
 Features: 4 Slots, 5 Gold Pin Connectors, PC Board, for all Non Dedicated Boards.

**Model 500 Motor Control AMP** ..... **\$39.75**  
 Features: TTL Compatible, LED Direction Indicators, Drives DC Motors 500 MA Max at 12 VDG.

**ELECTRONIC MOTION CONTROL**

**P.O. Box 17271 • ARPT Station**  
**Clearwater, Florida 33520**  
**813-896-8295 or 813-536-1694**



```

400 DRAW"BM93,81;C2;M96,82;M98,8
4;M99,86"
405 DRAW"BM92,83;C2;M95,84;M97,8
6;M98,88"
410 DRAW"BM98,88;C2;M94,88;M94,9
0;M92,92;M88,94;M87,97"
415 DRAW"BM71,118;C2;M75,114;BM7
7,108;M82,104;M85,100;M87,97"
420 DRAW"BM20,104;C2;M13,108;M21
,107;M16,111;M22,109;M20,114;M25
,110;M24,114;M28,111;M28,114;M31
,110"
425 DRAW"BM98,88;C2;M102,84;M106
,86;M108,88;M110,92;M112,95;M116
,94;M120,93;M124,92;M128,93;M136
,94;M146,92"
430 DRAW"BM90,93;C2;M94,100;M98,
102;M105,104;M108,108;M112,111;M
118,109;M139,102;M146,103;M151,1
02"
435 DRAW"BM146,90;C2;M142,89;M14
4,87;M144,84;M142,82;M138,83;M14
1,84;M141,88;M142,89;M138,88;M13
8,84;M144,83;M148,82;M152,86;M15
8,85;NM156,86;M162,86;M163,90;M1
58,92;M154,96;M153,95;M155,93;M1
55,90;M153,90;M152,93;M150,94;M1
48,95;M152,96"
440 DRAW"BM146,90;C2;M148,96;M15
0,100;M154,103"
445 DRAW"BM155,88;C2;M153,88;M15
1,90;M150,92"
450 DRAW"BM140,91;C2;NM141,89;NM
138,89"
455 DRAW"BM158,92;C2;M163,94;M16
4,96;M163,100;M163,104;M164,106;
M159,107;M158,104;M154,103;M155,
105"
460 DRAW"BM159,107;C2;M157,108;M
154,109;M155,106"
465 DRAW"BM154,101;C2;M156,100;M
157,97;M156,95"
470 DRAW"BM44,88;C2;M40,99"
475 DRAW"BM118,109;C2;M114,114;M
120,110;M120,114;M123,113;M124,1
10;M125,112;M128,108;M128,111;M1
32,106;M132,110;M136,103"
480 DRAW"BM 71,118;C2;M77,121;M8
3,121;M80,125;M78,126;M74,128;M8
4,136;M88,139;M90,150;M87,156"
485 DRAW"BM81,123;C2;M87,123;M85
,125;M84,128;M78,130;BM85,125;M9
1,125;M88,130;M83,134"
490 DRAW"BM95,88;C2;M92,86;M90,8
4"
495 DRAW"BM60,136;C2;M62,140;M59
,144;M56,146;M52,147;M42,144;M48
,146;M56,150;M59,152;M61,150;M60
,144"
500 DRAW"BM39,148;C2;M44,140;M48
,137;M50,132;M53,126"
505 DRAW"BM32,190;C2;M31,186;M26
,184;M28,182;M31,183;M32,186;M32
,190;M32,186;M35,184;M29,180;M29
,176;M26,174;M29,178;M34,181;M37
,180;M40,180;M41,183;M42,180;M39
,177;M36,176;M34,178;M37,180;M36
,176;M32,174;M28,168;M30,164;M36
,159;M38,151;M39,148"
510 DRAW"BM109,169;C2;M113,168;M
116,170;M120,175;M114,173;M113,1
71;M116,170;M116,174;M110,175"
515 DRAW"BM36,110;C2;M37,116;M32
,124;M29,128;M28,135;M26,144;M20

```

```

,156;M17,164;M17,170;M15,174;M8,
182;M7,186;M8,188;M8,186;M10,184
;M7,183;M8,182;M12,181;M12,184;M
11,186;M15,187;M18,184;M20,180;M
22,184;M30,188"
520 DRAW"BM93,174;C2;M100,176;M1
07,176;M112,178;M110,175;M107,17
2;M103,170;M104,172;M107,176;M11
0,175;M111,172;M109,169;M105,168
;M100,170;M95,168;M92,164;M88,16
0;M87,156"
525 DRAW"BM82,176;C2;M81,172;M83
,170;M85,172;M87,180;NM88,171;M9
0,176;M93,174;M92,170;M88,168;BM
90,176;M90,172;M88,171;M85,172"
530 DRAW"BM51,130;C2;M54,133;M64
,138;M72,139;M79,140;M78,146;M79
,152;M73,156;M71,160;M72,164;M73
,167;M75,164;M76,163;M80,166;M78
,170;M82,176"
535 DRAW"BM97,131;C2;NM85,137;M9
0,130;BM82,176;M86,177"
540 DRAW"BM98,135;C2;NM89,139;M9
0,135"
545 DRAW"BM99,143;C2;NM90,143;M9
4,138"
550 DRAW"BM98,147;C2;NM90,147;M9
4,143"
555 LINE (175,126)-(172,127),PSE
T
560 LINE-(204,166),PSET
565 LINE-(244,139),PSET
570 LINE-(244,160),PSET
575 LINE-(204,188),PSET
580 LINE-(172,152),PSET
585 LINE-(172,127),PSET
590 LINE (204,189)-(204,166),PSE
T
595 LINE (244,139)-(237,133),PSE
T
600 LINE-(240,132),PSET
605 LINE-(240,127),PSET
610 LINE-(210,100),PSET
615 LINE-(172,117),PSET
620 LINE-(172,122),PSET
625 LINE-(204,149),PSET
630 LINE-(240,132),PSET
635 LINE (172,117)-(204,144),PSE
T
640 LINE-(240,127),PSET
645 LINE (204,144)-(204,149),PSE
T
650 CIRCLE(200,154),4,0
655 CIRCLE(210,154),4,0
660 CIRCLE(200,154),1,0
665 CIRCLE(210,154),1,0
670 PAINT(215,152),0,0
675 DRAW"BM190,64;R4U2L4U2R4BR3N
R4D2NR3D2R4BR3NR4U2NR3U2R4BR3BD2
R4BR3BU2D4R4U4"
680 DRAW"BM192,72;U4F4U4BR3NR4D2
NR3D2R4BR3BU4F2NE2NG2F2BR5U4BL2R
4"
685 DRAW"BM183,80;U4R4D2L4BR7BU2
ND4R4D2L3F2BR5U4R4D4L4BR7BU4NR4D
4R4U2L2BR5BD2U4R4D2L3F2BR3E4F3NL
5FLBR2U4F2E2D4"
690 DRAW"BM210,84;D10NH5NE5"
695 DRAW"BM204,118;U2R5D5L5D4BD3
R1D1L1U1"
700 DRAW"BM36,124;M40,122;M44,12
2;M47,126;M49,129"
705 DRAW"BM34,128;M38,126;M41,12
7;M44,129;M46,132"
710 DRAW"BM33,131;M37,129;M40,13

```

```

0;M44,135"
715 DRAW "BM31,135;M34,134;M39,1
35;M41,140"
720 DRAW"BM31,139;M35,138;M38,14
1"
725 DRAW"BM30,142;M34,143;M36,14
5"
730 DRAW"BM28,146;M32,145;M34,14
8"
735 GOTO 735

```

Program Listing 7. Lilgrem

```

5 REM LITTLE GREMLIN
10 PMODE 4,1:PCLS1:SCREEN 1,0
15 DRAW"BM0,40;C2;M3,42;M5,42;M7
,47;M26,62;M28,64;M26,68;M24,69;
M23,72;M20,74;M18,76;M14,80;M11,
80;M6,81;M0,82"
20 DRAW"BM0,61;C2;M6,63;M3,68;M0
,69"
25 DRAW"BM23,72;C2;M27,74;M22,75
;M25,76;M20,77;M23,78;M22,78;M17
,79;M20,80;M14,81;M19,82;M12,81;
M11,80"
30 DRAW"BM7,80;C2;M8,84;M11,92;M
16,97;M18,100;M19,108;M23,120;M2
5,124;M28,129;M30,132;M32,136;M3
3,140;M34,143;M40,148;M41,151;M4
2,152;M43,156;M42,156;M40,154;M3
7,153;M34,154;M32,152;M29,149;M2
8,146;M28,154;M24,157;M20,157"
35 DRAW"BM40,154;C2;M38,152;M38,
150;M41,151"
40 DRAW"BM20,161;C2;M20,157;M23,
153;M21,152;M19,153;M18,156;M18,
158;M20,161;BM17,157;M16,154;M16
,152;M19,149;M21,146"
45 DRAW "BM20,149;C2;M16,150;M13
,149;M15,148;M14,146;M12,147;M9,
148;M9,151;M11,150;M14,146;M17,1
44;M20,140;M20,137;M16,133;M13,1
28;M11,124;M10,120;M7,115;M0,109
"
50 DRAW"BM0,48;C2;M6,46;BM0,46;M
5,44;BM0,44;M3,42"
55 LINE(0,0)-(256,192),PSET,B
60 DRAW"BM0,95;C2;M5,93;M8,94BM0
,103;M3,98;M7,96;M10,97;BM4,106;
M6,101;M9,100;M12,101;BM7,109;M9
,105;M13,106;BM9,112;M12,108;M15
,109"
65 LINE(168,114)-(208,95),PSET
70 LINE-(240,128),PSET
75 LINE-(200,152),PSET
80 LINE-(168,114),PSET
85 LINE-(168,139),PSET
90 LINE-(200,173),PSET
95 LINE-(240,150),PSET
100 LINE-(240,128),PSET
105 LINE (200,152)-(200,173),PSE
T
110 LINE(208,95)-(208,115),PSET
115 LINE-(228,135),PSET
120 LINE (208,115)-(180,129),PSE
T
125 DRAW"BM180,164;C2;M180,169;M
139,186;NM139,181;M112,158;M112,
153;M139,181;M180,164"
130 DRAW"BM180,164;C2;M148,138;N
M148,143;M112,153;M116,156;M148,

```

```

143;M176,166"
135 DRAW"BM78,32;C2;M86,31;M94,3
Ø;M1Ø2,32;M1Ø8,34"
14Ø DRAW"BM148,34;C2;M154,32;M16
2,3Ø;M17Ø,3Ø;M178,32
145 DRAW"BM1Ø8,34;C2;M11Ø,32;M11
2,33;M114,32;M116,33;M118,32;M12
Ø,31;M122,32;M124,31;M128,3Ø;M13
Ø,3Ø;M132,31;M134,32;M136,31;M13
8,3Ø;M14Ø,3Ø;M142,31;M144,32LM14
6,33;M148,34"
15Ø DRAW"BM78,32;C2;M78,34;M8Ø,3
6;M82,38;NM88,34;M82,4Ø;M85,41;N
M9Ø,37;M85,42;M88,43;NM93,39;M88
,46;M9Ø,46;NM95,42;M9Ø,48;M92,49
;NM96,46;M92,51;M95,51;NM99,49;M
96,54;M98,54;M1Ø3,51"
155 CIRCLE(118,42),6,Ø
16Ø CIRCLE(138,42),6,Ø
165 CIRCLE(118,41),4,Ø
17Ø CIRCLE(138,41),4,Ø
175 CIRCLE(118,41),3,Ø
18Ø CIRCLE(138,41),3,Ø
185 CIRCLE(118,41),2,Ø
19Ø CIRCLE(138,41),2,Ø
195 PRESET(118,41,1)
2ØØ PRESET(119,41,1)
2Ø5 PRESET(138,41,1)
21Ø PRESET(139,41,1)
215 CIRCLE(128,48),3,Ø,1,.5,.Ø
22Ø DRAW"BM13Ø,48;C2;M132,49;M13
3,51"
225 DRAW"BM126,48;C2;M124,49;M12
3,51"
23Ø PSET(127,5Ø)
235 PSET(13Ø,5Ø)
24Ø DRAW"BM119,55;C2;M121,56;M12
3,56;M125,55;M127,54;M129,53;M13
1,53;M133,54;M135,55;M138,56;M13
8,53;M137,52;M135,51"
245 DRAW"BM122,51;C2;M121,5Ø;M12
Ø,51;M118,55"
25Ø CIRCLE(128,49),13,Ø,1,.1,.42
255 DRAW"BM178,32;C2;M176,36;M17
3,37;NM166,33;M172,4Ø;M171,41;NM
163,37;M17Ø,43;M168,44;NM16Ø,4Ø;
M166,47;M165,48;NM157,44;M164,51
;M162,52;NM155,49;M161,55;M159,5
6;NM152,51"
26Ø DRAW"BM1Ø2,54;C2;M1Ø4,57;M1Ø
4,59;M1Ø6,61;M1Ø8,63;M11Ø,65;M11
2,65;M114,66;M116,67;M118,67;M12
Ø,68;M122,69;M124,7Ø;M126,71;M12
8,71;M13Ø,71;M132,7Ø;M134,68;M13
7,67;M14Ø,66;M142,64;M144,63;M14
6,6Ø;M148,59;M15Ø,56;M152,55"
265 DRAW"BM1Ø6,62;C2;M1Ø2,66;M98
,68;M96,7Ø;M95,72;M94,76;M92,79;
M92,8Ø;M91,84;M91,85;M95,84;M96,
83;M99,86;M1Ø1,84;M1Ø4,85;M1Ø6,8
6;M1Ø8,85;M11Ø,81;M112,78;M114,7
7;M115,74;M116,72;M118,71"
27Ø DRAW"BM94,84;C2;M96,89;M99,8
9;M1ØØ,9Ø;M1Ø2,9Ø;M1Ø4,88;M1Ø3,8
6;M1Ø2,84"
275 DRAW"BM1Ø4,88;C2;M1Ø3,92;M1Ø
2,96;M1Ø2,1ØØ;M1Ø3,1Ø8;M1Ø4,112;
M1Ø5,115;M1Ø3,118;M1Ø5,121;M1Ø8,
12Ø;M112,119;M115,12Ø;M116,118;M
12Ø,12Ø;M122,119;M122,114;M121,1
12;M12Ø,1Ø6;BM117,1Ø2;M116,99;M1
14,98;M112,96;M112,95;M11Ø,94;M1
Ø8,92;M1Ø7,9Ø"
28Ø CIRCLE(1Ø9,123),1,2,2.1
285 CIRCLE(113,124),1,2,2.1

