Your Family Needs a Disk Drive!

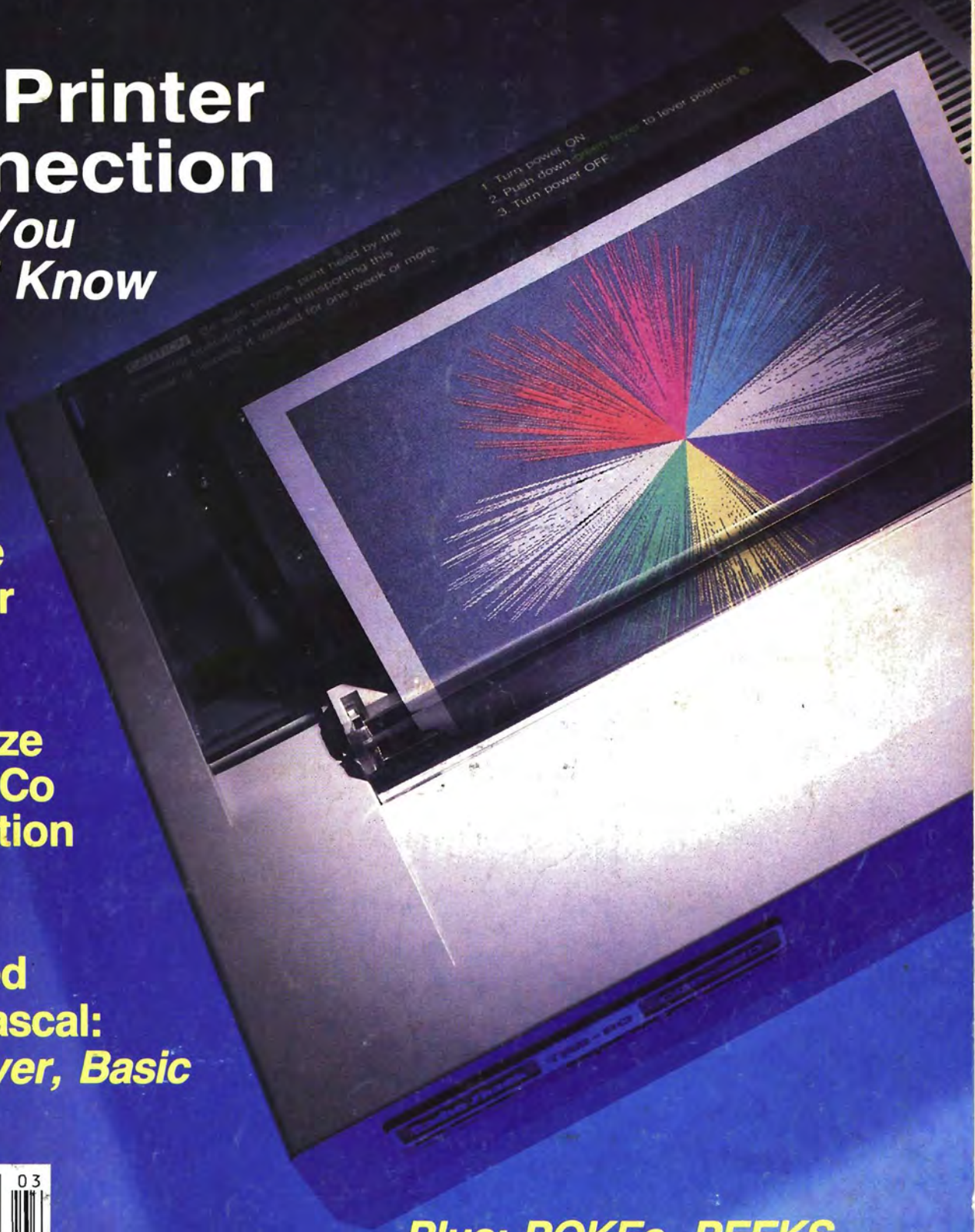
HOT CoCo®

THE MAGAZINE FOR TRS-80 COLOR COMPUTER® AND MC-10® USERS.

Rae
A7#6.75

UBLICATION
CH 1985
CAN $3.50

The Printer Connection
Facts You Should Know



Master Your Cassette Recorder

Customize Your CoCo Workstation

Reviewed DEFT Pascal:
Move Over, Basic

Plus: POKEs, PEEKS, And EXECs You Can Use

0 74470 12067 03

NEW LOW PRICE!

Powerful 64K Extended BASIC TRS-80 Color Computer 2

It's happened! Radio Shack's most powerful Color Computer 2 has a new low price!

Our 64K Color Computer 2 is just $219.95 (26-3127, Was $259.95 in Cat. RSC-12), so now's the perfect time to upgrade your home computer system or to get your first full-power computer.

A Computer for the Serious Programmer

Our 64K Color Computer 2 was designed for the serious programmer, with the top features you demand. It's no kiddie computer: There's enough power and room for expansion in the Color Computer 2 to see you through high school, and beyond. So come on, connect the Color Computer 2 to your TV set and see what you can do with a real computer.

We put the powerful Extended BASIC language in the Color Computer 2's ROM, so you can create stunning color graphics with simple one-line commands. Want a bigger programming challenge? Try color animation—or create your own arcade-style games.

For your advanced programming, we included string arrays up to 255 characters, trigonometric functions, multi-character variable names, full-featured editing, floating point 9-digit numerical accuracy, user definable keys and more.

And we give you 32,000 characters of user-accessible memory, to write sophisticated programs or create high-resolution graphics. Or add a disk drive and operating system for an impressive 64K.

Expand Your Computer As Your Needs Grow

Add cassette software and your Color Computer 2 is ready for word processing, home budgeting, electronic filing, school and business graphics and more. Or add a disk drive and you can choose from our large selection of educational, entertaining and professional software. A printer, plotter, modem, sound/speech cartridge and other accessories give your Color Computer even greater versatility.

Step up to our top-of-the-line Color Computer. Just visit your nearby Radio Shack today, and put our powerful 64K Color Computer 2 to a hands-on test.

Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION

Prices apply at participating Radio Shack stores and dealers.

Circle Reader Service card #4

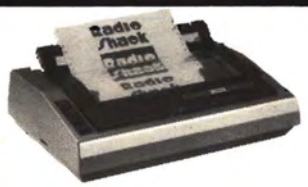
From Computer Plus to YOU . . .

PLUS *after* PLUS *after* PLUS

Model 100 8K $339
Model 100 24K $510

Color Computer II
w/16K Ext. Basic $135
w/64K Ext. Basic $179

Tandy 1000 $999
Tandy 1200 $2595



DMP120 $385

Color Computer Disk Drive
Drive 0 $289 Drive 1 $220

DWP210 $489
DWP510 $1295

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS	
Model 4 Portable	970
Model 4	970
Model 1000	999
Model 1200	2595
Model 2000 2 Drive	2299
MODEMS	
Hayes Smartmodem II	215
Radio Shack AC-3	125
Radio Shack DC Modem I	89
Radio Shack DC Modem II	160
Radio Shack DC Modem 2212	315
PRINTERS	
Radio Shack TRP100	229
Radio Shack DMP105	160
Radio Shack DMP110	305
Radio Shack DMP430	660
Radio Shack CGP220 Ink Jet	545
Silver Reed EXP500 D.W.	430
Star Gemini 10X	289
Star Gemini Powertype	345
Panasonic P1091	315
C. Itoh Prowriter 8510	320
Okidata and Epson	CALL

ETC.	
Radio Shack Drive Controller	119
Radio Shack Ext. Basic Kit	39.95
PBH Ser/Par Conv.	69
64K Upgrade Kit	49
Radio Shack Deluxe Keyboard	35.95
HJL Keyboard	79.95
Radio Shack CCR-81 Recorder	52
Radio Shack Del. Joystick (each)	35.95
Radio Shack Joysticks (pair)	22
Video Plus (monitor adapter)	24.95
Video Plus IIC	39.95
Amdek Color 300	265
Amdek Video 300 Green	145
Amdek Video 300 Amber	159
Taxan Color 220 Monitor	245
Taxan 115 Green	125
Taxan 116 Amber	129
Radio Shack VM-2	139
SOFTWARE	(Tape Version)
The Sailor Man	29.95
The King	26.95
Buzzard Bait	27.95
Worlds of Flight	29.95

Colorpede	29.95
Juniors Revenge	28.95
Pac Attack	24.95
Block Head	26.95
Lunar Rover Patrol	24.95
Lancer	24.95
Typing Tutor	23.95
Galagon	24.95
Scott Adams Adventures	19.95
Sea Dragon	34.95
Colorcome	49.95
Telewriter 64	49.95
Deft Pascal (disk)	79.95
Elite-Calc	59.95
VIP Writer (tape & disk)	69.95
VIP Calc (tape & disk)	69.95
VIP Terminal (tape & disk)	49.95
VIP Database (disk)	59.95
VIP Integrated Library (disk)	149.95
Graphicom (disk)	29.95

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*

VISA · AMERICAN EXPRESS · MasterCard

Circle Reader Service card #18

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (617) 486-3193

TRS-80 is a registered trademark of Tandy Corp.

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

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.

HJL PRODUCTS

Div. of Touchstone Technology Inc.
955 Buffalo Road • P.O. Box 24954
Rochester, New York 14624
Telephone: (716) 235-8358

Circle Reader Service card #440

HOT CoCo

Publisher
JEFF DETRAY

Editor-in-Chief
MICHAEL E. NADEAU

Managing Editor
MARK E. REYNOLDS

Review/New Products Editor
J. SCOT FINNIE

Education Editor
NANCY KIPPERMAN

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

Art Director
DONNA WOHLFARTH

Production Supervisor
SUSAN HAYS

Production Assistant
SANDRA DUKETTE

Advertising Director
PETER MONTROSS
80 Pine Street
Peterborough, NH 03458
1-800-441-4403 or
1-603-924-9471

Manufacturing Consultant:
SUSAN GROSS

Typesetting Manager:
DENNIS CHRISTENSEN

Film Preparation Manager:
ROBERT M. VILLENEUVE

Darkroom Manager:
NATHANIEL HAYNES

Vice President/General Manager
DEBRA WETHERBEE

Vice President/Finance
ROGER MURPHY

Assistant to Vice President/GM
MATT SMITH

Assistant to Vice President/Finance
DOMINIQUE SMITH

Director of Circulation
WILLIAM P. HOWARD

Assistant Circulation Manager
FRANK S. SMITH

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

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

Executive Creative Director
CHRISTINE DESTREMPES

Founder
WAYNE GREEN

DIGRESSIONS

The Success of Express Order

Tandy/Radio Shack does not sell third-party software in its stores, but its Express Order service is the next best thing.

Express Order is Tandy/Radio Shack's way of supporting vendors of selected third-party (i.e., non-Radio Shack) software packages for all Tandy computers. This software is not in the stores, but it is in the warehouses that supply the stores where a store manager can get it within a short time. Express Order's purpose is to fill a customer's needs should Radio Shack software be inadequate. Tandy/Radio Shack accepts software for Express Order based primarily on popularity, customer support (which is up to the outside vendor, not Radio Shack), and how well it works with all CoCo versions.

Participating third-party vendors seem to be happy with this arrangement. It could be better, though. Express Order suffers because of past Radio Shack policy. Some third-party vendors are hesitant to become involved because of the red tape associated with a previous third-party software program. Vendors who submitted software to the older program faced long waits for responses and little chance of success. Also, since Tandy/Radio Shack discouraged its stores from stocking or even acknowledging non-Radio Shack software in the past, some store managers are wary of Express Order and do not promote it to the extent that Fort Worth would like.

There has been a change of philosophy at the Tandy Towers; Express Order is taken seriously as a customer service and a selling point for the Color Computer. Vendors are encouraged to submit software. Not everything will be accepted, but there are Color Computer products yet to be submitted that are excellent candidates for Express Order.

Fort Worth has recently encouraged its store managers to promote Express Order. After all, it is not a charity service; its stores do receive revenue for selling an Express Order package. You can help, though, by supporting Express Order at your local Radio Shack store. If you have used Express Order, drop us a line and tell us your impressions.

Vendors who would like more information on Express Order should write: Express Order Software, 1300 One Tandy Center, Fort Worth, TX 76102.

Express Order is a progressive step for the Color Computer and further indication that Tandy/Radio Shack is willing to emphasize service while its competitors ignore it.—*Michael E. Nadeau*■

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

Back Issues

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

June 1983—The CoCo word processor; a serial-to-parallel interface project; and the adventure, Cavehunt.
July 1983—How to upgrade your CoCo to 64K; cure video RFI.
August 1983—Speech synthesis via software; get more colors; build a color monitor driver.
September 1983—Disk utilities; hi-res character generator.
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.
January 1984—Programs for the businessman and investor; ins and outs of database management.
February 1984—CoCo-aided circuit design; simulate Extended Basic in Color Basic; change your CoCo's vocabulary.
March 1984—How a disk stores information; create your own wordsearch puzzles; dental/medical bill balancer.
April 1984—Peripherals buyer's guide; how to shop for a disk drive; disk-fix utility; Lisp interpreter.
May 1984—OS-9 review; financial transactions tracker; homebrew spelling checker; CoCo Reversi game.
June 1984—Horse-racing and stock-market simulators.
July 1984—Do-it-yourself lowercase mod; variable cross-referencer; the game, Python.
August 1984—Basic-09 review; database manager program; graphics tutorials; hurricane tracker.
September 1984—Educational software buyer's guide; typing-teacher program; the CoCo as a marketing aid.
October 1984—A collection of sounds for your CoCo; how to make programs auto-execute; printer spooler.
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.

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 fee. Send your orders to *HOT CoCo*, Attn. Back Issue Orders, 80 Pine St., Peterborough, NH 03458.■

Instant CoCo Directory

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.

Side A

Article Name/Author/Description	Page #	File Name	System
Copyright Statement	---	TITLE	All
Printer Answers/Esposito and Jackson Get hi-res screen dumps on virtually any dot-matrix printer.	24	VERSADUMP	16K ECB
Colorful Cap'n Chemistry/Wood Learn the element table.	35	CAPCHEM VALENCE	16K CB
Expense Reports Made Easy/Wasserman Keep track of what you spend when away on business.	38	EXPRPT	32K DECB
Don't Print There!/Dunn Show your printer how to skip perforations.	48	16K AUTO 32K AUTO	16K ECB 32K ECB

Side B

CoCo Cassette Controller/Nicolettos Gain one-key control of your cassette recorder from your keyboard.	50	COCOCASS	16K ECB
Color Code Challenge Master Mind for the CoCo.	54	COLCODE	4K CB
Three Little Utilities/Miller Lighten up your programming chores.	56	REMOVE(m) RDUMP(m) SCRDMP(m)	16K ECB
Mindbusters/Ramella Face the challenge of Knight's Tour.	62	KNIGHT	16K ECB
Doctor ASCII/Esposito and Jackson Change the stepping rate of your disk drives.	90	DISKPOKE	64K DECB

Bonus Program

Viper Force/Fulp Fly the Army's experimental helicopter to defeat alien invaders.	---	VIPER	32K ECB

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

See List of Advertisers on page 89

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 (LPVII/VIII, 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-4 PM PST). Dealer inquiries invited.

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.

How to Use *HOT CoCo*

Each month, *HOT CoCo* provides program listings for you to type into your Color Computer and use. If you are new to computing, read this page for advice that will help you avoid problems often encountered when entering programs manually.

Know the Basics

Before you begin, you should be familiar with the basic operation of your Color Computer. Read the manual and make sure you understand how to enter a program line, save a program to cassette or disk, and make corrections to a program line. The Color Computer manuals are well written, and you will enjoy your CoCo much more if you've read them.

Check the Requirements

The first thing you should do is make sure that the program you want to enter will run on your version of the Color Computer. You need to know the memory requirements, the type of Basic used (Color, Micro Color, Extended Color, or Disk Extended Color Basic), what peripherals might be needed, and in some cases whether a particular ROM version is needed. (See below for an explanation of the different ROMs.)

All this information is provided in the System Requirements box included with each article that has a program listing. This box gives the minimum requirements to use the program. If, for instance, the box reads "16K RAM, Color Basic," the program should also work on 32K or higher, Extended or Disk Extended Color Basic CoCos.

Once you've established that the program will work on your CoCo, read the article thoroughly. Sometimes it will include information vital to typing in the listing.

What You See Is What You Get

We print all Basic program listings 32 characters across—just as they appear on your video screen. Type in the listing exactly as it appears in the magazine, being particularly careful with spaces and punctuation. If you do this, the 32-character format will aid in proofreading what you have typed in by letting you match beginning and ending characters on corresponding lines. If you have a line that ends on a character other than what appears in the magazine, go back and check for a typo.

Common Errors

Some characters are easier to confuse than others when you are typing in program listings. And since your Color Computer interprets everything literally, the smallest error can crash a program. Below is a list of characters commonly confused with one another:

zero and the letter O
colon and semicolon
lowercase l and the numeral one
uppercase B and the numeral eight

Weird Characters

The up arrow indicates exponentiation on the Color Computer. Unfortunately, most printers do not have an up arrow. Our printer prints a caret (^) instead. Be sure to type an up arrow in place of all carets in Basic program listings.

Assembly-Language Listings

HOT CoCo often publishes programs written in Assembly language rather than Basic. Assembly listings "talk" to your computer on a much more direct level; Basic requires some translation before your CoCo can execute it. Therefore, Assembly works much faster than Basic. Unfortunately, it is more difficult to learn Assembly-language programming than Basic programming.

But you do not need to know how to program in Assembly to use these programs. You do need, however, something called an editor/assembler. An editor/assembler allows you to manually enter an Assembly listing, and then it "assembles" it into a form that your CoCo can execute. Since editor/assemblers can cost as much as $80, you probably don't need one unless you want to learn Assembly-language programming.

It is possible to hand assemble an Assembly listing, but this is a tedious process that is best left to someone with a little experience with Assembly programming. It also requires a short Basic routine that prepares your CoCo for hand assembly.

We convert some Assembly programs to Basic DATA statements and include a short Basic routine to load and execute the DATA statements. This gives you a program that you can type in just like a Basic listing, yet it operates much like one written in Assembly.

If you want to run one of *HOT CoCo*'s Assembly listings, but it hasn't been converted to DATA statements and you do not own an editor/assembler, check to see if the program is included on our Instant CoCo cassette. All Assembly programs on Instant CoCo are in assembled form, meaning you can load and execute them immediately.

Speaking of DATA Statements

Since DATA statements often consist of numbers only, it is easy to make a mistake typing them in. One wrong number can crash the program or lock up your machine. When this happens, the only way to recover is often to turn off the computer for a few seconds and then turn it back on. Of course, this wipes out your program in memory.

To avoid this, always save what you have typed in before running it. That way, if you did make a mistake, you can load the program from tape or disk to look for the error, rather than retyping the entire listing.

One last thing about DATA statements: Error messages that occur due to a mistyped DATA statement line will refer to the corresponding READ statement line earlier in the program. Yet it is the DATA statement that is incorrect.

If All Else Fails

If you cannot get your typed-in listing to run after checking and double-checking for typos, you can ask us for help. Send a detailed description of your problem along with any error messages given. Ideally we'd like a printout of what you typed. Send a self-addressed, stamped envelope for the fastest reply. Sorry, but we cannot help you if you have modified the original program in any way. Write to ***HOT CoCo*, attn. Technical Editor, 80 Pine St., Peterborough, NH 03458.**

Different ROMs

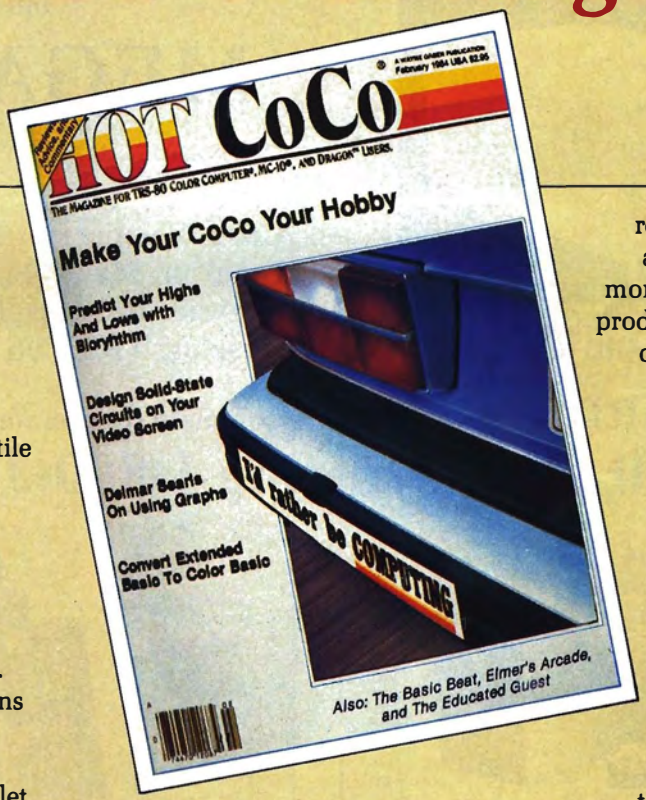
Radio Shack has updated the Basic ROMs in the Color Computer several times since it was introduced. Below is a list of the ROMs and the problems and benefits you might encounter with each one:

- Color Basic 1.0—Cannot fully use the 64K upgrade and has only a 7-bit serial printer routine, which inhibits sending graphics data to a printer.
- Color Basic 1.1—Fully supports 64K and has an 8-bit serial printer routine for graphics.
- Color Basic 1.2—Executes code faster than previous versions, but changed the way the ROM reads the keyboard. This makes some software written for the older ROMs incompatible with the 1.2 ROM. There is a simple fix, which *HOT CoCo* incorporates into every program in which this problem is encountered.

If you don't know what Color Basic ROM version you have, type EXEC 41175 after you first turn on your computer. The ROM version will be printed on the screen.

- Extended Basic 1.0—Has bugs in the PCLEAR, PRINT USING, and DLOAD statements.
- Extended Basic 1.1—Fixes the abovementioned bugs.
- Disk Basic 1.0—This is in the disk controller cartridge used with the grey CoCos and grey disk drives. The 1.0 Disk ROM is incompatible with the white 64K CoCos and CoCo 2s.
- Disk Basic 1.1—Works faster than 1.0, but you can use the 1.1 Disk Basic controller with the older, grey CoCos. Also, many routines have been moved, making some programs written using the 1.0 Disk ROM incompatible with the 1.1 ROM. (See "A Quick Fix for Your Disk ROM," by Mike Meehan, *HOT CoCo*, February 1985, p. 44, for a utility that overcomes this incompatibility in most cases.)■

Now you can learn how to use your Color Computer for more than just games . . . with HOT CoCo magazine.



With the right information on programming utilities, debugging, and graphics there's no limit to what you can do with your Color Computer. **HOT CoCo** gives you that information. It can make your computer a versatile tool that you'll find indispensible. **HOT CoCo** is packed with:

- **Business application programs**—to help you understand what the Color Computer can do at the office. You can use these applications immediately because they're written in plain English.
- **Home management help**—let **HOT CoCo** show you how everyday chores can be done on your machine. You'll be surprised at just what you can do and just how much time can be saved with your Color Computer.
- **Programming tips & tutorials**—**HOT CoCo** will show you how to program. It's loaded with programming techniques and hints to help the novice and expert programmer write and improve their programs.
- **New product reviews & announcements**—if you're looking for equipment to expand the use of your computer, **HOT CoCo** reviews numerous hardware and software products each month. Plus, **HOT CoCo**'s new product announcements let you comparison shop at home—spend more time at your computer and less time in computer stores.

And **HOT CoCo** is loaded with challenging games to provide hours of fun and excitement for your whole family.

Let **HOT CoCo** show you how much time you can save with your Color Computer. Order **HOT CoCo** today! Take advantage of this money-saving offer. Get 12 issues of **HOT CoCo** for only $24.97. Use the attached order card, the coupon, or call

TOLL FREE 1-800-258-5473.
IN NH CALL 1-924-9471.

☐ ***YES! I want more use from my CoCo!***

Send me 12 issues of **HOT CoCo** for the low subscription price of $24.97. I'll save 30% off the newsstand price!

☐ *Check Enclosed* ☐ *Bill Me*

Name _____

Address _____

City _____ *State* _____

Zip _____

Canada & Mexico $27.97, 1 year only, US funds drawn on US bank.
Foreign Surface $44.97, 1 year only, US funds drawn on US bank.
Foreign airmail please inquire. Please allow 6–8 weeks for delivery.

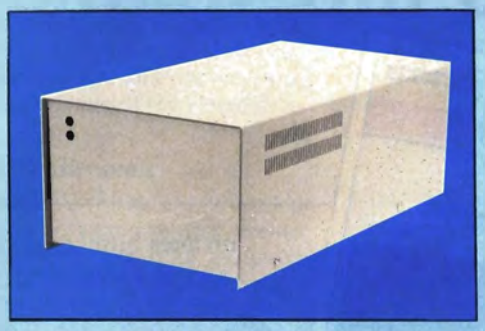
HOT CoCo • PO Box 975 • Farmingdale, NY 11737 353B4

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

PRICE BREAKTHROUGH

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

Super Sale on New Hard Drives



Introducing

MEGADISK™

Winchester Hard Drive ready to run on the TRS 80 Model I/III/IV/4P, Color Computer, I.B.M.-PC, Apple, Franklin, Max/80.
Software Drivers: LDOS, NewDos/80, Dosplus, TRSDOS 6.0, CP/M

CALL FOR NEW LOW PRICE

Warranty - One Full Year

DRIVE A HARD BARGAIN™ **Complete systems starting at $699.95**

Call Toll Free Ordering 1-800-343-8841

High Quality Lowest Price
Drive 0, 1, 2, 3
for the
Color Computer
Starting at ~~$199.95~~ CALL FOR NEW LOW PRICE

Disk Drive Upgrade
for Model III/IV easy to install system
Starting at ~~$309.95~~ CALL FOR NEW LOW PRICE

SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425
Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10:00 am to 3:30 pm

DEALER INQUIRIES INVITED.

TERMS:
M.C./Visa/Amex and personal checks accepted at no extra charge.
C.O.D., please add $3.00.
Shipping: Please call for amount.
Not responsible for typographical errors.
Prices subject to change.

CANADA
MICRO R.G.S. INC.
751, CARRE VICTORIA, SUITE 403
MONTREAL, QUEBEC, CANADA, H2Y 2J3
Regular Tel. (514) 287-1563
Canadian Toll Free 800-361-5155

Service! Service!

All in stock products are shipped within 24 hours of order. Repair/Warranty service is performed within 24 hours of receipt unless otherwise noted. We accept C.O.D., foreign and APO orders. School and D&B corporate P.O.s accepted.

TRS/80 Registered Trademark Tandy Corp. Apple Registered Trademark Apple Computer Corp
IBM-PC Registered IBM Corp. Franklin Registered Trademark Franklin Corp. Max/80 Registered Trademark Lobo Int.
LDOS Reg. Logical System Inc. Dosplus - Micro Systems Software Newdos/80 - Apparat Inc.

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

PRICE BREAKTHROUGH

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

MEGADISK™ HARD DISK DRIVE SYSTEMS

TOLL FREE ORDERING 1-800-343-8841

For the **IBM/PC**, Tandy 1000, **TRS/80 Models I/III/IV/4P**, Compaq, Eagle, Sanyo, Tava, PC Workalikes, **Color Computers**, Apple/Franklin, Heath/Zenith, Max/80
Complete with Hardware, Cables, Software and Quikfit Installation

5 Megabytes Internal Mount	starting at	$ 449.95
10 Megabytes Internal Mount	starting at	599.95
20 Megabytes Internal Mount	starting at	1,199.95
5 Megabytes External System	starting at	649.95
10 Megabytes External System	starting at	849.95
20 Megabytes External System	starting at	1,299.95
3.3 Megabytes Kodak Backup System	starting at	599.95
Streaming Tape Backup System	starting at	899.95

DOS Systems Available: IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, or later — Apple Franklin — DOS 3.3, Prodos
TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus, CP/M, COCO DOS, Max/80 LDOS, OS9

WARRANTIED FOR ONE FULL YEAR — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841

FLOPPY DISK DRIVES

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 years parts and labor. Warranty on floppy disk drive power supplies is five (5) years. In warranty or out of warranty service is 24 hour turn-a-round on all disk drives.

Tandon — Full Height Drives		
100-1	Single Sided 40 tk Bare	$128.00
	In Case with Power Supply	169.95
	Dual Drives in One Cabinet	329.95
100-2	Dual Sided 40 tk Bare	165.00
	In Case with Power Supply	209.95
	Dual Drives in One Cabinet	384.95
	Half High Drives	
65-1	Single Sided 40 tk Bare	125.00
	In Case with Power Supply	159.95
	Dual Drives in One Cabinet	309.95
65-2	**Dual Sided 40 tk Bare**	**145.00**
	In Case with Power Supply	**179.95**
	Dual Drives in One Cabinet	**349.95**
65-4	Dual Sided 80 tk Bare	165.00
	In Case with Power Supply	199.95
	Dual Drives in One Cabinet	359.95
TEAC Half High Drives		
55A	Single Sided 40 tk Bare	140.00
	In Case with Power Supply	169.95
	Dual Drives in One Cabinet	319.95
55B	Dual Sided 40 tk Bare	160.00
	In Case with Power Supply	199.95
	Dual Drives in One Cabinet	359.95
55F	Dual Sided 80 tk Bare	180.00
	In Case with Power Supply	219.95
	Dual Drives	389.95
Apple/Franklin Disk Drives		
	35/40 Track in Case with Cable and Software	159.95
	Controller Card for Two Disk Drives	49.95
	Combination Price for Disk Drive and Controller	199.95
Commodore Disk Drives		239.95

COLOR COMPUTER DISK DRIVE SYSTEMS AND ADD IN PRODUCTS

40 Track Single Head Drive with Case, Power Supply, Cable Controller, Instruction Booklet, Diskettes	$279.95
Above with Dual Drives in One Cabinet	413.95
40 Track Dual Head with Case, Power Supply, Cable, Controller, Instruction Booklet, Diskettes	**289.95**
Above with Dual Drives in One Cabinet	**429.95**
128 Memory Upgrade Kit	129.95
Dual DOS Switch	19.95
With Second DOS System — JDOS, RSDOS, Micro DOS	48.00

TRS/80 HARDWARE

Model I Starter System — Delivered by UPS One Single Sided Disk Drive, Case, Cable, Power Supply, TRSDOS 1.3 and Manual	**$220.00**
Model III/IV Easy	309.95
Memory Upgrades — 4116 and 4164	starting at 1.50 ea.

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

COMPUTERS

All of our computers come with a full one year Warranty — Parts and Labor — 24 Hour Service on all in stock parts.

IBM/PC-256K Two Floppy Drives, One Year Warranty	$1,895.00
With Monitor Card and High Resolution Monitor	2,195.00
IBM/PC-256K 5 Megabyte Drive, One Floppy Drive	2,495.00
With Monitor Card and Monochrome Monitor	2,695.00
10 Megabyte System	2,695.00
With Monitor Card and Monochrome Monitor	2,995.00
IBM Lookalike Monitor 800h x 650v resolution w/cable	199.00
TRS/80 Model IV Computer 128K Dual Drive RS232	1,095.00

PRINTERS

Dot Matrix		
Star Micronics		
Gemini X-Series Parallel 120 CPS	starting at	$259.95
Delta 10/15 160 CPS	starting at	424.95
Radix 10/15 200 CPS	starting at	649.95
Panasonic 1090		249.95
Daisy Wheel		
Silver Reed 440 80 Column 12 CPS		315.95
550 132 Column 19 CPS		439.95
770 132 Column 36 CPS		895.00
Olympia 132 Column 14 CPS with Form and Tractor		399.95
Star Micronics 100 Column 18 CPS		352.95
Apple/Franklin Printer Interface w/Graphics and Cable		84.95
Printer Cables	starting at	19.95
Printer Paper — Microperf Edge 1000 Sheets		16.95

ELECTRICAL

Surge Protectors — Line Filters — SL Waber — 6 Outlets with Switch	$ 39.95
Uninterruptable Power Supplies — Panamax 250 Watt-15 Minute	399.95

MODEMS

Volksmodem 300 Baud	$ 59.95
Signalman Mark X Autodial	123.95
Mark XII 1200/300 Baud Autodial	284.95

ADD IN BOARDS FOR THE IBM

STB — Rio Plus 128K	$299.95
Super Rio 128K	219.95
Graphix Plus	283.00
Graphics Plus II	355.00
Parallel Printer Port	74.95
Serial Port	84.95
Monochrome Board with Parallel Printer Port	210.00
Quadram — Quadboard 512 128K	269.95
Quadcolor I	215.95
Quadcolor II	439.95

MISCELLANEOUS

Diskettes in 10 Pack	**from $ 12.95**
Twoprint Switches	from 99.95
Disk Drive Cables	from 16.00
Maintenance Cleaning Kits	12.00
Parallel Printer Buffers 16K	149.95
Floppy Disk Drive Cables	
1 Driv	16.00
2 Drives	18.95
Heath/Zenith 2 Drive Cables — Shielded	39.95

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 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday.

WARRANTIES — Disk Drives — 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. Price Changes Occur On A Daily Basis. Please Call

Toll Free 1-800-343-8841

For Our Latest Price Saving Specials.