```

```

29Ø CIRCLE(117,123),1,2,2.1
295 DRAW"BM1Ø6,121;C2;M1Ø8,123;M
11Ø,123;M112,124;M114,124;M116,1
23;M118,123;M12Ø,12Ø"
3ØØ DRAW"BM12Ø,1Ø6;C2;M122,1Ø8;M
123,1Ø6;M124,1Ø8;M125,1Ø6;M126,1
Ø8"
3Ø5 DRAW"BM134,98;C2;M132,1ØØ;M1
28,1Ø4;M126,1Ø8;M126,112;M128,11
5;M132,118;M136,119;BM134,116;NM
138,119;BM137,115;NM139,119;BM13
9,114;M143,118;M14Ø,116"
31Ø DRAW"BM13Ø,1Ø9;C2;M132,111;M
134,11Ø;M136,112;M137,11Ø;M14Ø,1
1Ø;M142,1Ø8;M144,1Ø5;M146,1Ø3;M1
46,1ØØ;M145,96;M145,92;M144,87"
315 DRAW"BM2Ø8,32;C2;R5U4L5U4R5B
R4NR5D4NR4D4R5BR3NR5U4NR4U4R5BR6
D8R1U8BD1ØBL1R2D2L2U2"
32Ø DRAW"BM143,116;M14Ø,113;M13
8,111"
325 DRAW"BM14Ø,8Ø;C2;M143,85;M14
5,89;M147,91;M148,92;M146,96;M14
8,98;M151,98;M153,97;M154,96;M15
5,95;M154,94;NM148,92;M157,91;M1
58,89;M156,85;M154,82;M153,78;M1
5Ø,74;M148,71;M144,66"
33Ø FOR I=1 TO 5ØØ:NEXT I
335 DRAW"BM14Ø,8Ø;C5;M143,85;M14
5,89;M147,91;M148,92;M146,96;M14
8,98;M151,98;M153,97;M154,96;M15
5,95;M154,94;NM148,92;M157,91;M1
58,89;M156,85;M154,82;M153,78;M1
5Ø,74;M148,71;M144,66"
34Ø DRAW"BM141,66;C2;M148,68;M15
2,69;M156,7Ø;M16Ø,69;M164,68;M16
6,67;M168,68;M168,69;M172,69;M17
4,7Ø;M175,72;M176,74;M174,76;M17
2,77;M169,76;NM158,69;M167,78;M1
64,79;M16Ø,8Ø;M156,8Ø;M152,81;M1
48,82;M145,82;M144,83;M144,87"
345 FOR I=1 TO 5ØØ:NEXT I
35Ø DRAW"BM141,66;C5;M148,68;M15
2,69;M156,7Ø;M16Ø,69;M164,68;M16
6,67;M168,68;M168,69;M172,69;M17
4,7Ø;M175,72;M176,74;M174,76;M17
2,77;M169,76;NM158,69;M167,78;M1
64,79;M16Ø,8Ø;M156,8Ø;M152,81;M1
48,82;M145,82;M144,83;M144,87"
355 GOTO 32Ø

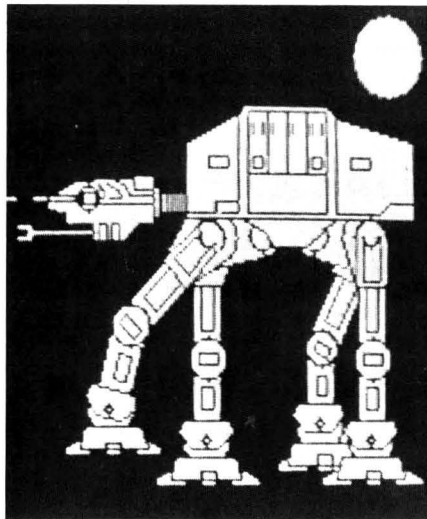
```

Program Listing 8. Walker

```

5 'THE IMPERIAL WALKER W/SOUND!
1Ø PMODE 4,1:PCLS3:SCREEN 1,1
2Ø DRAW"BM168,38;C2;M2Ø2,38;M2Ø6
,42;M238,5Ø;M238,78;M145,78;M145
,52;M168,4Ø;M168,38"
3Ø DRAW "BM17Ø,4Ø;C2;M2Ø2,4Ø;M2Ø
2,76;M17Ø,76;M17Ø,4Ø"
4Ø DRAW "BM17Ø,62;C2;M178,62;NU2
2;M186,62;NU22;M194,62;NU22;M2Ø2
,62"
5Ø DRAW "BM154,56;C2;M162,56;M16
2,6Ø;M154,6Ø;M154,56;BM172,56;M1
76,56;M176,6Ø;M172,6Ø;M172,56;BM
196,56;M2ØØ,56;M2ØØ,6Ø;M196,6Ø;M
196,56;BM212,56;M22Ø,56;M22Ø,6Ø;
M212,6Ø;M212,56"
6Ø DRAW"BM172,44;NM172,48;BM176,
44;NM176,48;BM18Ø,44;NM18Ø,48;BM
188,44;NM188,48;BM196,44;NM196,4
8;BM2ØØ,44;NM2ØØ,48"
7Ø DRAW"BM145,76;C2;M157,76;M157
,72;M166,72;M166,42"
8Ø DRAW" BM159,76;C2;M166,76;M16
6,7Ø"
9Ø DRAW "BM2Ø6,42;C2;M2Ø6,76;M22
4,76;M228,72;M238,72"
1ØØ DRAW "BM168,78;M177,83;M18Ø,
88;M194,88;M2Ø6,78"
11Ø DRAW "BM132,67;C2;M134,67;M1
34,78;M132,78;BR2;BU2;M145,76;M1
45,69;L2;ND7;L2;ND7;L2;ND7;L2;ND
7;L2;ND7"
12Ø DRAW "BM132,67;C2;M132,63;M1
1Ø1,65;M9Ø,71;M9Ø,75;M97,76;M97,8
Ø;M1Ø8,8Ø;M1Ø8,86;M12Ø,86;M126,8
Ø;M132,8Ø;M132,67"
13Ø DRAW"BM11Ø,86;C2;U6;R3;D6;R2
;U6;R3;D6"
14Ø DRAW"BM1Ø8,82;C2;M84,82;M84,
8Ø;L6;D2;R4;D2;L4;D2;R6;U2;R24"
15Ø CIRCLE(1Ø6,71),5,Ø
16Ø LINE (1Ø3,69)-(1Ø9,73),PSET,
B
17Ø LINE(84,7Ø)-(1Ø4,72),PSET,B
18Ø LINE(1Ø8,73)-(132,73),PSET
19Ø DRAW "BM116,64;C2;M12Ø,66;M1
22,69;M122,7Ø;R9"
2ØØ CIRCLE (1Ø6,71),7,Ø,1,.87,.9
9
21Ø CIRCLE (111,75),1Ø,Ø,1,.8,.9
2
22Ø LINE (114,71)-(119,71),PRESE
T
23Ø DRAW "BM124,64;C2;D4;R7"
235 COLOR 2,Ø
24Ø LINE(24,7Ø)-(41,72),PSET,B
25Ø LINE(54,7Ø)-(78,72),PSET,B
26Ø LINE(Ø,7Ø)-(17,72),PSET,B
27Ø CIRCLE (176,84),6,Ø,1,.1,.62
5
28Ø CIRCLE (176,84),8,Ø,1,.1,.23
29Ø CIRCLE (197,84),6,Ø,1,.9,.37
5
3ØØ CIRCLE(197,84),8,Ø,1,.27,.4
31Ø CIRCLE(22Ø,84),12,Ø,1,.52,.6
Ø
32Ø CIRCLE(22Ø,84),12,Ø,1,.92,.9
8
33Ø LINE (214,1Ø2)-(226,1Ø2),PSE
T
34Ø LINE(214,1Ø2)-(214,84),PSET
35Ø LINE(227,1Ø2)-(227,84),PSET

```



```

360 CIRCLE (220,84),7,0,1,.50,.9
370 CIRCLE(220,84),4,0,1,.01,.5
380 LINE (218,100)-(224,100),PSE
T
390 LINE(217,100)-(217,84),PSET
400 LINE(224,100)-(224,84),PSET
410 DRAW "BM215,102;C0;D20BR11U2
0L3D16L5U16"
420 DRAW "BM208,84;C2;M214,102;B
R12;M232,84"
430 LINE(197,92)-(210,95),PSET
440 CIRCLE(221,128),8,0
450 DRAW "BM217,130;U4R8D4L8"
460 DRAW "BM215,134;C2;D16R11U16
BD4BL3L5D8R5U8"
470 DRAW "BM212,150;C2;M229,150;
M231,154;M225,160;M214,160;M209,
154;M212,150"
480 DRAW "BM206,171;C2;M208,163;
M232,163;M234,171;M206,171"
490 CIRCLE(220,157),2,0
500 CIRCLE(221,157),9,0,1,.99,.1
0
510 CIRCLE(219,157),9,0,1,.40,.5
1
520 DRAW "BM212,171;C2;M212,173;
M200,173;M200,171;M207,167"
530 DRAW "BM218,173;C2;U5R6D5L6"
540 DRAW "BM230,171;C2;D2R12U2;M
235,168"
550 CIRCLE (154,85),12,0,1,.9,.1
2
560 LINE(136,93)-(145,103),PSET
570 LINE(136,93)-(145,78),PSET
580 LINE(162,92)-(145,103),PSET
590 LINE(156,96)-(176,92),PSET
600 LINE (148,102)-(160,102),PSE
T
610 LINE(160,102)-(162,96),PSET
620 CIRCLE (154,85),7,0,1,.62,.1
2
630 CIRCLE (154,85),4,0,1,.12,.6
2
640 DRAW "BM136,93;C2;M149,81;M15
1,83;M140,92;M146,98;M155,88;M15
7,90;M145,103"
650 CIRCLE(123,116),8,0
660 DRAW "BM148,102;C2;D21BR11U21
BL3D16L5U16"
670 CIRCLE(154,128),8,0
680 DRAW "BM150,130;U4R8D4L8"
690 DRAW "BM148,134;C2;D16R11U16
BD4BL3L5D8R5U8"
700 DRAW "BM145,150;C2;M162,150;
M164,154;M158,160;M147,160;M142,
154;M145,150"
710 DRAW "BM139,171;C2;M141,163;
M165,163;M167,171;M139,171"
720 CIRCLE(153,157),2,0
730 CIRCLE (154,157),9,0,1,.99,.
1
740 CIRCLE(152,157),9,0,1,.40,.5
1
750 DRAW "BM145,171;M145,173;M13
3,173;M133,171;M140,167"
760 DRAW "BM151,173;C2;U5R6D5L6"
770 DRAW "BM163,171;C2;D2R12U2;M
168,168"
780 DRAW "BM136,94;G14BF9E14H2G1
0H5E10"
790 DRAW "BM118,115;E3F6G3H6"
800 LINE (109,137)-(125,141),PSE
T
810 DRAW "BM110,138;C2;M116,115;B
M128,122;M123,140;BL2;BU4;M123,1
27;M118,126;M116,135;M120,136"
820 LINE (108,137)-(105,141),PSE
T
830 LINE-(109,148),PSET
840 LINE-(119,150),PSET
850 LINE-(125,146),PSET
860 LINE-(125,141),PSET
870 CIRCLE(114,146),2,0
880 LINE (104,152)-(126,152),PSE
T
890 DRAW "BM105,152;C2;M103,160;M
130,160;M127,152"
900 DRAW "BM113,162;C2;U4R6D4L6"
910 CIRCLE(115,145),10,0,1,.37,.
5
920 CIRCLE(115,145),10,0,1,.05,.
12
930 DRAW "BM104,156;C2;M97,160;M
97,162;R10U2BR18D2R10U2;M128,156
"
940 CIRCLE(200,124),7,0
950 LINE(206,98)-(196,118),PSET
960 LINE (207,124)-(214,108),PSE
T
970 LINE(206,94)-(204,96),PSET
980 LINE-(211,100),PSET
990 DRAW "BM209,99;C2;M201,114;M
207,117;M214,102"
1000 DRAW "BM198,121;C2;M204,124
;M202,128;M197,125;M198,121"
1010 DRAW "BM194,128;C2;D16R11NU
16BL3BU3U7L4D7R4"
1020 DRAW "BM191,144;C2;R16;M209
,148;M204,154;M193,154;M188,148;
M191,144
1030 CIRCLE(199,151),2,0
1040 CIRCLE(199,152),10,0,1,.4,.
55
1050 DRAW "BM210,158;C2;M188,158
;M186,166;M208,166"
1060 CIRCLE(199,152),10,0,1,.94,
.12
1070 DRAW "BM187,162;C2;M182,166
;M182,168;M194,168;M194,166;BR4D
2R6U6L6D4"
1072 CIRCLE(228,20),15,0
1075 PAINT(50,191),0,0
1078 PAINT(210,120),0,0
1079 CIRCLE(228,20),15,0
1080 AS="T303L2G04L1D"
1090 BS="T304L4C03L8BAO4L2GL1D"
1100 CS="T304L4C03L8BO4L8C03L1AL
3A"
1110 DS="T304L4DL3EO5L8CO4L8BAGG
BAEL4F#D"
1120 ES="T304L3EO5L8CO4L8BAGL4DL
4AA"
1130 FS="T304L8GFE-DCO3L8B-AGO4L
1DL2DL4D"
1140 GS="T304L4DO3L3GO4L1DL4C03
L8BAL3GO4L3GL1GO5L1DL1DL1DL1DL1D
"
1150 PLAY AS
1155 PLAY BS
1160 PLAY BS
1170 PLAY CS
1180 PLAY AS
1190 PLAY BS
1200 PLAY BS
1210 PLAY CS
1220 PLAY DS
1230 PLAY ES
1240 PLAY DS
1250 PLAY FS
1260 PLAY AS
1270 PLAY BS
1280 PLAY BS
1290 PLAY CS
1300 PLAY GS
1400 GOTO 1400

```

END

# AMATEUR RADIO SOFTWARE

**MC Color Monitor**  
 with sound  
 S25  
**Video Adapter—\$19.95**  
 w/ monitor purchase.  
 Specify CoCo 1 or 2



**THE LOG**—Search by call, QTH, or date. Output log to printer or screen. Store up to 13K QSO's per disk. Please specify your call sign when ordering. 16K ECB CoCo..... **\$19.95 Cass/\$24.95 Disk**  
**MORSE CODE TEACHER**—Teaches the letters and numbers and gives practice to up to 5 wpm. 16K ECB CoCo. MC-10 w/4K... **\$19.95 Cass/\$24.95 Disk**  
**MORSE CODE TUTOR**—Gives code practice from 3 wpm up to 27 wpm. An absolute must for upgrades!!! 16K ECB CoCo..... **\$19.95 Cass/\$24.95 Disk**  
**TEACHER/TUTOR Double pack.** 16K ECB CoCo... **\$34.95 Cass/\$39.95 Disk**  
**HF ANTENNA DESIGN**—Calculates dimensions of quads, dipoles, and Yagis from 1.8 to 30 MHz. Optimized for maximum gain. Easy-to-read tabular format. CoCo or MC-10 w/4K. TRS-80 Model I/3/4... **\$14.95 Cass/\$19.95 Disk**  
**VIDEO TESTER**—Test patterns for checking registration, convergence, and color of a monitor or TV. 16K ECB CoCo..... **\$9.95 Cass/\$14.95 Disk**

Check or M.O. to CYNWYN, 4791 Broadway, Suite 2F, New York, New York 10034 • 3% shipping handling. \$2 minimum. New York residents add sales tax.



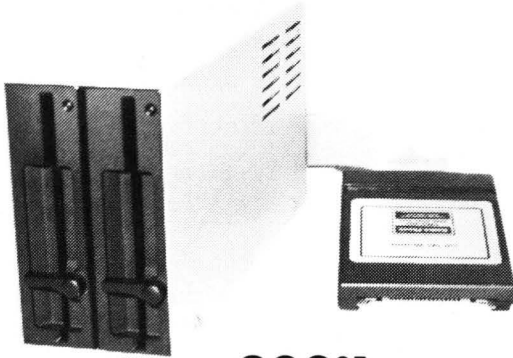


C  
H  
E  
A  
P  
E  
R  
E  
S  
T

**64K** EXT. BASIC **128<sup>95</sup>** ←

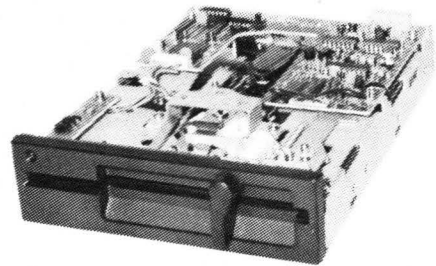
**Color Computer II**

Monitor Interface for above CoCo II 29.95 plus 7.50 installation. (color & green compatible)



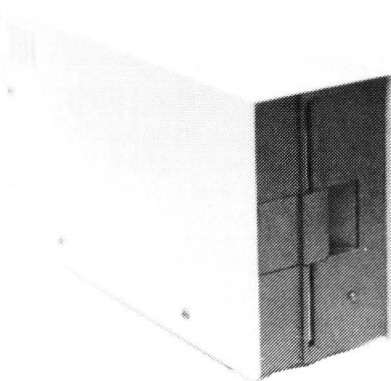
**2 Drives 299<sup>95</sup>**

Both our drive 0 and 1 in one case, with cable and R.S. controller. The best just got better!



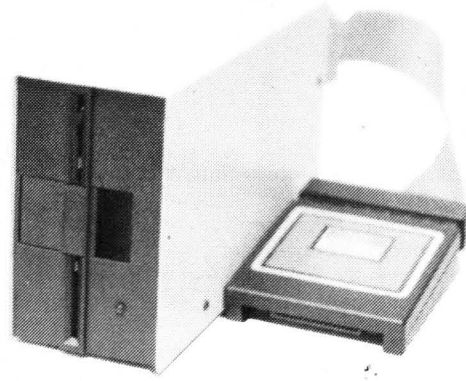
**Drive 1 Upgrade 89<sup>95</sup>**

Add a second 1/2 height drive to your Radio Shack 26-3129. Comes with 3 minute installation instructions, screwdriver required.



**Drive 1 118<sup>95</sup>**

Your Choice  
Silver or White



**195<sup>95</sup> 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 229.00 for dr. 1 and 299.00 for dr. 0, not us! Drive 1 is for mod I, Second Color Computer drive, or external mod III, IV. Drive 1 just plugs into the extra connector on your Drive 0 cable. Both drives are compatible with any version of the Color Computer and all versions of drives. Drive 0 is your first Color Computer drive and comes complete with cable, manual, and R.S. controller. For double-sided, add 45.00 (only for those who have DS-DOS, boards and knowledge) Bare full hgt SSDD drive only 79.95.

**THE COMPUTER CENTER**

901-761-4565, 5512 Poplar, Memphis, TN 38119

Add \$4.90 for shipping and handling—Visa, MC & money orders accepted

Allow an additional 2 weeks for personal checks—Drive faceplates may vary slightly

Continued from p. 38

```

2640 PRINT@271,"PHASER HIT ON":P
RINT@303,"RELIANT, SIR!"
2650 PLAY S1$
2660 IF SH$="U" THEN IS(0,1)=IS(
0,1)-450 ELSE IS(0,1)=IS(0,1)-35
0
2670 PRINT@466,STRING$(5,191);:P
RINT@466,IS(0,1);
2680 IF IS(0,1)=0 THEN PRINT@36
7,"RELIANT DESTROYED";:ME=3:GOSU
B 4680:GOTO 4820
2690 PL(3)=PL(3)-1:GA(T1,T2)=0
2700 PRINT@335,"planet destroyed
!";
2710 GOSUB 4680:RETURN
2720 IF GA(T1,T2)=191 THEN 2730
ELSE 2850
2730 GA(0,2)=GA(0,2)-GA(0,3):PLA
Y S1$
2740 FLAG=1:BS=BS-GA(0,3)
2750 GA(0,5)=GA(0,5)+50
2760 R=RND(10):IF R<=4 THEN 2770
ELSE 2820
2770 PRINT@271,"TORPEDO HIT ON":
PRINT@303,"RELIANT, SIR!"
2780 PLAY S2$
2790 IF SH$="U" THEN IS(0,1)=IS(
0,1)-400 ELSE IS(0,1)=IS(0,1)-50
0
2800 PRINT@466,STRING$(5,191);:P
RINT@466,IS(0,1);
2810 IF IS(0,1)<=0 THEN PRINT@33
5,"RELIANT DESTROYED";:ME=3:GOSU
B 4680:GOTO 4820
2820 IF BS<=0 THEN PRINT@335,"BA

```

```

SE DESTROYED":PL(4)=PL(4)-1:GA(T
1,T2)=0:GA(0,5)=GA(0,5)+400
2830 IF BS>1 THEN PRINT@335,"BAS
E @":BS:PRINT@367,"ENERGY UNITS."
2840 GOSUB 4680:RETURN
2850 IF GA(T1,T2)>64 AND GA(T1,T
2)<69 THEN 2860 ELSE 2960
2860 IF GA(T1,T2)=67 THEN K1=3
2870 IF GA(T1,T2)=65 THEN K1=4
2880 IF GA(T1,T2)=68 THEN K1=5
2890 IS(K1,1)=IS(K1,1)-GA(0,3):P
LAY S1$
2900 IF IS(K1,1)<=0 THEN 2910 EL
SE 2930
2910 PRINT@271,CHR$(GA(T1,T2));"
destroyed!":GA(T1,T2)=0:GA(0,5)
=GA(0,5)+400
2920 PL(6)=PL(6)-1:GA(0,2)=GA(0,
2)-GA(0,3):GOSUB 4680:RETURN
2930 PRINT@271,CHR$(GA(T1,T2));"
@":T1:T2
2940 PRINT@303,"STRENGTH" IS(K1,
1)
2950 GA(0,5)=GA(0,5)+50:GA(0,2)=
GA(0,2)-GA(0,3)
2960 GOSUB 4680:RETURN
2970 REM capture
2980 PRINT@49,""
2990 GOSUB 4640
3000 PRINT@49,"CAPTURE"
3010 PRINT@143,"TRANSPORTER ROOM
"
3020 PRINT@175,"STANDING BY."
3030 GOSUB 4650
3040 IF IS(0,2)-T1>1 OR IS(0,2)-

```

```

T1<-1 OR IS(0,3)-T2>1 OR IS(0,3)
-T2<-1 THEN PRINT@303,"OUT OF CA
PTURE":PRINT@335,"RANGE, SIR!":P
RINT@367,"capture aborted.":GOSU
B 4680:RETURN
3050 IF GA(T1,T2)=129 OR GA(T1,T
2)=177 OR GA(T1,T2)=191 THEN 306
0 ELSE 3170
3060 R=RND(10)
3070 IF R<4 THEN PRINT@303,"atta
ck repelled!":GA(0,5)=GA(0,5)-50
:GA(0,2)=GA(0,2)-100
3080 IF GA(0,2)<0 THEN PRINT@36
7,"RELIANT DESTROYED";:ME=3:GOSU
B 4680:GOTO 4820
3090 IF R<4 THEN GOSUB 4680:RETU
RN
3100 IF R=>4 THEN PRINT@303,"pla
net captured!":GA(0,5)=GA(0,5)+3
00
3110 IF GA(T1,T2)=129 THEN PL(5)
=PL(5)-1:PL(1)=PL(1)+1
3120 IF GA(T1,T2)=177 THEN PL(1)
=PL(1)+1:PL(3)=PL(3)-1
3130 IF GA(T1,T2)=191 THEN PL(1)
=PL(1)+1:PL(4)=PL(4)-1
3140 GA(T1,T2)=241
3150 GA(0,2)=GA(0,2)-100:IF GA(0
,2)<0 THEN PRINT@367,"RELIANT D
ESTROYED";:ME=1:GOSUB 4680:GOTO
4820
3160 GOSUB 4680:RETURN
3170 PRINT@303,"CAPTURE THAT?"
3180 PRINT@335,"ARE YOU FEELING"
3190 PRINT@367,"WELL, SIR?"

```

## Connect your TRS-80 Color Computer to the Outside World

Learn the simple techniques for putting your computer to work monitoring and controlling outside devices and instruments. Construct and use input and output ports, analog-to-digital and digital-to-analog converters to control signals using BASIC language programs. Excellent for individual or classroom instruction.

The book, **TRS-80 Color Computer Interfacing, With Experiments**, no. 21893, fully explains the fundamentals and illustrates them with experiments. \$14.95

The **Expansion Connector Breadboard**, no. CC-100, connects directly to the computer and brings out the needed address, data, and control bus signals. \$34.95

\*The **Experiment Component Package**, no. CC-150, contains all of the parts needed to do the experiments in the book. \$89.95

For a limited time only, **get all three for \$105.00**, a 25% saving. (Or take 15% off of any individual item.) Offer expires November 15, 1986.

Virginia residents, add 4% sales tax.

Include \$2.50 for shipping.

Write for our new free catalog of books, hardware, and software on interfacing, electronics, scientific software, and personal improvement guides. Order from:



**Group Technology, Ltd.**  
P.O. BOX 87 • CHECK, VIRGINIA 24072

Visa/Master Card accepted. 703-651-3153

TRS-80 is a trademark of Radio Shack, a Tandy Corporation.

## EUREKA! L.A. We got it—you found us!

<p>Lifetime Guarantee</p> <p><b>DISKS</b></p> <p>Bulk . . . .99¢ ea. Sentinel \$1.29 ea.</p>	<p>Dot Matrix</p> <p><b>PRINTERS</b> as low as <b>\$199</b></p> <p>Panasonic KXP1090 Daisy Wheel \$289</p>	<p><b>SOFTWARE</b> over 180 titles discounted</p> <p>Games up to 50% Books . . . .20% All others . . .10%</p>
<p>Hi Resolution</p> <p><b>MONITORS</b> start at <b>\$89</b></p> <p>Zenith 12" green Color/sound \$195</p>	<p>5 1/4 Half Height</p> <p><b>DISK DRIVES</b> <b>\$75</b></p> <p>Bare Hi-Tech W/Case/Pwr \$139 DS Teac . . . \$ 95</p>	<p>Direct Connect</p> <p><b>MODEMS</b> <b>\$59</b></p> <p>Volks 300 baud 1200 baud auto \$217 Hayes comp Smart 299</p>
<p><b>SYSTEMS</b></p> <p>64K Color Com- puter by Tano <b>\$119</b></p> <p>Zenith 256K 2dr Ser/Par/RGB/Mon Turbo mode \$1599</p>	<p><b>MISCELLANEOUS</b></p> <p>Keyboards . . \$59 Disk Cases . . \$17 Printer Int . . \$48 Video Driver . \$24 Power Strip . . \$19 Swivel Base . \$19 . . . . more . . . .</p>	<p><b>PARTS</b></p> <p>• EPROMS • ROMS • CONTROLLERS • MEMORY DRAMS • CABLES • KITS • ICS • PAPER • LABELS • RIBBONS • DAISY WHEELS</p>



**POLYGON COMPUTERS**  
1316 Wilshire Blvd., Suite 206  
Los Angeles, CA 90017  
(213) 483-8388



Ca. Res. 6 1/2% tax  
Visit our Retail Store

Shipping: \$2 Software  
Charges: \$5 Hardware

**NEW**

# So Long Hot CoCo - The End of an Era!

**NEW**

## CoCo Comm-4 Begins The CoCo **Multi-Tasking** Era

### 4 Channel Serial Communication Interface

COMM-4 allows serial I/O capabilities. Board supports full modem control. Enhances **multi-tasking** and/or **multi-user** features of OS-9.

#### Typical System Configuration\*:

- Terminal
- Modem
- Letter Quality Printer
- High-speed Printer

\*NOTE: The configuration shown above is only one of the several possible configurations with a **single** COMM-4 unit. Virtually any serial device compatible with the CoCo can be used with COMM-4.

The COMM-4 unit comes **completely assembled** in a plug-in cartridge. The cartridge plugs into any slot of a buffered, powered expansion device (not provided). The commercially available expansion devices (such as Multi-Pak) are required for COMM-4 operation.

Each of the four (4) serial channels is controlled by an **independent** serial controller. These serial controllers are part of the unit hardware and allow multi-tasking and/or simultaneous I/O applications **without** the use of software timing loops.

Communications are **interrupt-driven**. Standard communication baud rates from 50 to 19,200 are supported by COMM-4. The COMM-4 unit provides for the use of a "break key" (keyboard interrupt system). Connections to COMM-4 are made via DB-25 plugs for any RS-232 compatible serial device.

With the COMM-4 unit installed in the expansion device slot, COMM-4 is **always** enabled regardless of hardware/software slot selection methods. The COMM-4 unit will not interfere with existing device(s) in any other expansion slot.