Get Our Revolutionary Color Ink-Jet Printer

TURN YOUR BEST DISPLAYS INTO PERMANENT WORKS OF ART

Add the Advanced Technology CGP-220 Ink-Jet Printer to your computer system and enjoy printed text and graphics in up to seven different colors.

Print High-Quality Color Graphics

This whisper-quiet performer can take advantage of the Color Computer screen print utility to give you spectacular multi-color printouts of color graphics produced from any graphics program. Get beautiful full-color charts, graphs and diagrams, even detailed drawings in seconds!

The CGP-220 is ideal for business, engineering or just having fun printing your own computer-generated "doodles".

Top-Performance Features

The CGP-220 prints 2600 dots per second in the graphics mode with a resolution of 640 dots per inch (multi-color mode). The text mode gives you 12 character per inch at 37 characters per second in a 7 × 5 dot matrix.

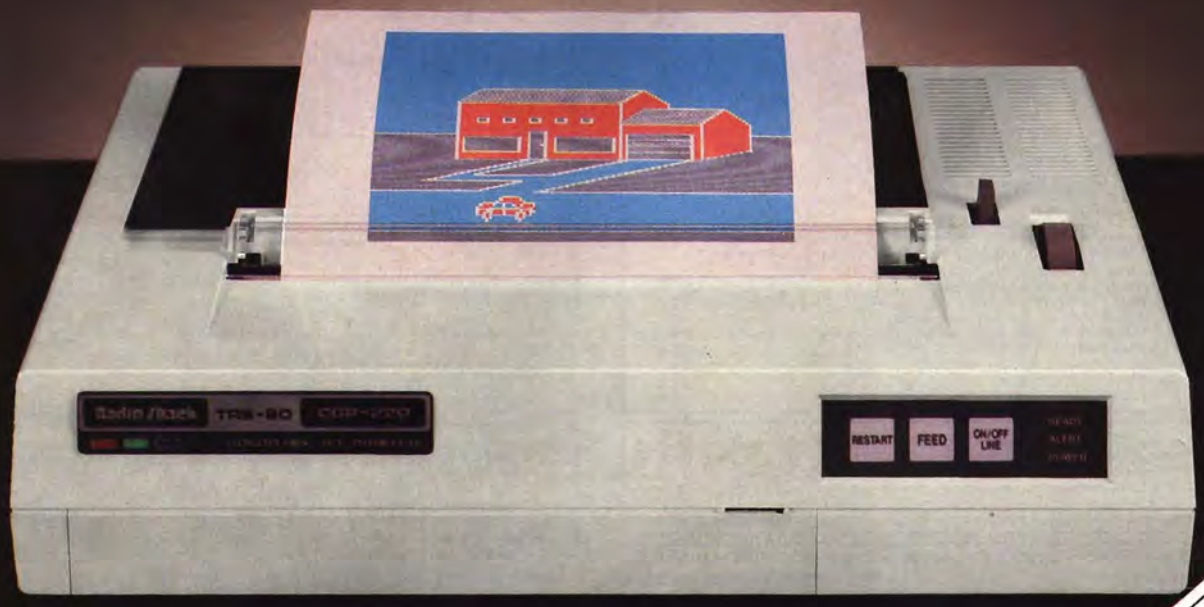
Pop-in ink packs are easy to remove. Replacement ink packs are available separately for black and color. Prints on 8½" paper. Selectable parallel and Color Computer-compatible serial interfaces (600/24000 baud).

Stop by your local Radio Shack Computer Center and get your CGP-220 Color Ink-Jet printer today! (26-1268, $699.)

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

Circle Reader Service card #4



TANDY Radio Shack ADVANCED TECHNOLOGY SERIES ...AND AFFORDABLE TOO ™

Engineered for Excellence

Radio Shack has introduced the latest in electronic technology for over 60 years. The CGP-220 is a true price breakthrough in color ink-jet print technology.

Price applies at Radio Shack Computer Centers and at participating stores and dealers

Send Me a New 1985 Computer Catalog!
Mail To: Radio Shack, Dept. 85-A-938, 300 One Tandy Center, Fort Worth, Texas 76102

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

Letters to the Editor

A Hot CoCo Tip

The December 1984 issue of *HOT CoCo* has two good articles on disk drive first aid, but both left out a tip I feel might help your readers.

Using an RPM check program required adjusting my drive up one speed one time and down in speed the next time I used it. Taking the drive to Radio Shack involved a service charge to discover that everything tested out okay. The speed fluctuations got worse, and finally, I realized the problem had to be the belt and pulleys or the motor. Simply cleaning the belt and pulleys with alcohol on a cotton swab solved my I/O problems and my drive's speed fluctuations.

My advice is always to start with the simple things first. When you have I/O errors with your disk drive, first try cleaning the contacts. If that doesn't solve the problem, clean the belt drive and pulleys. With an RPM test program like the one in December's *HOT CoCo,* this type of speed problem is easy to see. After cleaning the drive belt and pulleys, then adjust the speed at the spindle control, if necessary.

This simple maintenance tip might save you many frustrating hours and unnecessary repair bills.

Norman Karl Schmidt
Tampa, FL

Keyboards Blues Gone

I had trouble with the keyboard on my CoCo due to dust, fine sand, and no cover. I read Bruce Goshorn's article in the December 1984 issue ("End Those Keyboard Blues," p. 30). I did everything he said to do, including using the eraser on the PC board.

When I put it back together again, I had all kinds of strange reactions on the keyboard. The I came up O, the Q came up P, the Y came up X, and so on. I checked everything over, and the only thing I could figure was that the eraser had left a residue on the board.

I took it apart again and used a fine steel wool to reclean the contacts on the board. Now everything works perfectly. The article was a good piece, and without it, I probably wouldn't have attempted to take the board apart. Keep up the good stories.

Alan R. MacHattie
Scotia, NY

Croaker for 16K

I read in "Anatomy of an Assembly-Language Game" (*HOT CoCo*, December 1984, p.70) that it would take 32K to assemble Croaker. Although I have only 16K, I decided to try to assemble it anyway. I assembled all six parts, appended the parts, and ran the program without any problems. Please pass this on to other 16K readers.

I really like your magazine. This is one of the best articles so far. Keep up the good work!

Paul N. Naylor
Salt Lake City, UT

Simple Joystick Test

If your house is like mine, you're familiar with the situation that arises when the game players have problems. Quite often, the blame falls on the poor, unrepresented joystick. I wrote this simple program (Program Listing 1) to prove that perhaps you don't need to replace the sticks, and that between Radio Shack, Atari, Hayes, and the neighbors, we need to work on skills other than those that involve purchasing.

The program is fundamental at best but can be useful even to the youngest of operators. As the menu shows, section 1 checks the fire button, both single and rapid, and has been helpful in checking out the Colorcade module. Section 2 tests the directional feel of each stick. For those with an analytical bent, section 3 returns the values of JOYSTK(0) AND (1), the X and Y coordinates. The program operates from the right port. It checks joysticks and not computers, and those without Extended Color Basic should change the PLAY command in line 150 to a value of SOUND XXX,X. Use the space bar to return to the menu from each section.

```
10 CLS0
20 PRINT@32,"THIS PROGRAM TESTS
THE JOYSTICKS";
30 PRINT:PRINT"     (1) FIRE BUTT
ON"
40 PRINT:PRINT"     (2) STICK CON
TROL"
50 PRINT:?PRINT"    (3) STICK VAL
UES"
60 PRINT:PRINT"SPACE BAR RETURNS
 TO MENU"
70 PRINT@489,"WHICH ONE (1-3)";
80 A$=INKEY$:IF A$="" THEN80
90 A=VAL(A$):ON A GOTO110,160,24
0
100 GOTO 80
110 CLS3
120 IF PEEK(65280)=126 OR PEEK(6
5280)=254 THEN 150
130 IF INKEY$=CHR$(32) THEN10
140 CLS3:GOTO120
150 CLS8:PLAY"O1;L4;T50;V30;D;E;
F;G;E":GOTO120
160 CLS0
170 IF JOYSTK(0)<16THEN PRINT@22
4,"LEFT";:SOUND160,1:GOTO200
180 IF JOYSTK(0)>48 THEN PRINT@2
51,"RIGHT";:SOUND140,1:GOTO200
190 CLS0
200 IF JOYSTK(1)<16 THEN PRINT@1
5,"UP";:SOUND180,1:GOTO160
210 IF JOYSTK(1)>48THEN PRINT@49
4,"DOWN";:SOUND20,1:GOTO160
220 IF INKEY$=CHR$(32) THEN 10
230 GOTO 160
240 CLS
250 PRINT@448,"X=HORIZONTAL (L/R
) (0-63)"
260 PRINT@480,"Y=VERTICAL (U/D)
(0-63)"
270 H=JOYSTK(0)
280 V=JOYSTK(1)
290 PRINT@234,"Y ="V
300 PRINT@10,"X ="H
310 IF INKEY$=CHR$(32) THEN10
320 GOTO 270
```

Program Listing 1. Simple Joystick Test

Michael E. Fahy
Central City, UT

To Edit or Not to Edit

I typed in the word-processing program in the December 1984 issue ("To Edit or Not to Edit," p. 58). I had been using the word-processing program that appeared in the June 1983 issue of *HOT CoCo*. The new program took a little getting used to, but I am especially pleased with its features such as the move, copy, and add functions. I like the margins in the add function, as I can tell how much more I can type on a line.

Here are some changes I've made to the program:

```
1230 PRINT@488, "PRESS ANY KEY";
1235 I$ = INKEY:IF I$ = "" THEN 1235 ELSE
     CLS
```

The term "CURSOR" in line 2060 confused me so I changed it to "CURS POS" to indicate current position.

Bill Reed
Nashville, TN

Homespread Help

A bug in my program, Homespread (*HOT CoCo*, January 1985, p. 30), crops up when you reach position 100 during formula entry. The program seems to truncate the position tag to two digits on the strings that define the formulas. The following changes not only correct that problem, they also fix a bug that put an unwanted character at position H1 after you enter data into the spreadsheet.

Make the following line changes:

```
955  PRINT@448," ":FOR X = 1TOF: IF
     VAL(RIGHT$(FT$(X),ND)) = RL THEN
     956 ELSE 957
2540 FOR X = 1 TO Z - 1:FT$(F) = FT$(F) +
     FI$(X):NEXT X
2850 IF LEN(FT$(W)) > 12 THEN2860 ELSE
     2900
2920 RS = VAL(RIGHT$(FT$(W),ND))
```

Add the following lines:

```
2541 IF RL < 100 THEN 2542 ELSE 2543
2542 FT$(F) = FT$(F) + "@" + STR$(RL):
     GOTO2600
2543 FT$(F) = FT$(F) + "#" + STR$(RL):
     GOTO2600
2903 K$ = "@":IF INSTR(FT$(W),K$)
     < >0 THEN 2904 ELSE 2905
2904 ND = 2:GOTO2920
2905 ND = 3
5120 FR = FR - 1
```

Adrian Rose
Sparta, NJ

Letters to the Editor

Color Disk Fix

I found Howard Bassen's review of Color Disk ESTASM (*HOT CoCo,* November 1984, p. 26) to be quite informative. However, he neglected to mention one possible fix for those users who dislike the paper-wasting string of numbers that follow any FCC listing.

After loading EDTASM, simply enter ZBug, type 3C04/39, and then return to the editor, and programs will assemble as usual, but the string of number (except for the first) will no longer print, either on screen or paper.

Jim Brooks
Hays, KS

Unrelated Comments

Here are three unrelated comments that readers may find of interest.

Larry Allen is the boss of the MC-10 User's Group at P.O. Box 103, Owensville, IN 47665. He does a good job of putting out a newsletter, maintaining a program library, and answering mail promptly.

The Python game (*HOT CoCo*, July 1984, p. 63) seems quite popular. The joystick mode as suggested by M. Leduc in the December issue can be incorporated into the program as ELSE statements in lines 350-380, and renumber his program changes in lines 340 and 342 to 341 and 342. This provides either joystick or keyboard, and if it slows the game down too much, you can use the high-speed POKE 69495,0. If you change the 20 to a 10 in line 670, you can hang in there after a slow start and get very high scores (our high score is 13764).

I use the Color Connection from Computerware every day with pleasure. I wish the buffer were larger then 18K, but I can live with it. In the little printer utility program in the manual, I changed line 210 from INPUT to LINE INPUT to avoid FD errors when copying to screen or printer.

Michael E. Fahy
Central City, PA

Northward Move

Southern Software Systems recently relocated its operation slightly to the north. After many years in the Florida sun, our new address is: Southern Software Systems, 1835 Chimney Lane, Suite 1A, Kettering, OH 45440 (513-435-1940).

Thomas J. Ernst, Owner
Southern Software Systems

QType Improved

Program Listing 2 is a new version of QType provided by Robert E. Cutter. It should make the original program ("QType," HOT CoCo, November 1984, p.30) faster for speedy typists, eliminate losing the TAB locations when using the repeat option, and result in single-spaced text.

Ignore the underline in line 40. The arrow pointing to the left is CHR$(95) and is generated by holding down the shift key and then pressing the up-arrow key.—eds.

```
10 POKE282,0:CLEAR5000:DIMC$(100
),T(100)
20 X=1:CLS:INPUT"MAX NO CHARACTE
RS PER LINE =";Y:CLS:IF Y=<0 THE
NY=64
30 POKE65495,0:PRINT@0,K+T(X)"/"
Y-K-T(X);:PRINT@23,"LINE"X;
40 PRINT@33,"TAB='←'
 REPEAT='↑'";
50 IFK=0THENPRINT@(96+T(X)),CHR$
(207)
60 Q$=INKEY$:IF Q$="" THEN60
70 IF Q$=CHR$(9)THEN 60
80 IF Q$=CHR$(94)THEN280
90 IF Q$=CHR$(95)THEN290
100 IF Q$=CHR$(13)THEN230
110 A$=Q$
120 V=ASC(A$):IF V>96ANDV<123THE
NV=V-32:GOTO140
130 IFV<91ANDV>64THENV=V+32
140 PRINT@(96+K+T(X)),CHR$(V);CH
R$(207)
150 K=K+1:IF K>Y-4 AND K<Y-1 THE
NSOUND200,1
160 IF A$=CHR$(8)ANDK<2THENA$=""
:K=K-1:GOTO30
170 IF A$=CHR$(8)THENGOSUB240:K=
K-2
180 IF K+T(X)<0 THENK=0:A$=""
190 IF K+T(X)>Y THEN K=Y:GOSUB26
0
200 IF K+T(X)=>Y-1 THEN SOUND30,
1
210 IF K+T(X)=>Y THEN SOUND 30,3
0
220 B$=B$+A$:GOTO30
230 POKE65494,0:CLS:PRINT#-2,TAB
(T(X));B$:C$(X)=B$:X=X+1:B$="":Q
$="":T(X)=0:K=0:GOTO30
240 N$=LEFT$(B$,K-2)
250 B$=N$:A$="":RETURN
260 N$=LEFT$(B$,K)
270 B$=N$:A$="":RETURN
280 POKE65494,0:FORZ=1TOX-1:PRIN
T#-2,TAB(T(Z));C$(Z):NEXT:Q$="":
GOTO30
290 IF K>0THEN30
300 PRINT@294,"":INPUT"ENTER TAB
 POSITION";T(X):Q$="":GOTO30
310 END
```

Program Listing 2. QType

Database Manager Bug

The December 1984 *HOT CoCo* had a useful program, "Database Manager" (p. 48). However, one command was omitted and the program has one minor bug.

The "P" command was omitted from Table 3, Record Prompt Definitions (p. 50). "P" is used for "previous" extensively throughout the program, but in this case it represents "PRINT" (hardcopy).

The program as written doesn't skip over page perforations properly. The solution to this is in the last sentence on p. 51. "Each column is equal to the width of the field or the width of the variable name, whichever is larger, plus two." This is line 2470 of the program. It does not add the two additional characters. The line should be changed as follows:

```
2470 IF LEN(F$(I))>L(I) THEN TB(I)=
     LEN(F$(I))+2 ELSE TB(I)=L(I)+2
```

The program doesn't compensate for the title and field titles printed at the top of each page. This can be corrected by adding "LX = 1" to the end of line 2240 and changing the "LX = 0" in line 2330 to "LX = 1". Change the loop in line 2440 from "FOR I = 1 TO 3" to "FOR I = 1 TO 4". In line 2290, change "(TB(I)" to "((TB(I) – 2)", and in line 2390, change "(TB(II)" to "((TB(II) – 2)".

If you are using a printer that supports condensed type (132 columns) as I do, change the "80" in line 2500 to "132".

A. Arnold Weiss
Philadelphia, PA

Print French Accents

I was glad to see Damon Swanson's "New Tricks For Disk Scripsit" in the December 1984 issue of *HOT CoCo*. I was looking for a way to have Scripsit print the French accents on my printer ($7C for cedilla and $7E for accent circumflex). Though it takes eight to 10 keystrokes each time I want to insert a character, it's well worth the time to be able to add those characters to the text. This method of adding characters to Disk Scripsit also works the same way for the ROM Color Scripsit.

Paul G. Hache
Amos, Quebec

Send your letters to Letter to the Editor, HOT CoCo, *80 Pine St., Peterborough, NH 03458.*

User's Group Update

Last month we published a list of user's groups from all over the world. Since then, we've received a number of updates, which are listed here:

State	Group Name	Address	City	Zip	#Members	Just CoCo?	Dues?	Contact	Phone
CA	Color America	2227 Canyon Rd.	Arcadia	91006	300	Y	Y	Mark Randall	818-331-7903
CA	Forth Interest Group	P.O. Box 8231	San Jose	95155	3500	N	Y	Linda Kahn	415-962-8653
CD	Micro-80 Computer Club of Ottawa	150 Metcalfe, Suite 409	Ottawa, Ont.	K2P 1P1	160	N	Y	George Armstrong	613-236-7026

Letters to the Editor

State	Group Name	Address	City	Zip	#Members	Just CoCo?	Dues?	Contact	Phone
CD	Regina Operators of Microcomputers	1112 College Ave.	Regina, SK.	S4P 1A8	54	N	Y	R.W. Moffatt	522-8808
CD	Winnipeg Micro 80 User's Group	884 Ash St.	Winnipeg, Man.	R3N 0R9	80	N	Y	Mel Seder	284-0376
CD	Niagra Regional CoCo Club	7707 Jubilee Dr.	Niagra Falls, Ont.	L2G 7J3	132	Y	Y	Gerry Chamberland	416-357-3462
GA	OCOCO	404 Pine Tree Circle	Decatur	30032		Y	Y	David Gresch	404-396-5395
IL	Peoria Color Computer Club	418 La Kemper Dr.	Metamora	61548	55	N	Y	Larry Parker	309-383-4312
IN	Indy Color Computer Club	P.O. Box 20432	Indianapolis	46220	146	Y	N	Mike Davis	317-542-9800
KS	The Color Computer Club	c/o Rivco 1205 N. Mosley	Wichita	67214	100	Y	Y	Rex Rivers	316-264-9193
MA	The Boston Computer Society	One Center Plaza	Boston	02108	732	N	Y	Rick Mangekian	617-367-8080
MI	Educational Recreation Club (ERCC)	P.O. Box 325	Owosso	48867	35	N	Y		
MI	Petoskey Area CC Club (PAC3)	670 Liegl Dr.	Alanson	49706	21	Y	Y	Dennis Hoshield	616-347-0607
NJ	Microcomputing Newsletter	1371 White Oak Bottom Rd.	Toms River	08753	8	Y	Y	Mickey Zsoldos, Jr.	
NY	Adirondack CoCo Club, Albany Chap.	Box 4214	Albany	12204		Y	Y	Ron Fish	518-465-9793
OH	Color Computer Club	P.O. Box 478	Canfield	44406	180	Y	Y	Mike Kosmo	216-792-3772
VA	Northern VA Color Computer Club	4202 Evergreen Dr.	Dale City	22193	45	Y	Y	Fred Scoville	703-670-3820
WI	Pro-Color-File National UG	12851 W. Balboa Dr.	New Berlin	53151	210	Y	Y	Jorge Mir	414-425-8810
WV	Mountain State CoCo User's Group	P.O. Box 180	Morgantown	26507	30	Y	Y		

Circle Reader Service card #214

You're in good company...

These are some of our other valued customers

ADM Technology, Inc.
AT&T Technologies
Bethel College
E.I. DuPont
Florida International University
Georgia-Pacific Corporation
GM Technical Center
Hoffmann-La Roche, Inc.
Indiana University Northwest
International Minerals & Chem., Corp.
Marquette University
Mercy Hospital
Motorola Inc.
Motorola Comm. & Electronics, Inc.
National Video Services, Inc.
Niagara College
Oregon State University
RCA Corporation
Robertshaw Controls Company
Rutgers-The State University
Salescaster Displays Corporation
Seiscor Technologies, Inc.
(A Subsidiary of Switchcraft, Inc.)
Sonoma State University
Southwire Company
The John Hopkins University
The Singer Company
University of Wisconsin-Madison
Union Carbide
University of Southern California
US Environmental Protection Agency
Verbatim Corporation
WCVB-TV
Yeshiva University

pbj inc.

"Innovative Products for the CoCo User"

Call or write today for our **FREE** Catalog
P.O. Box 813 • North Bergen, N.J. 07047 • **201-330-1898**

See List of Advertisers on page 89

The Basic Beat

RAZZLE-DAZZLE VIDEO

by James W. Wood

As I promised last month, I'll show you how to unleash the power of the video spectrum and let the CoCo show its colors. The Basic Beat presents "Razzle-Dazzle Video," a topic that's so exciting I'll take two months to present and explain the information.

Begin by typing and running Program Listing 1. It's the easiest light and sound show I know. If you have access to more than one Color Computer, enter this program into each of them, turn off the lights, and enjoy the show.

You can use the SET, POKE, and CHR$( ) commands as at least three ways to program graphics on a Color Basic computer. For the next two months I'll concentrate on CHR$( ) graphics; with them, and a few tricks, you can create animated graphics. You use PRINT@ to place CHR$ graphics on the screen. Table 1 will show you the number to put into the parentheses after each CHR$. Each CHR$ character occupies one PRINT@ position.

Program Listing 2 adds graphic strings in the same way that you add alphanumeric strings. Compare the listing to Table 1 to see that every sixteenth CHR$ (CHR$(143), CHR$(159), CHR$(175). . .CHR$(255)) produces a solid color in each of the four corners of the PRINT@ position. Each time the program goes through the loop in lines 10–30, it adds another solid block of color to A$. Line 35 displays the string.

To add the razzle dazzle, press the break key and type GOTO 40, or delete lines 30–36 and run the program. This fills the screen with stripes of color, a good technique to help you set the color controls on your TV.

Color Basic does not offer the STRING$ command that you get with Extended Color Basic. STRING$ lets you print the same graphic character from 1 to 255 times, in a continuous row or string. Program Listing 3 shows you how to simulate this command with Color Basic. The method requires more memory and more initial running time, but it works nicely. Line 5 reserves string space. If you get an OS (out of string space) error while using these programming techniques, type CLEARn, where n is a number large enough to free up enough string space. Remember, however, that the larger you make n, the more memory it requires.

Lines 10–30 create a graphic string of 255 solid red characters. Line 50 prints the number of characters designated in line 40. The LEFT$ command in line 50 prints the left "L" characters of A$. Confused? Try typing in Program Listing 4. Line 20 prints the left three characters of A$, "NIA." Line 30 prints the right five of A$, "CALIF." Line 40 prints a string from A$, starting with the sixth character and printing four letters, including the sixth, "ORNI."

Program Listing 5 shows you a way to use the MID$ feature. This technique slows down the rate at which the screen displays text, so that it won't appear more quickly than you can read it. Line 30 finds the LENgth of the A$, and lines 40–60 print the sentence slowly, one letter at a time from the middle. The loop with variable B determines the printing speed.

Lines 10–40 of Program Listing 6 create eight strings, each 32 characters long. Each string is a different solid color. The program randomly chooses the color for each PRINT. As a result, you get a rapidly moving series of bars going up your screen. Try this game: Program your CoCo to print 100 strings and then see if you can determine how many orange lines it printed.

Program Listing 7 uses MID$ and the technique of looping to build a string of characters. The program creates a string of solid green, the input name, and then more green. The loop in line 60 prints sections of this string in the middle of the screen, and each section is 32 characters long. Each time it prints this section, the program moves it one space to the right, creating the impression that the name travels to the left.

Type in Program Listing 8 to take the concept one step farther. Here, the first name moves to the left while the last name moves to the right. You might use this to put a little pizazz into a title or other text you want to display.

Program Listing 9 brings you back to colorful graphics. Lines 20–40 create a string of 32 randomly colored solid CHR$ graphics. Line 50 prints this string as two connected sections, creating the effect you would get if you lined up 32 colored tiles. As you pick up the leftmost tile, move the others one tile to the right. Then place the tile in your hand back at the right end. Do this over and over again, and the colors appear to move to the left.

Can you make this effect cover more than one line? Your longest string could not contain more than 255 char-

Green	128–143
Yellow	144–159
Blue	160–175
Red	176–191
Buff	192–207
Cyan	208–223
Magenta	224–239
Orange	240–255
Black	all colored

8	4
2	1

Example: 176 + 4 + 2 = 182, PRINT CHR$ (182); will print red in the upper right and lower left.

Table 1. CHR$( ) Codes for Color

System Requirements

4K RAM
Color Basic

HARD DISK *for the CO CO*

5 meg $1295 *10 meg $1595*

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

HARD DISK - OPERATING SYSTEM features

- FULLY INTEGRATED INTO COLOR DISK BASIC
- TAPE TO HARD DISK
- DISK TO HARD DISK
- HARD DISK TO TAPE
- HARD DISK TO DISK
- D U P L I C A T E
- COLD START
- M-RUN
- ALL EXTENDED DISK BASIC COMMANDS

without hard drive ... operating system only
INTERFACE CARD & H-DOS $425.00

PERIPHERAL *H-DOS UTILITY PACK* $129.00
BOOT STRAPS OS-9 OR FLEX, MDIR (master directory)

128 K - RAM CARD

INCREASE YOUR 64 K Co-Co OR Co-Co II TO 128 K RAM

- ☐ FITS COMPLETELY INSIDE YOUR COMPUTER.
- ☐ SWITCHES TWO NEW 32 K BANKS OF RAM IN AND OUT OF MEMORY.
- ☐ BANKS CAN BE MAPPED IN THE UPPER HALF OR LOWER HALF, OR CAN ALSO BE A SECOND COMPLETE 64 K BANK.
- ☐ SWITCH TABLES INCLUDED.
- ☐ SIMPLE INSTALLATION AND DOCUMENTATION.
- ☐ A MUST FOR OS-9 USERS.
- ☐ COMPLETE WITH 8 (4164) RAM CHIPS.
- ☐ PAL CHIP HANDLES ALL BANKING COMMANDS.

$149.95

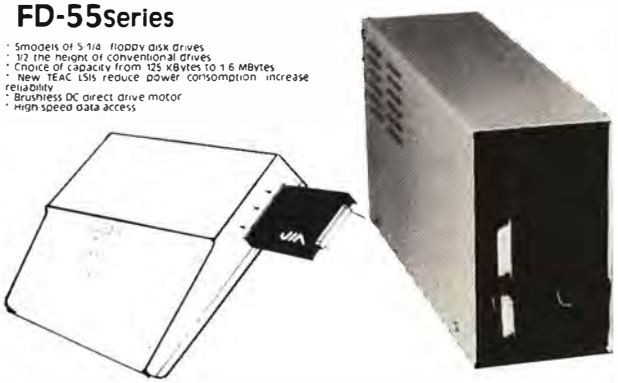
DISK DRIVES for the CoCo

TANDON DISK DRIVES
40 track · 6 ms trk-trk
FULLY COMPATIBLE

TEAC *DISK DRIVES*

FD-55 Series

- Smaaers of 5-1/4 floppy disk drives
- 1/2 the height of conventional drives
- Choice of capacity from 125 KBytes to 1.6 MBytes
- New TEAC LSIs reduce power consumption increase reliability
- Brushless DC direct drive motor
- High speed data access

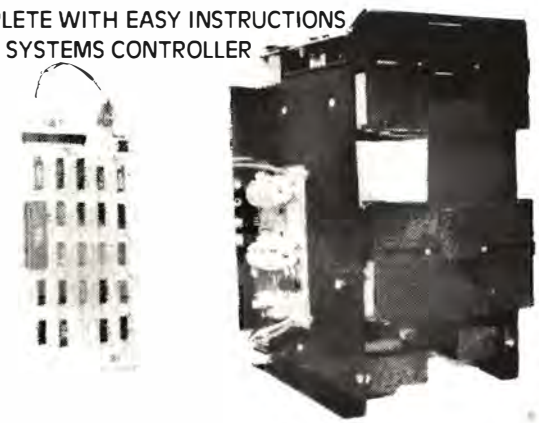


Super Sale on New Disk Drives

Distributor for - SOFTWARE SUPPORT, INC. Framingham, MA.

MODEL III & 4 DISK CONTROLLER KIT

- ☐ AVAILABLE FOR FULL HIGHT OR SLIM LINE DRIVES
- ☐ EASY INSTALLATION
- ☐ FULLY TESTED AND ASSEMBLED
- ☐ COMPLETE WITH EASY INSTRUCTIONS
- ☐ J & M SYSTEMS CONTROLLER



USA
RGS MICRO INC.
MAIN STREET
DERBY LINE, VERMONT
ZIP 05830
TEL: 802-873-3386
ORDER LINE 800-361-4970

RGS MICRO INC.

CANADA
RGS MICRO INC.
759, VICTORIA SQUARE 405
MONTRÉAL H2Y 2J3
TEL.:(514) 287-1563
ORDER LINE ONLY ★★★
QUÉBEC - ONTARIO - MARITIMES
800-361-5338
WESTERN CANADA 800-361-5155

TERMS: VISA · MASTER CARD · AMERICAN EXPRESS ——— **HOURS:** MONDAY - SATURDAY 10:00 AM - 6:00 PM

acters. It would take 256 characters to create eight lines across the screen. You could, however, create seven rows. Seven rows times 32 characters equals 224 total characters. Program Listing 10 moves not one, but two strings of 244 characters about on the screen. I won't even attempt to describe the effect; type in the listing and see it for yourself.

Have you noticed that most of this month's programs (except Listing 6) do not use the last row at the bottom of your screen? If PRINT places a character at the last space on the screen (PRINT@ position 511), the screen scrolls up one row. You can print in the bottom row without scrolling as long as you don't put anything in position 511. Therefore, if you notice your graphics moving upward, or a green line at the bottom of the screen, you'll know what happened.

If you've had enough of solid-colored graphics, Program Listing 11 is a classic "moving background" program. Lines 20–40 create a string of 128 random red characters. Line 50 adds the left 32 characters of A$ to the right end of A$. This makes sure that the end of the graphic string will flow smoothly into the beginning when the ground reaches the last of the 128 characters. In other words, the ground wraps around the screen continuously. The right end of the string comes onto the screen from the right and continues until it is one space from the left side, and the left end of the string is printed at the right side of the screen. For a demonstration of continuous movement, add line 41 A$ = "COCO" + RIGHT (A$,124) and run the program.

Program Listing 12 adds some improvement to the shape of the ground. Since most of Listing 12 is the same as Listing 11, you don't have to type in a new program; merely make the necessary changes to Listing 11.

From my examination of Table 1, I decided that I could create the graphics for a good landscape by adding the following numbers to 176: 1, 2, 3, 5, 7, 10, 11, and 15. Lines 5 and 6 place these values into an array so line 30 can choose the elements of that array randomly. Add line 85 PRINT@352, CHR$ (155) + CHR$(147) + CHR$ (147); to Listing 12 to see your shiny yellow space runabout cruising over the mysterious red planet.

Stay tuned next month for more secrets to unleash your Color Computer's amazing moving graphics. ■

Address correspondence to James Wood, 424 N. Missouri, Box 507, Atwood, IL 61913.