The COMM-4 unit is configured so that **two (2) COMM-4 units can be installed on the same expansion device**. In the dual COMM-4 configuration, the available, interrupt-driven serial communications channels become eight (8). In order to operate properly, the two COMM-4 units must be interconnected with a jumper cable which is provided when ordered in the dual COMM-4 configuration. In the COMM-8 configuration, all features of the COMM-4 are available (but for all 8 channels).

#### Items supplied with a COMM-4 unit:

- 1) COMM-4 cartridge
- 2) Users Manual
- 3) Interrupt cable (and jumper cable if ordered as COMM-8)

#### Installation of COMM-4 is accomplished in two phases as follows:

- 1) Hardware installation
  - a. Power down on CoCo and expansion device
  - b. Plug COMM-4 into any slot on expansion device
  - c. Plug interrupt cable into COMM-4 cartridge
  - d. Plug other end of interrupt cable into serial I/O port on CoCo
  - e. Plug user serial cables into DB-25 connectors on COMM-4
  - f. Power up entire system
- 2) Software installation (the following installation instructions are general and will vary with some systems due to user configuration).
  - a. Install COMM-4 disk (35 track, single-sided, double density)
  - b. Load device descriptors and drivers

**OR**

- a. Merge device descriptors and drivers into boot files using OS-9 procedure files
- c. Note: Disk contains commented course code **and** object code **and** procedure files
- d. For basic users, a sample basic program will be provided in users manual (not on disk). (Note: Color basic will **not** support multi-tasking.)

#### The documentation included with COMM-4 provides:

1. Hardware theory of operation
2. Software theory of operation
3. Installation instructions
4. Applications examples
5. Commented program listings
6. Schematic diagrams
7. Parts lists
8. Assembly drawings

If dual COMM-4 (COMM-8) units are to be installed, it will be necessary to specify, with order of second COMM-4, in order for necessary jumper cables to be supplied (no extra charge).

**CoCo COMM-4****Price.....\$108.00**

### Don't Forget Our Full Character Set Board:

Easy to install board adds:

- All 96 Standard ASCII Characters
- Upper & Lower Case Displayed Simultaneously with **NO** Inverse Video
- True Lower Case Descenders
- Braces & Vertical Bar Characters
- Slashed Zero
- Other Features

Board is hardware driven and requires **NO** software drivers. **NO** effect on **any** memory.

Enhances CoCo screen for:

- OS-9 Operating System Programming
- "C" Language Programming
- Word Processing
- Communications Terminal Modes

PRICE.....\$38.00

(+\$2.00 shipping/handling if charge)



**CoCo Devices**  
**Box 677, Seabrook, TX 77586**  
**713-474-3232**





```

3200 PRINT@399,"CAPTURE aborted.
"
3210 GOSUB 4680:RETURN
3220 REM list
3230 PRINT@49,"LIST"
3240 GOSUB 4640
3250 PRINT@143,"FED. PLANETS"PL(
1)
3260 PRINT@175,"FED. BASES.."PL(
2)
3270 PRINT@207,"ENB. PLANETS"PL(
3)
3280 PRINT@239,"ENB. BASES.."PL(
4)
3290 PRINT@271,"NU. PLANETS.."PL(
5)
3300 PRINT@303,"ENB. SHIPS.."PL(
6)
3310 PRINT@335,"FED. SHIPS.."PL(
7)
3320 PRINT@367,"points="GA(0,5)
3330 IF PL(1)=0 AND PL(2)=0 AND
PL(5)=0 THEN PRINT@399,"you have
lost!":GOSUB 4680:ME=5:GOTO 482
0
3340 IF PL(3)=0 AND PL(4)=0 AND
PL(5)=0 THEN PRINT@399,"you have
won!":GOSUB 4680:ME=4:GOTO 4820
3350 RETURN
3360 REM dock
3370 PRINT@49,"DOCK"
3380 GOSUB 4640
3390 PRINT@143,"DOCK SHIP"
3400 GOSUB 4650
3410 IF IS(0,2)-T1>1 OR IS(0,2)-
T1<-1 OR IS(0,3)-T2>1 OR IS(0,3)
-T2<-1 THEN PRINT@303,"OUT OF DO
CKING":PRINT@335,"RANGE, SIR!":P
RINT@367,"docking aborted.":GOSU
B 4680:RETURN
3420 IF GA(T1,T2)=241 OR GA(T1,T
2)=255 THEN 3430 ELSE 3560
3430 IF GA(T1,T2)=241 THEN AM=12
00
3440 IF GA(T1,T2)=255 THEN AM=15
00
3450 GA(0,2)=GA(0,2)+AM
3460 IS(0,1)=IS(0,1)+AM
3470 GA(0,4)=GA(0,4)+4
3480 FOR X3=1 TO 28
3490 IF GA(X3,0)=RK THEN 3500 EL
SE 3530
3500 IF GA(0,2)>GA(X3+2,0) THEN
GA(0,2)=GA(X3+2,0)
3510 IF IS(0,1)>GA(X3+3,0) THEN
IS(0,1)=GA(X3+3,0)
3520 IF GA(0,4)>GA(X3+5,0) THEN
GA(0,4)=GA(X3+5,0)
3530 NEXT X3
3540 PRINT@271,"DOCKING . . ."
3550 GOSUB 4680:RETURN
3560 PRINT@271,"WHAT? DOCK WITH"
3570 PRINT@303,"THAT? NO WAY!"
3580 PRINT@335,"docking aborted!"
"
3590 GOSUB 4680:RETURN
3600 REM build
3610 PRINT@49,"BUILD"
3620 GOSUB 4640
3630 PRINT@143,"TRANSPORTER ROOM
"
3640 PRINT@175,"STANDING BY."
3650 GOSUB 4650
3660 IF IS(0,2)-T1>1 OR IS(0,2)-
T1<-1 OR IS(0,3)-T2>1 OR IS(0,3)
-T2<-1 THEN PRINT@303,"OUT OF BU
ILDING":PRINT@335,"RANGE, SIR!":
PRINT@367,"build aborted!":GOSUB
4680:RETURN
3670 IF GA(T1,T2)= 241 THEN 3680
ELSE 3740
3680 IF PL(2)=6 THEN PRINT@303,"
ALL BASES STILL":PRINT@335,"FUNC
TIONAL, SIR.":PRINT@367,"build a
borted!":GOSUB 4680:RETURN
3690 GA(T1,T2)=255:PL(2)=PL(2)+1
:PL(1)=PL(1)-1
3700 GA(0,2)=GA(0,2)-300:IF GA(0
,2)<=0 THEN PRINT@335,"RELIANT R
UNS":PRINT@367,"OUT OF ENERGY":
ME=1:GOSUB 4680:GOTO 4820
3710 GA(0,5)=GA(0,5)+600
3720 PRINT@303,"NEW BASE BUILT":
PRINT@335,"@T1;T2
3730 GOSUB 4680:RETURN
3740 PRINT@303,"IMPOSSIBLE TO":P
RINT@335,"BUILD THAT, SIR!":PRIN
T@367,"build aborted!":GOSUB 468
0:RETURN
3750 REM other ships
3760 A=0
3770 FOR X=143 TO 399 STEP 32:PR
INT@X,STRINGS(17,223);NEXT X
3780 A=A+1:LB=0:LP=0:LC=0:LQ=0
3790 PRINT@49,"ship "CHR$(IS(A,0
))
3800 IF IS(A,1)<=0 THEN 3810 ELS
E 3910
3810 GA(IS(A,2),IS(A,3))=0
3820 S1=RND(44):S2=RND(44)
3830 IF GA(S1,S2)>0 THEN 3820
3840 GA(S1,S2)=IS(A,0)
3850 IS(A,2)=S1:IS(A,3)=S2
3860 IF IS(A,0)>70 THEN PL(7)=PL
(7)+1 ELSE PL(6)=PL(6)+1
3870 IF A=1 OR A=4 THEN IS(A,1)=
3000
3880 IF A=2 OR A=5 THEN IS(A,1)=
3500
3890 IF A=3 THEN IS(A,1)=2500
3900 GOTO 4590
3910 FOR LB=IS(A,2)-5 TO (IS(A,2
)-5)+10
3920 FOR LP=IS(A,3)-5 TO (IS(A,3
)-5)+10
3930 IF LB<1 OR LB>44 OR LP<1 OR
LP>44 THEN 4190
3940 IF GA(LB,LP)=0 THEN 4190
3950 IF GA(LB,LP)=193 THEN 4190
3960 IF GA(LB,LP)>0 AND GA(LB,LP
)<100 THEN 3970 ELSE 4120
3970 IF IS(A,0)>70 AND GA(LB,LP)
<70 THEN 3990
3980 IF IS(A,0)<70 AND GA(LB,LP)
>70 THEN 3990 ELSE 4120
3990 FOR X1=0 TO 5
4000 IF GA(LB,LP)=IS(X1,0) THEN
IS(X1,1)=IS(X1,1)-500:GOTO 4030
4010 IF X1=5 THEN 4030
4020 NEXT X1
4030 PRINT@143,CHR$(GA(LB,LP))"
hit @"LB;LP:PLAY S2$
4040 IF IS(X1,1)<=0 THEN PRINT@1
75,CHR$(GA(LB,LP))" destroyed!"
4050 IF IS(X1,1)<=0 AND IS(X1,0)
=82 THEN ME=6:GOSUB 4680:GOTO 48
20
4060 IF IS(X1,1)<=0 THEN GA(LB,L
P)=0
4070 IF IS(X1,1)<=0 THEN IS(X1,2
)=0:IS(X1,3)=0
4080 IF IS(X1,0)>70 AND IS(X1,1)
<=0 THEN PL(7)=PL(7)-1
4090 IF IS(X1,0)<70 AND IS(X1,1)
<=0 THEN PL(6)=PL(6)-1
4100 GOTO 4590
4110 REM planet or base
4120 IF GA(LB,LP)=241 OR GA(LB,L
P)=255 OR GA(LB,LP)=177 OR GA(LB
,LP)=191 THEN 4130 ELSE 4190
4130 IF IS(A,0)>70 AND IS(A,0)<8
5 THEN 4140 ELSE 4160
4140 IF GA(LB,LP)=177 THEN GA(LB
,LP)=0:PL(3)=PL(3)-1:PRINT@207,C
HR$(177);CHR$(128);"DESTROYED!":
SOUND 25,1:GOTO 4590
4150 IF GA(LB,LP)=191 THEN GA(LB
,LP)=0:PL(4)=PL(4)-1:PRINT@239,C
HR$(191);CHR$(128);"DESTROYED!":
SOUND 25,1:GOTO 4590
4160 IF IS(A,0)<70 AND IS(A,0)>6
0 THEN 4170 ELSE 4190
4170 IF GA(LB,LP)=241 THEN GA(LB
,LP)=0:PL(1)=PL(1)-1:PRINT@271,C
HR$(241);CHR$(128);"destroyed!":
SOUND 225,1:GOTO 4590
4180 IF GA(LB,LP)=255 THEN GA(LB
,LP)=0:PL(2)=PL(2)-1:PRINT@303,C
HR$(255);CHR$(128);"destroyed!":
SOUND 225,1:GOTO 4590
4190 NEXT LP,LB
4200 REM neutral planet
4210 FOR LC=IS(A,2)-5 TO (IS(A,2
)-5)+10
4220 FOR LQ=IS(A,3)-5 TO (IS(A,3
)-5)+10
4230 IF LC<1 OR LC>44 OR LQ<1 OR
LQ>44 THEN 4480
4240 IF GA(LC,LQ)=129 THEN 4250
ELSE 4480
4250 SM=0:SR=0
4260 FOR SM=LC-1 TO LC+1
4270 FOR SR=LQ-1 TO LQ+1
4280 IF SM<1 OR SM>44 OR SR<1 OR
SR>44 THEN 4300
4290 IF GA(SM,SR)=0 THEN GA(SM,S
R)=IS(A,0):GA(IS(A,2),IS(A,3))=0
:IS(A,2)=SM:IS(A,3)=SR
4300 NEXT SR
4310 NEXT SM
4320 IF IS(A,0)>70 THEN 4330 ELS
E 4420
4330 IF PL(2)=6 THEN GA(LC,LQ)=2
41 ELSE GA(LC,LQ)=255
4340 PL(5)=PL(5)-1
4350 IF GA(LC,LQ)=241 THEN PL(1)
=PL(1)+1 ELSE PL(2)=PL(2)+1
4360 IF GA(LC,LQ)=241 THEN PRINT
@335,CHR$(241);CHR$(128);"built@
";LC;LQ:SOUND 200,1
4370 IF GA(LC,LQ)=255 THEN PRINT
@335,CHR$(255);CHR$(128);"built@
";LC;LQ:SOUND 200,1
4380 IF A=3 THEN IS(A,1)=2500
4390 IF A=1 OR A=4 THEN IS(A,1)=
3000
4400 IF A=2 OR A=5 THEN IS(A,1)=
3500
4410 GOTO 4590
4420 IF PL(4)=6 THEN GA(LC,LQ)=1
77 ELSE GA(LC,LQ)=191
4430 PL(5)=PL(5)-1
4440 IF GA(LC,LQ)=177 THEN PL(3)
=PL(3)+1 ELSE PL(4)=PL(4)+1
4450 IF GA(LC,LQ)=177 THEN PRINT
@367,CHR$(177);CHR$(128);"BUILT@
";LC;LQ:SOUND 50,2
4460 IF GA(LC,LQ)=191 THEN PRINT
@367,CHR$(191);CHR$(128);"BUILT@
";LC;LQ:SOUND 50,2
4470 GOTO 4590