Program Listing 1

```
10 CLSRND(8):SOUND RND(200),1:GO
TO10
```

Program Listing 2

```
10 FOR A=143 TO 255 STEP16
20 A$=A$+CHR$(A):NEXTA
30 CLS0
35 PRINT@0,A$;
36 GOTO36
40 CLS0:FORA=1 TO 60:PRINTA$;:NE
XT
50 GOTO50
```

Program Listing 3

```
5 CLEAR600
10 FOR A=1 TO 255
20 A$=A$+CHR$(191)
30 NEXT A
40 INPUT"LENGTH OF RED (1 TO 255
)";L
50 PRINTLEFT$(A$,L)
60 GOTO40
```

Program Listing 4

```
10 A$="CALIFORNIA"
20 PRINTLEFT$(A$,3)
30 PRINTRIGHT$(A$,5)
40 PRINTMID$(A$,6,4)
```

Program Listing 5

```
10 CLS
20 A$="WANT TO WATCH A SLOW SENT
ENCE."
30 L=LEN(A$)
40 FOR A=1 TO L
50 PRINTMID$(A$,A,1);
60 FORB=1 TO 70:NEXT B,A
```

Program Listing 6

```
 5 CLEAR400
10 FOR A=1 TO 8
20 FOR B=1 TO 32
30 C$(A)=C$(A)+CHR$(127+16*A)
40 NEXT B,A
50 PRINTC$(RND(8));:GOTO50
```

Program Listing 7

```
10 CLS
20 FOR A=1 TO 32:A$=A$+CHR$(143)
:NEXT A
30 INPUT"YOUR NAME";NA$
40 CLS
50 B$=A$+NA$+A$
60 FORA=1TO50:SOUND RND(200),1:P
RINT@160,MID$(B$,A,32);:NEXT
70 GOTO60
```

Program Listing 8

```
10 CLS:CLEAR500
20 FOR A=1 TO 32:A$=A$+CHR$(143)
:NEXT A
30 INPUT"FIRST NAME";F$
40 INPUT"LAST NAME";L$
50 CLS
60 FB$=A$+F$+A$:LB$=A$+L$+A$
70 FORA=1TO42
80 SOUND RND(200),1
90 PRINT@160,MID$(FB$,A,32);
100 PRINT@192,MID$(LB$,43-A,32);
110 NEXT A:GOTO70
```

Program Listing 9

```
10 CLS0
20 FORA=1TO32
30 A$=A$+CHR$(127+16*RND(8))
40 NEXTA
50 FORB=1TO31
60 PRINT@0,MID$(A$,B,32-B)+MID$(
A$,1,B);
70 NEXT B
80 GOTO50
```

Program Listing 10

```
5 CLEAR 800
10 CLS0
20 FORA=1TO224
30 A$=A$+CHR$(127+16*RND(8))
40 NEXTA
50 FORB=1TO223
60 PRINT@0,MID$(A$,B,224-B)+MID$
(A$,1,B);
65 PRINT@224,MID$(A$,B,224-B)+MI
D$(A$,1,B);
70 NEXT B
80 GOTO50
```

Program Listing 11

```
10 CLS0:CLEAR500
20 FOR A=1TO128
30 A$=A$+CHR$(176+RND(15))
40 NEXTA
50 A$=A$+LEFT$(A$,32)
60 FORA=1TO32:R$=R$+CHR$(191)
70 NEXTA
80 PRINT@448,R$;
90 FORA=1TO128
100 PRINT@416,MID$(A$,A,32);
105 NEXTA
110 GOTO90
```

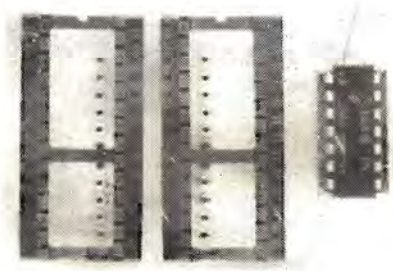
Program Listing 12

```
1 CLEAR500
5 S(1)=1:S(2)=2:S(3)=3:S(4)=5
6 S(5)=7:S(6)=10:S(7)=11:S(8)=15

10 CLS0
20 FOR A=1TO128
30 A$=A$+CHR$(176+S(RND(8)))
40 NEXTA
50 A$=A$+LEFT$(A$,32)
60 FORA=1TO32:R$=R$+CHR$(191)
70 NEXTA
80 PRINT@448,R$;
90 FORA=1TO128
100 PRINT@416,MID$(A$,A,32);
105 NEXTA
110 GOTO90
```

END

16 K DOS CARD

- ☐ PLUGS INTO YOUR J-M DISK CONTROLLER AND ALLOWS YOU TO MAP ON AN EXTRA 8 K E-PROM ABOVE DOS.
- ☐ USE YOUR OWN 24 PIN, 8 K DOS AND ONE 2764 E-PROM OR TWO 2764 E-PROMS.
- ☐ GREAT FOR UTILITIES OR A MACHINE LANGUAGE MONITOR.
- ☐ ON BOARD DE-CODING, ONLY ONE WIRE TO SOLDER. COMPLETE WITH INSTRUCTIONS.



$19.95

RGS DUAL DOS CARD

WITH SWITCH SELECTOR

DESIGNED TO ACCOMODATE TWO DIFFERENT DOS CHIPS INSIDE YOUR J-M DISK CONTROLLER.

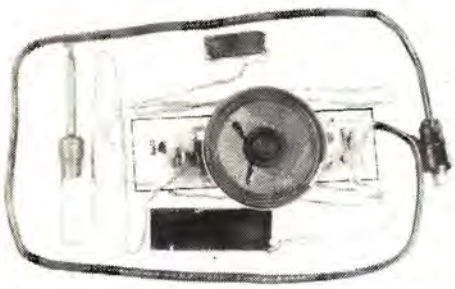
- ☐ PIN TO PIN COMPATIBLE WITH RS-DOS AND J-DOS CHIPS.
- ☐ THE SWITCH ALLOWS YOU TO HARD SELECT ANY ONE OF THE TWO DOS SYSTEMS OF YOUR CHOICE.
- ☐ IN CENTER POSITION, THE SWITCH DISCONNECTS FROM THE DOS AND BRINGS YOU BACK TO BASIC.
- ☐ DESIGNED FOR ONE 24 PIN ROM AND A 28 PIN E-PROM OR TWO 28 PIN E-PROM CONFIGURATION.
- ☐ EASILY MODIFIED BY CUTTING TWO TRACES ON THE BACK OF THE BOARD.

$19.95
(Board with switch only)

VIDEO PAL

- ☐ AUDIO-VIDEO INTERFACE
- ☐ MONOCHROME COMPOSITE OUTPUT
- ☐ EASY TO INSTALL, FITS UNDER YOUR KEYBOARD
- ☐ NO SOLDERING!
- ☐ BUILT-IN SPEAKER
- ☐ DOES NOT DISABLE YOUR REGULAR T.V. OUTPUT
- ☐ FULLY TESTED AND ASSEMBLED
- ☐ COMPLETE WITH INSTRUCTIONS.

ALSO AVAILABLE FOR COLOR MONITORS



$29.95

PROJECT BOARD

A MUST FOR EXPERIMENTS

- ☐ UNLIMITED CHIP POSITIONS
- ☐ GOLD PLATED EDGE-CARD CONNECTOR
- ☐ FITS INTO ANY RS DISK PACK
- ☐ HOLES PLATED THROUGH BOTH SIDES
- ☐ EASY TO WIRE - WRAP

GREAT TO BUILD YOUR "TURN OF THE SCREW" PROJECTS.

$19.95
(TWO FOR $34.95)

USA
RGS MICRO INC.
MAIN STREET
DERBY LINE, VERMONT
ZIP 05830
TEL: 802-873-3386
ORDER LINE 800-361-4970

RGS MICRO INC.

CANADA
RGS MICRO INC.
759, VICTORIA SQUARE 405
MONTRÉAL H2Y 2J3
TEL.:(514) 287-1563
ORDER LINE ONLY ★ ★ ★
QUÉBEC - ONTARIO - MARITIMES
800-361-5338
WESTERN CANADA 800-361-5155

TERMS: VISA - MASTER CARD - AMERICAN EXPRESS

HOURS: MONDAY - SATURDAY 10:00 AM - 6:00 PM

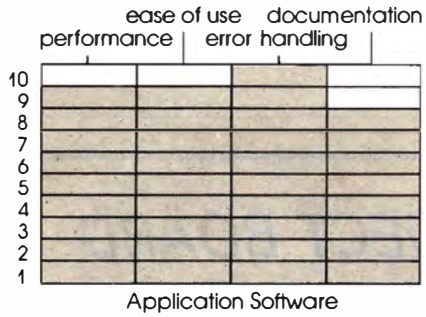
✓ See List of Advertisers on page 89

Circle Reader Service card #185

BY SCOTT L. NORMAN

A SURE WAY TO PASCAL

The secret to Pascal without a headache—
DEFT's well-written product line promotes compatibilty.



DEFT Pascal (v. 3.4)
DEFT Bench (v. 3.3)
DEFT Pascal Workbench (v. 3.4)
DEFT Systems Inc.
P.O. Box 359
Damascus Centre, Suite 4
9815 Main Street
Damascus, MD 20872
32K, one disk drive
Pascal: $79.95
DEFT Bench: $49.95
DEFT Pascal Workbench: $119.95

Mankind does not live by Basic alone. Although the Color Computer's ROMs contain a very satisfactory dialect of this popular high-level language, many users find themselves eager to explore other options after a time. One of those options is Pascal.

Pascal is largely the brainchild of one man: Professor Niklaus Wirth of the Swiss Federal Institute of Technology. The language that Wirth set forth in the late 1960s and early 1970s was intended primarily as a teaching vehicle. Wirth's goal was to create a logical system that could ease the conversion of algorithms ("recipes" for the solution to a problem)

Blaise Pascal

into actual programs. Such a language would let programmers set up a useful variety of data structures (lists, and arrays, for example) into which they could organize information for storage and manipulation by the computer.

Wirth's attempt was successful. Pascal is now a standard language for teaching programming at the college level, and is making headway in replacing Basic in secondary schools. It is widely used to spread the gospel of organized, formally structured programming and has become a useful vehicle for writing applications programs.

Pascal has grown up on machines with a variety of capabilities. The best-known modification is probably UCSD Pascal, so named because it was developed at the University of California at San Diego. Its file structures and input and output operations are suited to interactive operation on personal computers, while the original Pascal was intended by Wirth to run on mainframes in a batch-processing mode.

DEFT's Product Line

DEFT Systems' Pascal line contains three main products: Pascal, Bench, and Workbench. The DEFT Pascal compiler supports a powerful version of the language. It offers almost all the features of standard Pascal, and a number of extensions for the CoCo, too. As the documentation points out, you should use the CoCo-specific commands only in programs that you are sure you will not port (convert) to other computers. But these extensions are often of considerable interest to single-machine users. Some of them, notably those devoted to string handling, are compared by many people to features available in the UCSD Pascal.

Because Pascal is a compiled language, you must convert the high-level, English-like statements of the source code to a machine-language program for actual use. It involves a couple of steps. The compiler translates each source-code file (there might be several for a long program) into an object module. The module is in machine language but is not capable of running on the Color Computer by itself.

It must be combined, or "linked," with other machine-language files that handle such tasks as floating-point arithmetic, input and output operations, string manipulations, and so on. These utility files constitute the run-time library and are spliced to the object module (or modules) by a "linker" program.

THE NEW GENERATION

COMPLETE SG-10 PRINTER SYSTEM

All the performance, features, and reliability of the **Star Micronics GEMINI-10X PLUS:**

120 CPS with true descenders.

NLQ (Near Letter Quality).

2K BUFFER accessible.

HEX DUMP for Machine Language listings.

ULTRA HI bit image graphics.

20% INCREASE in throughput.

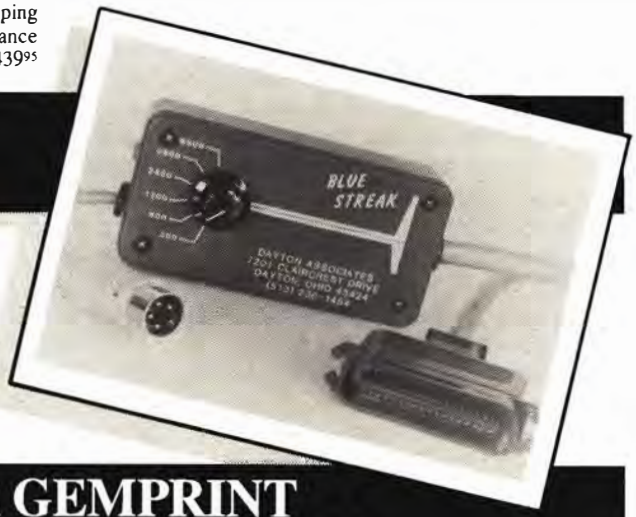
1 YEAR MICRONICS WARRANTY
Servicable at over 4000 locations.

COMPLETE SYSTEM
NOTHING MORE TO BUY

- SG-10 PRINTER
- BLUE STREAK INTERFACE
- SUPER GEMPRINT
- TYPE SELECTION/TUTORIAL

$299.95 + $10 Shipping and Insurance
SG-15-439.95

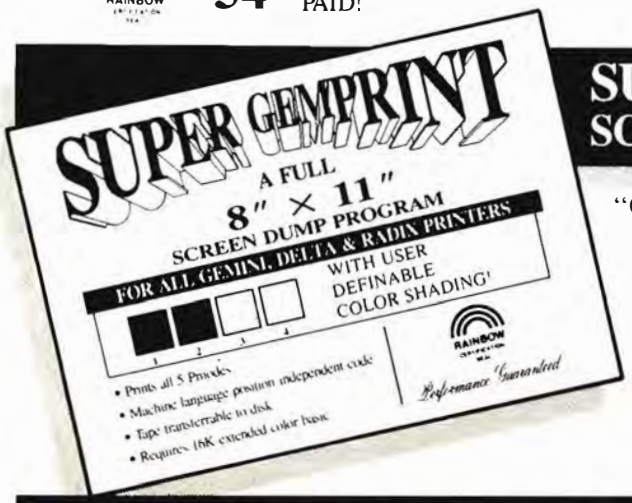
BLUE STREAK
SERIAL TO PARALLEL INTERFACE



- RUN COCO I or II to PARALLEL PRINTER
- 300, 600, 1200, 2400, 4800, 9600 SWITCHABLE BAUD RATES
- AC POWER OPTIONAL-NOT NEEDED WITH SG-10 PRINTER
- COMPLETE WITH ALL CABLES AND CONNECTORS
- 180 DAY WARRANTY

RAINBOW

54.95 SHIPPING PAID! (SPECIFY PRINTER)



SUPER GEMPRINT
SCREEN DUMP PROGRAM

"Overall, **Super Gemprint** is very well-written and documented."
–Rainbow December 84 review.

BONUS! TYPE SELECTION/TUTORIAL PROGRAM
FREE WITH SUPER GEMPRINT

Menu driven program for the CoCo. Teaches and shows the new user the numerous features of the **SG-10.**

SUPER GEMPRINT AND TYPE SELECTION/TUTORIAL PROGRAM **$17.95** + $2 Shipping and Handling

DAYTON ASSOCIATES of W.R. HALL, INC.

DUN & BRADSTREET LISTED
7201 CLAIRCREST BLDG. C • DAYTON, OHIO 45424
(513) 236-1454
OHIO RESIDENTS ADD 6% SALES TAX
C.O.D. ADD $2.00

star micronics·inc
AUTHORIZED DEALER

The ouput of the linker is the final product of the compilation process—a stand-alone, binary-load module called into service by the usual LOADM and EXEC commands. The DEFT compiler is not present in RAM when you run the final program.

The DEFT Pascal disk contains the compiler, linker, run-time library routines, and some additional files that are automatically called into play during the construction of a load module. The compiler and linker are split up into separate files because of the Color Computer's limited memory capacity; there has to be room for the user's program in RAM, too! Compilation and linkage are often combined in Pascal implementations for larger machines.

In principle, the only other function you need to get started is a text editor for writing the Pascal source code. You can use any editor or word processor capable of producing ASCII text. However, it is more cumbersome to debug a program written in a compiled language than it is to debug a Basic program that you can just edit and run immediately. With Pascal, if a syntax error interferes with compilation or a logic error causes spurious results, you must trot out your text editor, load, modify, resave the source code, and recompile and relink before you can run it again.

Some editors get in the way. You must give a series of four commands to the Color Computer at the start of a working session, before loading any of the DEFT software:

```
NEW
PCLEAR 1
FILES 0,0
CLEAR 16,4999
```

These reserve everything above memory location 5000 for DEFT's Pascal products and keep the Color Basic monitor from overwriting anything stored there. When the compiler finishes its job and returns you to the monitor (signified by the usual "OK" prompt), you can immediately call for the linker and proceed to the next step in the program preparation.

Some text editors require a separate memory configuration cycle. For example, Telewriter-64 does a satisfactory job of source-code preparation, but it requires you to enter those four commands every time you leave it to use one of the DEFT products. In the middle of a hot and heavy debugging session, this is a real annoyance. It is very helpful to have a compatible editor—another piece of the whole that DEFT makes.

The DEFT Full Screen Editor is a neat little package that you can use to prepare all sorts of ASCII files, including Pascal or Assembly-language source code, and Basic programs. It isn't a word processor—it lacks printing functions—but it does give you the ability to handle more than 42,000 bytes of text in a 64K computer. That's a very large program. It is completely compatible with the memory setup for the compiler and linker; all you have to do is enter the four commands once at the beginning of the program. The editor is easy to learn, too. It lets the Pascal neophyte concentrate on the new language without spending too much time worrying about the compatibility of the editor. The bad news is that it is not included with the DEFT Pascal disk. To get the editor, you must purchase either DEFT Bench or the DEFT Pascal Workbench.

DEFT Bench is intended for the hard-core programmer. It includes the same object linker you'll find on the Pascal disk; a well-designed macro assembler for creating either stand-alone Assembly-language programs or subroutines for linking to Pascal programs—the Macro/6809; an "object librarian," which lets you combine as many as 50 object modules into one file (the DEFT linker can merge such libraries with the output of the Pascal compiler); and a symbolic debugger, a brute that can hook up with anything produced by the Pascal compiler or Macro/6809, and which provides the programmer with a great deal of control over the execution and debugging cycle—single-step operation, memory and register displays, breakpoints, trace facilities, and more.

The DEFT Pascal Workbench combines the features of the other two products. I think it is the one to buy. Even if your programming ambitions go no further than bread-and-butter Pascal, the editor and debugger justify the additional cost of the Workbench over the Pascal disk.

DEFT's Version of Pascal

Forms of Pascal have been available for the Color Computer for several years. In fact, I reviewed an early release of DynaSoft Pascal in the September 1982 issue of *80 Micro,* p. 198. What sets the DEFT product apart is the extent of its coverage. It provides the CoCo user with a very compatible implementation of standard Pascal, along with many useful extensions for string handling, absolute memory access, and the compilation of separate program modules. That's quite a feat for a system that can run on a 32K computer.

DEFT's Pascal supports real (that is, floating-point) variables. Many CoCo aftermarket languages handle only integers; this Pascal gives you full-bore computation capatability. The dynamic range (the scale of numbers that the system can handle), is much larger than that of Color Basic—from roughly 1E + 64 down to 1E – 64. This might be of little consequence in everyday work, but it's important for scientific calculations in which you routinely encounter extremely large or small numbers.

The compiler handles many kinds of data. Additional predefined data are 16-bit integers, single characters with ASCII codes from 0 to 255, Booleans (true and false variables), strings of up to 255 characters, and text (another file-of-characters variety). Enumerated types, sets, arrays, records, and files are also available. Pascal is a "strongly typed" language in which you must identify the types of all variables, constants, and other data structures before you can use them.

Experts are often touchy about the topic of extensions, especially because they affect the portability of a language. The usual countering argument is that they are also exceptionally useful. DEFT Pascal's string-handling features are a perfect example. In contrast with the standard version, DEFT treats strings as variable-length structures rather than fixed-length arrays of characters. As a result, it is possible to access individual elements, copy a portion of one string to another, delete a portion of a string, and locate substrings—very promising for text manipulation.

To go along with the many simple and structured data types, there is a full complement of functions, procedures, and decision-making constructs. You'll find all the standard ones, including trigonometric, logarithmic, and exponential functions. One Pascal novelty is CURSOR, a built-in procedure that lets you position the cursor to any screen-print position (on the standard 32-col-

umn by 16-row text screen).

While DEFT Pascal gains enormously by incorporating real variables, it does lack graphics. However, relief is available through the accessing of specific memory locations, pointing the way toward manipulating video RAM. For those reluctant to go it alone, DEFT Systems recently released a library of separately compiled graphics modules. They let you generate high-resolution, three-dimensional, wire-frame images from Pascal, and incorporate rotation, zooming, and motion features. The library modules, along with a selection of examples, are available as the DEFT 3-D Graphics Sampler for $15.95.

Pascal has many more control and decision-making statements than Basic. DEFT's Pascal offers an IF. . .THEN . . .ELSE branch, similar to Basic's; a WHILE statement that repeatedly executes a piece of code as long as a given Boolean expression remains true; a REPEAT. . .UNTIL construction, which executes code until a given expression becomes false; the FOR. . .DO statement, which works similarly to Basic's FOR. . .NEXT loop; and CASE. . . ELSE, which executes one of a number of alternative statements depending on the value of a so-called ordinal expression. The CASE. . .ELSE command resembles a much more flexible version of Basic's ON X. . .GOTO control structure.

The degree of control that these commands offer is one of the most attractive aspects of Pascal. You might feel a bit like a kid in a candy store at first.

About Performance

I have deliberately avoided writing a blow-by-blow description of DEFT Pascal programming in this review so that I could look at the entire product line. A few comments about my personal experiences with the program are pertinent, however.

The DEFT documentation is not intended to teach Pascal programming; users of the product should anticipate buying a good text, such as Alan R. Miller's *Pascal Programs for Scientists and Engineers* (Sybex), Rodnay Zak's *Introduction to Pascal* (Sybex), and Peter Grogono's *Programming in Pascal* (Addison-Wesley). Because DEFT's compiler is complete and extremely compatible with standard Pascal, you can use almost any popular textbook to learn the language. You aren't likely to come across a but-my-system-can't-do-that problem. And if you need a quick answer to a specific problem, you can probably go to any good Pascal reference work, copy a program, and get results.

Pascal is not blazingly fast when it comes to number crunching; I have done specific trigonometric calculations in which it ran factors of two or more slower than Extended Color Basic. DEFT's Dan Eastham suggested that my routine might have included mixed (real and integer) calculations, but the fact remains that floating-point computations aren't likely to set any speed records. The sine function is a little slower than the one in Extended Color Basic, and the logarithm, exponential, and square-root functions are significantly slower. Nevertheless, in a complex program in which all kinds of data manipulation are used, Pascal will probably exhibit a speed advantage.

It might be a good idea to discuss compilation times. One of Miller's routines for solving simultaneous linear equations happened to come in for some heavy use while I was testing the compiler. The program contains 132 lines of source code, amounting to about 2,500 bytes. The compiler required about 23 seconds to generate the object file. It took the linker just under a minute and a half more to produce the load module. (These figures don't represent the use of the debugger.) Incidentally, Miller's program ran almost too fast to measure —well under one second to solve three equations.

Mopping up the typos provided an interesting reminder of Pascal's error indications, and of some of the frustrations that are a part of using a compiled language. At one point, a missing semicolon in the early stages of the program caused the compiler to report 83 errors. It is a hallmark of Pascal that syntax errors of this kind tend to propagate throughout the code; the compiler fails to find something it is expecting, gets thrown off the track of analyzing the remaining syntax, and generates a huge amount of error messages. Once an error is found, it is necessary to repeat the whole compilation and link cycle. This alone is enough to warrant compiling small, reliable program modules separately.

But that's just in the nature of compiled languages; it shouldn't keep CoCo owners with an interest in Pascal from getting in on it. And DEFT Pascal is an excellent way to arrive. ■

MusiWriter

A "Word" Processor for Music!

At last! Here is a music editor that allows you to set out music without those frustrating manuscript problems.

You can generate as many copies as you wish as well as edit music whenever you want. No More Faded Photo Copies!

MusiWriter easily edits or transcribes music systems. You see the music on the screen as it will appear on paper. Edit any stave individually with full cursor control, scrolling forwards or backwards, up or down a stave.

MusiWriter handles systems up to ten staves and fifteen keys. It will also compose time signatures and a wide range of notes, rests and bar notes.

It's a masterpiece!

SYSTEM REQUIREMENTS:
Color Computer with 32K RAM, disk drive, and graphic printer (such as Radio Shack's DMP 120.

PRINTERS SUPPORTED:
Group 1—Radio Shack DMP 110/DMP 120/DMP 200/etc.

Group 2—Epson/Gemini/Spirit/ Smith Corona/etc.

VER	PRINTERS	PRICE
1.0	Group 1	$50.00
1.1	Group 2	50.00
1.2	Group 1 & 2	60.00

Add $5.00 for handling and first class postage. Price in U.S. currency.

Circle Reader Service card #342

Send check or money order to,
TESSERACT SOFTWARE/SYSTEMS
5350 Montclair Ave.,
Montreal, Quebec Canada H4V 2L1

See List of Advertisers on page 89

BY RICHARD E. ESPOSITO AND JESSE W. JACKSON

Printer Answers

Learn the basics of printer shopping, then use this universal screen-dump program with your purchase.

System Requirements

16K, 32K, or 64K RAM
Extended Color Basic
Dot-Matrix Printer

This program is available on our Instant CoCo cassette.
See the Instant CoCo ad elsewhere in this issue.

Contemplating the purchase of a printer for your CoCo? Don't buy on price alone; consider the features you want to have.

Buy only an ASCII (American Standard Code for Information Interchange) printer. Some low-cost printers use the Baudot or Correspondence codes. While these may be quite serviceable, you must write and load special software every time you use these printers with a CoCo. This is difficult and time consuming. With the price of a decent ASCII printer less than $300, a non-ASCII printer isn't worth it.

You can buy either a serial or a parallel printer. Serial printers are hooked up to the CoCo directly through the serial port on the back side. The serial baud rate that the CoCo normally uses is 600. If your printer uses a rate other than this, you (or your program) must change it by altering the values in locations 149 and 150. (See John Majka's "Those Amazing POKEs" elsewhere in this issue for those values.) Some serial printers have variable baud rates controlled by DIP switches. In any case, the CoCo and the printer need to settle upon a common baud rate or your printer will print gibberish, if anything. Parallel printers are generally cheaper than the serial type. If you purchase a parallel printer, you'll need an interfacing device. They cost $50–$90 and are available from a number of manufacturers. Table 1 lists some popular models.

Blue Streak—$54.95
Dayton Associates Inc.
7201 Claircrest Bldg. C
Dayton, OH 45424
513-236-1454

CCP-1 Parallel Printer Interface—$69
CCP-2 Parallel Printer Interface—$84
Botek Instruments
4949 Hampshire
Utica, MI 48087
313-739-2910

CoCoPort Parallel Interface—$54.95, $44.95 kit
Green Mountain Micro
Bathory Road, Box H
Roxbury, VT 05669
802-485-6112

CoCo Serial/Parallel Interface—$89.95
pbh Computer Products Inc.
P.O. Drawer 55868
Houston, TX 77055
713-956-0207

SP-3 Interface—$59.95
True Data Products
195 Linwood St., P.O. Box 546
Linwood, MA 01525
617-234-7047

Table 1. A Selection of Parallel Printer Interfaces

Check the Character Set

Be sure to see a sample of the complete character set available with the printer you're considering. Insist on an actual printout, not a facsimile. Generally, formed-character (daisy-wheel, type ball, and so on) printers produce the highest-quality printing. Dot-matrix printers, however, are improving all the time. A few years ago, seven-pin printers were common. Then nine-pin printers came along. The newest crop uses 18 and 24 pins. The more pins, the more detail to the characters. Without close scrutiny, most people cannot distinguish the print quality of a 24-pin dot-matrix printer from that made by a formed-character printer.

The print quality of ink-jet and thermal printers is similar to that produced by the dot-matrix types. Although thermal printers are generally cheaper initially, the cost of the specially treated paper makes them more expensive over time. Also, thermal and ink-jet printers can't produce stencils or carbon copies—an especially critical shortcoming if you happen to be a teacher. Ink-jet printers generally use plain paper and are quieter than the formed-character or dot-matrix types.

Make sure that the printer you buy has the features you want for the foreseeable future. Some of the features you might consider are lowercase descenders, double strike, expanded width, compressed width, proportional spacing, downloadable character sets, and bit-image graphics.

If you plan to use your printer for word processing, lowercase descenders are a high priority. Some printers lack this feature. (Be especially wary of seven-pin, dot-matrix types.) Without this feature, characters such as y, g, p, and q do not descend below the line but stand conspicuously above it.

Double-struck characters appear darker than normal ones. This feature is useful for accenting key words and titles. Expanded-width (or double-width) characters often appear in titles. Compressed-width characters allow you to print 132 characters on standard 8½-inch-wide paper.

You see proportional spacing in books and newspapers. Unlike copy from a typewriter, different characters take up different amounts of space on a line (e.g., w is much wider than i). With a word processor that supports this feature, such as Stylograph, you can line text up on both sides of the page by inserting partial spaces between the characters on a line. Don't confuse this with justification, which puts whole spaces between words to line up the text on both sides.

Downloadable character sets give you the versatility of defining your own characters. This is useful if you do much printing in foreign languages or need special mathematical symbols. Bit-image graphics give you the capability of dumping high-resolution screens to your printer.

Acronym	Control	Decimal	Hex
NUL	@	0	00
SOH	A	1	01
STX	B	2	02
ETX	C	3	03
EOT	D	4	04
ENQ	E	5	05
ACK	F	6	06
BEL	G	7	07
BS	H	8	08
HT	I	9	09
LF	J	10	0A
VT	K	11	0B
FF	L	12	0C
CR	M	13	0D
SO	N	14	0E
SI	O	15	0F
DLE	P	16	10
DC1	Q	17	11
DC2	R	18	12
DC3	S	19	13
DC4	T	20	14
NAK	U	21	15
SYN	V	22	16
ETB	W	23	17
CAN	X	24	18
EM	Y	25	19
SUB	Z	26	1A
ESC	[	27	1B
FS	/	28	1C
GS	]	29	1D
RS	^	30	1E
US	—	31	1F

Table 2. Control Code Acronyms

Control Codes

If you read the manual with your printer, you'll probably see that you enter different modes with escape sequences and control codes. Appendix E of *Getting Started with Color Basic* lists most of the ASCII codes. It does not, however, make reference to the control codes. A <control> – A, for example, is the ASCII code for A minus 64 (65 – 64 = 1). In general, a control character's ASCII code is the value of the normal code for that character minus 64. To further confuse you, some manuals use a set of acronyms to reference these control codes. (See Table 2.)

Different printers use a number of different protocols. If you read the documentation for the Radio Shack LP VIII, you'll see that in order to put the printer into the expanded or double-wide mode, you need to send the following sequence of codes: Escape Control-N (also known as ESC SO) and you send it to the printer with PRINT# – 2, CHR$(27) + CHR$(14). To put Gemini-10 in the same mode, you use the following codes: Escape W Control-@ (also know as ESC W NUL) and you send it to the printer with PRINT# – 2, CHR$(27) + CHR$(87) + CHR$(1).

Likewise, turning off this mode with these printers is PRINT# – 2, CHR$(27) + CHR$(15) with the LP VII and PRINT# – 2, CHR$(27) + CHR$(87) + CHR$(0) with the Gemini-10. As you can see, little or no relationship exists between the codes for one printer and another even for simple tasks such as these.

Program Generator

Now, here are the results of an ambitious attempt to write a program generator that produces a machine-language, high-resolution, screen-print program for any bit-image, graphics-capable printer. The generator has been used successfully for the LP VIII, the Gemini-10, and the Epson MX-80. Please let us know how you fare with other printers and send in any fixes that hackers might make to add other printers to the fold. (Gemini-10X owners should follow instructions for the Epson.)

Running the VersaDump Screen-Print Generator program requires that you successfully answer the 10 questions asked by it and that your printer doesn't have a quirk that we didn't anticipate. At this time, it seems to us that the LP VIII and the Gemini are at such extreme ends of the spectrum that every other printer should slip in between (famous last words. . .).

1) Is this a 16K or 32K version?

You use this to position the generated code. If your machine only has 16K, you must respond with 16. The resulting machine-language program is position independent, so those of you with 64K can put it above $E000, after enabling memory map 1.

2) Code sequence to return to text mode, how many, 1, 2,. . .

Once your printer is in its bit-image graphics mode, you need a sequence of codes to get it out. For the three printers we tested, they are:

Gemini-10 (How many?) 2, (Codes?) 27 64;
Epson MX-80 (How many?) 2, (Codes?) 27 64;
LP VIII (How many?) 1, (Codes?) 30.

3) Code Sequence to enter graphics mode, how many, 1, 2,. . .

In order to enter graphics mode, you must enter a certain sequence of codes.

Gemini-10 (How many?) 4, (Codes?) 27 75 112 1;
Epson MX-80 (How many?) 4, (Codes?) 2775 112 1;
LP VIII (How many?) 1, (Codes?) 18.

4) Code Sequence to adjust line feed, how many, 1, 2,. . .

In this case, the Epson differs from the Gemini. Give the sequence of codes needed to return the print head to the left side of the page, move down a line, and remain in graphics mode.

Gemini-10 (How many?) 3, (Codes?) 27 65 8;
Epson MX-80 (How many?) 4, (Codes?) 27 65 8 13;
LP VIII (How many?) 1, (Codes?) 13.

5) How many dots high is a line?

Graphics printers (that we've seen) print a column of dots at each print position as the print head moves across the page. In one pass, how many of these dots can print in a vertical column? The numbers are: Gemini-10, 8; Epson MX-80, 8; and LP VIII, 7.

6) Must graphics codes exceed 127?

The Gemini and Epson accept all codes in graphics modes. If your printer does too, answer N. The LP VIII requires that all graphics codes have the high-order bit set (values must exceed 127). If your printer is of this type, answer Y.

7) Which dot corresponds to the LSB (least-significant bit)?

On the Epson and Gemini, a graphics code of 1 corresponds to a column of seven blank dots over a single dark dot (the bottom dot corresponds to the LSB —respond "B"). On the LP VIII, the MSB (most-significant bit) is always set for a graphics character. If the only bits set are the MSB and the LSB (128 + 1 = 129), a column of six blank dots with a dark one atop it is printed (respond "T").

8) Do you want reverse video standard?

Here, you specify the default option. You can always change it by POKEing $7A24 (32K) or $3A24 (16K) with 0 (normal) or 255 (reverse).