```

```

4480 NEXT LQ,LC
4490 REM move ship
4500 R1=RND(2):R2=RND(2)
4510 IF R1=1 THEN R3=-RND(6) ELSE
R3=RND(8)
4520 IF R2=1 THEN R4=-RND(6) ELSE
R4=RND(8)
4530 IF IS(A,2)+R3<1 OR IS(A,2)+
R3>44 OR IS(A,3)+R4<1 OR IS(A,3)
+R4>44 THEN 4500
4540 IF GA(IS(A,2)+R3,IS(A,3)+R4
)>0 THEN 4500
4550 GA(IS(A,2)+R3,IS(A,3)+R4)=I
S(A,0)
4560 GA(IS(A,2),IS(A,3))=0
4570 IS(A,2)=IS(A,2)+R3:IS(A,3)=
IS(A,3)+R4
4580 PRINT@399,CHR$(IS(A,0))"@"
:IS(A,2):IS(A,3):SOUND 150,1
4590 IF A<5 THEN 3780
4600 GOSUB 4680
4610 FOR X=143 TO 399 STEP 32:PR
INT@X,STRING$(17,159);:NEXT X
4620 PRINT@49,"READY"
4630 RETURN
4640 RS="":FOR X=143 TO 399 STEP
32:PRINT@X,STRING$(17,159);:NEX
T X:RETURN
4650 PRINT@175,"COORDINATE 1";:I
NPUT T1
4660 PRINT@207,"COORDINATE 2";:I
NPUT T2
4670 RETURN
4680 FOR TX=1 TO 999:NEXT TX:RET
URN
4690 REM help
4700 PRINT@49,"COMPUTER HELP"
4710 RS=""
4720 PRINT@143,"<S> SCANNER"
4730 PRINT@175,"<M> MOVE RELIANT
"
4740 PRINT@207,"<F> FORCE FIELD
"
4750 PRINT@239,"<T> FIRE TORPEDO
"
4760 PRINT@271,"<P> FIRE PHASERS
"
4770 PRINT@303,"<C> CAPTURE"
4780 PRINT@335,"<B> BUILD"
4790 PRINT@367,"<D> DOCK SHIP"
4800 PRINT@399,"<L> LIST <x> SAV
E";
4810 RETURN
4820 CLS
4830 PRINT@0,STRING$(32,255);
4840 PRINT@10,"final report";
4850 IF ME=1 THEN MSS$="RELIANT R
UNS OUT OF ENERGY!"
4860 IF ME=2 THEN MSS$="RELIANT B
LOWN UP BY A STAR!"
4870 IF ME=3 THEN MSS$="RELIANT D
ESTROYED BY A PLANET!"
4880 IF ME=4 THEN MSS$="YOU HAVE
WON THE WAR!"
4890 IF ME=5 THEN MSS$="YOU HAVE
LOST THE WAR!"
4900 IF ME=6 THEN MSS$="RELIANT D
ESTROYED BY ENEMY FIRE!"
4910 IF ME=7 THEN MSS$="RELIANT Q
UITS BATTLE."
4920 PRINT@64,MSS$;:IF ME=4 THEN
GA(0,5)=GA(0,5)+1000 ELSE GA(0,5
)=GA(0,5)-1000
4930 PRINT@128,"FEDERATION PLANE
TS."PL(1)
4940 PRINT@160,"FEDERATION BASES
..."PL(2)
4950 PRINT@192,"ENBOT PLANETS...
..."PL(3)
4960 PRINT@224,"ENBOT BASES....
..."PL(4)
4970 PRINT@256,"NEUTRAL PLANETS.
..."PL(5)
4980 PRINT@320,NA$;" POINTS = ";
GA(0,5)
4990 IF GA(0,5)<GA(14,0) THEN RK
=1:RL$="CADET"
5000 IF GA(0,5)=>GA(14,0) AND GA
(0,5)<GA(21,0) THEN RK=2:RL$="LI
EUTENANT"
5010 IF GA(0,5)=>GA(21,0) AND GA
(0,5)<GA(28,0) THEN RK=3:RL$="CO
MMANDER"
5020 IF GA(0,5)=>GA(28,0) THEN R
K=4:RL$="ADMIRAL"
5030 PRINT@352,"RANK: ";RL$
5040 PRINT@416,STRING$(32,255)
5050 PRINT@480,"SAVE SCORE <Y OR
N>";:INPUT SC$
5060 IF SC$="Y" THEN 5150
5070 IF SC$="N" THEN 5080 ELSE 5
080
5080 CLS
5090 PRINT@0,STRING$(32,239);
5100 PRINT@64,"PLAY AGAIN <Y OR
N>";:INPUT PL$
5110 IF PL$="Y" THEN RUN
5120 IF PL$="N" THEN CLS:END
5130 GOTO 5080
5140 REM save file
5150 CLS
5160 PRINT@0,STRING$(32,207);
5170 PRINT@5,"save on tape";
5180 PRINT@64,"NAME OF FILE";:IN
PUT F1$
5190 PRINT@128,"PRESS <ENTER> WH
EN READY";:INPUT EN$
5200 PRINT@192,STRING$(32,207);
5210 PRINT@256,"SAVING FILE "F1$
5220 OPEN"O",#-1,F1$
5230 PRINT#-1,NA$
5240 PRINT#-1,RK
5250 PRINT#-1,GA(0,5)
5260 CLOSE#-1
5270 PRINT@320,"BACKUP FILE <Y O
R N>";:INPUT BU$
5280 IF BU$="Y" THEN 5150
5290 IF BU$="N" THEN 5310
5300 GOTO 5280
5310 CLS
5320 PRINT@0,STRING$(32,159);
5330 PRINT@64,"WOULD YOU LIKE TO
PLAY AGAIN"
5340 PRINT@96,"<Y OR N>";:INPUT
PA$
5350 IF PA$="Y" THEN RUN
5360 IF PA$="N" THEN CLS:END
5370 GOTO 5340
5380 REM load file
5390 CLS:PRINT@0,STRING$(32,191)
;
5400 PRINT@3,"load";
5410 PRINT@64,"TYPE FILE NAME AN
D <ENTER>"
5420 PRINT:INPUT"FILE NAME";F1$
5430 PRINT@192,STRING$(32,191);
5440 INPUT"PRESS <ENTER> WHEN RE
ADY";EN$
5450 PRINT@256,STRING$(32,191);
5460 PRINT@320,"SEARCHING FOR "F
1$
5470 OPEN"I",#-1,F1$
5480 PRINT@384,"loading file"
5490 INPUT#-1,NA$
5500 INPUT#-1,RK
5510 INPUT#-1,GA(0,5)
5520 IF EOF(-1) THEN 5540
5530 GOTO 5520
5540 CLOSE#-1
5550 PRINT@384,"file loaded"
5560 FOR T=1 TO 1000:NEXT T
5570 CLS
5580 PRINT@0,STRING$(32,175);
5590 PRINT@64,"WELCOME BACK TO T
HE GALACTIC"
5600 IF RK=1 THEN RL$="CADET"
5610 IF RK=2 THEN RL$="LIEUTENAN
T"
5620 IF RK=3 THEN RL$="COMMANDER
"
5630 IF RK=4 THEN RL$="ADMIRAL"
5640 PRINT@96,"WARS, ";RL$;" ";N
A$;". "
5650 PRINT@160,"POINT TOTAL: ";GA
(0,5);
5660 PRINT@224,STRING$(32,175);
5670 PRINT@288,"PRESS <ENTER> WH
EN READY";:INPUT EN$:GOTO 600
5680 REM title page
5690 CLS(0)
5700 S2$="L255;12;11;10;9;8;7;6;
5;4;3;2;1"
5710 S1$="L255;12;11;10;9;12;11;
10;9;12;11;10;9"
5720 G2=RND(7)+9:G2=(G2*16)-1:M1
=1023:M2=1536
5730 M1=M1+1:M2=M2-1
5740 G1=RND(7)+9
5750 G1=(G1*16)-10
5760 IF M1<1184 THEN POKE M1,G1
ELSE POKE M1,G2
5770 IF M1<1184 THEN POKE M2,G1
ELSE POKE M2,G2
5780 IF M1<1279 THEN 5730
5790 FOR T=1 TO 500:NEXT T
5800 PRINT@199,"the";:PRINT@203,
"galactic";:PRINT@212,"wars";
5810 FOR T=1 TO 500:NEXT T
5820 PRINT@296,"by";:POKE1322,58
:PRINT@301,"lynn";:PRINT@306,"da
vis";
5830 FOR T=1 TO 2000:NEXT T:RETU
RN
5840 REM pre-load
5850 CLS
5860 PRINT@0,STRING$(32,255);
5870 PRINT@3,"load";
5880 PRINT@64,"LOAD PREVIOUS SCO
RE <Y OR N>";:INPUT PR$
5890 IF PR$="Y" THEN GOSUB 5390
5900 IF PR$="N" THEN 5910 ELSE 5
850
5910 PRINT@128,STRING$(32,255);
5920 PRINT@192,"FOR THE RECORD,
PLEASE TYPE IN"
5930 INPUT"YOUR NAME..";NA$
5940 CLS
5950 RK=1:PRINT@0,STRING$(32,255
);
5960 PRINT@64,"WELCOME TO THE GA
LACTIC WARS,"
5970 PRINT@96,"CADET "NA$"."
5980 PRINT@160,"SHOULD YOU NEED
ASSISTANCE"
5990 PRINT@192,"DURING THE BATTL
E, PRESS THE"
6000 PRINT@224,"<H> KEY -- FOR H
ELP."
6010 PRINT@288,STRING$(32,255);
6020 PRINT@352,"PRESS <ENTER> WH
EN READY";:INPUT EN$
6030 GOTO 600

```

END

# 6809 on Line

by Bobby Ballard

## Up to Date

**D**uring the past year and a half I've tried to bring you useful information on telecommunicating with your Color Computer. Together we've covered information utilities, communications software, starting a BBS, and a host of other topics related to being on line. I've received a lot of mail, and I appreciate it all. This month I would like to try to answer some of the most-asked questions and share a few personal views on telecommunicating in general.

The question I hear most often is: "What software should I buy to get started?" I hesitate to recommend one product over another because there is no best product—it depends upon your needs. But I do have advice on how to go about buying software, and several useful and important features come to mind that you might want to consider.

When you purchase software, you should start by familiarizing yourself with information about available products. You might start by reading the reviews in back issues of *HOT CoCo* and other publications. If you don't have these, ask a friend or check at the library. *HOT CoCo* has printed some excellent reviews of cassette- and disk-based telecommunications software that are well worth tracking down. (Eds. note—See p. 6 for information on ordering back issues of *HOT CoCo*.) You should also ask around about what others are using, what they like and dislike about their telecommunications software, and why. You might be able to network yourself with others who are already using the program you plan to buy. This could be invaluable to you if you need help down the road.

While you're making up your mind, consider the following factors. What size files can a potential program download? Which protocols does it support? How does the manufacturer handle upgrades when new versions are released? I recommend software that supports xmodem protocol and saves files to the buffer. Many people like programs that support direct transfer to disk, but I find such software to be slower, which increases connect time and, therefore, cost. However, if you plan to be on CompuServe a great deal, you might want to consider the Vidtex program sold by the information utility. It handles the CompuServe B protocol, which is slower but ensures a good copy at download time.

Mikeyterm, by Mike Ward, is another terminal program to think about. You can't beat the price; it's free as part of the public domain and you can download it from CompuServe. It handles xmodem protocol, has disk and tape I/O, and is easy to use. It even lets you make various copies of differently configured Mikeyterms so that you can be ready for several specific applications. For

example, you can configure one copy for BBS activity and another for CompuServe, and so on. Later, if you find you need or want features not supported by Mikeyterm, you can purchase a program that has them and not be out money for a program that you no longer need. Mikeyterm is a good way to get started.

### BBS Update

Since beginning this column, I've written several articles on using and starting a BBS. I've also put up a BBS in New York running on a Color Computer 2. There are a few developments on this subject on which I want to bring readers up to date.

Following the series that appeared here on starting a BBS, I was informed of many new and exciting products soon to be released. If you own OS-9, you might want to look in the OS-9 SIG on CompuServe. There's a public-domain BBS there that runs under Basic-09 with documentation and lots of on-line help. I haven't looked at it, but if you are interested, I suggest that you download and read the documentation before you download the rest of the files. There are a lot of people working on their own versions of BBS software, which will probably be released into the public domain. There are also some exciting commercial developments on the way. One product that may soon be released is an OS-9 BBS that handles two phone calls at once. Four Star Software has released a new BBS package, and there's even one that

should be coming over from Australia.

On the hardware front, there are some intriguing new products for use on a BBS or a terminal. CoCo Devices has released a communications serial port called COMM-4. It supports four channels of serial I/O and can be expanded to eight. Running under OS-9, this would make for a very interesting eight-channel BBS. (I don't even want to think about the installation fees for eight new phone lines!) Spectrum Projects is distributing a new memory upgrade called Thunder RAM. It is a 256K memory add-on board that shows a lot of promise for reducing disk I/O under OS-9, which would make a multitasking timesharing BBS more feasible than before. The possibilities for this product seem to be about as many as the bytes it adds.

### Hackers and Crackers

A final thought on running a BBS. It seems that the so-called "hackers" are forever gaining attention in the popular press for breaking codes and accessing classified or private computer systems. But it really doesn't take a lot of talent or genius to break into a system. The real talent and ingenuity is found in the hundreds of sysops around the country who keep their systems up and running, in many cases 24 hours a day, seven days a week. My hat is off to these hardworking individuals; they spend literally thousands of hours running and improving their BBSes, verifying users, providing answers to hundreds of questions, helping many people make better use of their computers, and sharing information on a multitude of topics.

The term hacker was originally applied to innovators of hardware and is not deserved by those who crack systems or try to access computers where access is prohibited. Those who participate in such activities are often not the computer whizzes they are cracked up to be. In fact, they often work with programs written by others and equipment they know little about; they crack into a system by banging away at it until they hit upon something, anything. Such a person is better termed a "cracker."

Don't hesitate to write me, send me email, or contact me on line. I'd like to continue hearing from you. If you have the chance, call my BBS at the number below. See you "on line." ■

### Vendors Mentioned In 6809 On Line

CoCo Devices  
Box 677  
Seabrook, TX 77586  
713-474-3232

CompuServe  
P.O. Box 20212  
Columbus, OH 43220  
800-848-8990

Four Star Software  
P.O. Box 730  
Streetsville, Ontario  
L5M 2C2, Canada  
416-858-7827

Spectrum Projects  
P.O. Box 21272  
93-15 86th Drive  
Woodhaven, NY 11421  
718-441-2807

Address correspondence to Bobby Ballard, 1207 Eighth Ave., 4 R, Brooklyn, NY 11215. You can also reach him on line through CompuServe (#72746,2373 or #73135,255), The Source (#BCT173), and MCI Mail (#172-3476). Bobby's BBS number is 718-499-1633.



# GREAT COCO PRODUCTS

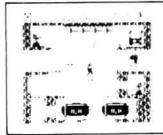
**MARK DATA DOES IT AGAIN!**  
Just in time for the holiday season!