9) New file name?

Give the name of the machine-language program to be generated.

10) <T>ape or <D>isk?

Respond with T or D. If you use tape, it will prompt with "Ready Tape" to give you a chance to position the tape. At that point, press the enter key and your screen dump program will be saved to tape as a binary file. If you're using disk, put the target disk in drive 0 before running the program as no "change disk" prompt is in the code.

Using Your VersaDump Program

To use the VersaDump machine-language program that was generated, type CLEAR 200,31231 for the 32K version or CLEAR 200,14847 for the 16K version. Then CLOADM or LOADM the program. After this, an EXEC of the machine-language routine gives you a dump of a PMODE3 or PMODE4 screen. Because the program is written in position-independent code, those of you with 64K can enable memory map 1 and then offset load it into high memory, avoiding the need to clear memory for your screen dump routine. ■

Address correspondence to Richard E. Esposito and Jesse W. Jackson, 9464 Sohap Lane, Columbia, MD 21045.

Program Listing 1. VersaDump Screen-Print Generator

```
1 PRINT@0,STRING$(32,"*")
2 PRINT@32,"*          VERSADUMP
          *
3 PRINT@64,"*    SCREEN PRINT GE
NERATOR     *"
4 PRINT@96,"*
          *"
5 PRINT@128,"* R.E. ESPOSITO & J
.W. JACKSON *"
6 PRINT@160,"*           (C) 198
4          *"
7 PRINT@192,STRING$(32,"*")
10 INPUT"IS THIS TO BE A 16 OR 3
2K VERSION (16/32)";K
20 IF K=16 THEN O=-16384 ELSE O=
0
30 GOSUB 450
40 PRINT"CODE SEQUENCE TO RETURN
 TO TEXT MODE"
50 INPUT"HOW LONG";N
60 POKE O+&H7A02,N
70 IF N=0 THEN 130
80 FOR I=0 TO N-1
90 PRINT I+1":";
100 INPUT X
110 POKE I+O+&H7A03,X
120 NEXT I
130 PRINT"CODE SEQUENCE TO ENTER
 GRAPHICS MODE"
140 INPUT"HOW LONG";N
150 POKE O+&H7A0C,N
160 IF N=0 THEN 220
170 FOR I=0 TO N-1
180 PRINT I+1":";
190 INPUT X
200 POKE I+O+&H7A0D,X
210 NEXT I
220 PRINT"SEQUENCE TO ADJUST LIN
EFEED"
230 INPUT"HOW LONG";N
240 POKE O+&H7A16,N
250 IF N=0 THEN 310
260 FOR I=0 TO N-1
270 PRINT I+1":";
280 INPUT X
290 POKE I+O+&H7A17,X
300 NEXT I
310 PRINT"HOW MANY DOTS HIGH IS
A LINE?"
320 INPUT X
330 IF X>8 THEN 310
340 POKE O+&H7A20,X
350 INPUT"MUST GRAPHICS CODES EX
CEED 127 (<Y>ES/<N>O)";Y$
360 IF Y$="Y" THEN POKE O+&H7A21
,255 ELSE POKE O+&H7A21,0
370 INPUT"WHICH DOT CORRESPONDS
TO THE LSB? (<T>OP / <B>OTTOM)";
T$
380 IF T$="T" THEN POKE O+&H7A22
,255 ELSE POKE O+&H7A22,0
390 INPUT"DO YOU WANT REVERSE VI
DEO STANDARD (<Y>ES/<N>O)";Y$
400 IF Y$="Y" THEN POKE O+&H7A24
,255 ELSE POKE O+&H7A24,0
410 INPUT"NEW FILE NAME";A$
420 INPUT"<T>APE OR <D>ISK";TD$
430 IF TD$="D" THEN SAVEM A$,&H7
A00+O,&H7C67+O,&H7A00+O ELSE INP
UT "READY TAPE";XX$: CSAVEM A$,&
H7A00+O,&H7C67+O,&H7A00+O
440 END
450 FOR I= 31232+O  TO  31847+O
460 READ X
470 POKE I,X
480 NEXT I
490 RETURN
500 DATA  32, 43, 2, 27, 64, 0,
0, 0
510 DATA  0, 0, 0, 0, 4, 27, 75,
 112
520 DATA  1, 0, 0, 0, 0, 0, 3, 2
7
530 DATA  65, 8, 0, 0, 0, 0, 0,
0
540 DATA  8, 0, 0, 112, 0, 255,
255, 255
550 DATA  255, 255, 255, 255, 25
5, 26, 80, 52
560 DATA  119, 15, 111, 127, 255
, 64, 23, 1
570 DATA  57, 23, 0, 209, 16, 38
, 0, 117
580 DATA  23, 1, 47, 23, 1, 64,
158, 186
590 DATA  49, 137, 23, 240, 16,
175, 140, 218
600 DATA  31, 18, 95, 23, 0, 246
, 23, 0
610 DATA  237, 23, 1, 62, 23, 0,
 254, 31
620 DATA  35, 16, 175, 140, 193,
 95, 52, 4
630 DATA  231, 140, 193, 134, 8,
 167, 140, 184
640 DATA  141, 70, 166, 140, 180
, 109, 140, 172
650 DATA  39, 1, 67, 109, 140, 1
64, 39, 3
660 DATA  23, 0, 123, 109, 140,
155, 39, 2
670 DATA  138, 128, 189, 162, 19
1, 106, 140, 152
680 DATA  38, 222, 31, 50, 53, 4
, 92, 193
690 DATA  32, 45, 203, 16, 174,
140, 135, 166
700 DATA  141, 255, 125, 49, 168
, 32, 74, 38
710 DATA  250, 16, 172, 141, 255
, 124, 16, 45
720 DATA  255, 161, 23, 0, 139,
53, 119, 57
730 DATA  16, 174, 141, 255, 105
, 166, 141, 255
740 DATA  95, 52, 2, 74, 39, 5,
49, 168
750 DATA  32, 32, 248, 53, 2, 16
7, 141, 255
760 DATA  84, 111, 141, 255, 84,
 99, 141, 255
770 DATA  80, 230, 141, 255, 79,
 26, 1, 16
780 DATA  172, 141, 255, 70, 44,
 10, 166, 165
790 DATA  230, 141, 255, 60, 70,
 90, 38, 252
800 DATA  102, 141, 255, 53, 49,
 168, 224, 106
810 DATA  141, 255, 42, 38, 220,
 57, 198, 8
820 DATA  167, 141, 255, 37, 102
, 141, 255, 33
830 DATA  73, 90, 38, 248, 57, 1
82, 255, 34
840 DATA  132, 1, 16, 39, 0, 41,
 23, 0
850 DATA  89, 23, 0, 100, 173, 1
59, 160, 0
860 DATA  16, 39, 0, 9, 129, 89,
 16, 39
870 DATA  0, 19, 22, 255, 224, 2
3, 0, 106
880 DATA  142, 128, 0, 48, 31, 3
8, 252, 23
890 DATA  0, 96, 22, 255, 223, 2
8, 0, 57
900 DATA  48, 141, 254, 190, 32,
 10, 48, 141
910 DATA  254, 194, 32, 4, 48, 1
41, 254, 198
920 DATA  230, 128, 39, 8, 166,
128, 189, 162
930 DATA  191, 90, 38, 248, 57,
230, 141, 254
940 DATA  194, 134, 0, 109, 141,
 254, 186, 39
950 DATA  2, 138, 128, 189, 162,
 191, 90, 38
960 DATA  250, 57, 142, 4, 0, 20
4, 96, 96
970 DATA  237, 129, 140, 6, 0, 3
8, 249, 57
980 DATA  48, 141, 0, 143, 32, 4
, 48, 141
990 DATA  0, 31, 166, 128, 129,
255, 16, 39
1000 DATA  0, 7, 173, 159, 160,
2, 22, 255
1010 DATA  241, 57, 142, 4, 0, 1
66, 132, 136
1020 DATA  64, 167, 128, 140, 6,
 0, 38, 245
1030 DATA  57, 32, 32, 32, 32, 3
2, 32, 32
1040 DATA  32, 32, 32, 32, 32, 3
2, 32, 86
1050 DATA  69, 82, 83, 65, 32, 3
2, 32, 13
1060 DATA  10, 13, 10, 32, 32, 3
2, 32, 32
1070 DATA  32, 32, 32, 32, 32, 3
2, 32, 66
1080 DATA  73, 84, 32, 68, 85, 7
7, 80, 13
1090 DATA  10, 13, 10, 32, 32, 3
2, 32, 32
1100 DATA  32, 32, 32, 32, 67, 7
9, 80, 89
1110 DATA  82, 73, 71, 72, 84, 3
2, 49, 57
1120 DATA  56, 52, 13, 10, 13, 1
0, 32, 32
1130 DATA  32, 32, 32, 32, 32, 3
2, 74, 69
1140 DATA  83, 83, 69, 32, 87, 4
6, 32, 74
1150 DATA  65, 67, 75, 83, 79, 7
8, 13, 10
1160 DATA  13, 10, 255, 32, 32,
32, 32, 32
1170 DATA  32, 32, 32, 32, 32, 3
2, 80, 82
1180 DATA  73, 78, 84, 69, 82, 3
2, 79, 70
1190 DATA  70, 32, 13, 10, 13, 1
0, 32, 32
1200 DATA  32, 32, 32, 32, 32, 3
2, 32, 82
1210 DATA  69, 84, 85, 82, 78, 3
2, 84, 79
1220 DATA  32, 66, 65, 83, 73, 6
7, 63, 13
1230 DATA  10, 13, 10, 32, 32, 3
2, 32, 32
1240 DATA  32, 32, 32, 32, 89, 6
9, 83, 32
1250 DATA  79, 82, 32, 78, 79, 3
2, 60, 89
1260 DATA  47, 78, 62, 13, 10, 1
3, 10, 255
```

END

BY JOHN MAJKA

THOSE AMAZING POKEs

Have you ever wished you could find all the POKEs for your CoCo in one handy place? Here they are.

Leafing through endless stacks of computer books and magazines to find some obscure bit of information is hardly the ideal way to spend spare computing time. To avoid this, I've collected some of the best POKEs known to Color Computerists (at least to me) in this one article.

POKEs Explained

A POKE statement follows the format of POKE L,V where L is any location in memory (0 to 65535) and V is a value between 0 and 255 to be placed in that memory location. The drawing in Fig. 1 shows the byte of memory at location 1024. The byte is divided into eight individual cells called bits (a contraction of binary digit). Note that the bits are numbered from zero to seven, right to left. Each bit can hold a value of zero (reset) or one (set).

If the location is POKEd with a value of 65, the bits contain 01000001, as the figure shows. Why? The decimal value of 65 is 01000001 in binary. Figure 2 helps you understand how to convert decimal to binary and vice-versa. Each bit has a position value that equals two to the power of the bit number. Bit 0 is the exception; it always has a position value of one. For example, bit 5 has a value of two to the power of five (the bit number), which equals 32. The bits have position values of 1, 2, 4, 8, 16, 32, 64, and 128. To actually convert a binary number to decimal, sum the position values of the set bits. In the first figure, you have the binary number 01000001. Bits 6 and 0 are set, so add 64 (the position value of bit 6) and one (the position value of bit 0), which yields 65, the number POKEd.

To convert a decimal number to binary, take the decimal number and see if each successive position value (starting with bit 7 and going down) can be subtracted from the number and still yield a positive number. If the subtraction can occur, then the bit number is set; otherwise, it is reset. Figure 3 illustrates this.

System Requirements

All Systems

GREAT COCO PRODUCTS

SUPER SCREEN

The Color Computer Supercharger

- A big 52 character by 24 line screen
- 'PRINT @' is fully implemented on the big screen
- Easily combine text with Hi-res graphics
- Auto-key repeat for greater keyboard convenience
- The 'ON ERROR GOTO' statement is fully implemented
- Control codes for additional function

Super Screen comes with complete, well detailed instructions and is available on cassette or disc. It adjusts automatically to any 16K or greater, Extended or Disc basic Color Computer or TDP-100 and uses only 2K of memory in addition to the screen memory reserved during power up. Guaranteed to be the most frequently used program in your software library...once you use it, you won't be without it!

Hot CoCo, Jan. '84 *"Super Screen represents a quality utility program that fills a definite need for the serious CoCo user. No other programs on the market so far have offered the error-trapping utility of Super Screen."*
Color Computer Magazine, May '84 *"Super Screen is a worthy addition to anyone's software library. It has become my most used utility and has made programming in BASIC on the Color Computer a joy..."*

Cassette $29.95 **Disc $32.95**

ORDER ENTRY SYSTEM

Rainbow, Feb.'84 *"If you are looking for a program to keep track of your sales and print invoices, then this one will take care of those needs quite well...A good program that would serve the invoicing needs of a small company quite nicely."*

The Mark Data Products sales order processing system provides a fast, efficient means to enter orders, print shipping papers and invoices, prepare sales reports, and monitor receivables. The system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

The MDP Order Entry System is a family of programs which operate interactively by means of a "menu" selection scheme. Up to 900 products may be defined and a single disc system can hold over 600 transactions. When the operator selects a task to be performed, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary paperwork including shipping and invoice forms, daily sales reports, a monthly (or other period) sales report and a receivables report.

This order entry software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

SUPER PRO KEYBOARD

ONLY $64.95*

- Original key layout
- Fast, easy installation—no soldering
- Individually boxed with full instructions
- Smooth "Touch Typist" feel—no sagging
- U.S. made—high quality, quad gold contacts
- Professional, low profile, finished appearance

* Computers produced after approximately October 1982 require an additional keyboard plug adapter. Please add $4.95.

NEW! EASY-FILE

Data Management System

- Need a good mailing list or customer list program? How about a program to keep track of your investments, your computer magazines, or record collection? Do you have an inventory of all household items for insurance purposes? **EASY-FILE** will do all of these things and many more.
- **EASY-FILE** makes data managing a breeze with single key menu selections, extensive error handling procedures, a demonstration data file and a detailed, easy to understand instruction manual.
- **EASY-FILE** is powerful too. It automatically enhances your monitor screen to a full upper and lower case 51 character by 24 line display. **EASY-FILE** allows up to 30 data fields and provides password file protection, selectable numeric totalling, and complete data searching and editing capabilities. You can quickly enter, locate, review and modify data records, and even transfer records from one file to another.
- Sorting? You bet! **EASY-FILE** allows you to sort up to 5 levels of data and allows you to define upper and lower limits as well. You can sort in many different ways and save the results in individual index files. These index files may be used later to determine what will appear on your printed reports.
- Reports are easily prepared with **EASY-FILE** because it offers so many automatic features. There is no need to generate complex report forms. With **EASY-FILE** you simply select from a list of options to determine what your report and header will look like. There are countless variations. **EASY-FILE** takes care of tabstops and field spacing automatically. Prepare horizontal reports (80 or 132 columns), vertical reports or labels! Save your favorite report formats right in a data file so they may be used whenever you need them.
- The **EASY-FILE** master disc and instructions are packaged in an attractive 3-ring binder. Requires 32K and at least one disc drive.

Order yours now! Get organized for only $59.95!

ACCOUNTING SYSTEM

Rainbow, May '84 *"Considering what it can do to organize a small business, it is quite a value."*

Hot CoCo, June '84 *"...a serious, professional accounting program and well worth its price. The programs are complete and simple to use."*

The Mark Data Products Accounting System is ideal for the small businessman needing a fast, efficient means to process income and expenses, prepare detailed reports and maintain most of the information required at tax time. The system is a family of programs which operate by means of a "menu" selection scheme. When the operator selects a task to perform, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary accounting reports including a transaction journal, a P & L or income report, an interim or trial balance and a balance sheet.

Up to 255 separate accounts may be defined and a single disc system can hold over 1,400 transactions. This system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

This accounting software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

NEW! UNIVERSAL VIDEO DRIVER

Carefully engineered to work with **ALL** Color Computer models, including the new **COCO II**

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

- Works with Monochrome Monitors!
- Works with Color Monitors!
- Audio Connection Included!
- Easy Installation—No Soldering!
- Great Price! **ONLY $29.95**

FREE - Send for our NEW 24 page catalog!

MD

Mark Data Products

24001 ALICIA PKWY., NO. 207 • MISSION VIEJO, CA 92691 • (714) 768-1551

SHIPPING: All orders under $100 please add $2 regular, $5 air. All orders over $100 please add 2% regular, 5% 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.

Sometimes it is useful to know what value a byte contains. The PEEK function can accomplish this. Its format is PEEK (L) where L is any memory location. When this function is used, it returns the contents of the specified byte in decimal. If you must know the contents of individual bits, convert the decimal value returned to binary digits.

The EXEC (execute) command follows the format of EXEC L where L is any location in memory. When you use the statement, it transfers control to the specified memory location.

Now that I've explained the POKE statement and its relatives PEEK and EXEC, let's move on to the POKEs themselves and their powerful capabilities. I'll describe four groupings of POKEs here: system alterations, graphics, disables, and odds and ends.

POKE 1024,65

Bit Numbers	7	6	5	4	3	2	1	0	
	0	1	0	0	0	0	0	1	Binary Equivalent of Decimal 65

Fig. 1. A Byte of Memory

Bit Numbers	7	6	5	4	3	2	1	0	
	0	1	0	0	0	0	0	1	
								$2^0 = 1$	Bit Position Values
							$2^1 = 2$		
						$2^2 = 4$			
					$2^3 = 8$				
				$2^4 = 16$					
			$2^5 = 32$						
		$2^6 = 64$							
	$2^7 = 128$								

Fig. 2. Bit Position Values

110 Decimal Must Be Converted To Binary

Can 128 Be Subtracted from 110?	No	
Can 64 Be Subtracted from 110?	Yes	110 – 64 = 46
Can 32 Be Subtracted from 46?	Yes	46 – 32 = 14
Can 16 Be Subtracted from 14?	No	
Can 8 Be Subtracted from 14?	Yes	14 – 8 = 6
Can 4 Be Subtracted from 6?	Yes	6 – 4 = 2
Can 2 Be Subtracted from 2?	Yes	2 – 2 = 0 (0 is positive)
Can 1 Be Subtracted from 0?	No	

Decimal 110 = Binary 01101110

Fig. 3. Decimal-to-Binary Conversions

System Alterations

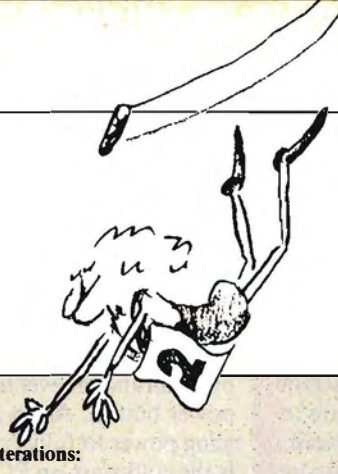
To begin, I turn to every Color Computer enthusiast's familiar friend, the double-speed POKE, more commonly known by its slang name, the Vitamin E POKE. To use the speed-up POKE, type POKE 65495,0. The cursor should now be blinking twice as fast. As a matter of fact, everything in the CoCo is operating twice as fast because this particular POKE doubles the clock speed of the computer. However, there is a drawback. While running under Vitamin E, input/output functions don't work, so be careful not to save any cassette or disk without putting the clock speed back to normal with POKE 65494,0.

If this POKE doesn't work, don't worry! Nothing is wrong with your Co-Co. Not all POKEs work on all computers, so just continue plowing through this article until you find something that does. If you have a disk system, that could be the source of your problem. Try removing the disk controller and entering the POKE again.

To increase your computer's efficiency, another POKE is better than the double-speed POKE. This one triples the Color Computer's clock speed. However, I must confess that I've seen only a few instances when this POKE worked. To use this super-command, type POKE 65497,0. The same restrictions that apply to the double-speed POKE are also in effect here. To set the clock speed straight, type POKE 65496,0.

Whenever I type parentheses, I tend to accidentally hit the zero key instead, thereby reversing the text and wasting time. POKE 282,1 prevents reversed text by locking characters into the normal mode. If, for some strange reason, you want to reverse your text, type POKE 282,0. The 282,0 POKE doesn't lock the text into reversed characters, as the 282,1 does.

The slow scrolling POKE 359,60 is one of the most interesting of the POKEs. When it's used, all text is printed at a slower rate, which is espe-



cially nice for listing programs. A curious side effect of this POKE is that you can enter graphics commands directly. You can change PMODEs, SCREENs, or any other graphics command and watch it execute. Try SCREEN 0,1. I particularly like the orange screen. Use POKE 359,126 to return to normal scrolling and counteract any graphics on the screen. This POKE won't work with the disk controller plugged in.

To prevent programs from listing, POKE 383,158. I put this POKE at the beginning of a program so that after it is run, the program cannot be listed. This can't protect a program from being seen if it is listed before it is run. Using this POKE with an auto-loader solves the problem, though. POKE 383,0 accomplishes normal listing.

Adventure games and the like usually take up a lot of memory. A PCLEAR0 command can reserve more RAM for a long program if it doesn't use graphics. Unfortunately, Extended Color Basic only supports a PCLEAR1. The memory displaced by that single graphics page might someday prevent a masterpiece of programming genius. You can eliminate it by entering POKE 25,6:NEW. The disk system doesn't allow this method to clear the final page of graphics memory. To PCLEAR0 with a disk system, type POKE 25,14:POKE 3584,0:NEW.

Baud Rate	POKE 149	POKE 150
50	4	88
75	2	227
110	1	246
134.5	1	153
150	1	110
300		180
600		87
1,200		40
1,800		25
2,000		23
2,400		18
3,600		10
4,800		7
7,200		3
9,600		1

Table 1. Baud-Rate-Selection POKEs

Color Computers with 64K have many advantages over models with less memory. Besides having more RAM, they have the ability to make major alterations to Basic. After entering the 64K RAM mode, you can change the cursor and OK prompt easily. The cursor is stored at location 41382. By a POKE 41382,128, you can change the cursor to a steady cyan box. Using a value of 192 instead of 128 results in a flashing blue cursor. You can change the prompt by POKE 44014,X:POKE 44015,X where X denotes any ASCII code. POKEing the two memory locations that store the prompt with 43 causes the OK to become + +. Again, you can use any ASCII character code you like.

If you have a modem or other hardware device that connects to the RS-232 port, you can increase (or decrease) the baud rate of the computer. See Table 1 for a complete listing of available rates and the POKEs to enact them.

System Alterations:	
Speed Up	POKE 65495,0
Normal Speed	POKE 65494,0
Triple Speed	POKE 65497,0
Normal Speed	POKE 65496,0
Lock into Uppercase	POKE 282,1
Reverse Text	POKE 282,0
Slow Scrolling	POKE 359,60
Normal Scrolling	POKE 359,126
Prevent Listing	POKE 383,158
Normal Listing	POKE 383,0
PCLEAR0	POKE 25,6:NEW
PCLEAR0 for Disk	POKE 25,14:POKE 3584,0:NEW
Steady Cyan Cursor	POKE 41382,128
Flashing Blue Cursor	POKE 41382,192
Change Prompt	POKE 44014,x:POKE 44015,x
Graphics	
Colorful Patterns	POKE 178,x
Change PCLS Colors	POKE 179,x
SCREEN 0,0	POKE 65314,0
SCREEN 0,1	POKE 65314,8
Color Set 0	POKE 65314,192
Color Set 1	POKE 65314,200
Blk., Red, Wht., Blu. Color Set	POKE 65314,248
Four Shades of Green	POKE 65314,240
Disables	
Disable Extended Basic	POKE 298,0:POKE 303,0
Restore Extended Basic	POKE 298,25:POKE 303,14
Odds and Ends:	
Cold Start-Up	POKE 113,0:EXEC 40999
Motor On	POKE 65313,4
Motor Off	POKE 65313,52
Hard Copy of Disk Directory	POKE 111,254:DIR
ROM Revision Number	EXEC 41175
Pause Until Key Is Pressed	EXEC 44539

Table 2. Quick-Reference Chart

Graphics

You like good graphics but the Color Computer has limitations. You believe Assembly language is required to have a wide selection of colors in the higher resolutions. Wrong! Actually, you can attain almost any color or pattern with a single POKE. That magic command is POKE 178,X where X is any value between 0 and 255 that denotes a color or combination of colors. Look at Program Listing 1. If you've never seen the 178 POKE in action before, type in and run the program. It runs through each of

the colors possible with the 178 POKE in PMODE4. You probably won't care to watch all of the available combinations. Try changing the color set and the PMODE for a different combination of colors. Look at line 50 of the program. The two commas in the PAINT statement are important. After you execute the 178 POKE, all graphics are drawn with the POKEd color unless you specify another color. This POKE is most effective in PMODEs 3 and 4.

A close cousin of the 178 POKE is the 179 POKE. You use it exactly like the 178 POKE as far as the values POKEd go, but it behaves slightly differently. The 179 POKE changes the PCLS colors. Type in and run Program Listing 2 to see what I mean.

You POKE maniacs probably want to know how to change graphics color sets with a POKE instead of the Extended Basic commands. For SCREEN 0,0 (green text screen), POKE 65314,0. For the orange SCREEN 0,1 POKE 65314,8. To use the graphics screen POKEs, you must set the graphics mode and execute a SCREEN 1 (no comma or second number). The POKE for color set 0 is POKE 65314,192, and POKE 65314,200 enacts color set 1. Color sets not supported by the Basic ROMs are also available. For a black, red, white, and blue color set (in PMODE3), POKE 65314,248. You can obtain a set of colors consisting of four shades of green by POKEing location 65314 with 240.

Disables

One major aspect of writing a program is to determine the system requirements. Instead of running a program on both an Extended Basic computer and a regular Color Basic model, it's much more efficient to simply disable Extended Basic and run the program once. The commands to put the expansion ROM into temporary stasis are POKE 298,0:POKE 303,0. After you enter the POKEs, the CoCo no longer understands Extended Basic commands. Restoration of the Extended ROM is every bit as easy as disabling it; just POKE 298,25:POKE 303,14.

Odds and Ends

Continually turning the Color Computer on and off eventually wears out the power button. As an alternative to toggling power to fully erase memory, here is the cold start-up POKE, my personal favorite. To cause a cold start-up, type POKE 113,0:EXEC 40999. A few moments later, the Extended or Color Basic banners appear. This POKE is good to use for obliterating a machine-language program put into a CLEARed memory location because it completely erases RAM, unlike the NEW statement.

You can turn the cassette motor on or off by either the Basic commands or with a POKE 65313,4 to start the motor or a POKE 65313,52 to shut it off.

If you want to print out a disk directory on your printer, POKE111, 254: DIR produces a hardcopy of the contents of any disk.

Technology is always on the move as evidenced by the ROM revision numbers. There are two Extended Basic revisions (1.0 and 1.1) and three revisions of Color Basic (1.0, 1.1, and 1.2). Each revision of ROM added something new or fixed a fault in a previous ROM. On power-up on Extended Basic machines, the Extended Basic ROM announces its revision number, but in Color Basic, you can find the ROM revision number by typing EXEC 41175.

Most programmers use the INKEY$ function to make a program pause until they press a key. That's fine if the key pressed has any significant part in the program. When it's used just to let the computer know that you're ready to continue with the program, INKEY$ takes up a lot of space. A less cumbersome method is to EXEC 44539. This command causes the computer to wait until it receives a response from the keyboard, and then it executes the next command in the program.

Table 2 lists all the POKEs explained here and can serve as a quick-reference guide for you to use when you're in the heat of programming. ■

Address correspondence to John Majka, 387 Brook Drive, Valparaiso, IN 46383.

Program Listing 1.
178 POKE Demonstration Program

```
10 PMODE 4,1:SCREEN1,1:PCLS
20 FOR X= 1 TO 255
30 CIRCLE(128,96),50,5
40 POKE 178,X
50 PAINT(128,96),,5
60 PCLS:NEXT
```

Program Listing 2.
179 POKE Demonstration Program

```
10 PMODE 4,1:SCREEN1,1:PCLS
20 FOR X= 1 TO 255
30 POKE 179,X
40 PCLS
50 FOR T= 1 TO 200:NEXT T,X
```

Can't get past the snake?
Can't find the treasure room?
Are you still lost in:

THE SANDS OF EGYPT

The clues to solve these problems are contained in *Percy's Diary*.

Adventurers can still solve the games on their own, but the clues are in *Percy's Diary* if you need them.

How to make reliable adventure maps.

Help when you need it—*Encrypted clue sheets.*

Percy's own solution in less than 85 moves, (sealed separately). *BEAT THAT!*

Help is on the way. Send check or money order with a self-addressed, stamped envelope to :

J.B. Carvaly
Box 165
Corona, CA 91720
(714-735-6405)

First 100 orders. . .$3.95 (reg. $4.95) *Trademark of Tandy Corp. &Datasoft Corp.

Circle Reader Service card #454

DISK DRIVES

DRIVE 0 $249.

DRIVE 1 $169.

KEYBOARDS

Keytronics Keyboard $69.

MEMORY

64K (8) CHIPS $45.

PRINTER ADAPTER

PARALLEL PRINTER ADAPTER $ 50.

Southwestern Digital
1-713-480-3296
2515 W. Main #337, Houston, Texas 77098

Ordering Information
All prices reflect a pre madediscount for cash. Visa MasterCard orders are at regular price [illegible]
[illegible]

DYNAMITE+™

"THE CODE BUSTER"

disassembles any 6809 or 6800 machine code program into beautiful source

- Learn to program like the experts!
- Adapt existing programs to your needs!
- Convert your 6800 programs to 6809!
- Automatic LABEL generation.
- Allows specifying FCB's, FCC's, FDB's, etc.
- Constants input from DISK or CONSOLE.
- Automatically uses system variable NAMES.
- Output to console, printer, or disk file.
- Available for all popular 6809 operating systems.

FLEX™ $100 per copy; specify 5" or 8" diskette.
OS-9™ $150 per copy; specify 5" or 8" diskette.
UniFLEX™ $300 per copy; 8" diskette only.

For a free sample disassembly that'll convince you DYNAMITE + is the world's best disassembler, send us your name, address, and the name of your operating system.

NEW CoCo OS-9 VERSION

$59.95

DISASSEMBLES OS-9, FLEX, DOS FILES

Order your DYNAMITE+ today!

See your local DYNAMITE + dealer, or order directly from CSC at the address below. We accept telephone orders from 10 am to 6 pm, Monday through Friday. Call us at 314-576-5020. Your VISA or MasterCard is welcome. Orders outside North America add $5 per copy. Please specify diskette size for FLEX or OS-9 versions.

Circle Reader Service card #507

Computer Systems Center
13461 Olive Blvd.
Chesterfield, MO 63017
(314) 576-5020

CSC

UniFLEX software prices include maintenance for the first year.

DYNAMITE + is a trademark of Computer Systems Center.

MasterCard

FLEX and UniFLEX are trademarks of TSC.
OS-9 is a trademark of Microware and Motorola.
Dealer Inquiries welcome.

VISA

DISK $44.95

NEW

Introducing The "Super Smart"

DATA PACK II

TERMINAL COMMUNICATIONS SOFTWARE

NEW

TAPE $34.95

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

28-64x24 Hi-Resolution Display

64K Support Up To 55K Text Buffer

9 Unlimited Variable Length Macro Key Buffers

BUFFER EDITOR Insert, Delete Change or Add To Buffer

"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 Exrra 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

NEW!!!

"The Wait is Finally Over"

ANNOUNCING
The CBASIC COMPILER

NEW!!!

Now anyone can create fast efficient Machine Language Programs without the Drudgery of using an Assembler.

CBASIC is a fast Machine Language integer Basic Complier that can convert Color Basic programs into fast machine language programs. CBASIC features over 100 Basic Commands and functions that fully support Disk, Tape, Screen and Printer I/O, Hi & Low Resolution Graphics, Sound, Play and String Operations just like Color Basic. CBASIC also includes a powerful full featured Basic program Editor using a 51,64 or 85 by 24 line display. The Hi-Resolution display can be automatically included in your compiled program for enhanced display capability and allow mixed text and graphic displays.

Graphics Commands:	CIRCLE, COLOR, CLS, DRAW, GET, LINE, PAINT, PCLS, PCOPY, PMODE, PRESET, PSET, PUT, RESET, SCREEN, SET, POINT, PPOINT
Sound Commands:	PLAY, SOUND
String Functions:	CHR$, LEFT$, MID$, RIGHT$, LEN, INSTR, LSET, RSET, TRM$, STR$, STRING$, INKEY$, MKN$
Numeric Functions:	ABS, POS, TIMER, RND, ASC, TAB, CAL, JOYSTK, PEEK, POKE, LOC, LOF, EOF, FREE, CVN, ERR, VARPTR, SWAP
I/O Commands:	OPEN, CLOSE, INPUT, LINEINPUT, PRINT WRITE, PRINT @, GET, PUT, KILL, CHAINM, FIELD, DATA, READ, RESTORE
Program Control:	FOR/NEXT/STEP, GOTO/GOSUB, IF/THEN/ELSE, RETURN, STOP, RETI, ON n GOTO/GOSUB, ON ERROR, ON RESET, ON IRQ/FIRQ/NMI, ON OVR/NOVR, EXEC, LET
Directives:	ORG, REM OR ', END, DIM, END, BASE, RAM, ON/OFF, RAM64K, HIRES, GENERATE, DPSET, STACK
Editor Commands:	LINE EDIT, AUTO EDIT, COPY, MOVE, RENUMBER, AUTO LINE#, PRINTER, LIST, DELETE, SEARCH, REPLACE, BAUD RATE, PRINTER, CBASIC, TAPPEND, SKIP, SIZE..LOAD, SAVE, APPEND, KILL, DIR, and much, much more.