## SHOCK TROOPER SUPER ACTION!

The Greatest Hi-Res Graphic Arcade Game Ever Written for Your CoCo  
*By Rob Shaw, Author of Tut's Tomb*



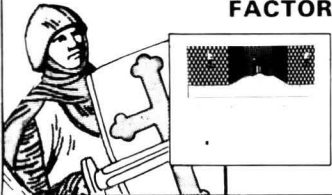
Welcome Shock Trooper Squad Commander! Intelligence has intercepted a coded message revealing a plan to conquer Earth. Four of your Shocktroopers must infiltrate the heavily defended underground enemy base and steal all of their secret TRG-5 attack saucer sub-assemblies. Return them to our scientists for analysis. This secret information is crucial to our defense.



Good Luck!

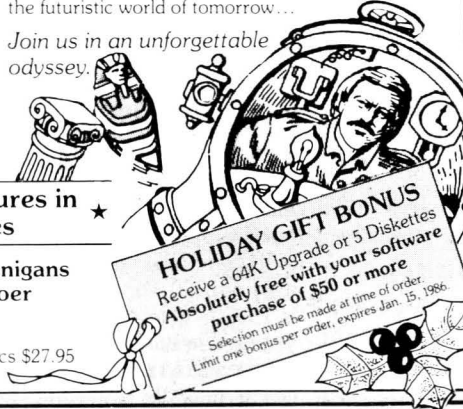
Also: Presenting the Sixth and Most Challenging of our Adventures  
*By Bob Withers and Steve O'Dea*

## THE VORTEX FACTOR



The Vortex Factor! What is it? What secrets does it hold? The seeker of treasures through time and space must find out! From the coliseum of ancient Rome to the futuristic world of tomorrow...

Join us in an unforgettable odyssey.



### ★ Other Exciting Adventures in Our Popular Series ★

Calixto Island      Shenanigans  
Sea Search          Trekboer  
Black Sanctum

All Games-Cassettes \$24.95 Discs \$27.95  
32K required

**HOLIDAY GIFT BONUS**  
Receive a 64K Upgrade or 5 Diskettes  
Absolutely free with your software  
purchase of \$50 or more.  
Selection must be made at time of order.  
Limit one bonus per order, expires Jan. 15, 1986.

### PRINTERS

Star Gemini SG-10  
New model for 1985

**star**

Only  
**\$249.95**

### SUPER PRO KEYBOARD

Why pay more? The best is  
only **\$59.95\***.

\*Computers produced after approximately Oct., 1982 require an additional plug adapter. Please add \$3.95.

### COCO — UTIL

Coco Util is a valuable utility program that allows you to transfer Color Computer disc files to your MS-DOS machine. Also transfer MS-DOS files to a Color Computer disc.

**\$29.95**

Great new utility.

### PCX-II



We now offer IBM PC-XT compatible computer systems. Don't settle for a

Tandy 1000 or other standard PC until you check our systems and prices.

**Starting at \$865.**

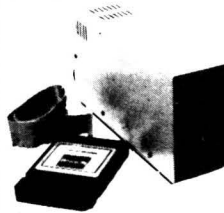
### NEED MORE MEMORY?

now  
only  
**\$14.95**

64K Memory  
Expansion Kit

### GREAT BARGAINS ON COCO DISC DRIVES!

Single Drive (SSDD) in Dual Cabinet w/Controller	\$299.95
Additional Drive	89.95
Two Drives (SSDD) in Dual Cabinet w/Controller	384.95
Single Drive (DSDD) in Dual Cabinet w/Controller	339.95
Additional Drive	119.95
Two Drives (DSDD) in Dual Cabinet w/Controller	449.95
Dual Cabinet/Power Supply	79.95
Disc Controller (Radio Shack or J & M)	139.95
Connecting Cable	24.95
Radio Shack DOS ROM 1.1 or J/DOS w/Manual	39.95



### QUALITY VIDEO MONITORS

SaKata Color SC-100  
High Quality 13" monitor.  
Sharp, brilliant colors.

**\$199.95**

CG S Amber Screen  
12" 20 MHZ monitor  
with DELUXE TILT  
SWIVEL BASE.

**\$119.95**

### UNIVERSAL VIDEO DRIVER



ONLY  
**\$29.95**

Carefully  
engineered to  
work with  
ALL color  
computers &  
ALL composite  
monitors.

**PURCHASED WITH A MONITOR \$24.95**

### ACCOUNTING SYSTEM

Ideal for small businessman.  
Process income and expenses  
Prepare detailed reports.\*

**\$99.95**

### ORDER ENTRY SYSTEM

Enter orders, print shipping  
papers and invoices.\*

**\$99.95**

### EASY FILE DATA MANAGEMENT

Keep track of your investments, com-  
puter magazines or record collection.

\*All business programs require 32K,  
an 80-column printer  
and one disc drive.

**\$59.95**

**SHIPPING:** All orders under \$100 please add \$2 regular, \$5 air. All orders over \$100 please add 3% regular, 8% air. California residents please add 6% sales tax. Orders outside the continental U.S., check with us for shipping amount; please remit U.S. funds. Software authors—contact us for exciting program marketing details. We accept MasterCard and VISA. Distributed in Canada by Kelly Software.

**FREE—Send for our free catalog flier.**

# MD

## Mark Data Products

Department H

24001 ALICIA PKWY., NO. 207 • MISSION VIEJO, CA 92691 • (714) 768-1551

# Reader's Forum

## Automatic Menu Generator

Here's one for all you Color Basic hackers who enjoy building bigger and better programs with as few bytes of RAM as possible. It's an automatic menu generator that will create as many different menus as you want within a program with only one line of code for a call.

Put these preliminary lines early in the program:

```
10 PT$="* YOUR PROGRAM TITLE *
":PT=16-(LEN(PT$)/2):REM YOUR PR
OGRAM TITLE
20 RES=" * M - RETURN TO MAIN M
ENU **:EN$=" * ENTER # OF YOU
R CHOICE *"
30 FOR X=1TO30:LI$=LI$+"*":NEXT:
LI$=" "+LI$:FORX=1TO28:BL$=BL$+"
":NEXT:BL$="**"+BL$+"**"
40 GOTO1000
```

Then insert the automatic menu generator subroutine, early in the program as well:

```
100 REM AUTO MENU GENERATOR ROUT
INE
110 IF NU=1THEN A=3 ELSE IF NU>1
AND NU<5 THEN A=2ELSE IF NU>4 T
HEN A=1
120 CLS:FORX=1TOA:PRINT:NEXT:PRI
NT TAB(PT)PT$,LI$
130 PRINT TAB(1)"*";TAB(16-(LEN(
MT$)/2))MT$:TAB(30)"**",BL$
140 FOR X=1TO NU:PRINT" *";TAB(3
)X;"- ";MI$(X);TAB(30)"*":NEXT:P
RINT RES,BL$,EN$,LI$:RETURN
150 CH$=INKEY$:IF CH$=" "THEN150E
LSE IF CH$="M"THEN ***ELSE 155
155 CH=VAL(CH$):IF CH<1 OR CH>V
THEN150ELSE RETURN
```

The \*\*\* in line 150 will normally be the line number of your main menu call or some other safe haven within your program.

Finally, place the call anywhere in the program:

```
1000 NU=5:MT$="TITLE OF YOUR MEN
U":MI$(1)="YOUR FIRST MENU CHOIC
E":MI$(2)="YOUR NEXT MENU CHOICE
":MI$(3)="YOUR NEXT MENU CHOICE"
:MI$(4)="YOUR NEXT MENU CHOICE":
MI$(5)="YOUR NEXT MENU CHOICE"
1010 GOSUB100:V=5:GOSUB150
1015 ON CH GOTO ***,***,***,***,
***
```

The \*\*\*'s represent the line numbers of your various routines.

This routine gives you one to five menu choices plus an automatic option of escaping to a safe or logical program line (usually the main menu) should you not want any of the menu's other choices.

Duncan F. Dempster  
Kaneoke, HI

## On Error GOTO

The following program serves the same purpose as the ON ERROR GOTO command. It loads into low memory a machine-language program that transfers control to a line number given in line 2. The program then POKEs that line number into the two zero bytes of the

machine-language program shown in line 6. If you already know your line number, delete lines 2-4 and put the hexadecimal equivalent of that line number in place of the two zeros in line 6. If you specify an unidentified line number, the computer will hang up. This program will work on all CoCos.

```
1 FOR X=0TO17:READA$:POKEX+550,V
AL("&H"+A$):NEXT X
2 Y=100 'LINE NUMBER
3 POKE551,INT(Y/256)
4 POKE552,Y-INT(Y/256)*256
5 POKE&H18F,2:POKE&H190,38
6 DATA8E,0,0,9F,2B,10,DE,21,CC,A
D,C4,34,06,0F,6F,7E,AE,A9
```

John Stewart  
West Liberty, KY

## Work Out More Efficiently

You can get the maximum benefit from your aerobic exercises by working out at the right intensity. Your target intensity range is based on your age and resting heart rate. Remember, your goal is to attain but not exceed this range in your aerobic activities.

To determine your estimated maximum heart rate, subtract your age from 220. For example, a 30-year-old adult's maximum heart rate is 190. To determine your resting heart rate, take your pulse when you first awake in the morning. I'll use 70 for this example.

Type in and run the following program. If you don't have a printer, delete the #-2s. Enter the numbers from the previous paragraph at the prompts. The program tells you that this 30-year-old should exercise at a heart rate between 142 (called the threshold intensity) and 160 beats per minute (called the peak intensity), and gives the threshold and peak number of heartbeats in a 10-second period.

```
35 PRINT#-2, "NAME"
36 PRINT#-2
37 PRINT#-2, "MONTH"
38 PRINT#-2
40 PRINT"WHAT IS YOUR AGE";:INPU
T AG
45 PRINT"WHAT IS YOUR RESTING PU
LSE RATE";:INPUT RR
50 X=220
55 Y=X-AG
60 Z=.60
65 W=.75
70 TI=((Y-RR)*Z)+RR
75 PRINT#-2,"YOUR 60 SECOND THRE
SHOLD IS";TI
80 PRINT#-2:PI=((Y-RR)*W)+RR
85 PRINT#-2,"YOUR 60 SECEND PEA
K IS";PI
86 PRINT#-2
90 SZ=TI/6
95 SW=PI/6
96 PRINT#-2,"YOUR 10 SECOND THRE
SHOLD IS";SZ
97 PRINT#-2
98 PRINT#-2,"YOUR 10 SECOND PEAK
IS";SW
```

Larry Williams  
Bentonville, AR

# DYNACALC<sup>®</sup>

## CoCo's Best & Fastest Spreadsheet System

### ACCLAIMED BY THE EXPERTS

"DYNACALC is my choice for a CoCo spreadsheet."

Dan Downard, RAINBOW, September, 1984.

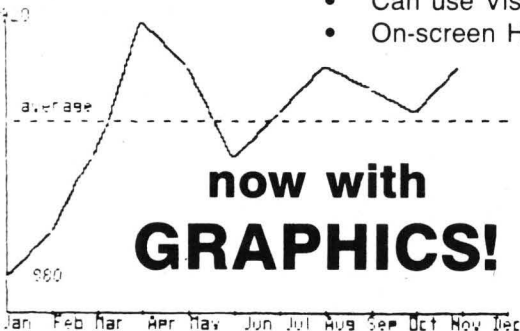
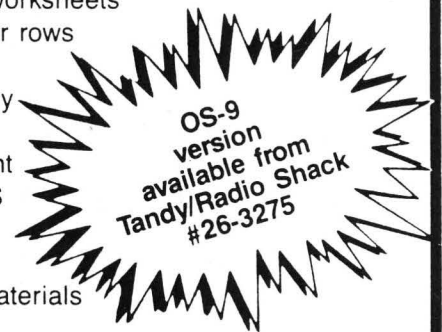
"Eat your heart out, Lotus 1-2-3!"

Scott Norman, HOT CoCo, October, 1984.

#### Built-in Features:

- 51 x 24 Display with Lower Case
- Super-fast Smart Screen Refresh
- Auto-Repeat Keyboard Driver
- Keysaver (TM) repeats last command x times
- Disk Operating System (works just like ROM DOS)
- Easy communication with BASIC/DOS programs
- Two-way communications with PRO-COLOR-FILE ★ Enhanced ★
- Outputs to ASCII Word Processors like Telewriter-64
- Fast 16-Digit Arithmetic with Scientific Functions
- Summation, Mean, and Standard Deviation Functions
- Logical Functions with String & Numeric Comparison
- String locate command to navigate large worksheets
- Sort full or partial worksheet by columns or rows
- Line, Bar, Hi/Lo/Close, Circle Graphs
- Full Graphics captioning and overlay facility
- Graphics Drivers for all popular Printers
- Joystick/Mouse Driver for Cursor Movement
- Works with any ROM versions, even JDOS
- 33k Available Worksheet Space
- Up to 256 Columns or 256 Rows
- Can use VisiCalc worksheets & training materials
- On-screen Help Messages

**NOW  
ONLY  
\$99<sup>95</sup>**



#### FOR 64K DISK SYSTEMS

available from

#### COMPUTER SYSTEMS CENTER

42 Four Seasons Center #122  
Chesterfield, MO 63017 USA  
(314) 576-5020

10 to 6 Mon.-Fri.

or your local DYNACALC dealer

Price US\$99.95

Outside North America add \$10 postage

DYNACALC Reg. U. S. Pat. Off.

Lotus and 1-2-3 are trademarks of Lotus Development Corp.

PRO-COLOR-FILE is a trademark of Derringer Software

Telewriter-64 is a trademark of Cognitech

VisiCalc is a trademark of VisiCorp.

**NEW  
ADDRESS**



CANADA-CDN \$129.95  
DATAMAN INTERNATIONAL  
420 FERGUSON AVE. N.  
HAMILTON, ONT. L8L 4Y9  
(416) 529-1319



AUSTRALIA  
PARIS RADIO  
161 BUNNERONG RD.  
KINGSFORD 2032 NSW  
(612) 344-9111





# Product News

by J. Scot Finnie

## Trends in Software, DeskMate, The Tandy 600, C.E.O., One-On-One, Pegasus, Trading Post, King Chip, Logoworlds, and More

Information related in the Product News section is supplied by manufacturers. HOT CoCo has not tested or reviewed the products discussed here and cannot guarantee manufacturers' claims.

Color Computer software is changing as a result of better use of old ideas and perhaps in anticipation of new ones. Largely unfounded rumors were bandied about for two years concerning a new "super CoCo," which was described with widely varying characteristics. Recently, the rumors about a new Color Computer have started taking on uniformity. The new machine is reported to be targeted for release in the latter part of the year. Some third-party industry insiders claim that it will have 512K, downward compatibility with the CoCo 2, a new 80-column video chip for increased resolution, and an integral disk drive. Vague rumors place the price of the new computer near the same range as the Atari 520 ST, suggesting that Tandy might take on Atari's ST and Commodore's higher-priced Amiga.

Back in the here and now, the trend in Color Computer software is to make better use of an old idea by using OS-9 to take advantage of the full 64K offered by the CoCo. Several programs on the market use OS-9 but offer an easy-to-use interface or a shell. To boot up a program, typically all you do is type the word DOS. The computer takes care of the rest, and no knowledge of OS-9 is required. Some programs use other means to address the CoCo's second bank of 32K. The fact is, the majority of new programs on the market require or can make use of 64K. Most of

Tandy's latest Color Computer software releases use 64K, many with an OS-9 shell.

Several software manufacturers are thinking along these lines. Bigger is better, and that includes more options, more graphics, and more applications. Four Star Software's **PenPal**, Tandy's **DeskMate** (see below for more on this), and Computerware's **C.E.O.** (Complete Electronic Organizer) all offer multiple applications in a single 64K package. They represent an emerging trend toward integrated software. C.E.O. is the latest from Computerware, a program that combines calendar, note keeper, memo pad, calculator, and phone directory. It sells for \$49.95.

### What's Handy at Tandy

There are several new products available in your local Radio Shack store of late. Some were announced quite some time ago and are just finding their way onto the shelf; others, like the new **Tandy 600** MS-DOS-compatible portable computer with

32K RAM expandable to 224K and on-board 3.5-inch disk drive were just announced as this was written (in November). The Tandy 600 (catalog no. 26-3901) sells for \$1,599, by the way.

Perhaps most notable for Color Computer fans is Tandy's introduction of **DeskMate** (catalog no. 26-3259) to the Color Computer. This software, first designed and released for the Tandy 1000, shares the concept and title with its MS-DOS cousin, but little else. The integrated package of seven commonly used applications includes Text, Ledger, Index Cards, Paint, Telecom, Calendar, and Calculator. It requires 64K, comes on disk, and sells for \$99.95.

Other new and available products from Tandy include the following. **Childpace** (catalog no. 26-3248) is a 64K program that tracks a child's early development from three months to five years by evaluating dexterity, language, and personal and social skills. It's based on a national survey and a university study. Childpace comes on disk and sells for \$39.95.

Tandy has picked up the beat in the music area. They are offering **Pan** (catalog no. 26-3279), a program that lets you write your own songs. It requires the Sound/Speech Cartridge (catalog no. 26-3144) and 64K and sells for \$29.95. **Orchestra-90 CC** (catalog no. 26-3143) is a ROM-pack-based music and sound-effects generator selling for \$79.95.

The popular **One-On-One** Larry Bird and Dr. J basketball program heads up the list of new games for the Color Computer. One-On-One (catalog no. 26-3288) comes on disk, requires 64K, and sells for \$39.95. But there are other new entries as well. **Pegasus** (catalog no. 26-3281) is similar to the popular arcade-game called Joust. **Varloc** (catalog no. 26-3291) is similar to Electronic Art's Archon available for other brands of computers. Both of these disk games require 64K and sell for \$29.95.

**Color Connection III** (catalog no. 90-0348, an Express Order Software product) is a communications program that supports the Color Computer's serial port or the Deluxe RS-232 Program Pak (catalog no. 26-2226). It also supports xmodem protocol and CompuServe's B protocol. Color Connection III requires a minimum of 32K and sells for \$49.95. Check your nearest Radio Shack store for more information.

### Games, Diversions, and Education

So, you thought you were pretty nifty because you could play a trivia game on your computer. But can you bring up trivia questions on the computer—without a computer? You can if you have **King Chip**. It's a new trivia board game that bases its questions on the world of high technology and the computer.



King Chip from XYLYX is the computer-sans-computer game.

and its answers are accompanied by explanations designed to inform and educate players. King Chip's six categories are data communications, history and current events, hardware, jargon and acronyms, potpourri, and software. The game can be played by two to six players and sells for \$39.95 from XYLYX Computer Entertainment Ltd.

After reading *The Million Dollar Strategy of a Lottery Jackpot Winner*, by Rodney T. Hard, Professor Jones decided to add a module to their **Lotto** program that will achieve a similar analysis. With the new module, the same input will be required but additional permutations and result screens will be available. Customers who have Professor Jones' "automatic update" package will receive the new module for free. A \$25 update charge will be in effect for other Lotto owners. Contact the company for more information.

Software Exchange has released two new programs, the **Greyhound Racing Analysis Package** and the **Enhanced Greyhound Racing Analysis Package**, selling for \$29.95 and \$49.95 respectively. The two packages facilitate handicapping of greyhound races by using past-performance information taken from racing programs. Also included is **Bet Return Analysis** for calculating winning percentages. Both programs come on cassette or disk and include instructions. Contact the manufacturer for more information.

Sunburst Communications, makers of several well-received educational computer programs, has released a new program that runs on the IBM, Apple II, Tandy 1000, and Color Computer. **Trading Post** is a two-player strategy game that helps teach students to organize their thinking as they try through trade and sound planning to be first to collect commodities toward a specific goal. The new educational game is designed for third-through seventh-grade level players. It requires 32K and comes on disk with a backup copy and teacher's guide for \$59.

**Logoworlds**, by Rachele S. Heller, C. Dianne Martin, and June L. Wright is a new book published by Computer Science Press to help teachers and parents learn Logo quickly and easily so that they can teach children. **The Computer and the Child: A Montessori Approach**, by Dr. Peter G. Gebhardt-Steele is also available from the publisher. It focuses on the needs of children six and older when interacting with computers. Each of these books sells for \$19.95. ■

## Vendors Mentioned In Product News

Computerware  
Box 668  
Encinitas, CA 92024  
619-436-3512

Computer Science Press Inc.  
1803 Research Blvd.  
Rockville, MD 20850  
301-251-9050

Four Star Software  
P.O. Box 730  
Streetsville, Ont.  
L5M 2C2, Canada  
416-858-7827

Professor Jones  
1940 W. State St.  
Boise, ID 83702  
208-342-6939

Software Exchange  
2681 Peterboro Road  
P.O. Box 5382  
W. Bloomfield, MI 48033  
313-626-7208

Sunburst Communications  
39 Washington Ave.  
Pleasantville, NY 10570  
800-431-1934

Tandy Corp.  
1400 One Tandy Center  
Fort Worth, TX 76102

XYLYX Computer  
Entertainment Ltd.  
20 Torbay Road  
Markham, Ont.  
L3R 1G6, Canada  
416-477-4053

Aardvark Software	59
A.S.C.	21
Cer-Comp	14, 15
Challenger Software	58
Cinsoft	5
CoCo Devices	69
Cognitec	9
Colorware	18, 19
The Computer Center	67
Computer Plus	CIII
Computer Systems Center	75
Computer Systems Consultants	25
CYNWYN	66
Delker Electronics	44
Dorsett Educational Systems	4
D.P. Johnson	80
E.D.C.	12
Electronic Motion Control	63
Four Star Software	45
GRAFX	80
Group Technology Ltd.	68
HJL Products	7, CIV
HOT CoCo	
Instant CoCo	54
American Radio Relay League	17
Incentive Software	38
<b>Intercomp Sound</b>	<b>13</b>
J & M Systems	2
Mark Data	73
Mathegraphics Software	17
Micro Computer Systems	61
Nibble Notch Computer Products	60
Perry Computers	24
Polygon Computers	68
Professor Jones	63
Radio Shack	CII, 1
Robotic Microsystems	58
Spectral Associates	39
Software Support	52, 53
Soistmann Enterprises	59
Spectrosystems	61
Sunlock Systems	25
Sunrise Software	37
T & D Subscription	37
TCE Programs	78, 79
True Data Products	30, 31
VMC	13
Wasatchware	60

Advertising Offices: (603) 924-7138 or (800) 441-4403  
Please contact advertisers directly.



It's not just

# CHILD'S PLAY

but a total application software series.

It's a WORD PROCESSOR. It's a DATA BASE. It's a SPREAD-SHEET. And each program of the CHILD'S PLAY software series is available in three different levels of sophistication so you can custom fit CHILD'S PLAY to your individual needs.

## Easy is Better!

It took us a year and a half to complete the CHILD'S PLAY series. Our goal was to produce software easy enough for a child to use, yet versatile enough for the home or professional user. The end result is software so easy, so much fun for everyone to use, it's like CHILD'S PLAY.

## A Mouse and Click-Down Menus

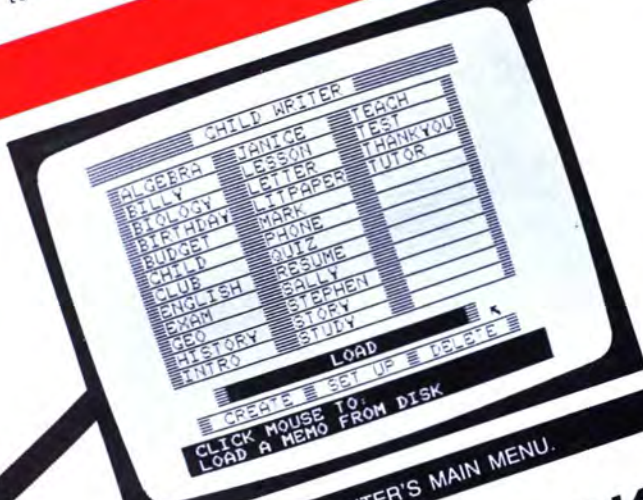
CHILD WRITER, our elementary word processor, is currently being used in schools by second grade children with amazing ease. Teachers tell us that kids are fascinated with the total control they have with a mouse. Just point and click! And we incorporated click-down menus to eliminate having to memorize dozens of commands. Simple instructions are right there on the screen, but only when you want them. Click the menu in when you need help and click it out when you don't. CHILD WRITER is not only easy to use, it's more fun and powerful.

Does your word processor underline text on the screen? All of the CHILD'S PLAY word processor programs do. For the first time you can reproduce on paper exactly what you've created on the screen. It's neat!

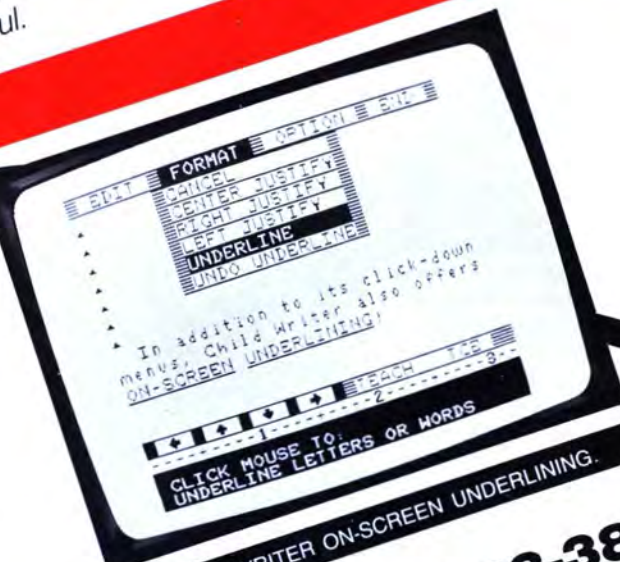
## More Sophistication

We could have stopped developing when we completed CHILD WRITER, but we knew that someone always wants more. So we developed MEMO WRITER, designed for the home user. And soon, we will have BUSINESS WRITER, the ultimate word processor designed for professional use.

# MOUSE



CHILD WRITER'S MAIN MENU.



CHILD WRITER ON-SCREEN UNDERLINING.

**1 800/4TC-4TCE or 301/963-3848**  
**TCE Programs, Inc.**  
**PO Box 2477**  
**Gaithersburg, MD 20879 2477**



**More Power**  
CHILD FILER and CHILD CALC are our elementary database and spreadsheet programs. LIST MANAGER and SIMPLE CALC are designed for the home user. BUSINESS MANAGER and BUSINESS CALC are for professionals.

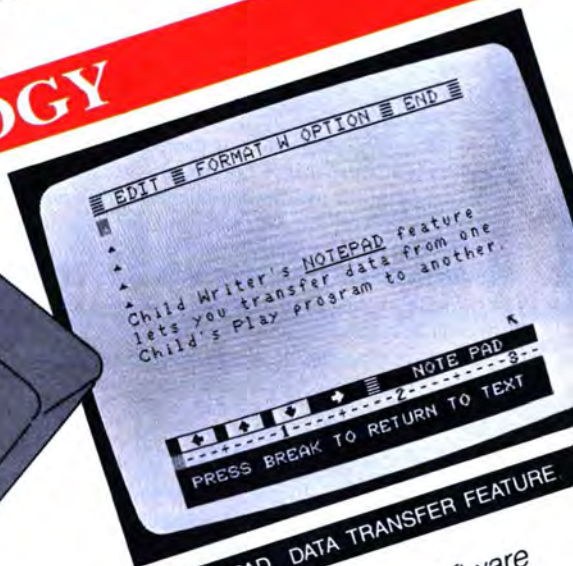
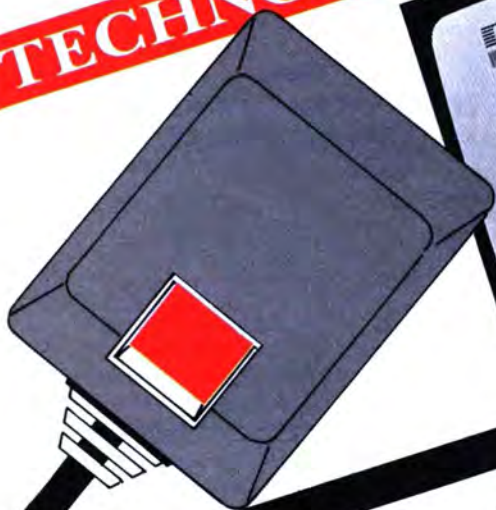
All of these programs, no matter what level of sophistication, are completely compatible with the other CHILD'S PLAY applications on the same level. And, data can be shared between applications by using our unique NOTE PAD feature.

Available through express order at Radio Shack®.

**The CHILD'S PLAY Software Series is available for the Tandy 1000.\***

\* Tandy 1000 is a registered trademark of Tandy Corp.

# TECHNOLOGY



NOTE PAD, DATA TRANSFER FEATURE

NOTE PAD is the program vehicle we use to transfer data when you jump from one application to another, as well as move, cut, and paste text within your word processing program. Information from your database program is stored in NOTE PAD and made available for sharing with the other CHILD'S PLAY programs. It is a breeze to use and it sure beats retyping lots of data from one application program to another.