REQUIRES 32K and Disk. 64K recommended

Introductory Price $119.00
Regularly $149.00

HI — RES II SCREEN UTILITY

NEW IMPROVED VERSION

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

- FULLY BASIC COMPATIBLE
- DISPLAY FORMATS OF 28 to 255 CHARACTERS PER LINE
- FULL 96 UPPER/LOWER CASE CHARACTERS
- MIXED GRAPHICS & TEXT OR SEPARATE GRAPHIC & TEXT SCREENS
- INDIVIDUAL CHARACTER HIGHLIGHTING
- REVERSE CHARACTER HIGHLIGHT MODE
- WRITTEN IN FAST MACHINE LANGUAGE
- AUTOMATIC RELOCATES TO TOP OF 16/32K
- AUTOMATICALLY SUPPORTS 64K of RAM WITH RESET CONTROL
- REVERSE SCREEN
- ON SCREEN UNDERLINE
- DOUBLE SIZE CHARACTERS
- ERASE TO END OF LINE
- ERASE TO END OF SCREEN
- HOME CURSOR
- BELL TONE CHARACTER
- HOME CURSOR & CLEAR SCREEN
- REQUIRES ONLY 2K OF RAM
- COMPATIBLE WITH ALL TAPE & DISK SYSTEMS

$24.95 TAPE $29.95 DISK

ALL ORDERS SHIPPED FROM STOCK
ADD $2.50 POSTAGE

Circle Reader Service card #335

CER COMP

5566 Ricochet Avenue Las Vegas, Nevada 89110

(702) 452-0632

Screen Enhancement Program Comparison Chart

PROGRAM FEATURES	HI-RES II NEW	HI-RES I OLD	BRAND X
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
X,Y Coordinate Cursor 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	No
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	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatability	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	$24.95	$19.95	$29.95

VISA master charge

VISA, MASTERCARD AND C.O.D. ACCEPTED

BY JAMES W. WOOD

This program is available on our Instant CoCo cassette.
See the Instant CoCo ad elsewhere in this issue.

Colorful Cap'n Chemistry

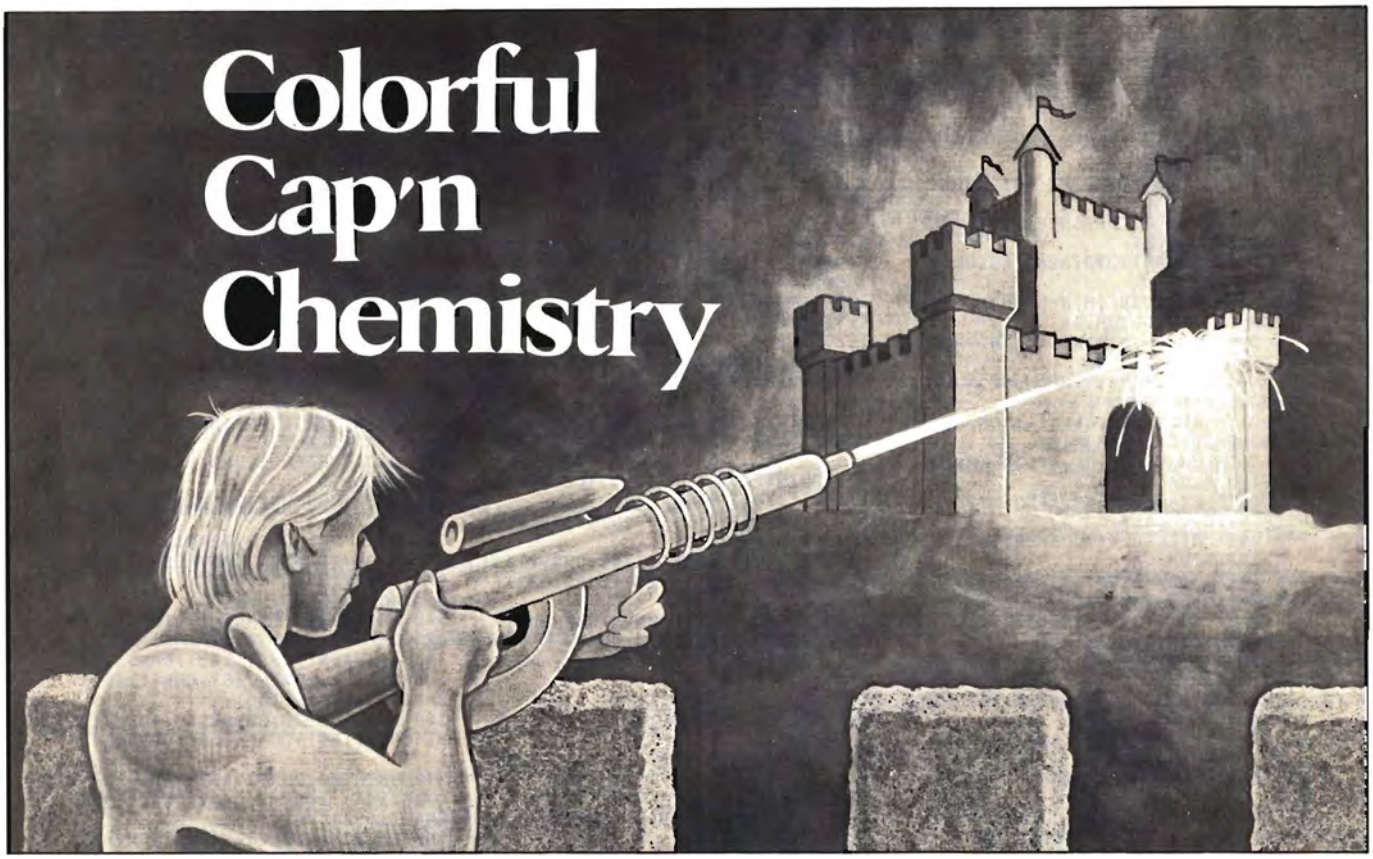


Illustration by Richard Cowdrey

Learn the element symbols and valences with the help of Cap'n Chemistry and his laser.

Two Color Computer games featuring Cap'n Chemistry make learning an element's symbol and its oxidation state fun instead of a boring task of memorization.

A program for learning the correct symbol of each of the 103 elements was introduced for the TRS-80 Models I and III in *80 Micro* (February, 1982). This color version (Listing 1) covers 50 elements due to the smaller number of set graphic positions on the CoCo screen. By entering different elements into the data lines of the listing, you can make several versions of the game.

In this element game, a correct answer strengthens the Cap'n's laser; an incorrect answer strengthens the Evil Element's laser. Each laser is firing toward the opponent's castle. Enough correct or incorrect answers end the game. If you answer all 50 symbols correctly, you earn your Cap'n Chemistry cape (a lab apron worn backwards).

Listing 2 requires you to give the most stable oxidation state of a named element. The graphics involve lines, which become longer with each correct and incorrect answer. You better hope that the line representing correct elements reaches its Erlenmeyer flask first. You can change the level of difficulty by changing the distance to the incorrect line's flask.

Both games respond to incorrect answers by giving the correct answer. When you answer an element's symbol or oxidation state correctly, that element is removed from the questions. An incorrect answer causes that element to come up again at random.■

Address correspondence to James W. Wood, 424 N. Missouri, Atwood, IL 61913.

System Requirements

Color Computer or MC-10
16K or 20K RAM
Color Basic or Micro Color Basic

Program Listing 1. Element Symbols

```
10 CLS:CLEAR200:DIME$(50),S$(50)
,JW(50)
20 FORA=1TO7:READ C$(A),IC$(A):N
EXTA
30 DATA QUIT CHEATING,HA HA,PUT
THE CHART AWAY,BAD GUESS,SHOW OF
F,SORRY,GOOD GUESS,EVIL LIKED TH
AT
40 DATA CAPTAIN IS PROUD,TRY HAR
DER,YEA TEAM,BOO HISS,GOOD SHOW,
STUDY MUCH?
50 C(1)=4:C(2)=5:C(3)=3
60 FORA=1TO25:BL$=BL$+CHR$(128):
NEXTA
70 FORA=1TO8:R$=R$+CHR$(191):NEX
TA:L$=CHR$(175)+CHR$(170)+CHR$(1
65)+CHR$(175)
80 PRINTTAB(4)"HELP CAPTAIN CHEM
ISTRY"
90 PRINTTAB(3)"BATTLE THE FORCES
 OF THE"
100 PRINTTAB(8)"EVIL ELEMENTS."
110 PRINT:PRINT"  YOU ARE TO GIV
E THE CORRECT"
120 PRINT"SYMBOL FOR EACH ELEMEN
T NAMED."
130 PRINT"(USE ALL CAPITOL LETTE
RS.)
140 PRINT"CORRECT ANSWERS STRENG
THEN THE"
```

Listing continued

Listing continued

```
15Ø PRINT"CAPTAIN'S DESTRUCTO RA
Y.
16Ø PRINT"INCORRECT ANSWERS HELP
 THE"
17Ø PRINT"EVIL SIDE OF THE ELEME
NTS."
18Ø PRINT:PRINT"DON'T LET CAPTAI
N CHEMISTRY BE"
19Ø PRINT"DESTROYED BY EVIL ELEM
ENTS."
2ØØ PRINT:INPUT"PRESS <ENTER> TO
 CONTINUE.";EN$
21Ø CLS3:FORA=1TO5Ø:READ E$(A),S
$(A):NEXTA
22Ø DATA HYDROGEN,H,HELIUM,HE,LI
THIUM,LI,BERYLLIUM,BE
23Ø DATA BORON,B,CARBON,C,NITROG
EN,N,OXYGEN,O
24Ø DATA FLUORINE,F,NEON,NE,SODI
UM,NA,MAGNESIUM,MG
25Ø DATA ALUMINUM,AL,SILICON,SI,
PHOSPHORUS,P,SULPHUR,S
26Ø DATA CHLORINE,CL,ARGON,AR,PO
TASSIUM,K,CALCIUM,CA
27Ø DATA CHROMIUM,CR,MANGANESE,M
N,IRON,FE,COBALT,CO
28Ø DATA NICKEL,NI,COPPER,CU,ZIN
C,ZN,GALLIUM,GA
29Ø DATA GERMANIUM,GE,ARSENIC,AS
,SELENIUM,SE,BROMINE,BR
3ØØ DATA KRYPTON,KR,RUBIDIUM,RB,
STRONTIUM,SR,SILVER,AG
31Ø DATA TIN,SN,ANTIMONY,SB,IODI
NE,I,XENON,XE
32Ø DATA CESIUM,CS,BARIUM,BA,PLA
TINUM,PT,GOLD,AU
33Ø DATA MERCURY,HG,LEAD,PB,RADO
N,RN,FRANCIUM,FR
34Ø DATA RADIUM,RA,URANIUM,U
35Ø CLSØ
36Ø PRINT@32,CHR$(145)+CHR$(145)
;:PRINT@64,CHR$(149)+CHR$(159)+C
HR$(163);
37Ø PRINT@96,CHR$(149)+CHR$(151)
;:PRINT @128,CHR$(148)+CHR$(156)
;
38Ø PRINT@29,CHR$(178)+CHR$(178)
+CHR$(178);:PRINT@61,CHR$(191)+C
HR$(189)+CHR$(186);
39Ø PRINT@92,CHR$(163)+CHR$(191)
+CHR$(19Ø)+CHR$(186);
4ØØ PRINT@125,CHR$(191)+CHR$(189
)+CHR$(186);
41Ø PRINT@157,CHR$(188)+CHR$(188
)+CHR$(184);
42Ø PRINT@16Ø,"CAPTAIN    ";:PRI
NT@192,"CHEMISTRY'S";:PRINT@224,
"CASTLE     ";
43Ø PRINT@183,"EVIL      ";:PRINT
@215,"ELEMENT'S";:PRINT@247,"EMP
IRE    ";
44Ø PRINT@29Ø,"WHAT IS THE SYMBO
L FOR---";
45Ø R=RND(5Ø):IF JW(R)=1 THEN 45
Ø
46Ø PRINT@354,BL$;:PRINT@374,LEF
T$(BL$,1Ø);
47Ø PRINT@418,BL$;:PRINT@48Ø,BL$
;
48Ø PRINT@354,E$(R);:PRINT@374,"
";:INPUTAN$
49Ø IF AN$=S$(R) THEN JW(R)=1:GO
TO5ØØ
492 GOTO 53Ø
5ØØ NC=NC+1:FORA=1TO3:SOUND15Ø,1
:FORB=6 TO 6+NC:SET(B,5,C(A)):NE
XTB:FORB=6 TO 6+NC:RESET(B,5):NE
XTB:NEXTA
51Ø PRINT@418,C$(RND(7));
52Ø IF NC=5Ø THEN 6ØØ
525 GOTO56Ø
53Ø NI=NI+2:SOUND3Ø,3:FORA=55TO5
5-NI STEP-1:SET(A,5,2):NEXTA:FOR
A=55TO 55-NI STEP-1:RESET(A,5):N
EXTA
54Ø IF NI=5Ø THEN 77Ø
55Ø PRINT@418,IC$(RND(7))+". IT'
S "+S$(R)+" ";
56Ø PRINT@48Ø,"PRESS <ENTER> TO
CONTINUE";
57Ø IN$=INKEY$
58Ø A$=INKEY$:IFA$=""THEN58Ø
59Ø IFASC(A$)=13 THEN 45Ø
595 GOTO58Ø
6ØØ CLSØ:PRINT@11Ø,CHR$(147)+CHR
$(147)+CHR$(147)+CHR$(147);
61Ø PRINT@141,CHR$(148)+CHR$(159
)+CHR$(168)+CHR$(168)+CHR$(159)+
CHR$(152);
62Ø PRINT@174,CHR$(159)+CHR$(159
)+CHR$(159)+CHR$(159);:PRINT@2Ø7
,CHR$(149)+CHR$(154);
63Ø PRINT@236,R$;:PRINT@268,CHR$
(191)+CHR$(128)+LEFT$(R$,4)+CHR$
(128)+CHR$(191);
64Ø PRINT@3ØØ,CHR$(191)+CHR$(128
)+LEFT$(R$,4)+CHR$(128)+CHR$(191
);
65Ø PRINT@332,CHR$(158)+CHR$(128
)+LEFT$(R$,4)+CHR$(128)+CHR$(157
);
66Ø PRINT@366,CHR$(175)+CHR$(175
)+CHR$(175)+CHR$(175);
67Ø PRINT@398,L$;:PRINT@43Ø,L$;:
PRINT@462,L$;
68Ø PRINT@493,CHR$(179)+CHR$(183
)+CHR$(128)+CHR$(128)+CHR$(187)+
CHR$(179);
69Ø PRINT@36,"YOU HAVE EARNED YO
UR CAPE":FORT=1TO3ØØ:NEXTT
7ØØ FORA=14TO2Ø:SET(37-A,A,4):NE
XTA
71Ø SET(17,21,4):SET(17,22,4)
72Ø FORA=16TO27:SET(A,23,4):NEXT
A
73Ø FORA=36TO47:SET(A,23,4):NEXT
A
74Ø SET(46,22,4):SET(46,21,4)
75Ø FORA=2ØTO14STEP-1:SET(A+26,A
,4):NEXTA
76Ø GOTO78Ø
77Ø FORA=8 TO Ø STEP-1:SOUND2Ø,1
:CLS(A):NEXTA:PRINT@196,"YOU LET
 THE CAPTAIN DOWN"
78Ø PRINT"TRY AGAIN (Y/N)?"
79Ø A$=INKEY$:IFA$="Y"THEN RUN
795 IF A$="N" THEN END
8ØØ GOTO 79Ø
```

Program Listing 2. Stable Valence

```
1Ø CLS3:CLEAR2ØØ:DIM E$(5Ø),V$(5
Ø),JW(5Ø)
2Ø FORA=1TO32:BL$=BL$+CHR$(128):
NEXTA
3Ø FORA=1TO5Ø:READ E$(A),V$(A):N
EXTA
4Ø PRINT:PRINTTAB(6)"**VALENCE T
IME**"
5Ø PRINT"  GIVE THE MOST STABLE
VALENCE":PRINT"FOR EACH ELEMENT
NAMED."
6Ø PRINT"DON'T FORGET TO USE A N
EGATIVE":PRINT"SIGN FOR NEGATIVE
 ANSWERS."
7Ø PRINT:PRINT"YOU WANT THE LINE
 REPRESENTING":PRINT"CORRECT ANS
WERS TO REACH IT'S":PRINT"FLASK
FIRST!!"
8Ø PRINT:PRINT"PRESS <ENTER> TO
CONTINUE"
9Ø IN$=INKEY$
1ØØ A$=INKEY$:IFA$="" THEN1ØØ
1Ø5 IF ASC(A$)=13 THEN 11Ø
1Ø7 GOTO 1ØØ
11Ø CLS
12Ø IN$=INKEY$
13Ø PRINT:PRINT"DIFFICULTY  (E)A
SY, (M)EDIUM,     (H)ARD, (I)MPO
SSIBLE";
14Ø D$=INKEY$:IFD$=""THEN14Ø
15Ø IFD$="E"THEN D=153:GOTO2ØØ
16Ø IF D$="M" THEN D=146:GOTO 2Ø
Ø
17Ø IF D$="H" THEN D=139:GOTO 2Ø
Ø
18Ø IFD$="I" THEND=132:GOTO2ØØ
19Ø GOTO13Ø
2ØØ DATA HYDROGEN,1,HELIUM,Ø,LIT
HIUM,1,BERYLLIUM,2
21Ø DATA BORON,3,CARBON,-4,NITRO
GEN,-3,OXYGEN,-2
22Ø DATA FLUORINE,-1,NEON,Ø,SODI
UM,1,MAGNESIUM,2
23Ø DATA ALUMINUM,3,SILICON,4,PH
OSPHORUS,5,SULFUR,6
24Ø DATA CHLORINE,-1,ARGON,Ø,POT
ASSIUM,1,CALCIUM,2
25Ø DATA CHROMIUM,3,MANGANESE,2,
IRON,3,COBALT,2
26Ø DATANICKEL,2,COPPER,2,ZINC,2
,GALLIUM,3
27Ø DATA GERMANIUM,4,ARSENIC,-3,
SELENIUM,4,BROMINE,-1
28Ø DATA KRYPTON,Ø,RUBIDIUM,1,ST
RONTIUM,2,SILVER,1
29Ø DATA TIN,4,ANTIMONY,-3,IODIN
E,-1,XENON,Ø
3ØØ DATACESIUM,1,BARIUM,2,PLATIN
UM,4,GOLD,3
31Ø DATA MERCURY,2,LEAD,2,RADON,
Ø,FRANCIUM,1
32Ø DATA RADIUM,2,URANIUM,6
33Ø CLSØ:PRINT@9,"**VALENCE GAME
**";:PRINT@32,"CORRECT";:PRINT@9
6,"INCORRECT";
34Ø PRINT@257,"WHAT IS THE VALEN
CE OF---";
35Ø PRINT@57,CHR$(145)+CHR$(147)
+CHR$(146);:PRINT@89,CHR$(145)+C
HR$(159)+CHR$(146);
36Ø PRINT @12Ø,CHR$(145)+CHR$(15
9)+CHR$(159)+CHR$(159)+CHR$(146)
;
37Ø PRINT@D,CHR$(145)+CHR$(147)+
CHR$(146);:PRINT@D+32,CHR$(145)+
CHR$(159)+CHR$(146);
38Ø PRINT@D+63,CHR$(145)+CHR$(15
9)+CHR$(159)+CHR$(159)+CHR$(146)
;
39Ø R=RND(5Ø):IF JW(R)=1THEN39Ø
4ØØ PRINT@325,BL$;:PRINT@345,LEF
T$(BL$,7);
41Ø PRINT@324,E$(R);
42Ø PRINT@345,"";:INPUT AN$
43Ø IF AN$<>V$(R) THEN NI=NI+1:G
OTO 432
431 GOTO 435
432 IF POINT(NI+1,11)<>ØTHEN48Ø
434 SET(NI,1Ø,8):GOTO45Ø
435 NC=NC+1
44Ø IF NC=5Ø THEN 5ØØ
445 SET(NC,4,3):JW(R)=1:PRINT@38
8,"CORRECT";:GOTO46Ø
45Ø PRINT@388,"INCORRECT, IT IS
";V$(R);
46Ø PRINT@449,"PRESS <ENTER> TO
CONTINUE";:INPUT E$
47Ø PRINT@388,BL$;:PRINT@449,BL$
;:GOTO39Ø
48Ø 'LOSE
49Ø CLS:FORA=1TO1Ø:CLS(RND(9)-1)
:SOUNDRND(1ØØ),1:NEXTA:CLS:PRINT
:PRINT"SORRY":PRINT"THE VALENCE
GAME DESTROYED YOU":GOTO58Ø
5ØØ 'WIN
51Ø FORB=1TO3:FORA=-1TO6
52Ø PRINT@57,CHR$(145+16*A)+CHR$
(147+16*A)+CHR$(146+16*A);
53Ø PRINT@89,CHR$(145+16*A)+CHR$
(159+16*A)+CHR$(146+16*A);
54Ø PRINT@12Ø,CHR$(145+16*A)+CHR
$(159+16*A)+CHR$(159+16*A)+CHR$(
159+16*A)+CHR$(146+16*A);
55Ø SOUNDRND(1ØØ)+1ØØ,1
56Ø NEXTA,B
57Ø CLS:PRINT:PRINT"YOU ARE NOW
A VALENCE PERSON"
58Ø PRINT:PRINT"PLAY AGAIN? (Y/N
)
59Ø IN$=INKEY$:IF IN$="Y"THEN RU
N
595 IF IN$="N" THEN END
6ØØ GOTO 59Ø
```

END

ATTENTION SUBSCRIBERS

We occasionally make our mailing list available to other companies or organizations with products or services which we feel might be of interest to you. If you prefer that your name be deleted from such a list, please fill out the coupon below or affix a copy of your mailing label and mail it to:

CW Communications/Peterborough
HOT CoCo
P.O. Box 975
Farmingdale, NY 11737

Please delete my name from mailing lists sent to other companies or organizations.

name _____

address _____

city _____ state _____ zip _____

HOT CoCo

Circle Reader Service card #361

Now Your Computer Can See!

$295.00*

A total imaging system complete and ready for plug-and-go operation with your personal computer.

MicronEye™ "Bullet"

The MicronEye™ offers selectable resolution modes of 256 x 128 and 128 x 64 with operating speeds up to 15 FPS. An electronic shutter is easily controlled by software or manual functions, and the included sample programs allow you to continuously scan, freeze frame, frame store, frame compare, print and produce pictures in shades of grey from the moment you begin operation.

Only the MicronEye™ uses the revolutionary IS32 OpticRAM™ image sensor for automatic solid state image digitizing, with capability for greytone imaging through multiple scans. And with these features, the MicronEye™ is perfectly suited for graphics input, robotics, text and pattern recognition, security, digitizing, automated process control and many other applications.

The MicronEye™ is available with immediate delivery for these computers: Apple II, IBM PC, Commodore 64 and the TRS-80CC (trademarks of Apple Computer Inc., International Business Machines, Commodore Corp., and Tandy Corp. respectively).

Phone for MicronEye™ information on the Macintosh, TI PC and RS232 (trademarks of Apple Computer Inc. and Texas Instruments respectively.)

*(Add $10.00 for shipping and handling | Federal Express Standard Air); residents of the following states *must add sales tax*: AK, AZ, CA, CO, CT, FL, GA, IA, ID, IL, IN, LA, MA, MD, ME, MI, MN, NC, NE, NJ, NY, OH, PA, SC, TN, TX, UT, VA, VT, WA, WI.)

MICRON TECHNOLOGY, INC.
SYSTEMS GROUP
1475 Tyrell Lane
Boise, Idaho 83706
(208) 386-3800
TWX 910-970-5973

Mouse Technological Software For The Color Computer!

Many Companies call their Home and Business Software User Friendly . . .

COMING SOON!

ONLY ONE CALLS IT

Child's Play™

T C E

Send for FREE Catalog

TCE BUSINESS DIVISION
P.O. BOX 2477
GAITHERSBURG, MD 20879
1-(301) 963-3848

MasterCard VISA

Circle Reader Service card #386

See List of Advertisers on page 89

This program is available on our Instant CoCo cassette.
See the Instant CoCo ad elsewhere in this issue.

EXPENSE REPORTS MADE EASY

Finally, a program to take the drudgery out of keeping track of your travel expenses.

If you travel in your normal business routine, accounting for your expenses after the trip is probably not your favorite task. However, unless you're a compulsive record keeper, you must do your expense report as soon as possible to avoid becoming a victim of your own poor memory.

Expense Report

Expense Report takes the drudgery out of this task. It's fully menu driven. It uses the INKEY$ function where immediate screen action is desired and the INPUT function where it's desirable to control action with the enter key. It allows for entry of all necessary data, then does the arithmetic for you, and enables you to edit the data and recalculate the results, either before or after printing out the report.

The printout is carefully formatted so you can see all the information at a glance. The program provides for disk storage of the data, and the data can be edited and recalculated after loading it in from disk. If you don't have a disk system, the last paragraph has instructions concerning conversion of Expense Report for use with tape.

If you don't have a printer, Expense Report can still help you because all the totals are written to the screen, and you can use all the editing routines. Unfortunately, since Expense Report uses more than 20K of RAM, you can't use it with a 16K CoCo.

Expense Report is written entirely in Basic, so it's quite simple to modify any part of the program for your own needs. As it appears here, it allows for an expense report covering one to five days. The five-day limit is an arbitrary decision to make a printout on an 80-column printer easy to read. If you have a 15-

System Requirements

32K RAM
Disk Extended Color Basic
Disk Drive
(Will work with cassette with modification)
Printer Optional

inch printer, you can easily extend the maximum number of days to 10 by careful formatting and making the necessary changes in the program. You can also extend the maximum number of days even with an 80-column printer by using the compressed-type mode. To fit the entire report on an 8½- by 11-inch sheet of paper, position the print head at the very top of the sheet.

Special Features

Some features of Expense Report deserve more detailed attention. Refer to Table 1, a list of the variables used, and Table 2, a sample expense-report printout.

Expense Report uses a four-layered set of double-dimensioned variables. The first layer contains the variable XP, which holds the dollar amounts of each of the 13 daily expense items (IT$), plus the daily totals (row 14), and item totals (column 6). The variable XP is, therefore, dimensioned for 14 rows and six columns (XP(14,6)).

The remaining three layers contain three other variables. Each of these variables (F1, F2, and F4) represent flags that add information about the item to which they apply. Specifically, F1 indicates whether the item was paid for with cash (out-of-pocket) and/or was nonbillable. The item to which F1 applies is flagged with c, n, or cn.

The variable F2 indicates an explanatory comment for the item, and the item is flagged with a number (from one to 12) referring to the like-numbered comment. The variable F4 indicates that the item is billable (chargeable) to a secondary account, and that item is flagged with an s.

The transportation items be can similarly flagged with the exception that no provision is made for explanatory comments for transportation items. Variable F3 is the cash and/or nonbillable flag, while F5 is the secondary account charge flag for transportation items.

When you start a new expense report, choose "Input Data" from the main menu. The first information you must input is the number of days covered by the report, which must have a minimum value of one or the program won't proceed. After you provide some additional identifying information, you reach the first actual expense item: Breakfast. When entering a dollar amount, don't use the dollar sign, and if it's an even amount (no cents), don't enter the decimal point and two zeros. All numbers are automatically formatted because the program uses the PRINT USING instruction throughout.

As soon as you enter an amount for Breakfast, you'll encounter the flagging procedure. If you press just enter, indicating a zero expense for that item, the program skips the flagging procedure.

At the top of the screen, you signify yes or no to the question, "Flag this item?" If you answer "N", data entry proceeds with the next item, "Lunch". If you answer "Y", the screen switches to the flag menu. There are actually two different flag menus. The one that appears on the screen depends on whether or not you've indicated a secondary account to which to charge some items. The screen continues to return to the flag menu until you choose "5. Exit Flag Item Menu". This choice is the same in both flag menus. Once you choose option 5, the program continues with the next daily expense item.

After you enter all the items for each day, the program automatically adds each row and column and stores the results. It then proceeds to the entry of transportation items. The procedure is essentially the same as with the daily items (including flagging of items) except for the lack of explanatory comments.

After you enter all the transportation data, the remainder of the calculations are automatically performed. (You have

Table 1. List of Variables in EXPREPRT.BAS.

AD	Amount of cash advance
B1	Amount charged to primary account
B1$	Name of primary account
B2	Amount charged to secondary account
B2$	Name of secondary account
C	Total number of comments (at end of data input), or number of a particular comment
CA	Total cash paid out-of-pocket
CO$(C)	A comment
D$(X)	Date of a transportation item
DE$(X)	Destination of a particular transportation item
DT$(J)	Dates covered by expense report
F1(I,J)	Cash or nonbillable flag for a daily expense item
F2(I,J)	Comment flag
F3(X)	Cash or nonbillable flag for a transportation item
F4(I,J)	Secondary account charge flag for a daily expense item.
F5(X)	Secondary account charge flag for a transportation item
GT	Grand Total of expenses
HD	Amount of hotel charges billed directly to primary account
I	Number of each daily expense item (rows)
IT$(I)	Names of daily expense items
J	Number of each day covered by expense report (columns)
M	Number of transportation items
N	Total number of days covered by expense report
NB	Total of nonbillable expenses
NF$	Name of file (to be saved to disk)
OT$	Name of "Other" (last of daily expense items)
PR$	Purpose of travel
RE	Amount of reimbursement to individual or company
SA$	Secondary account presence (Yes or No)
TB	Total of billable expenses (B1 + B2)
TC	Total of transportation expenses
TR$(X)	Type of transportation (plane, train, car, etc.)
T1(X)	Amount of a transportation item
XP(I,J)	Amount of a daily expense item
XX$	Your name

to indicate if a cash advance was taken and if the hotel bill was billed directly to your company or client.) All the results then scroll out on the screen and remain there until you press any key to return to the main menu.

Once you return to the main menu, you can exercise any of the options listed. If you choose to change (edit) any data, the change menu appears on the screen. Here, your choices are: to change daily items, to change transportation items, to change comments, to change the amount of hotel expense billed direct, to change the amount of cash advance, to recalculate, or to exit to main menu. If you make any changes, the last step before exiting the change menu must be the Recalculate choice. If you fail to exercise this choice, the totals won't reflect the changes you've made. When you choose Recalculate, there is a brief pause (during which your CoCo is redoing the arithmetic), and once again, all of the results scroll on the screen and remain on the screen until you press any key to return to the main menu.

Note that while you're in the edit mode, you have the opportunity to change the actual expense items or the flags associated with any expense item. To reach the flag-changing procedure, just press the enter key when asked what item you want to change. You are then asked if you want to change a flag. Don't try to change a comment flag here—to do so, your choice must be Change Comments in the change menu.

If you choose Change Comments in the change menu, you see the Change Comments menu. Here you can change an already existing comment, delete a comment, add a comment, and return to the change menu. If you delete a comment, all the comment numbers (and flags) are rewritten. If you choose to add a comment, you can do so only if you're not already at the limit of 12 comments.

If you choose to save the file to disk while in the main menu, you are instructed to name the file in the following format: MMMDD-YY, e.g., MAY05-84. When loading a file from disk, use the same file-name convention.

Formatting Safeguards

Whenever the program requires the input of names (name of primary and secondary accounts or of text, e.g., comments), safeguards prevent the input of more characters than allowed by the format limitations. The safeguards not only prevent the input, but also provide a tone to call your attention to the need to redo the input. Similar safeguards prevent errors in making menu selections that might have a destructive effect on the data.

Table 2. Sample Expense Report Printout

```
                HILTON N. WASSERMAN & ASSOCIATES, INC.

                        TRAVEL EXPENSE REPORT

Travel Report of: HILTON N. WASSERMAN

Purpose of Travel: ORGANIZATION DEVELOPEMNT

                                DAILY EXPENSES
-------------------------------------------------------------------------------
     Date       05/20/84   05/21/84   05/22/84   05/23/84   05/24/84  Item Total
-------------------------------------------------------------------------------

BREAKFAST          5.00c     10.75 3     4.90c      3.95c      5.75c     $30.35
LUNCH             19.45cs1     8.20      6.90c      ----       ----      $34.55
DINNER            20.15     41.00 4     22.35s     33.60n7    ----     $117.10
TIPS               4.00c      4.00c      3.00c      ----       5.00c     $16.00
VALET-LAUNDRY      ----       8.00       ----      12.00       ----      $20.00
TELEPHONE          5.20       8.00       4.80       3.40       6.70      $28.10
HOTEL ROOM       110.00     110.00     110.00     110.00       ----     $440.00
ENTERTAINMENT     12.00n2    15.00c5     ----       ----       ----      $27.00
TAXIS              7.80cs     ----       ----       7.80cs     ----      $15.60
PARKING            5.50c      4.00c      3.50c      7.50c      3.50c     $24.00
TOLLS              6.00c      ----       ----       ----       6.00c     $12.00
CAR RENTAL         ----       ----       ----       ----       ----       $0.00
OTHER:GIFT         ----      25.00c6     ----       ----       ----      $25.00
-------------------------------------------------------------------------------

Daily Total      $195.10    $233.95    $155.45    $178.25     $26.95    $789.70
-------------------------------------------------------------------------------

                                                Total Daily Expenses:     $789.70

                          TRANSPORTATION EXPENSES
-------------------------------------------------------------------------------

Date          Type          Destination        Amount
-----------------------------------------------------

05/20/84      CAR           SPRINGFIELD         75.00
05/22/84      PLANE         ALBANY             125.00s
-----------------------------------------------------

                                        Total Transportation Expenses:   $200.00
-------------------------------------------------------------------------------

1. J. SLADE - V.P. SALES                          Grand Total Expenses:   $989.70
2. R. REEVES - DIR. OF RESEARCH                 Less Non-Billable Items:   $45.60
3. W. WALLACE - DIR. OF PERSONNEL             Less Hotel Billed Direct:   $550.00
4. G. ROWLAND - V.P. MANUFACTURING
5. T. ROWE - DIR. OF P.R.                       Total Billable Expenses:   $394.10
6. M. JONES - RETIREMENT PARTY
7. E. ROSS - DIR. CONSUMER AFFAIRS                            Cash Advance:     $0.00
                                                Reimbursement Due Me:   $153.55

                                              BILL WILLIMATIC COMPANY:   $211.70
                                              BILL FORMATH CORPORATION:  $182.40
-------------------------------------------------------------------------------

KEY: c=cash; n=non-billable; s=billable to secondary account; Number=comment.
```

The Print Subroutine

The print subroutine starts at line 8000. These comments enable you to make any necessary changes in the program to adapt it to your printer. The printer codes as they appear here are for the C.Itoh Prowriter 8510. The codes in line 8010 and 8020 (CHR$(27); CHR$(33) and CHR$(27);CHR$(34)) simply cause the name of the company and the title "Travel Expense Report" to be printed in bold type. These codes should be changed for your printer or omitted entirely.

Similarly, the codes CHR$(27); CHR$(88) and CHR$(27);CHR$(89) are the start and stop codes on the Prowriter for underlines. These codes are used to print 55- and 80-column lines on the report. You'll notice, incidentally, that the printer pauses noticeably before printing a line. This delay is eliminated if you set your printer and CoCo to print at 9600 baud.

You should modify line 8010 so that it prints the name of the company for

Circle Reader Service card #302

Nexus presents
New Keys to Creativity!

CHROMA-SKETCH
The Picture Program Writer

CHROMA-SKETCH has an option that **writes a BASIC program** as you draw, paint and letter on the hi-res screen in **66 colors and shadings** (22 in each of 3 color-sets). Save program to disk or tape to recreate your picture from BASIC at any time, or save the screen as a binary image.

Dual cursors simplify arcs, circles, lines and boxes. Drawing aids include options for **full-screen crosshair cursor** and **"graph-paper" grid**. Automatic **preview** and **undo** commands available in 64K. **Help** key gives command and status display. If the program writer is enabled, you can return to **any previous stage** of your picture!

Draw complex shapes and CHROMA-SKETCH will redraw, rotate, reduce or enlarge them at any position in any color or pattern. Save the shape definitions to disk or tape for use in BASIC programs. **Paint in any dot pattern** including checks, stripes (horizontal or vertical) or others you define yourself. Draw dotted or twisted lines. Overlay color patterns for translucent effects.

CHROMA-SKETCH can be used with any combination of joystick devices including **Touch-Pad** or **Color Mouse.** If you prefer, you may use the fast, auto-repeat cursor keys to move diagonally, horizontally or vertically.

The fast, compact graphic programs you can write using CHROMA-SKETCH are **yours** to alter or use in any way you wish. These BASIC programs may be used for games, graphic adventures, educational software or on-screen slide shows.

Requires 32K Extended BASIC. Supports disk or cassette systems, all ROM versions, all graphic modes.

CHROMA-SKETCH

$29.95 ..... cassette
$34.95 ..... disk

FREE SHIPPING & HANDLING

The WIZARD Font For Telewriter-64*

"I recommend Wizard for Telewriter devotees who want to do something nice for their hard-working word processor."
Scott Norman
Hot Coco, Feb. '85

"...I can attest to the relief that innovation offers the eyes after long periods of key-boarding." "Wizard is another CoCo winner..."
Charles Springer
Rainbow, Dec. '84

The pleasantly proportioned characters of the WIZARD font have **true descenders** and **optional end-of-line markers**. If you do not prefer this clear, attractive font, take advantage of our money back guarantee.

The simple modification of Telewriter-64 done by WIZ causes no change in the operation of the word processor or the amount of buffer space. You may choose to permanently install the font in a backup copy of Telewriter-64 or to quickly install the font each time you load an unmodified copy of Telewriter-64.

The end-of-line markers are useful for locating run-on spaces at the end of lines and between lines, and for counting spaces between paragraphs. They are essential for the complex on-screen formatting that tables or poetry often involve, as well as for keeping track of carriage returns in program code.

WIZ will run in any CoCo, **16-64K, disk or cassette**. The WIZARD font does not alter the characters produced by your printer.

Details of how the new font is added to Telewriter-64 may be requested when you order WIZ. Previous purchasers may request this information if they include their WIZ ID# and a SASE.

WIZ

$16.95 ..... cassette
$21.95 ..... disk

FREE SHIPPING & HANDLING

MONEY BACK GUARANTEE. If not completely satisfied, you may return the material within 30 days for a prompt refund. Specify the program and media desired. Programs supplied on disk and cassette are identical in all respects. Send check or money order. Personal checks — no delay. Next day shipping in most cases.

NEXUS
2604 Bridalwood Drive
Knoxville, TN 37917

for additional information: (615) 522-1977. CIS 71575,1706
Write for a catalog. Dealer inquiries are welcome.
TN residents add 7% sales tax.

*Telewriter-64 is a trademark of Cognitec

See List of Advertisers on page 89

which you work. You also have to change the tab number to properly center the company name.

Alternate Editing Procedure

If you want to cut down on typing when entering this program in your CoCo, you can omit the editing subroutines in lines 1385–1940 and still edit the data although in a much less convenient manner. Bear in mind that you cannot omit the Recalculate subroutine contained in lines 600–740.

The alternate editing is on an item-by-item basis. This brief description of the procedure is also helpful in understanding the inner workings of Expense Report.

Completely enter the data for the entire expense report. If you make an error during the data entry, make a note of that error on a separate piece of paper. When you complete the data entry, you are at the point where the program tells you to press any key to continue. Do so and you are back to the main menu. Press the E key to exit the program. Even though you've exited the program, your CoCo retains all the data you entered as long as you don't turn the CoCo off or type "RUN" and press enter.

This procedure requires familiarity with the variables shown in Table 1. Think of the first part of the expense report as a matrix. The rows (I) are the daily items numbered from 1 to 14. Number 1 is Breakfast, and number 14 is Daily Total. The columns (J) are days numbered from 1 to 5, and the sixth column is Item Total. So you have a 14-by-6 matrix.

For example, suppose that you want to change the amount for Dinner on the second day. Dinner is the third item (I = 3), and it is the second day (J = 2). Therefore, Dinner on the second day is represented by the variable XP(3,2). To enter a new amount for XP(3,2), simply type in XP(3,2) = (the new amount) and press the enter key. You can change any daily expense item in this manner.

To change a flag for any daily expense item, you use a similar procedure. If you want to change the flag for Entertainment on the third day to make it nonbillable, simply type F1(8,3) = 2. Refer to the daily item flag subroutine starting at line 5500 for the proper numbers to use. To charge a daily expense item (for example, Lunch on the second day) to the secondary account, type F4(2,2) = 6.

To change comment 3, type and enter CO$(3) = (the new comment in quotes). Be careful here not to exceed 40 characters. To add a comment to an expense report that has seven comments, type and enter CO$(8) = (the new comment in quotes). Again, be careful not to exceed 40 characters. When you add a comment for a daily expense item, you must also type in and enter F2(I,J) = (the number of the new comment). If the new comment applies to Entertainment on the third day, type F2(8,3) = 8. To delete comment number 8 for Entertainment on the third day, type and enter CO$(8) = "", and then F2(8,3) = 0.

To change a transportation item, use the same procedure. For example, to change the first transportation item, type and enter T1(1) = (the new amount). To change the flag for the first transportation item, type F3(1) = 1 (to flag it as a cash item) or F3(1) = 2 (to flag it as a nonbillable item) or F5(1) = 6 (to flag it as a secondary account charge).

When you complete this manual editing, you then type GOTO 600 to recalculate all of the totals. *Caution:* Do not type and enter "RUN 600". If you do, you may wipe out all of the data you have entered. As a safeguard against inadvertently making this mistake, save the report to disk before attempting to do any manual editing.

Hope It's Helpful

I hope EXPREPRT.BAS is as helpful to you as it is to me. I find that it not only assures accurate records, but it also makes it easy to keep up-to-date, even with a heavy travel schedule.

For those of you who don't have disk systems, an easy conversion makes this program work with tape. The conversion affects the two subroutines starting at lines 7300 and 7700. Wherever the word "Disk" is (in the main menu also), change it to "Tape", and change all references to "#1" to "# – 1". For clarity, add some instructions for positioning the tape, pressing the play or record buttons, and so on. ■

Address correspondence to Hilton N. Wasserman, Ph. D., 45-53 248th St., Little Neck, NY 11362.

Program Listing. Expense Report

```
2Ø REM ** PROVIDES A FORMATTED P
RINTOUT OF A 1-5 DAY EXPENSE REP
ORT.
3Ø CLEAR1ØØØ
4Ø DIM XP(14,6),F1(13,5),F2(13,5
),F2$(13,5),F4(13,5),IT$(14),DT$
(5),T1(3),F3(3),F5(3),D$(3),TR$(
3),DE$(3),CO$(12)
5Ø CLS:PRINT@232,"INITIALIZING..
..":GOSUB1ØØØ:'INITIALIZATION.
6Ø CLS:PRINT@11, "MAIN MENU":PRI
NT:PRINT@71,"<I> INPUT DATA":PRI
NT:PRINT@135,"<C> CHANGE DATA":P
RINT:PRINT@199,"<S> SAVE TO DISK
"
7Ø PRINT@263,"<L> LOAD FROM DISK
":PRINT@327,"<P> PRINT REPORT":P
RINT@391,"<E> EXIT PROGRAM":PRIN
T@451,"YOUR CHOICE-I-C-S-L-P-E--
>"
8Ø X$=INKEY$:IF X$="" THEN 8Ø
9Ø CLS:ON INSTR("ICSLPE",X$) GOT
O11Ø,14ØØ,73ØØ,77ØØ,37Ø,41Ø
1ØØ PRINT"  INVALID ENTRY" PLEAS
E REDO.":SOUND 1ØØ,5:FOR X=1TO1Ø
ØØ:NEXT X:GOTO6Ø
11Ø GOSUB2ØØØ:'INPUT DAILY DATA
12Ø GOSUB3ØØØ:'DO ALL HORIZONTAL
 TOTALS.
13Ø GOSUB4ØØØ:'DO ALL VERTICAL T
OTALS.
14Ø IN=14:'THE PARAMETER "IN" IS
 AN INPUT TO THE SUBROUTINE. IT
IS USED TO TOTAL ROW 14 TO GET A
 TOTAL OF THE DAILY TOTALS.
15Ø GOSUB35ØØ:'DO ROW 14 TOTAL.
16Ø GOSUB46ØØ:'INPUT TRANSPORTAT
ION DATA.
17Ø CLS:PRINT"TOTAL DAILY EXPENS
E IS:";:PRINTUSING"$$####.##";XP
(14,6):PRINT
18Ø PRINT"TOTAL TRANSPORTATION E
XPENSE IS ";:PRINTUSING"$$###.#
#";TC:PRINT
19Ø GT=XP(14,6)+TC:PRINT"GRAND T
OTAL EXP. IS ";:PRINTUSING"$$###
#.##";GT
2ØØ GOSUB65ØØ:'GET TOTAL NON-BIL
LABLE EXPENSES.
21Ø PRINT:INPUT"HOTEL BILLED DIR
ECT";HD
22Ø IF SA$="Y" THEN GOSUB7ØØØ:'G
ET SECONDARY ACCOUNT TOTAL.
23Ø TB=GT-NB-HD
24Ø PRINT:PRINT"TOTAL BILLABLE E
XP. IS ";:PRINTUSING"$$####.##";
TB:PRINT
25Ø GOSUB6ØØØ:'GET TOTAL CASH EX
PENDED.
26Ø AD=Ø:INPUT"AMOUNT OF CASH AD
VANCE";AD
27Ø RE=CA-AD
28Ø PRINT:PRINT:IF RE>=Ø THEN PR
INT"REIMBURSEMENT DUE ME IS:
   ";:PRINTUSING"$$####.##";RE
29Ø IF RE<Ø THEN PRINT"REIMBURSE
MENT DUE COMPANY IS: ";:PRINTUSI
NG"$$####.##";ABS(RE)
3ØØ PRINT"TOTAL NON-BILLABLE EXP
ENSE IS: ";:PRINTUSING"$$####.##
";NB
31Ø B1=TB-B2
32Ø PRINT"TOTAL TO BE BILLED TO
"B1$" IS: ";:PRINTUSING"$$####.#
#";B1
33Ø IF SA$="Y" THEN PRINT"TOTAL
TO BE BILLED TO "B2$" IS: ";:PRI
NTUSING"$$####.##";B2
34Ø PRINT:PRINT"  TO CONTINUE, P
RESS ANY KEY."
```

Listing continued

Circle Reader Service card #223

DISKETTES AND 680X SOFTWARE

SUPER SLEUTH DISASSEMBLER EACH $99-FLEX, $101-OS-9
interactively generates source on disk with labels, includes xref
specify 6800,1,2,3,5,8,9/6502 version or Z-80/8080/85 version
OS-9 version also processes FLEX object file format
OBJECT-ONLY versions: EACH $50-FLEX & OS-9, $49-COCO DOS
COCO DOS available in 6800,1,2,3,5,8,9/6502 version only

CROSS-ASSEMBLERS EACH $50-FLEX/OS-9, ANY 3 $100, ALL $200
specify for 180x, 6502, 680x, Z-80, 8048/51, 8085, 68000
true, modular, free-standing cross-assemblers, written in C
8-bit source included only with all cross-assemblers (for $200)

DEBUGGING SIMULATORS EACH $75-FLEX, $100-OS-9
specify 6800/1, (14)6805, 6502, 6809 OS-9, Z-80 FLEX
OBJECT-ONLY versions: EACH $50-COCO FLEX & COCO OS-9

6502 TO 6809 ASSEMBLER TRANSLATOR $75-FLEX, $85-OS-9
translates 6502 programs to 6809, noting inexact conversions

6800 TO 6809 & 6809 PIC TRANSLATORS $50-FLEX, $75-OS-9
translates 6800 programs to 6809, 6809 programs to PIC

FULL-SCREEN FLEX TSC XBASIC PROGRAMS
(with complete 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 sectors, sort directory, maintain master catalog, do disk sorts, ...

CMODEM PROGRAM $100-FLEX & OS-9
menu-driven with terminal mode, file xfer, MODEM7 protocol, etc.
OBJECT-ONLY versions: EACH $50-FLEX & OS-9

5.25" DISKS EACH 10 $13-SSSD $15-SSDD $17-DSDD $25-DSQD
with jackets and hub rings

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

Most programs in source on disk: give computer, disk size, OS.
Contact CSC for full catalog and dealer information.
25% off multiple purchases of same program on same order.
VISA and MASTER CARD accepted; US funds only, please.
Add GA sales tax and 5% shipping; no shipping for disks in 100's.

FLEX trademark Technical Systems Consultants. OS-9 trademark Microware.

Dealers Dealers Dealers

SELL!

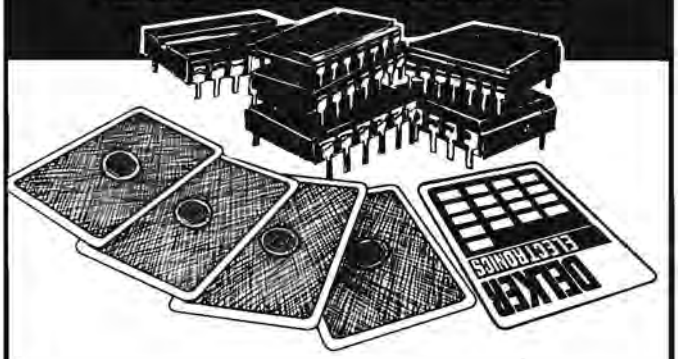
Selling **HOT CoCo** will make money for you. Consider the facts: *Fact 1:* Selling **HOT CoCo** increases store traffic—our dealers tell us that **HOT CoCo** is one of the hottest-selling computer magazines on the newsstands. *Fact 2:* There is a direct correlation between store traffic and sales—increase the number of people coming through your door and you'll increase sales. *Fact 3:* Fact 1 + Fact 2 = INCREASED SALES, which means more money for you. And that's a fact.

For information on selling **HOT CoCo,** call 800-343-0728 (In N.H. call 924-9471) and speak with our direct sales manager. Or write to **HOT CoCo,** 80 Pine Street, Peterborough, NH 03458.

HOT CoCo
80 Pine Street
Peterborough, NH 03458
800-343-0728

See List of Advertisers on page 89

It's time we put our chips on the table



and showed you our best deals on computer hardware.

HARDWARE SPECIALS

Extended Basic w/bk	$ 39.95	26-1192 CGP-115 Prinler/Plotter	$119.95
64k (DEI) Memory Upg	$ 59.95	26-1276 DMP-105 Printer 80 cps	$179.95
26-3029 CoCo Drive 0	$275.00	C. Itoh 8510 AP Printer 120 cps	$399.95
26-3023 CoCo Drive 1	$229.00	Gorilla/NAP Video Monitor (Grn)	109.95
HJL Keyboard (D,E,F,2)	$ 79.95	Video Monitor Adapters	$ 29.95
Super Pro Keybd. (D,E)	$ 64.95	26-3024 RS Multi-Pac Interface	$ 89.95
26-3127 64K Extended CoCo2	$179.95	Botek Ser/Par Interface	$ 69.95
26-3134 16K Standard CoCo2	$ 89.95	CGP-220 Ink Jet Printer	$379.00
26-3136 16K Extended CoCo2	$129.95	DMP 110 Printer	$349.00
26-3801 Model 100 8K	$349.95	DWP 210 Printer	$379.00
26-3816P 8K Upgrade Model 100	$ 69.95		

ACCESSORIES

Volksmodem 1200	$299.00	Mach II Joystick	$ 39.95
RS D.C. Modem IB	$ 89.95	26-3030 OS-9 (64k)	$ 64.95 (disk)
Novation J-Cat Modem	$129.95	Basic-09 (req. OS-9)	$ 87.95 (disk)
RS D.C. Modem II	$179.95	"C" Compiler (OS-9)	$ 87.95 (disk)
USR Password 300	$179.95	FHL O-Pak (req. OS-9)	$ 34.95 (disk)
Hayes SM 300 Modem	$239.95	Elite Word	$ 59.95 (d&c)
USR Password 1200	$429.00	Elite Calc	$ 59.95 (d&c)
CoCo Switcher	$ 39.95	Color Term Plus	$29.95 (cass)
Elephant Disks ssdd	$ 22.95	Deft Pascal	$ 79.95
		26-3012 Deluxe Joystick	$ 34.95
NEW! Dual Double Sided Drives including case, power supply & cable	$475.00	**NEW! 26-3128 64K Direct Video CoCo2**	$219.95

MSI SOFTWARE

MSI DISKUTIL	NEW	$ 19.95	MSI NAMEFILE		$ 24.95
COLOR FINANCE 1		$ 49.95	MSI CALENDAR	NEW	$ 19.95
COLOR FINANCE II	NEW	$ 69.95	MSI COLOR PAYROLL	NEW	$ 99.95

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.

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

Circle Reader Service card #397

DELKER ELECTRONICS

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

Call Toll Free:
800-251-5008
800-545-2502 (TENNESSEE)
615-459-2636 (TENNESSEE)
615-254-0088 (NASHVILLE)

VISA MasterCard

Listing continued

```
35Ø X$=INKEY$:IF X$="" THEN 35Ø
36Ø GOTO6Ø
37Ø IF N=Ø THEN PRINT@23Ø,"NO DA
TA IN COMPUTER!":SOUND 1ØØ,5:FOR
 X=1TO1ØØØ:NEXT X:GOTO6Ø
38Ø IF PEEK(65314)=4 THEN GOSUB8
ØØØ ELSE GOTO4ØØ:'IF PRINTER IS
READY, GET PRINTOUT OF EXPENSE R
EPORT.
39Ø GOTO6Ø
4ØØ CLS:PRINT@5,"PRINTER IS NOT
READY!":SOUND 1ØØ,5:FOR X=1TO1ØØ
Ø:NEXT X:GOTO6Ø
41Ø END
57Ø '
58Ø 'RECALCULATE AFTER CHANGING
DATA.
59Ø '
6ØØ GOSUB3ØØØ:'DO ALL HORIZONTAL
 TOTALS.
61Ø GOSUB4ØØØ:'DO ALL VERTICAL T
OTALS.
62Ø IN=14:GOSUB35ØØ:'DO ROW 14 T
OTAL.
63Ø TC=Ø:FOR X=1TOM
64Ø TC=TC+T1(X)
65Ø NEXT X
66Ø CLS:PRINT"TOTAL DAILY EXPENS
E IS:";:PRINTUSING"$$####.##";XP
(14,6):PRINT
67Ø PRINT"TOTAL TRANSPORTATION E
XPENSE IS ";:PRINTUSING"$$####.#
#";TC:PRINT
68Ø GT=XP(14,6)+TC:PRINT"GRAND T
OTAL EXP. IS ";:PRINTUSING"$$###
#.##";GT
69Ø GOSUB65ØØ:'GET TOTAL NON-BIL
LABLE EXPENSES.
7ØØ IF SA$="Y" THEN GOSUB7ØØØ:'G
ET SECONDARY ACCOUNT TOTAL.
71Ø TB=GT-NB-HD
72Ø PRINT:PRINT"TOTAL BILLABLE E
XP. IS ";:PRINTUSING"$$####.##";
TB:PRINT
73Ø GOSUB6ØØØ:'GET TOTAL CASH EX
PENDED.
74Ø GOTO27Ø
97Ø '
98Ø 'INITIALIZATION.
99Ø '
1ØØØ FOR I=1TO14
1Ø1Ø FOR J=1TO6
1Ø2Ø XP(I,J)=Ø
1Ø3Ø NEXT J
1Ø4Ø NEXT I
1Ø5Ø FOR I=1TO13
1Ø6Ø FOR J=1TO5
1Ø7Ø F1(I,J)=Ø
1Ø8Ø F2(I,J)=Ø
1Ø9Ø F4(I,J)=Ø
11ØØ NEXT J
111Ø NEXT I
112Ø FOR X=1TO12
113Ø CO$(X)=""
114Ø NEXT X
115Ø FOR X=1TO3
116Ø F3(X)=Ø
117Ø F5(X)=Ø
118Ø NEXT X
119Ø A=5:C=Ø:N=Ø:Y=Ø
12ØØ IT$(1)="BREAKFAST"
121Ø IT$(2)="LUNCH"
122Ø IT$(3)="DINNER"
123Ø IT$(4)="TIPS"
124Ø IT$(5)="VALET-LAUNDRY"
125Ø IT$(6)="TELEPHONE"
126Ø IT$(7)="HOTEL ROOM"
127Ø IT$(8)="ENTERTAINMENT"
128Ø IT$(9)="TAXIS"
129Ø IT$(1Ø)="PARKING"
13ØØ IT$(11)="TOLLS"
131Ø IT$(12)="CAR RENTAL"
132Ø IT$(13)="OTHER"
133Ø IT$(14)="Daily Total"
134Ø RETURN
1385 '
139Ø 'CHANGE DATA.
1395 '
14ØØ CLS:IF N=Ø THEN 73ØØ ELSE P
RINT@69,"DO YOU WANT TO CHANGE:"
14Ø5 PRINT@133,"<D> DAILY ITEM":
PRINT@165,"<T> TRANSPORTATION IT
EM":PRINT@197,"<M> COMMENTS":PRI
NT@229,"<H> HOTEL BILLED DIRECT"
:PRINT@261,"<C> CASH ADVANCE":PR
INT@293,"<R> RECALCULATE":PRINT@
325,"<E> EXIT TO MAIN MENU"
141Ø PRINT@386,"YOUR CHOICE-D-T-
M-H-C-R-E-->"
1415 X$=INKEY$:IF X$="" THEN 141
5
142Ø CLS:ON INSTR("DTMHCRE",X$)
GOTO1445,1555,165Ø,1865,19ØØ,6ØØ
,6Ø
1425 PRINT"  INVALID ENTRY! PLEA
SE REDO.":SOUND 1ØØ,5:FOR X=1TO1
ØØØ:NEXT X:GOTO14ØØ
143Ø '
1435 'CHANGE DAILY ITEMS.
144Ø '
1445 PRINT"CHANGE WHAT DAY (1-5)
";:INPUT J
145Ø IF J=Ø THEN 14ØØ ELSE IF J>
5 OR J>N THEN PRINT:PRINT"  INVA
LID ENTRY! PLEASE REDO.":SOUND 1
ØØ,5:FOR X=1TO1ØØØ:NEXT X:PRINT:
GOTO1445
1455 CLS:PRINT:FOR I=1TO13
146Ø PRINT I"- "IT$(I);:PRINT@2Ø
+I*32,USING"####.##";XP(I,J)
1465 NEXT I
147Ø GOSUB1935
1475 IF I=Ø THEN CLS:PRINT"CHANG
E A FLAG (Y/N)":GOTO1485
148Ø PRINT"ENTER CORRECT AMOUNT
FOR        "IT$(I);:INPUT XP(I,J
):PRINT:PRINT:GOTO1455
1485 X$=INKEY$:IF X$="" THEN 148
5 ELSE IF X$<>"Y" THEN 14ØØ
149Ø CLS:PRINT:FOR I=1TO13
1495 PRINT@I*32,I"- "IT$(I);:PRI
NT@2Ø+I*32,USING"####.##";XP(I,J
);:IF F1(I,J)=1 THEN PRINT"C";:E
LSE IF F1(I,J)=2 THEN PRINT"N";:
ELSE IF F1(I,J)=3 THEN PRINT"CN"
;
15ØØ IF F4(I,J)=6THEN PRINT"S";
15Ø5 IF F2(I,J)<>Ø THEN PRINT F2
(I,J)
151Ø NEXT I
1515 PRINT@448,"CHANGE FLAG FOR
WHAT ITEM #";:INPUT I:IF I<1 OR
I>13 THEN I=Ø
152Ø IF I<>Ø THEN PRINT"ENTER CO
RRECT FLAG FOR ITEM"I":":INPUT F
6$ ELSE GOTO14ØØ:'CHANGE ONLY TH
E LETTER FLAG HERE. TO CHANGE TH
E COMMENT NUMBER, CHOOSE "COMMEN
TS" FROM THE CHANGE MENU.
1525 IF F6$="C" THEN F1(I,J)=1:F
4(I,J)=Ø ELSE IF F6$="N" THEN F1
(I,J)=2:F4(I,J)=Ø ELSE IF F6$="C
N" THEN F1(I,J)=3:F4(I,J)=Ø
153Ø IF F6$="S" THEN F1(I,J)=Ø:F
4(I,J)=6 ELSE IF F6$="CS" THEN F
1(I,J)=1:F4(I,J)=6 ELSE IF F6$="
NS" THEN F1(I,J)=2:F4(I,J)=6 ELS
E IF F6$="CNS" THEN F1(I,J)=3:F4
(I,J)=6
1535 IF F6$<>"" THEN 149Ø ELSE F
1(I,J)=Ø:F4(I,J)=Ø:GOTO149Ø
154Ø '
1545 'CHANGE TRANSPORTATION ITEM
S.
155Ø '
1555 PRINT"CHANGE WHICH TRANSPOR
TATION ITEM (1-3)";:INPUT X
156Ø IF X=Ø THEN 14ØØ ELSE IF X>
M THEN PRINT"  INVALID ENTRY! PL
EASE REDO.":SOUND 1ØØ,5:FOR X=1T
O1ØØØ:NEXT X:GOTO1555
1565 CLS:PRINT"1. DATE: "D$(X):P
RINT:PRINT"2. TYPE: "TR$(X):PRIN
T:PRINT"3. DESTINATION: "DE$(X):
PRINT:PRINT"4. AMOUNT: ";:PRINTU
SING"####.##";T1(X)
157Ø PRINT:PRINT"  ENTER NUMBER
OF ITEM TO BE                CHAN
GED";:INPUT T:IF T=Ø THEN 1595 E
LSE IF T>4 THEN 14ØØ ELSE ON T G
OTO1575,158Ø,1585,159Ø
1575 PRINT"ENTER CORRECT DATE":I
NPUT D$(X):GOTO1565
158Ø PRINT"ENTER CORRECT TYPE":I
NPUT TR$(X):GOTO1565
1585 PRINT"ENTER CORRECT DESTINA
TION":INPUT DE$(X):GOTO1565
159Ø PRINT"ENTER CORRECT AMOUNT"
:INPUT T1(X):GOTO1565
1595 IF T=Ø THEN CLS:PRINT"CHANG
E A FLAG (Y/N)?"
16ØØ X$=INKEY$: IF X$="" THEN 16
ØØ ELSE IF X$<>"Y" THEN 14ØØ
16Ø5 CLS:PRINT"AMOUNT: ";:PRINTU
SING"####.##";T1(X);:IF F3(X)=1
THEN PRINT"C";:ELSE IF F3(X)=2 T
HEN PRINT"N";:ELSE IF F3(X)=3 TH
EN PRINT"CN";
161Ø IF F5(X)=6 THEN PRINT"S"
1615 PRINT:PRINT"ENTER CORRECT F
LAG";:INPUT F7$
162Ø IF F7$="C" THEN F3(X)=1:F5(
X)=Ø ELSE IF F7$="N" THEN F3(X)=
2:F5(X)=Ø ELSE IF F7$="CN" THEN
F3(X)=3:F5(X)=Ø
1625 IF F7$="S" THEN F3(X)=Ø:F5(
X)=6 ELSE IF F7$="CS" THEN F3(X)
=1:F5(X)=6 ELSE IF F7$="NS" THEN
 F3(X)=2:F5(X)=6 ELSE IF F7$="CN
S" THEN F3(X)=3:F5(X)=6
163Ø IF F7$<>"" THEN 14ØØ ELSE F
3(X)=Ø:F5(X)=Ø:GOTO14ØØ
1635 '
164Ø 'CHANGE COMMENTS MENU.
1645 '
165Ø CLS:PRINT@4Ø,"DO YOU WANT T
O:"
1655 PRINT@1ØØ,"<C> CHANGE A COM
MENT":PRINT@164,"<D> DELETE A CO
MMENT":PRINT@228,"<A> ADD A COMM
ENT":PRINT@292,"<E> EXIT TO CHAN
GE MENU"
166Ø PRINT@357,"YOUR CHOICE-C-D-
A-E-->"
1665 X$=INKEY$:IF X$="" THEN 166
5
167Ø CLS:ON INSTR("CDAE",X$) GOT
O1695,174Ø,1815,14ØØ
1675 PRINT"  INVALID ENTRY! PLEA
SE REDO.":SOUND 1ØØ,5:FOR X=1TO1
ØØØ:NEXT X:GOTO165Ø
168Ø '
1685 'CHANGE ONE COMMENT.
169Ø '
1695 GOSUB58ØØ
17ØØ PRINT:PRINT"ENTER # ØF COMM
ENT TO CHANGE":INPUT K:IF K=Ø TH
EN 165Ø ELSE IF K>C THEN PRINT"
 INVALID ENTRY! PLEASE REDO.":SO
```