We have designed this software series for everyone. It doesn't matter if you are using a computer for the first time, or if you are a seasoned hacker, the CHILD'S PLAY application software series is for you. Write or call for more detailed information about the CHILD'S PLAY software series. Ask for the free TCE catalog with over 75 additional Educational Software titles. Ask about your HOT CoCo discount too.

## Educational Level for the Radio Shack® Color Computer

CHILD WRITER 32/64K disk	\$54.95
(network version 32/64K)	\$99.95
CHILD FILER 32/64K disk	\$54.95
(network version 32/64K)	\$99.95
CHILD CALC 32/64K disk	\$54.95
(network version 32/64K)	\$99.95
Elementary Level Series	TBA

MEMO WRITER 64K disk	\$64.95
(network version 64K)	\$129.95
LIST MANAGER 64K disk	\$64.95
SIMPLE CALC 64K disk	\$64.95
Home Use Level Series	TBA

BUSINESS WRITER	\$99.95
64K disk	
BUSINESS MANAGER	\$99.95
64K disk	
BUSINESS CALC 64K disk	\$99.95
Business Level Series	TBA

PROOFREADER	\$34.95
(20,000 words) 32/64K	
MASTER PROOFREADER	\$54.95
(50,000 words) 64K	

## 75 ADDITIONAL EDUCATIONAL SOFTWARE TITLES AVAILABLE



**Call us!**  
**800/4TC-4TCE**



**OS-9™**

**SOFTWARE/HARDWARE**

**SDISK**—Standard disk driver module, allows the use of 40 and 80 track double sided drives with COCO OS-9, plus reads/writes format used by other OS-9 systems. **\$29.95**

**SDISK + BOOTFIX**—To boot from a DOUBLE sided disk **\$35.95**

**PC-XFER**—Read/write ss MS-DOS™ diskettes under CoCo OS-9, requires SDISK. **\$45.00**

**CCRD 512K Byte RAM DISK CARTRIDGE**—Requires RS Multipak interface; with software below creates OS-9 RAM disk device. **\$259.00**

**CCRDV**—OS-9 Driver software for above. **\$20.00**

Terms: Prepaid Check, MO, VISA/MC; add \$1.50 S&H for software, \$5.00 for CCRD. COD actual charges added. Send SASE for latest catalog.

**D.P. Johnson**

7655 SW Cedarcrest St.  
Portland, OR 97223  
(503) 244-8152

(We prefer your calling 9-11 AM Pacific Time.)

OS-9 is a trademark of Microware and Motorola Inc.  
MS-DOS is a trademark of Microsoft, Inc.

# The Corner Office

by Jeff DeTray, Publisher

## The Great Merger

If you are a regular subscriber to *HOT CoCo*, then you've heard the news. This is the last month *HOT CoCo* will be published as a separate magazine. Next month we merge with our sister publication, *80 Micro*. You'll begin receiving the combined magazine starting with the March issue. Look for *80 Micro* and its new Color Computer section next month.

When you consider it, our merger with *80 Micro* is highly appropriate. Old-timers will remember that *HOT CoCo* spun out of *80 Micro* back in June, 1983, after a flood of Color Computer articles threatened to overwhelm our older sibling. So in a sense, merging with *80 Micro* is like going home again.

The combined magazine will have its own, distinct Color Computer section. The features of *HOT CoCo* you have indicated you like best will be carried over into *80 Micro*, so you'll be seeing old friends like Doctor ASCII and Scott Norman. The CoCo section will focus on productivity, making existing software more functional, and applications you can really use. There is plenty of interesting material on tap.

## An Institution

Among Tandy computer users, *80 Micro* is something of an institution. It was first published in 1980, and we can't think of an older, more respected manufacturer-specific computer magazine. There's a strong tradition of editorial excellence and independence at *80 Micro*. You always get the straight scoop from *80*, with no punches pulled, so be prepared for its feisty, often irreverent outlook. We think you will enjoy it.

And when you start reading *80 Micro*, be sure to look beyond the special CoCo section. You will be surprised at how many of the non-CoCo articles turn out to contain information you can use. Articles on programming, news about Tandy—these are things that apply to you and your CoCo as well as to Model 4 and Tandy 1000 owners. Besides, you have to love a magazine that once bound a pair of 3-D glasses into each copy.

Thanks for your support—See You in *80 Micro*! ■

**... VIZIDRAW— CLIPART— ...**

Print Your Graphics On T-Shirts... Send large self-address stamped envelope

**HAM SOFTWARE.** **DISKS & MORE**

MAX-X Pad a patch to run your RS-X Pad with COCOMAX ..... \$14.95 PPD.  
MUSX DISKS 1-5. See our review April 85 RAINBOW... Were \$13.95 each NOW \$6.00 EACH PPD.  
SHRINX—reduce your graphics pictures Reviewed March 85 RAINBOW .....  
Special \$21.95 + \$1 Postage.  
GRAPHICOM—Reg. \$29.95—NOW \$19.95 + \$2 Postage.  
GRAPHICOM PICTURE DISKS (Art 1, Art 2, Aid 1, Font 1) Special \$19.95 \$2 Postage  
CHRIS W. BROWN GRAPHICOM ART DISKS (New Fonts & Graphics—2 Disk Set... \$19.95 + \$2 Postage.  
COMPUERVE Starter Kits—\$20 + 2 Postage.  
64K CHIPS... Set of 8... \$19.95 + \$1 Post.  
BASF SSSD Disks with sleeves 10—\$10 PPD.  
Send for our Digitized Pix Demo Disk \$3.50 PPD.

**VIDX-VIDEO DIGITIZER**

Connects to the RS-232 port of your COCO, no need for Y-CABLES or MULTIPACKS! Runs on minimum 16K to 32K TAPE or DISK. Comes with software easily modifiable to your needs. WHY PAY MORE? Unlimited GREY scale when you use a color camera! The only digitizer that recommends you use a color camera!

**VIDX-1** ..... \$99.95 + \$3 Postage  
**VIDX-2** ..... \$124.95 + \$3 Postage  
VIDX-2 Has A RS-232 Switcher Built In

✓ CHECK US FOR OUR LOW PRICES! SEND FOR OUR CATALOG

To Order Send Check or M.O.

**GRAFX**  
P.O. Box 254  
West Millfin PA  
15122-0254



**GRAFX**

*HOT CoCo* is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 57 computer publications in more than 20 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*; Asia's *The Asian Computerworld*; Australia's *Computerworld Australia*, *Australian PC World*, *Macworld* and *Directories*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark*, *PC World* and *RUN* (Commodore); Finland's *Mikro*; France's *Le Monde Informatique*, *Golden* (Apple), *OPC* (IBM) and *Distributique*; Germany's *Computerwoche*, *Microcomputerwelt*, *PC Welt*, *SoftwareMarkt*, *CW Edition/Seminar*, *Computer Business*, *RUN* and *Apple's*; Italy's *Computerworld Italia* and *PC Magazine*; Japan's *Computerworld Japan*; Mexico's *Computerworld/Mexico* and *CompuMundo*; The Netherlands's *Computerworld Benelux* and *PC World Benelux*; Norway's *Computerworld Norge*, *PC World* and *RUN* (Commodore); Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld Espana*, *Microsistemas/PC World*, *Commodore World*; Sweden's *ComputerSweden*, *Mikrodatorn* and *Svenska PC*; the UK's *Computer Management*, *Computer News*, *PC Business World* and *Computer Business Europe*; Venezuela's *Computerworld Venezuela*; the US's *Computerworld*, *Hot CoCo*, *inCider*, *Infoworld*, *MacWorld*, *Micro Marketworld*, *PC World*, *RUN*, *73*, *80 Micro*, *Focus Publications* and *On Communications*.

From Computer Plus to YOU ...  
**PLUS** after **PLUS** after **PLUS**



Tandy 200 24K \$739  
 Model 100 24K \$510



Color Computer II  
 w/16K Basic \$107.95  
 w/64K Ext. Basic \$179



Tandy 1000 \$710  
 Tandy 1000 HD \$1539



Smith Corona L-1000  
 \$259



Color Computer Disk Drive  
 Drive 0 \$239 Drive 1 \$189



DMP105 \$160

**BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS**

**COMPUTERS**

Tandy 1000 1 Drive 128K	710.00
Tandy 1000 HD 10 Meg. 256K	1539.00
Tandy 1200 HD 10 Meg. 256K	1599.00
Model IVD 64K with Deskmate	889.00

**PRINTERS**

Radio Shack DWP-105	160.00
Radio Shack DMP-130	269.00
Radio Shack DMP-430	660.00
Radio Shack CGP-220	359.00
Radio Shack DWP-220 Daisy Wheel	469.00
Silver Reed EXP-550 Daisy Wheel	425.00
Star SG-10	245.00
Star SG-15	410.00
Panasonic P-1091	259.00
CITOH Prowriter 8510AP + NLQ	345.00
Toshiba 1340	559.00
Okidata 192	375.00
Epson LX-80	245.00
Epson FX-185	369.00

**MODEMS**

Radio Shack DCM-3 Modem	52.00
Radio Shack DCM-5 Modem	99.00
Radio Shack DC Modem 2212	315.00

**COLOR COMPUTER MISC.**

Radio Shack Drive Controller	139.00
Extended Basic Rom Kit	39.95
64K Ram Upgrade Kit	39.00
Radio Shack Deluxe Keyboard Kit	24.95
HJL Keyboard Upgrade Kit	79.95
COCO Max Y Cable	27.95
Botek Serial to Parallel Conv.	69.95
Radio Shack CCR-81 Recorder	52.00
Radio Shack Deluxe Joystick	26.95
Amdek Color 300 Monitor	265.00
Amdek Video 300 Green Monitor	139.00
Amdek Video 300 Amber Monitor	149.00
Taxan Color 220 Monitor	245.00
Tatung DM-12VLG Green Monitor	139.00
Tatung DM-12VLA Amber Monitor	149.00
Radio Shack VM-2 Green Monitor	129.00
Mark Data Universal Video Driver	29.95

**COLOR COMPUTER SOFTWARE**

	TAPE	DISK
Approach Control Simul.	29.95	34.95
Worlds Of Flight	29.95	32.95
Mustang P-51 Flight Simul.	29.95	34.95
Spectral Typing Tutor	19.95	22.95
Dungeon Quest	24.95	27.95

Major Istar	24.95	27.95
Sam Slueth Private Eye	24.95	27.95
Mark Data Graphic Adven.	24.95	27.95
Graphicom (disk only)		29.95
COCO Max by Colorware	69.95	69.95
Color ComE (rom)	49.95	49.95
AutoTerm by PXE Computing	39.95	49.95
Key-264K by Key Color	39.95	44.95
TeleWriter 64	49.95	59.95
Deft Pascal Workbench		89.95
Deft Extra		39.95
Pro Color File Enhanced 2.0		59.95
Telegraphics by Derringer		24.95
Elite Calc	69.95	69.95
Elite Word	69.95	69.95
Elite File (disk only)		74.50
DynaCalc (disk only)		99.95
Word Pack II by PBJ		134.95
VIP Writer (tape & disk)		69.95
VIP Integrated Library (disk)		149.95

Order any 2 software pieces listed and take 10% off their listed price. All Radio Shack software 10% off list. Send for complete list.

**CALL TOLL FREE  
 1-800-343-8124**

- LOWEST POSSIBLE PRICES
- BEST POSSIBLE WARRANTY
- KNOWLEDGEABLE SALES STAFF
- TIMELY DELIVERY
- SHOPPING CONVENIENCE



**computer  
 plus**  
 P.O. Box 1094  
 480 King Street  
 Littleton, MA 01460  
**SINCE 1973**

IN MASSACHUSETTS CALL (617) 486-3193



# The HJL-57 Keyboard

Now available for all models,  
including CoCo 2.



## Compare it with the rest. Then, buy the best.

If you've been thinking about spending good money on a new keyboard for your Color Computer, why not get a good keyboard for your money?

Designed from scratch, the HJL-57 Professional Keyboard is built to unlock ALL the potential performance of your Color Computer. Now, you can do real word processing and sail through lengthy listings...with maximum speed; minimum errors.

At \$79.95, the HJL-57 is reasonably priced, but you can find other CoCo keyboards for a few dollars less. So, before you buy, we suggest that you compare.

### Compare Design.

The ergonomically-superior HJL-57 has sculptured, low profile keycaps; and the three-color layout is identical to the original CoCo keyboard.

### Compare Construction.

The HJL-57 has a rigidized aluminum baseplate for solid, no-flex mounting. Switch contacts are rated for 100 million cycles minimum, and covered by a spill-proof membrane.

### Compare Performance.

Offering more than full-travel, bounce-proof keyswitches, the HJL-57 has RFI/EMI shielding that eliminates irritating noise on displays; and four user-definable function keys (one latchable), specially-positioned to avoid inadvertent actuation.

### Free Function Key Program

Your HJL-57 kit includes usage instructions and decimal codes produced by the function keys, plus a free sample program that defines the function keys as follows: F1 = Screen dump to printer. F2 = Repeat key (latching). F3 = Lower case upper case flip (if you have lower case capability). F4 = Control key; subtracts 64 from the ASCII value of any key pressed. Runs on disc or tape; extended or standard Basic.

### Compare Installation.

Carefully engineered for easy installation, the HJL-57 requires no soldering, drilling or gluing. Simply plug it in and drop it right on the original CoCo mounting posts. Kit includes a

new bezel for a totally finished conversion.

### Compare Warranties.

The HJL-57 is built so well, it carries a full, one-year warranty. And, it is sold with an exclusive 15-day money-back guarantee.

### Compare Value.

You know that a bargain is a bargain only so long as it lasts. If you shop carefully, we think you will agree...The HJL-57 is the last keyboard your CoCo will ever need. And that's real value.

### Order Today.

Only \$79.95, the HJL-57 is available for immediate shipment for either the original Color Computer (sold prior to October, 1982) or the F-version and TDP-100 (introduced in October, 1982), and the new 64K CoCo. **Now also available for CoCo 2.**

**Call Toll Free**  
**1-800-828-6968**

In New York 1-800-462-4891



**PRODUCTS**

Div. of Touchstone Technology Inc.  
955 Buffalo Road • P.O. Box 24954  
Rochester, New York 14624

Telephone: (716) 235-8358

Ordering Information: Specify model (Original, F-version, or CoCo 2). Payment by C.O.D., check, MasterCard or Visa. Credit card customers include complete card number and expiration date. Add \$2.00 for shipping (\$3.50 for Canada). New York state residents add 7% sales tax. Dealer Inquiries Invited.