Listing continued

Listing continued

```
UND 1ØØ,5:FOR X=1TO1ØØØ:NEXT X:G
OTO17ØØ
17Ø5 PRINT"ENTER CORRECT COMMENT
 #"K:INPUT CO$(K)
171Ø IF LEN(CO$(K))>4Ø THEN PRIN
T"YOU HAVE EXCEEDED 4Ø CHARACTER
S!          PLEASE REDO.":SOUND
1ØØ,5:FOR X=1TO1ØØØ:NEXT X:GOTO1
7Ø5
1715 CLS:GOSUB58ØØ:PRINT:PRINT"P
RESS ANY KEY TO CONTINUE"
172Ø X$=INKEY$:IF X$="" THEN 172
Ø ELSE GOTO165Ø
1725 '
173Ø 'DELETE A COMMENT.
1735 '
174Ø CLS:GOSUB58ØØ
1745 PRINT:PRINT"ENTER # OF COMM
ENT TO DELETE":INPUT L
175Ø IF L=Ø THEN 165Ø ELSE IF L>
C THEN PRINT"  INVALID ENTRY! PL
EASE REDO.":SOUND 1ØØ,5:FOR X=1T
O1ØØØ:NEXT X:GOTO174Ø
1755 FOR I=1TO13
176Ø FOR J=1TO5
1765 IF F2(I,J)=L THEN F2(I,J)=Ø
 ELSE IF F2(I,J)>L THEN F2(I,J)=
F2(I,J)-1
177Ø NEXT J
1775 NEXT I
178Ø FOR K=L TO C-1
1785 CO$(K)=CO$(K+1)
179Ø NEXT K
1795 C=C-1:GOTO174Ø
18ØØ '
18Ø5 'ADD A COMMENT.
181Ø '
1815 PRINT"ADD COMMENT FOR WHAT
DAY (1-5)";:INPUT J
182Ø IF J=Ø THEN 165Ø ELSE IF J>
5 OR J>N THEN PRINT"  INVALID EN
TRY! PLEASE REDO.":SOUND 1ØØ,5:F
OR X=1TO1ØØØ:NEXT X:GOTO1815
1825 CLS:PRINT:FOR I=1TO13
183Ø PRINT I"- "IT$(I);:PRINT@2Ø
+I*32,USING"####.##";XP(I,J)
1835 NEXT I
184Ø PRINT"COMMENT IS FOR ITEM #
:";:INPUT I:IF I<1 OR I>13 THEN
I=Ø:GOTO165Ø
1845 IF C=>12 THEN PRINT"MAXIMUM
 NUMBER OF COMMENTS HAS
 BEEN ENTERED!":SOUND 1ØØ,5:FOR
X=1TO1ØØØ:NEXT X:GOTO165Ø
185Ø IF C<12 THEN C=C+1:PRINT"EN
TER COMMENT #"C":";:LINEINPUT CO
$(C):F2(I,J)=C
1855 IF LEN(CO$(C))>4Ø THEN PRIN
T:PRINT"YOU HAVE EXCEEDED 4Ø CHA
RACTERS!          PLEASE REDO.":S
OUND 1ØØ,5:FOR X=1TO1ØØØ:NEXT X:
:PRINT:GOTO1845
186Ø GOTO165Ø
1865 PRINT"HOTEL BILLED DIRECT I
S NOW:    ";:PRINTUSING"####.##"
;HD:PRINT"DO YOU WANT TO MAKE A
CHANGE    (Y/N)?"
187Ø X$=INKEY$:IF X$="" THEN 187
Ø ELSE IF X$<>"Y" THEN 14ØØ
1875 PRINT"ENTER NEW AMOUNT FOR
HOTEL       BILLED DIRECT";:INPUT
 HD
188Ø GOTO14ØØ
1885 '
189Ø 'CHANGE AMOUNT OF CASH ADVA
NCE.
1895 '
19ØØ PRINT"CASH ADVANCE IS NOW:"
;:PRINTUSING"####.##";AD:PRINT"D
O YOU WANT TO MAKE A CHANGE    (
Y/N)?"
19Ø5 X$=INKEY$:IF X$="" THEN 19Ø
5 ELSE IF X$<>"Y" THEN 14ØØ
191Ø PRINT"ENTER NEW AMOUNT FOR
CASH       ADVANCE";:INPUT AD
1915 GOTO14ØØ
192Ø '
1925 'SUBROUTINE FOR CHANGING DA
TA.
193Ø '
1935 PRINT"ENTER # OF ITEM TO CH
ANGE";:INPUT I:IF I<1 OR I>13 TH
EN I=Ø
194Ø RETURN
197Ø '
198Ø 'INPUT DAILY DATA.
199Ø '
2ØØØ CLS
2Ø1Ø PRINT"NUMBER OF DAYS COVERE
D (1-5)"
2Ø2Ø N$=INKEY$:IF N$="" THEN 2Ø2
Ø
2Ø3Ø N=VAL(N$)
2Ø4Ø IF N<1 OR N>5 THEN PRINT:PR
INT"  INVALID ENTRY! PLEASE REDO
.":PRINT:SOUND 1ØØ,5:FOR X=1TO1Ø
ØØ:NEXT X:GOTO2Ø1Ø
2Ø45 PRINT:LINEINPUT"TRAVEL REPO
RT OF:";XX$
2Ø5Ø PRINT:LINEINPUT"PURPOSE OF
TRAVEL?";PR$
2Ø6Ø PRINT:LINEINPUT"PRIMARY ACC
OUNT BILLABLE TO:?   ";B1$:IF LE
N(B1$)>19 THEN PRINT:PRINT"  NAM
E IS TOO LONG! REDO IN NO      M
ORE THAN 19 CHARACTERS.":SOUND 1
ØØ,5:FOR X=1TO1ØØØ:NEXT X:GOTO2Ø
6Ø
2Ø7Ø PRINT"IS THERE A SECONDARY
ACCOUNT    (Y/N)?"
2Ø8Ø SA$=INKEY$:IF SA$="" THEN 2
Ø8Ø
2Ø9Ø IF SA$<>"Y" THEN 211Ø
21ØØ PRINT:LINEINPUT"SECONDARY A
CCOUNT BILLABLE TO:? ";B2$:IF LE
N(B2$)>19 THEN PRINT:PRINT"YOU H
AVE EXCEEDED 19 CHARACTERS!
    PLEASE REDO.":SOUND 1ØØ,5:FO
R X=1TO1ØØØ:NEXT X:GOTO21ØØ
211Ø FOR J=1TON
212Ø CLS:PRINT"DATE OF DAY" J;:I
NPUTDT$(J):PRINT
213Ø FOR I=1TO13
214Ø PRINTIT$(I);:INPUT XP(I,J):
IF XP(I,J)=Ø THEN 217Ø
215Ø GOSUB55ØØ:'CHECK IF FLAGS A
RE NEEDED.
216Ø CLS
217Ø IF OT$<>"" THEN 22ØØ:'DON'T
 RENAME "OTHER" IF PREVIOUSLY DO
NE.
218Ø IF XP(13,J)>Ø THEN PRINT"WH
AT ITEM IS ";CHR$(34);"OTHER";CH
R$(34);:INPUT OT$:IF LEN(OT$)>7
THEN PRINT"PLEASE REDO IN NO MOR
E THAN 7   CHARACTERS.":SOUND 1Ø
Ø,5:FOR X=1TO1ØØØ:NEXT X:GOTO218
Ø
219Ø IT$(13)="OTHER:"+OT$
22ØØ NEXT I
221Ø NEXT J
222Ø RETURN
297Ø '
298Ø 'DO ALL HORIZONTAL TOTALS.
299Ø '
3ØØØ FOR IN=1TO13
3Ø1Ø GOSUB35ØØ
3Ø2Ø NEXT IN
3Ø3Ø RETURN
347Ø '
348Ø 'DO ONE HORIZONTAL TOTAL.
349Ø '
35ØØ XP(IN,6)=Ø
351Ø FOR J=1TON
352Ø XP(IN,6)=XP(IN,6)+XP(IN,J)
353Ø NEXT J
354Ø RETURN
397Ø '
398Ø ' DO ALL VERTICAL TOTALS.
399Ø '
4ØØØ FOR IN=1TON
4Ø1Ø GOSUB45ØØ
4Ø2Ø NEXT IN
4Ø3Ø RETURN
447Ø '
448Ø 'DO ONE VERTICAL TOTAL.
449Ø '
45ØØ XP(14,IN)=Ø
451Ø FOR I=1TO13
452Ø XP(14,IN)=XP(14,IN)+XP(I,IN
)
453Ø NEXT I
454Ø RETURN
457Ø '
458Ø 'INPUT TRANSPORTATION DATA
459Ø '
46ØØ TC=Ø:CLS:INPUT"HOW MANY ITE
MS OF TRANSPORTATION";M:'THERE I
S ROOM FOR 3 TRANSPORTATION ITEM
S.
461Ø IF M>3 THEN PRINT"    THERE
 IS ROOM FOR ONLY 3          TRA
NSPORTATION ITEMS.":SOUND 1ØØ,5:
FOR X=1TO1ØØØ:NEXT X:PRINT:GOTO4
6ØØ
4615 IF M<1 THEN 471Ø
462Ø FOR X=1TOM
463Ø CLS:PRINT"ENTER COST OF TRA
NSPORTATION    ITEM "X;:INPUT T1
(X)
464Ø TC=TC+T1(X)
465Ø GOSUB55ØØ:'CHECK IF CASH, N
ON-BILLABLE ITEM, SECONDARY ACCO
UNT CHARGE, OR IF THERE IS A COM
MENT.
466Ø IF A<>5 THEN F3(X)=A
467Ø INPUT"DATE";D$(X)
468Ø INPUT"TYPE";TR$(X)
469Ø INPUT"DESTINATION";DE$(X)
47ØØ NEXT X
471Ø RETURN
5485 '
549Ø 'FLAG ITEMS: CASH; NON-BILL
ABLE; SECONDARY ACCOUNT CHARGE;
COMMENTS.
5495 '
55ØØ A=5:PRINT"FLAG THIS ITEM (Y
/N)?";:'EQUATING A TO 5 CLEARS T
HE FLAG VARIABLE.
55Ø5 X$=INKEY$:IF X$="" THEN 55Ø
5 ELSE IF X$<>"Y" THEN CLS:RETUR
N
551Ø CLS
5515 IF SA$<>"Y" THEN PRINT@41,"
FLAG ITEM MENU":PRINT@1Ø1,"1. FL
AG AS CASH":PRINT@165,"2. FLAG A
S NON-BILLABLE":PRINT@229,"3. FL
AG AS 1 AND 2":PRINT@293,"4. ENT
ER COMMENT":PRINT@357,"5. EXIT F
LAG ITEM MENU";ELSE GOTO5525
552Ø PRINT:PRINT:INPUT"   YOUR C
HOICE-1-2-3-4-5-->";A:GOTO5535
5525 PRINT@41,"FLAG ITEM MENU":P
RINT@1Ø1,"1. FLAG AS CASH":PRINT
@165,"2. FLAG AS NON-BILLABLE":P
RINT@229,"3. FLAG AS 1 AND 2":PR
INT@293,"4. ENTER COMMENT":PRINT
@357,"5. EXIT FLAG ITEM MENU":PR
INT@421,"6. FLAG AS SECOND. ACC'
T."
```

Listing continued

Listing continued

```
553Ø PRINT:INPUT"   YOUR CHOICE-
1-2-3-4-5-6-->";A:GOTO5545
5535 IF A<1 OR A>5 THEN PRINT@48
Ø,"   INVALID ENTRY! PLEASE REDO
.":SOUND 1ØØ,5:FOR X=1TO1ØØØ:NEX
T X:CLS:GOTO5515
554Ø GOTO555Ø
5545 IF A<1 OR A>6 THEN PRINT@48
4,"INVALID ENTRY! PLEASE REDO.":
SOUND 1ØØ,5:FOR X=1TO1ØØØ:NEXT X
:CLS:GOTO5525
555Ø IF A=5 THEN CLS:RETURN
5555 IF TC<>Ø THEN 557Ø
556Ø IF A=1 OR A=2 OR A=3 THEN F
1(I,J)=A ELSE GOTO558Ø
5565 GOTO551Ø
557Ø IF A=1 OR A=2 OR A=3 THEN F
3(X)=A ELSE GOTO558Ø
5575 GOTO551Ø
558Ø IF A=4 THEN 57ØØ
5585 IF TC<>Ø THEN 5595:'IF TRAN
SPORTATION ITEMS HAVE BEEN ENTER
ED, GET FLAG IF NEEDED.
559Ø IF A=6 THEN F4(I,J)=A:GOTO5
51Ø
5595 IF A=5 THEN F5(X)=A:GOTO551
Ø
567Ø '
568Ø 'ENTER COMMENTS.
569Ø '
57ØØ C=C+1
571Ø IF C>12 THEN CLS:PRINT"MAXI
MUM NUMBER OF COMMENTS HAS
    BEEN ENTERED!":SOUND 1ØØ,5:F
OR X=1TO1ØØØ:NEXT X:GOTO574Ø:'TH
ERE IS ROOM FOR UP TO 12 COMMENT
S OF UP TO 4Ø CHARACTERS EACH.
572Ø PRINT:PRINT"ENTER COMMENT N
O."C":";:LINEINPUT CO$(C):F2(I,J
)=C
573Ø IF LEN(CO$(C))>4Ø THEN PRIN
T:PRINT"YOU HAVE EXCEEDED 4Ø CHA
RACTERS!          PLEASE REDO.":S
OUND 1ØØ,5:FOR X=1TO1ØØØ:NEXT X:
GOTO572Ø
574Ø GOTO551Ø
577Ø '
578Ø 'LIST COMMENTS ON SCREEN.
579Ø '
58ØØ IF C<=6 THEN FOR K=1TOC ELS
E FOR K=1TO6
581Ø PRINT K"- "CO$(K)
582Ø NEXT K
583Ø IF C<=6 THEN RETURN ELSE PR
INT"PRESS ANY KEY TO CONTINUE"
584Ø X$=INKEY$:IF X$="" THEN 584
Ø
585Ø FOR K=7TOC
586Ø PRINT K"- "CO$(K)
587Ø NEXT K
588Ø RETURN
597Ø '
598Ø 'GET CASH ITEM TOTAL.
599Ø '
6ØØØ CA=Ø:'INITIALIZE CASH TOTAL
 TO ZERO.
6Ø1Ø FOR I=1TO13
6Ø2Ø FOR J=1TON
6Ø3Ø IF F1(I,J)=1 OR F1(I,J)=3 T
HEN CA=CA+XP(I,J)
6Ø4Ø NEXT J
6Ø5Ø NEXT I
6Ø6Ø FOR X=1TOM
6Ø7Ø IF F3(X)=1 OR F3(X)=3 THEN
CA=CA+T1(X)
6Ø8Ø NEXT X
6Ø9Ø RETURN
647Ø '
648Ø 'GET NON-BILLABLE ITEM TOTA
L.
649Ø '
65ØØ NB=Ø:'INITIALIZE NON-BILLAB
LE ITEM TOTAL TO ZERO.
651Ø FOR I=1TO13
652Ø FOR J=1TON
653Ø IF F1(I,J)=2 OR F1(I,J)=3 T
HEN NB=NB+XP(I,J)
654Ø NEXT J
655Ø NEXT I
656Ø FOR X=1TOM
657Ø IF F3(X)=2 OR F3(X)=3 THEN
NB=NB+T1(X)
658Ø NEXT X
659Ø RETURN
697Ø '
698Ø 'GET SECONDARY ACCOUNT TOTA
L.
699Ø '
7ØØØ B2=Ø:'INITIALIZE SECONDARY
ACCOUNT TO ZERO.
7Ø1Ø FOR I=1TO13
7Ø2Ø FOR J=1TON
7Ø3Ø IF F4(I,J)=6 THEN B2=B2+XP(
I,J)
7Ø4Ø NEXT J
7Ø5Ø NEXT I
7Ø6Ø FOR X=1TOM
7Ø7Ø IF F5(X)=6 THEN B2=B2+T1(X)

7Ø8Ø NEXT X
7Ø9Ø RETURN
727Ø '
728Ø 'SAVE DATA TO DISK.
729Ø '
73ØØ IF N=Ø THEN PRINT@23Ø,"NO D
ATA IN COMPUTER!":SOUND 1ØØ,5:FO
R X=1TO15ØØ:NEXT X:GOTO6Ø
731Ø PRINT"ENTER NAME OF FILE TO
 BE SAVED   USING THIS FORMAT: M
MDD-YY       (FOR EXAMPLE: JAN2
Ø-84)":LINEINPUT NF$
732Ø PRINT:PRINT"    SAVING "NF$
 " TO DISK"
733Ø OPEN"O",#1,NF$
734Ø WRITE#1,N,M,C,PR$,SA$,B1,B1
$,B2,B2$,TC,HD,GT,TB,CA,AD,RE,NB
,OT$
735Ø FOR J=1TON
736Ø WRITE#1,DT$(J)
737Ø FOR I=1TO13
738Ø WRITE#1,IT$(I),XP(I,J),F1(I
,J),F2(I,J),F4(I,J)
739Ø NEXT I
74ØØ NEXT J
741Ø FOR IN=1TO14
742Ø WRITE#1,XP(IN,6)
743Ø NEXT IN
744Ø FOR IN=1TON
745Ø WRITE#1,XP(14,IN)
746Ø NEXT IN
747Ø FOR X=1TOM
748Ø WRITE#1,T1(X),F3(X),F5(X),D
$(X),TR$(X),DE$(X)
749Ø NEXT X
75ØØ FOR K=1TO12
751Ø WRITE#1,CO$(K)
752Ø NEXT K
753Ø CLOSE#1:GOTO6Ø
767Ø '
768Ø 'LOAD DATA FROM DISK.
769Ø '
77ØØ PRINT"NAME OF FILE TO BE LO
ADED FROM         DISK (MMMDD-YY
)":LINEINPUT NF$
771Ø PRINT:PRINT"   LOADING "NF$
 " FROM DISK"
772Ø OPEN"I",#1,NF$
773Ø INPUT#1,N,M,C,PR$,SA$,B1,B1
$,B2,B2$,TC,HD,GT,TB,CA,AD,RE,NB
,OT$
774Ø FOR J=1TON
775Ø INPUT#1,DT$(J)
776Ø FOR I=1TO13
777Ø INPUT#1,IT$(I),XP(I,J),F1(I
,J),F2(I,J),F4(I,J)
778Ø NEXT I
779Ø NEXT J
78ØØ FOR IN=1TO14
781Ø INPUT#1,XP(IN,6)
782Ø NEXT IN
783Ø FOR IN=1TON
784Ø INPUT#1,XP(14,IN)
785Ø NEXT IN
786Ø FOR X=1TOM
787Ø INPUT#1,T1(X),F3(X),F5(X),D
$(X),TR$(X),DE$(X)
788Ø NEXT X
789Ø FOR K=1TO12
79ØØ INPUT#1,CO$(K)
791Ø NEXT K
792Ø CLOSE#1:GOTO6Ø
797Ø '
798Ø 'PRINT EXPENSE REPORT.
799Ø '
8ØØØ PRINT@228,"PRINTING EXPENSE
 REPORT"
8ØØ5 REM INSERT BETWEEN QUOTES I
N LINE 8Ø1Ø YOUR COMPANY'S NAME
OR YOUR OWN
8Ø1Ø PRINT#-2,CHR$(27);CHR$(33);
TAB(21)"HILTON N. WASSERMAN & AS
SOCIATES, INC.":'CODES SET PRINT
ER FOR BOLD TYPE.
8Ø2Ø PRINT#-2:PRINT#-2,TAB(27)"T
RAVEL EXPENSE REPORT";CHR$(27);C
HR$(34):'GO BACK TO REGULAR TYPE
.
8Ø3Ø PRINT#-2:PRINT#-2:PRINT#-2,
"Travel Report of: ";XX$
8Ø4Ø PRINT#-2:PRINT#-2,"Purpose
of Travel: ";PR$
8Ø5Ø PRINT:PRINT#-2:PRINT#-2,TAB
(32)"DAILY EXPENSES"
8Ø6Ø GOSUB9ØØØ:'DRAW 8Ø COLUMN L
INE.
8Ø7Ø PRINT#-2
8Ø8Ø PRINT#-2,TAB(5)"Date";
8Ø9Ø FOR J=1TON
81ØØ PRINT#-2,TAB(J*11+5);DT$(J)
;
811Ø NEXT J
812Ø PRINT#-2,TAB(7Ø)"Item Total
"
813Ø GOSUB9ØØØ:'DRAW 8Ø COLUMN L
INE.
814Ø PRINT#-2
815Ø FOR I=1TO13
816Ø PRINT#-2,IT$(I);
817Ø FOR J=1TON
818Ø PRINT#-2,TAB(J*11+4);:IF XP
(I,J)<>Ø THEN PRINT#-2,USING"###
#.##";XP(I,J);:ELSE PRINT#-2,TAB
(J*11+7)"----";
819Ø F=Ø:'WILL BE USED TO ENABLE
 A LEADING BLANK TO BE INSERTED
IF AN ITEM HAS ONLY A COMMENT FL
AG.
82ØØ IF F1(I,J)=1 THEN PRINT#-2,
"c";:ELSE IF F1(I,J)=2 THEN PRIN
T#-2,"n";:ELSE IF F1(I,J)=3 THEN
 PRINT#-2,"cn";:'FLAG CASH AND N
ON-BILLABLE ITEMS.
821Ø IF F1(I,J)=1 OR F1(I,J)=2 O
R F1(I,J)=3 THEN F=1
822Ø IF F4(I,J)=6 THEN PRINT#-2,
"s";:F=1:'FLAG SECONDARY ACCOUNT
 ITEMS.
```

Listing continued

Listing continued

```
8230 '
8240 'IN LINE 8250 WE ARE GOING
TO PRINT THE NUMBER REPRESENTED
BY F2(I,J) AS A FLAG FOR A COMME
NT.
8250 'TO AVOID PRINTING THE LEAD
ING BLANK SPACE THAT COCO INSERT
S, WE WILL CONVERT F2(I,J) TO A
STRING, AND USE MID$ TO CHOOSE W
HAT IS PRINTED.
8260 '
8270 F2$(I,J)=STR$(F2(I,J))
8280 IF F2(I,J)<>0 AND F=0 THEN
PRINT#-2," "MID$(F2$(I,J),2,2);
ELSE IF F2(I,J)<>0 THEN PRINT#-2
,MID$(F2$(I,J),2,2);:'FLAG COMME
NT NUMBER.
8290 NEXT J
8300 PRINT#-2,TAB(70);:PRINT#-2,
USING"$$####.##";XP(I,6):'PRINT
ITEM TOTALS.
8310 NEXT I
8320 GOSUB9000:'DRAW 80 COLUMN L
INE.
8330 PRINT#-2
8340 PRINT#-2,IT$(14);
8350 FOR J=1TON
8360 PRINT#-2,TAB(J*11+3);:PRINT
#-2,USING"$$####.##";XP(14,J);:'
PRINT DAILY TOTALS.
8370 NEXT J
8380 PRINT#-2,TAB(70);:PRINT#-2,
USING"$$####.##";XP(14,6):'PRINT
 TOTAL OF TOTALS.
8390 GOSUB9000:'DRAW 80 COLUMN L
INE.
8400 PRINT#-2
8410 PRINT#-2,TAB(45)"Total Dail
y Expenses:";TAB(70);:PRINT#-2,U
SING"$$####.##";XP(14,6)
8420 PRINT#-2
8430 PRINT#-2,TAB(28)"TRANSPORTA
TION EXPENSES"
8440 GOSUB9000:'DRAW 80 COLUMN L
INE.
8450 PRINT#-2
8460 PRINT#-2,"Date";TAB(15)"Typ
e";TAB(28)"Destination";TAB(46)"
Amount"
8470 GOSUB9500:'DRAW 55 COLUMN L
INE.
8480 FOR X=1TOM
8490 IF T1(X)<>0 THEN PRINT#-2:P
RINT#-2,D$(X);TAB(15)TR$(X);TAB(
28)DE$(X);TAB(45);:PRINT#-2,USIN
G"####.##";T1(X);
8500 IF F3(X)=1 THEN PRINT#-2,"c
";:ELSE IF F3(X)=2 THEN PRINT#-2
,"n";:ELSE IF F3(X)=3 THEN PRINT
#-2,"cn";:'FLAG CASH OR NON-BILL
ABLE TRANSPORTATION ITEM.
8510 IF F5(X)=6 THEN PRINT#-2,"s
";;'FLAG SECONDARY ACCOUNT TRANS
PORTATION ITEM.
8520 NEXT X
8530 PRINT#-2
8540 GOSUB9500:'DRAW 55 COLUMN L
INE.
8550 PRINT#-2
8560 PRINT#-2,TAB(40)"Total Tran
sportation Expenses: ";:PRINT#-2
,TAB(70);:PRINT#-2,USING"$$####.
##";TC
8570 GOSUB9000
8580 PRINT#-2
8590 IF CO$(1)<>"" THEN PRINT#-2
,"1. "CO$(1);ELSE GOTO8600
8600 PRINT#-2,TAB(49)"Grand Tota
l Expenses: ";TAB(70);:PRINT#-2,
USING"$$####.##";GT
8610 IF CO$(2)<>"" THEN PRINT#-2
,"2. "CO$(2);ELSE GOTO8620
8620 PRINT#-2,TAB(46)"Less Non-B
illable Items: ";TAB(70);:PRINT#
-2,USING"$$####.##";NB
8630 IF CO$(3)<>"" THEN PRINT#-2
,"3. "CO$(3);ELSE GOTO8640
8640 PRINT#-2,TAB(45)"Less Hotel
 Billed Direct: ";TAB(70);:PRINT
#-2,USING"$$####.##";HD
8650 IF CO$(4)<>"" THEN PRINT#-2
,"4. "CO$(4) ELSE PRINT#-2
8660 IF CO$(5)<>"" THEN PRINT#-2
,"5. "CO$(5);ELSE GOTO8670
8670 PRINT#-2,TAB(46)"Total Bill
able Expenses: ";TAB(70);:PRINT#
-2,USING"$$####.##";TB
8680 IF CO$(6)<>"" THEN PRINT#-2
,"6. "CO$(6) ELSE PRINT#-2
8690 IF CO$(7)<>"" THEN PRINT#-2
,"7. "CO$(7);ELSE GOTO8700
8700 PRINT#-2,TAB(57)"Cash Advan
ce: ";TAB(70);:PRINT#-2,USING"$$
####.##";AD
8710 IF CO$(8)<>"" THEN PRINT#-2
,"8. "CO$(8);ELSE GOTO8720
8720 IF RE=>0 THEN PRINT#-2,TAB(
49)"Reimbursement Due Me: ";TAB(
70);:PRINT#-2,USING"$$####.##";R
E
8730 IF RE<0 THEN PRINT#-2,TAB(4
8)"Reimbursement Due Co.: ";TAB(
70);:PRINT#-2,USING"$$####.##";A
BS(RE)
8740 IF CO$(9)<>"" THEN PRINT#-2
,"9. "CO$(9) ELSE PRINT#-2
8750 IF CO$(10)<>"" THEN PRINT#-
2,"10. "CO$(10);ELSE GOTO8760
8760 PRINT#-2,TAB(45)"BILL "B1$"
:";TAB(71);:PRINT#-2,USING"$$###
#.##";B1
8770 IF CO$(11)<>"" THEN PRINT#-
2,"11. "CO$(11);ELSE GOTO8780
8780 IF B2<>0 THEN PRINT#-2,TAB(
45)"BILL "B2$":";TAB(71);:PRINT#
-2,USING"$$####.##";B2
8790 IF CO$(12)<>"" THEN PRINT#-
2,"12. "CO$(12)
8800 GOSUB9000
8810 PRINT#-2:PRINT#-2,"KEY: c=c
ash; n=non-billable; s=billable
to secondary account; Number=com
ment.
8820 RETURN
8970 '
8980 'DRAW 80 COLUMN LINE.
8990 '
9000 FOR Y=1TO80
9010 PRINT#-2,CHR$(27);CHR$(88);
" ";
9020 NEXT Y
9030 PRINT#-2,CHR$(27);CHR$(89)
9040 RETURN
9470 '
9480 'DRAW 55 COLUMN LINE.
9490 '
9500 FOR Y=1TO55
9510 PRINT#-2,CHR$(27);CHR$(88);
" ";
9520 NEXT Y
9530 PRINT#-2,CHR$(27);CHR$(89)
9540 RETURN
```

END

Circle Reader Service card #337

DOUBLES DISK CAPACITY!

Cuts Your Cost 50%!

Now! The back of 5¼" diskettes can be used for data storage even with single head disk drives.

- ***NIBBLE NOTCH*** makes it easy
- Adds the notch needed.
- SATISFACTION OR MONEY BACK.

NIBBLE NOTCH II

Cuts square notch and ¼" round "index hole." For use with TRS 80 I & III, Osborne, Kaypro, IBM and others needing an "index hole."

only **$21.90** each*
*add $2.00 each order P&H
($5.00 each foreign P&H)

Florida Residents Add 5% Sales Tax

ORDER TODAY!

VISA **Toll Free 1-800-642-2536** MasterCard
FLORIDA: 1-305-493-8355
OR SEND CHECK OR MONEY ORDER TO:

NIBBLE NOTCH® COMPUTER PRODUCTS
4211 NW 75th TERRACE, · DEPT. 1 5
LAUDERHILL, FL 33319

PATENTED ALL TRADEMARKS ARE ACKNOWLEDGED

Subscription Problem?

Hot CoCo does not keep subscription records on the premises, therefore calling us only adds time and doesn't solve the problem.

Please send a description of the problem and your most recent address label to:

HOT CoCo
Subscription Dept.
PO Box 975
Farmingdale, NY 11737

Thank you and enjoy your subscription

BACK ISSUES

HOT CoCo back issues are $3.50 each with a $1.00 shipping fee per issue.

For 10 or more issues add $7.50 per order for shipping.

Send your order and payment to:

HOT CoCo
Back Issue Order Department
80 Pine Street
Peterborough, NH 03458

See List of Advertisers on page 89

This program is available on our Instant CoCo cassette.
See the Instant CoCo ad elsewhere in this issue.

DON'T PRINT THERE!

Avoid printing on the dotted line by using this Auto-Page program.

Isn't it annoying when the printer prints on the perforated line that separates the sheets of fanfold paper? Not only does it make a funny sound, but it splits the printed line between two pages. This is especially irritating when you have to tear the pages apart. Wouldn't it be nice if the printer just skipped that dotted line, leaving margins at the top and bottom of each page?

Auto-Page is a program designed to make the printer do just that. All you have to do, after the program is in memory, is advance the paper to the beginning of a new page. The computer takes care of the rest. Every time the printer jumps to a new line, a counter in the program is incremented. When the counter reaches 58, the computer knows that it's time for the printer to skip to a new page. It causes the printer to skip eight lines, resets the counter, and begins the process all over again.

Putting Auto-Page into Memory

Before loading Auto-Page into memory, you must protect the memory storage space. Type CLEAR 200,16308 if you're a 16K user, and type CLEAR 200,32692 if you're a 32K or 64K user. Those of you with disk systems will probably find that your disk drive won't function properly unless you protect this memory. Listing 1 is the Assembly program that generates Auto-Page. If you have an editor/assembler, you can type this in and assemble on cassette or disk. The program is relocatable so you may assemble it anywhere in memory. If you have a 16K machine, change the origin value in line 100 to $3FB4. If you don't have an editor/assember, Listings 2 and

3 are Basic programs that POKE Auto-Page into memory and save it on cassette. If you have a 16K computer, use Listing 2. Listing 3 is for 32K and 64K users. Once you've saved the program on cassette, use CLOADM "AUTOPAGE" to get it into memory.

Using Auto-Page

When Auto-Page is in memory, type EXEC. This activates the program. Advance the paper in the printer to the beginning of a new page. The computer takes care of the rest by skipping eight lines after every 58 lines it prints. If you manually advance the paper, it is necessary to reset the counter to zero. This can be accomplished by typing POKE 16376,0 on a 16K computer or POKE 32760,0 on a 32K or 64K computer. If you took the liberty of relocating the program, these locations will be different.

Auto-Page is useful when listing long programs on the printer or printing out lengthy data. However, there may be times when you want to deactivate it. To do so, simply type POKE 16321,38 on a 16K machine or POKE 32705,38 on a 32K or a 64K machine. To reactivate the program, POKE this location with a 33 and advance the paper to the beginning of a new page.■

Address correspondence to Tony Dunn, 530 Junipero Serra, San Francisco, CA 94127.

Program Listing 1. Auto-Page, Assembly Version

```
7FB4                00100          ORG     $7FB4
7FB4 FC   0168      00110 BEGIN    LDD     $0168   Store address to return to
7FB7 FD   7FF9      00120          STD     RETURN  After Auto-Page is finished.
                    00130
7FBA CC   7FC1      00140          LDD     #ATOPGE Store the start address of
7FBD FD   0168      00150          STD     $0168   AUTO-PAGE in the jump table
7FC0 39             00160          RTS             and return to Basic.
                    00170
7FC1 21   31        00180 ATOPGE   BRN     FINIS
7FC3 34   06        00190          PSHS    D       Preserve the "D" register.
                    00200
7FC5 B6   006F      00210          LDA     DEVNUM  Is the character being
7FC8 81   FE        00220          CMPA    #$0FE   sent to the printer?
                    00230
7FCA 26   26        00240          BNE     EXIT    If not, exit this program.
                    00250
7FCC B6   009C      00260          LDA     LPTPOS  Where will the printer print?
                    00270
7FCF 81   50        00280          CMPA    #80     At column 80?
                    00290
7FD1 27   04        00300          BEQ     MAIN    If so, go to the main program.
                    00310
7FD3 81   00        00320          CMPA    #0      Will it print at column 0?
                    00330
7FD5 26   1B        00340          BNE     EXIT    If not, exit this program.
                    00350
7FD7 B6   7FF8      00360 MAIN     LDA     LINE    The printer will jump
7FDA 4C             00370          INCA            to a new line so
7FDB B7   7FF8      00380          STA     LINE    increment the counter.
                    00390
7FDE 81   3B        00400          CMPA    #59     Have 58 lines been printed?
                    00410
7FE0 26   10        00420          BNE     EXIT    If not, exit this program.
                    00430
7FE2 C6   08        00440          LDB     #8      \
7FE4 86   0D        00450          LDA     #$0D    \
7FE6 AD   9F A002   00460 LOOP     JSR     [CHROUT]  Print 8 line feeds.
7FEA 5A             00470          DECB            /
7FEB 26   F9        00480          BNE     LOOP    /
                    00490
7FED 86   01        00500          LDA     #1      Reset the counter
7FEF B7   7FF8      00510          STA     LINE    to zero.
                    00520
7FF2 35   06        00530 EXIT     PULS    D       Restore the "D" register.
                    00540
7FF4 6E   9F 7FF9   00550 FINIS    JMP     [RETURN]        Proceed as normal.
                    00560
                    00570 ********** DEFINE THE VARIABLES **********
7FF8      00        00580 LINE     FCB     0
7FF9      0000      00590 RETURN   FDB     0
          006F      00600 DEVNUM   EQU     111
          009C      00610 LPTPOS   EQU     156
          A002      00620 CHROUT   EQU     $A002
          7FB4      00630          END     BEGIN

00000 TOTAL ERRORS

ATOPGE   7FC1
BEGIN    7FB4
CHROUT   A002
DEVNUM   006F
EXIT     7FF2
FINIS    7FF4
LINE     7FF8
LOOP     7FE6
LPTPOS   009C
MAIN     7FD7
RETURN   7FF9
```

Program Listing 2. Auto-Page, 16K Basic Version

```
10 FOR M=16308 TO 16378
20 READ V$
30 POKE M,VAL("&H"+V$)
40 NEXT M
50 CLS
60 PRINT "DO YOU WISH TO SAVE TH
E OBJECT"
70 PRINT"CODE ON CASSETTE? ";R$
80 A$=INKEY$:IF A$="" THEN 80
90 IF A$<>"Y" THEN 120
100 INPUT "CASSETTE READY";ZZ$
110 CSAVEM "AUTOPAGE",16308,1637
8,16308
120 EXEC 16308
130 END
140 DATA FC, 01, 68, FD, 3F, F9
150 DATA CC, 3F, C1, FD, 01, 68
160 DATA 39, 21, 31, 34, 06, B6
170 DATA 00, 6F, 81, FE, 26, 26
180 DATA B6, 00, 9C, 81, 50, 27
190 DATA 04, 81, 00, 26, 1B, B6
200 DATA 3F, F8, 4C, B7, 3F, F8
210 DATA 81, 3B, 26, 10, C6, 08
220 DATA 86, 0D, AD, 9F, A0, 02
230 DATA 5A, 26, F9, 86, 01, B7
240 DATA 3F, F8, 35, 06, 6E, 9F
250 DATA 3F, F9, 00, 00, 00
```

Program Listing 3. Auto-Page, 32K or 64K Basic Version

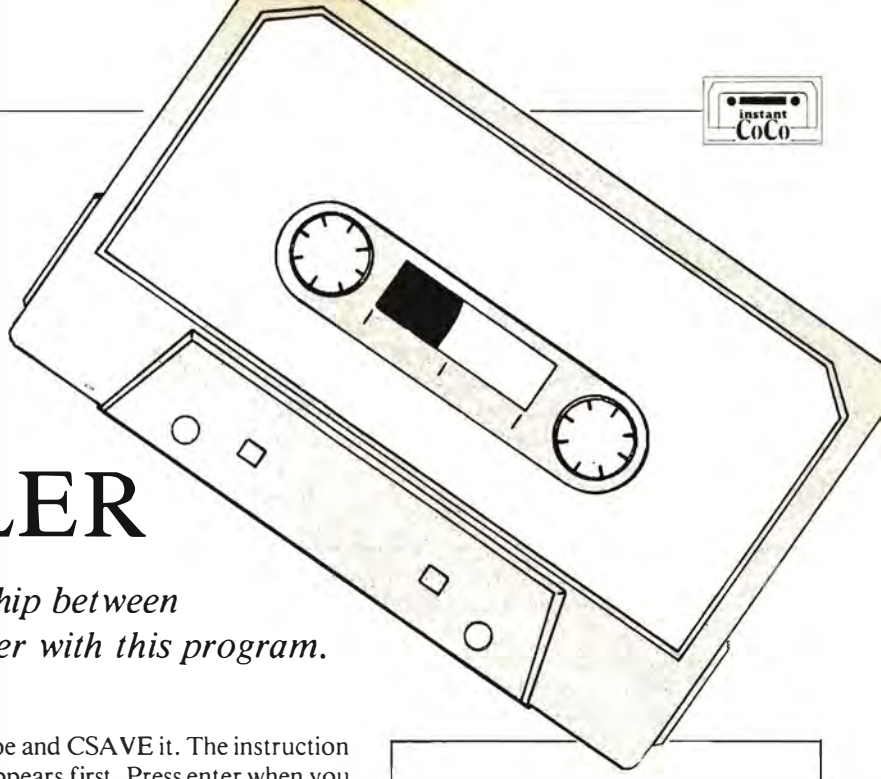
```
10 FOR M=32692 TO 32762
20 READ V$
30 POKE M,VAL("&H"+V$)
40 NEXT M
50 CLS
60 PRINT "DO YOU WISH TO SAVE TH
E OBJECT"
70 PRINT "CODE ON CASSETTE? "
80 A$=INKEY$:IF A$="" THEN 80
90 IF A$<>"Y" THEN 120
100 INPUT "CASSETTE READY";ZZ$
110 CSAVEM "AUTOPAGE",32692,3276
2,32692
120 EXEC 32692
130 END
140 DATA FC, 01, 68, FD, 7F, F9
150 DATA CC, 7F, C1, FD, 01, 68
160 DATA 39, 21, 31, 34, 06, B6
170 DATA 00, 6F, 81, FE, 26, 26
180 DATA B6, 00, 9C, 81, 50, 27
190 DATA 04, 81, 00, 26, 1B, B6
200 DATA 7F, F8, 4C, B7, 7F, F8
210 DATA 81, 3B, 26, 10, C6, 08
220 DATA 86, 0D, AD, 9F, A0, 02
230 DATA 5A, 26, F9, 86, 01, B7
240 DATA 7F, F8, 35, 06, 6E, 9F
250 DATA 7F, F9, 00, 00, 00

END
```

System Requirements

16K RAM
Extended or Disk Color Basic
Printer

BY JOHN NICOLETTOS

CoCo Cassette Controller



Make the naturally good relationship between your CoCo and recorder even better with this program.

A cassette recorder is an excellent match for the Color Computer because Tandy has made the CoCo's cassette interface simple and reliable. Loading a program or file requires only typing a command and the CoCo turns the cassette on, loads the file, and turns the cassette off. You just have to locate the beginning of the program you want by using the recorder index counter.

This is often a trying task, however. I usually forget to jot down the start and stop counter readings. I also tend to switch between two or more cassettes. Occasionally, my son resets the counter or the counter jumps a count or two, effectively making the index counter a poor indicator of the exact location of the tape. I wrote CoCo Cassette Control to save wear and tear on you and your cassette recorder. It also makes an inexpensive cassette recorder more useful with the CoCo.

CoCo Cassette Control converts the down arrow to a cassette-control key. When you press the down-arrow key, the computer turns the cassette motor on and enables the audio from cassette. When you find the beginning of the file, press the down arrow again to return the computer to its normal configuration. CoCo Cassette Control even has its own prompt to remind you that the cassette is on.

You'll find CoCo Cassette Control easy to use. Run the Basic program after you type and CSAVE it. The instruction page appears first. Press enter when you finish reading the page to initiate the loading of the machine-language program into memory. During the loading operation, you see a loading prompt. The end of program prompt signals the completion of loading.

Now you turn your cassette recorder on and activate the audio by pressing the down-arrow key. The computer responds to your keyboard command by providing the "Cassette On" prompt. Press the down arrow again to turn the cassette recorder off. The "Cassette Off" prompt appears, and the motor and the audio turn off. You can continue this process as long and as often as you like. ■

Address correspondence to John L. Nicolettos, 9728 Lookout Place, Gaithersburg, MD 20879.

System Requirements

16K RAM
Extended Color Basic

Program Listing 1.
CoCo Cassette Control Basic Driver

```
10 CLS
20 PRINT"      co"CHR$(128)"co"CH
R$(128)"cassette"CHR$(128)"contr
ol":PRINT@32,STRING$(32,131);
30 PRINT"    THIS PROGRAM WILL L
OAD,":PRINT"  PROTECT, AND AUTOM
ATICALLY"
40 PRINT"  EXECUTE A MACHINE LAN
GUAGE":PRINT"  UTILITY WHICH WIL
L CONTROL"
50 PRINT"  YOUR CASSETTE RECORDE
R FROM":PRINT"  THE KEYBOARD.  Y
OU WILL BE"
60 PRINT"  ABLE TO CONTROL BOTH
THE":PRINT"  MOTOR AND AUDIO FUN
CTIONS"
70 PRINT"  BY SIMPLY PRESSING TH
E DOWN":PRINT"  ARROW KEY.  THE
COMPUTER"
80 PRINT"  WILL RESPOND WITH EIT
HER A":PRINT"  cassette on OR of
f PROMPT."
90 PRINT@484,"PRESS ENTER TO CON
TINUE";:LINEINPUT ZZ$
100 CLS:PRINT@259,"L  O  A  D
   I  N  G"
110 ED=PEEK(39)*256+PEEK(40)
120 ST=ED- 131
130 FOR X=ST TO ED
140 READ D:POKE X,D:SUM=SUM+D
150 NEXT X
160 IF SUM <> 15782 THEN CLS:PRI
NT@263,"!!!DATA ERROR!!!":END
170 EXEC ST
180 CLEAR 200,ST
190 DATA 48, 141, 0, 9, 191, 1,
107, 111
200 DATA 141, 0, 1, 57, 0, 129,
10, 38
210 DATA 86, 52, 20, 109, 141, 2
55, 245, 38
220 DATA 34, 246, 255, 1, 202, 8
, 247, 255
230 DATA 1, 246, 255, 35, 202, 8
, 247, 255
240 DATA 35, 246, 255, 33, 202,
8, 247, 255
250 DATA 33, 99, 141, 255, 215,
48, 141, 0
260 DATA 49, 32, 32, 246, 255, 1
, 196, 247
270 DATA 247, 255, 1, 246, 255,
35, 196, 247
280 DATA 247, 255, 35, 246, 255,
 33, 196, 247
290 DATA 247, 255, 33, 111, 141,
 255, 181, 48
300 DATA 141, 0, 28, 198, 13, 16
6, 128, 189
310 DATA 162, 130, 90, 38, 248,
53, 20, 126
320 DATA 140, 241, 67, 65, 83, 8
3, 69, 84
330 DATA 84, 69, 32, 32, 79, 78,
 13, 67
340 DATA 65, 83, 83, 69, 84, 84,
 69, 32
350 DATA 79, 70, 70, 13
360 CLS
370 PRINT:PRINT
380 PRINTTAB(5)"CO":PRINT
390 PRINTTAB(8)"CO":PRINT
400 PRINTTAB(11) "CASSETTE":PRIN
T
410 PRINTTAB(14)"CONTROL":PRINT
420 PRINTTAB(17)"EXECUTED"
430 PRINT:PRINT:PRINT
440 END
```

This program is available on our Instant CoCo cassette. See the Instant CoCo ad elsewhere in this issue. *END*

DIGISECTOR™ DS-69 VIDEO DIGITIZER FOR THE COCO

Give your COCO the gift of sight!
The Micro Works is happy to introduce the newest member of our Digisector™ family — the DS-69 Video Digitizer for your COCO. It has all the standard features of its big brothers but comes with a price tag that's right for you.

- **High Resolution** 256 by 256 spatial resolution.
- **Precision** 64 levels of grey scale.
- **SPEED!** ½ second for a full screen of video.
- **Compactness** Self contained in a plug in Rompack.
- **Ease of Use** Software on disk will get you up and running fast!

The DS-69 Digisector opens up a whole new world for you and your COCO. Your computer can be a security system, take portraits, analyze signatures, inspect assembly work . . . the DS-69 is your COCO's eyes. Use the DS-69 and a TV camera to get fast, precise conversion of video signals into digital data.

Powerful C-SEE™ software.
C-See is a menu-driven software package included with your DS-69. It provides high speed 5 level digitizing to the screen, high precision 16 level digitizing for superb hard copy printout, and simple software control of brightness and contrast. Or call our driver routines from your own Basic program for easy 64 level random access digitizing. Pictures taken by the DS-69 may be saved on disk by C-See and then edited by our optional MAGIGRAPH package for enhancements and special effects.

The DS-69 comes with a one year warranty. C-See supports both cassette and disk operation with the Multi-Pak adaptor and requires 64K. Cameras and other accessories are available from The Micro Works. Let your COCO see the World!

- DS-69 Digisector & C-See Software $149.95
- MAGIGRAPH Graphics Package on disk $ 39.95

Terms: Visa, Mastercard, Check or C.O.D.

Purveyors of Fine Video Digitizers Since 1977.

The MICRO WORKS Established 1977

P.O. Box 1110 Del Mar, CA 92014 (619) 942-2400

Circle Reader Service card #196

See List of Advertisers on page 89

BY MICK MCGUIRE

Desk Surgery!

Follow these easy modifications to make your desk or table into an efficient workstation.

Providing a comfortable workspace is one way to make your computing time more enjoyable and efficient. If your computing workspace is cluttered, looks bad, or causes you to tire after only a few hours' use, then you need to clean up your act with a well-thought out and properly modified desk.

You don't have to be a carpenter to modify your desk or table to fit you and your computer, but you will need the tools and equipment in Table 1.

Layout and Planning

First, set everything you use on your desk. This allows you to make sure that everything is where you want it to be after you modify it. All controls and switches should be easy to reach without stretching. Make sure the surface is at the right height. It is usually 26 inches, but make it comfortable for you.

Don't worry too much about where the cables are, as they will be hidden later. Consider putting small pieces of equipment (disk drives, modem) on lower shelves to cut down on surface clutter. Make sure you're fully satisfied with your arrangement before proceeding.

Now plug in all the cables and decide where you want them to go. Route all cables down and to the rear through the surface and back so that you won't see them when you're done. If your desk has a kick panel, plan to hide the wires behind it. If it has none, attach the wiring to the underside of the work surface after routing. Now mark where you want to drill with the spade bit and where you want slots for ribbon cables and other ugly items. Allow enough room for gentle (wide radius) bends so that you don't place a strain on any of the connectors. Now, double check to make sure you won't weaken the desk by your drilling and cutting. Items can "stick through" holes you have cut as long as the desk remains strong. (See Photos 1-3.) After marking where to drill and cut, remove your computer and other equipment and store it well away from your work area.

Table 1.
Tools Needed For Desk Modification

Hand or electric drill, one ¼-inch drill bit.
Spade bit (¾- or 1-inch).
Keyhole, coping, or electric jig saw (latter preferred).
Tape measure, ruler, or similar measuring device.
Felt marker or #2 pencil.
Medium grit sandpaper (two sheets).
Stain or paint for touchup (optional).

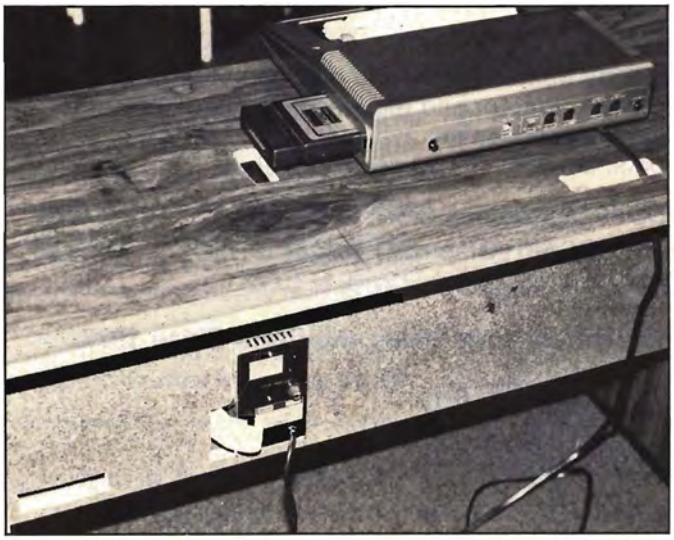


Photo 1. Make sure you place components where they are most comfortable for you. You cannot undo a hole once it's drilled.

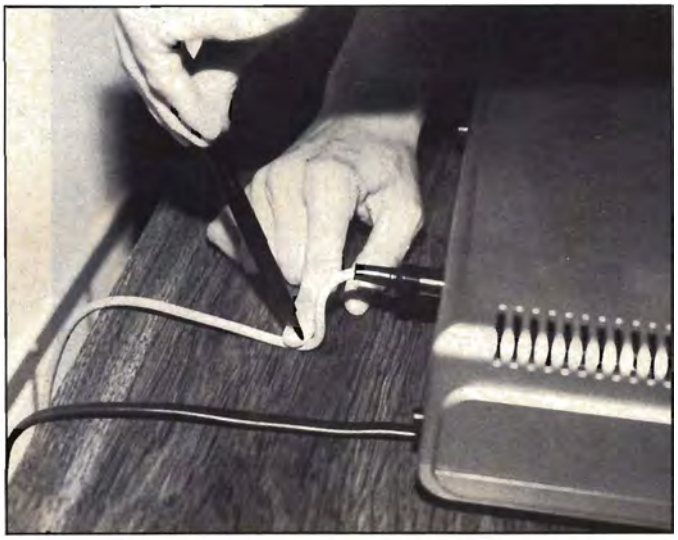


Photo 2. Do not force cables to bend too sharply.

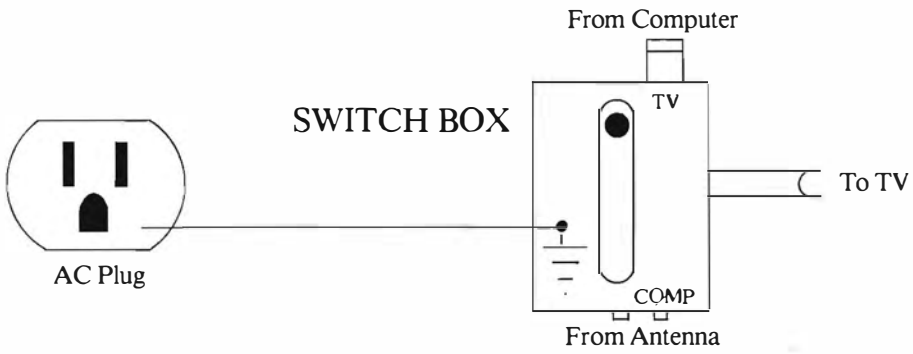


Fig. 1. Eliminating Television Interference

Cutting, Sanding, Staining

Protect the surface on the desk that will show later with tape or newspaper. Use the ¼-inch drill bit to provide a starting place for your saw blade. Use the spade bit to make cable holes if you're not going to cut slots. Work slowly and carefully. To keep the surface from chipping at the cut, consider laying masking tape on the cut line and cutting through the tape.

Now, cut and drill the slots and holes you previously marked. Then use the sandpaper to smooth all the rough edges and surfaces. All sharp edges must be sanded to protect your cables. Now dust it all off, and stain or paint the cut edges to match the rest of the desk. Reassemble the desk if you took it apart to do the cutting, and replace all your computer equipment.

Hide Those Cables

Attach all cables and wires to each item and route them through the correct holes and slots. Plug all the power lines into a power strip attached to the back of the desk (hidden, but where you can reach its switch). Gather and secure all loose cables and wires so that they're out of sight. Use screw eyes and wide plastic garbage tie straps. Now step back and look—if all you can see is one power cord, you did a good job. (See Photo 4.)

You may find that after gathering all your cables together, your television interference (sometimes called radio frequency interference) has increased to unacceptable levels. I eliminated all my television interference by running a ground wire from the outer metal surface of my computer/TV switchbox (at the TV antenna lead) to the ground pin of an extra electrical plug. Be sure that the wire connects *only* to the ground pin. You can solder, screw, rivet, or clamp the wire to the outer switchbox case. Just be sure that you don't short out anything inside while you're doing it. (See Fig. 1.)

Now you should have a comfortable and efficient place to enjoy your computer. ■

Address correspondence to Mick McGuire, 2234 George Wythe Road, Orange Park, FL 32073.

Photo 3. If your desk has a monitor stand, you'll probably have to modify it to accommodate ROM packs.

Photo 4. Voilá! The finished product will be both a joy to work at and pleasing to the eye.

GAME
BY MICHEAL HUNT

COLOR CODE CHALLENGE

Guess the code and win the game.
Color Code is a puzzle for you to solve.

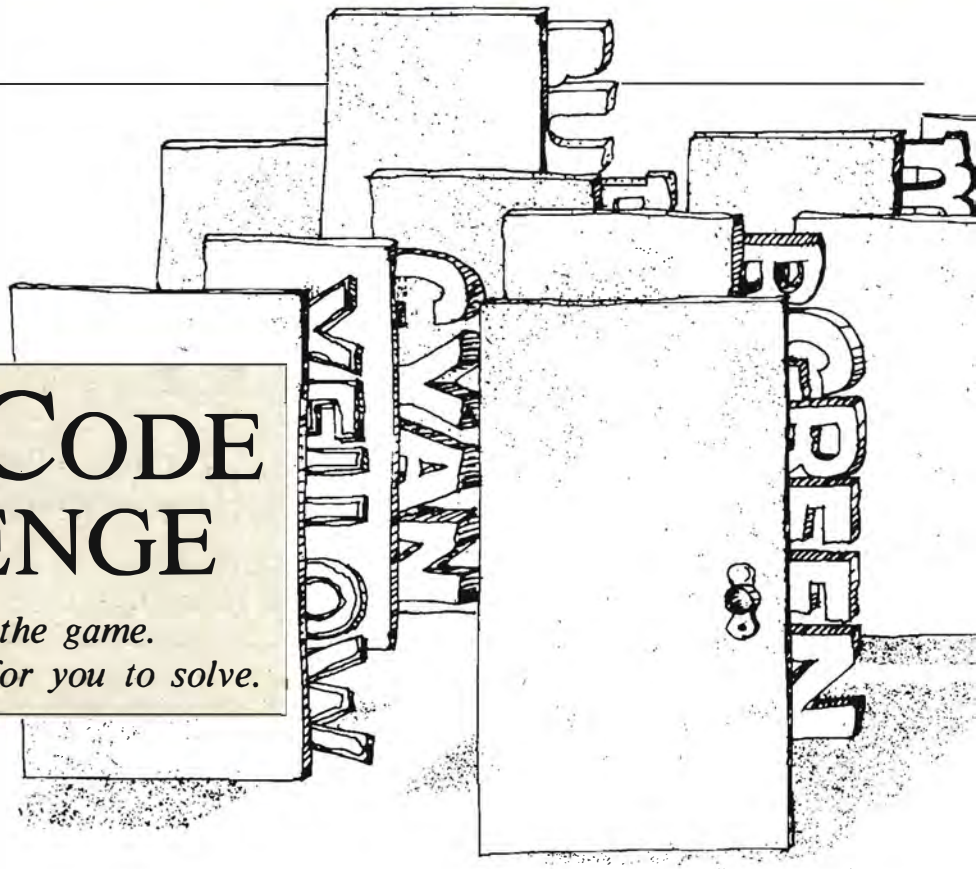


Illustration by Bob Dukette

Color Code is a derivation of the Master Mind concept. The computer picks five out of seven colors. You have six tries to guess the code. You pick the colors using the chart to the left of your screen. After you enter the five colors, the computer gives clues for each color block. These clues are explained by the instructions within the program. If you fail to break the code, the computer will give you the right answer. ■

Address correspondence to Micheal Hunt, P.O. Box 323, Decatur, IL 46733.

System Requirements

Color Computer or MC-10
4K RAM
Color or Micro Color Basic

Program Listing. Color Code

This program is available on our Instant CoCo cassette.
See the Instant CoCo ad elsewhere in this issue.

```
5Ø GOSUB1ØØØ
6Ø CLS(Ø):A=2
7Ø FOR N=2TO1ØSTEP2
8Ø R(N)=RND(8)-1:NEXTN
1ØØ FOR X=46TO55STEP2
11Ø PRINT@X,CHR$(143);
13Ø NEXTX:PRINT@77,"SECRET CODE"
;
132 Y=Ø
135 FOR X=32TO256STEP32
14Ø PRINT@X,CHR$(143+Y);
15Ø Y=Y+16:NEXTX
2ØØ PRINT@34,"Ø=GREEN  ";
21Ø PRINT@66,"1=YELLOW ";
22Ø PRINT@98,"2=BLUE   ";
23Ø PRINT@13Ø,"3=RED    ";
24Ø PRINT@162,"4=BUFF   ";
25Ø PRINT@194,"5=CYAN   ";
26Ø PRINT@226,"6=MAGENTA";
27Ø PRINT@258,"7=ORANGE ";
29Ø X=142
3ØØ T=Ø:Q=Ø
31Ø PRINT@X,CHR$(134);:A$=INKEY$
:PRINT@X,CHR$(143);:PRINT@X,CHR$
(137);
34Ø PRINT@X,CHR$(137);
35Ø IF VAL(A$)=9OR VAL(A$)=8THEN
31Ø
36Ø IF A$=""THEN31Ø
362 IF A$ <>""THEN4ØØ
365 GOTO31Ø
4ØØ PRINT@X,CHR$(143+(VAL(A$)*16
));
41Ø X=X+2:T=T+1
42Ø GOSUB5ØØ
425 IF T=5THEN6ØØ
43Ø GOTO31Ø
5ØØ IF VAL(A$)=R(A)THEN D(A)=1:G
OTO57Ø
51Ø FOR Y=2TO1ØSTEP2
52Ø IF VAL(A$)=R(Y)THEN D(A)=2:G
OTO57Ø
54Ø NEXTY:D(A)=Ø
57Ø A=A+2:RETURN
6ØØ X=X+2Ø
61Ø FOR P=2TO1ØSTEP2
62Ø X=X+2
625 IF D(P)=1THEN PRINT@X,"X";:Q
=Q+1
63Ø IF D(P)=2THEN PRINT@X,"O";
64Ø IF D(P)=ØTHEN PRINT@X,"-";
65Ø NEXT P
66Ø IF Q=5THEN7ØØ
67Ø IF X=5Ø2THEN8ØØ
68Ø X=X+24:A=2:GOTO3ØØ
7ØØ FOR X=1TO2Ø
715 SOUND2ØØ,1:NEXT X
72Ø FOR X=15ØTO21ØSTEP5
725 SOUND X,1:NEXT X
735 CLS(Ø):Y=1Ø7
74Ø FOR X=2TO1ØSTEP2
745 PRINT@Y, CHR$(143+(R(X)*16))
;
75Ø Y=Y+2:NEXT X
755 FOR X=192TO479
76Ø PRINT@X,CHR$(175);
765 NEXT X
77Ø PRINT@227,"YES THIS IS THE R
IGHT CODE";:GOTO86Ø
8ØØ FOR X=2ØØTO1ØØSTEP-5
81Ø SOUND X,1:NEXT X
82Ø CLS(Ø):Y=1Ø7:FOR X=2TO1ØSTEP
2
825 PRINT@Y, CHR$(143+(R(X)*16))
;
83Ø Y=Y+2:NEXT X
835 PRINT@66,"YOU FAILED TO BREA
K THE CODE";
84Ø PRINT@133,"BETTER LUCK NEXT
TIME";
845 FOR X=192TO319
85Ø PRINT@X,CHR$(246);:NEXTX
86Ø PRINT@361,"ANOTHER GAME?";
865 PRINT@39Ø,"ENTER YES OR NO";
:INPUT B$
87Ø IF B$="YES"THEN6Ø
875 IF B$="NO"THEN PRINT"END OF
PROGRAM";:END
88Ø GOTO865
1ØØØ CLS:PRINT@41,"INSTRUCTIONS"
;
1Ø1Ø PRINT:PRINT
1Ø2Ø PRINT"  THE COMPUTER PICKS
5 COLORS."
1Ø3Ø PRINT"  OBJECT; GUESS THE 5
 COLORS."
1Ø4Ø PRINT"  YOU ONLY GET 6 TRYS
"
1Ø5Ø PRINT:PRINT" THE COMPUTER G
IVES YOU CLUES."
1Ø6Ø PRINT" X ,MEANS A RIGHT COL
OR IN THE   RIGHT SPOT."
1Ø7Ø PRINT" O ,MEANS A RIGHT COL
OR IN THE   WRONG SPOT."
1Ø8Ø PRINT " - , MEANS A COLOR T
HAT IS'NT    IN THE CODE AT ALL.
"
1Ø9Ø PRINT:PRINT" PRESS ENTER TO
 BEGIN";:INPUT Z
2ØØØ RETURN
```

END

DYNACALC®

CoCo's Best & Fastest Spreadsheet System

ACCLAIMED BY THE EXPERTS

"DYNACALC is my choice for a CoCo spreadsheet."
Dan Downard, RAINBOW, September, 1984.

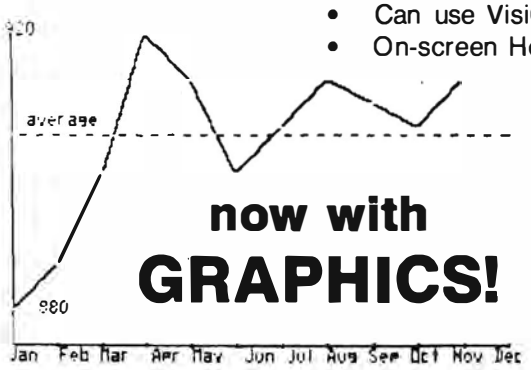
"Eat your heart out, Lotus 1-2-3!"
Scott Norman, HOT CoCo, October, 1984.

NOW ONLY $99.95

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

RAINBOW CERTIFICATION SEAL



now with GRAPHICS!

FOR 64K DISK SYSTEMS
available from

COMPUTER SYSTEMS CENTER
42 Four Seasons Center #122
Chesterfield, MO 63017
(314) 576-5020

NEW ADDRESS

CSC

10 to 6 Mon.-Fri.

or your local DYNACALC dealer

Price US$99.95
Outside North America add $10 postage

CANADA- CDN$129.95
RGS MICRO INC.
759, VICTORIA SQUARE 405
MONTREAL H2Y 2J3
TEL.: (514) 287-1563
ORDER LINE ONLY ★ ★ ★
QUEBEC-ONTARIO-MARITIMES
800-361-5338
WESTERN CANADA 800-361-5155

MasterCard
VISA

DYNACALC Reg. U. S. Pat. Off.
PRO-COLOR-FILE is a trademark of Derringer Software
Telewriter-64 is a trademark of Cognitec
VisiCalc is a trademark of VisiCorp.

Circle Reader Service card #506

See List of Advertisers on page 89

BY R.F. MILLER

Three Little Utilities

Add these handy routines to your programmer's toolbox.

Have you ever wanted to take the spaces out of a Basic program, check the 6809 register contents while running either a Basic or machine-language program, or dump your screen display to the printer? I've written three short Assembly-language programs to perform those tasks.

I think you'll find the programs useful, and you can apply the 6809 programming techniques that they use to your own programs. I am assuming, however, that you have some familiarity with Assembly language. I have geared my explanations toward the beginning/intermediate user, but not toward the absolute novice.

I wrote the programs using Radio Shack's EDTASM+, but you can enter them with any standard editor/assembler.

I have shown editor listings, rather than the more traditional assembler listings, because they leave more room for comments. I feel extensive comments are more useful than hex object code. I've used the same number convention used by EDTASM+. A number preceded by $ is hex, while anything without the $ is decimal.

Remove

Program Listing 1 takes all the spaces (except for those between quotes) out of a Basic program. Typically, Remove gives approximately a 10-percent reduction in the memory requirement. In one application, it shrank a 7.2K program by 677 bytes.

Programs with spaces are much easier to read and debug. With Remove, you can enter and list a program with the spaces in, and then take them out.

A program stores each Basic statement in memory in the form shown in Table 1. A second zero after an EOL marker indicates the end of the program.

There are a few points in Remove worth discussion. The LEAX 4,X statements, numbered 190 and 260, add four to the X register to move from the first byte of a Basic statement to byte 5 where the tokens start.

To understand the purpose of statement 470, assume byte 6 of a Basic line is a space. As Remove loads the statement into the A register in statement 200, it increments X to point to byte 7.

After MOVDWN removes the space, the original contents of byte 7 will be in byte 6. You haven't checked this byte yet, so you must back up one to get it. The autoincrement addressing mode of the 6809 is very handy, but you must keep track of where you are.

Statement 680 shows a similar situation. The token is only moving down one byte, but the program must store it two bytes below the current X value because X increases after the load.

Certain Basic keywords such as ON...GOTO require spaces after them. However, this is only partially true. The problem is in the CoCo's tokenize routine; it must see the spaces to properly interpret those keywords and tokenize them. Remove takes out the spaces after the Basic statements have already been tokenized, so the programs run correctly. However, if you edit a line containing one of the problem keywords after using Remove, you'll get an SN error.

Byte	Contents
1, 2	Pointer to start of next statement
3, 4	Line number
5 . . 7	Tokens for keywords, and ASCII characters for spaces, strings, digits, etc.
n	End of Line (EOL) marker is a zero

Table 1

To use Remove, just CLEAR 200, 16307, load Remove and your Basic program, and EXEC &H3FB4 (or 16308 in decimal). It will take about 30 seconds to go through an 8K program. I always save the original and compressed Basic programs in case I must make any changes.

RDUMP

Program Listing 2 prints the contents of all the 6809 registers on the screen. It

System Requirements

16K/32K RAM
(4K possible)
Editor/Assembler

This program is available on our Instant CoCo cassette.
See the Instant CoCo ad elsewhere in this issue.

is invaluable for debugging other machine-language programs. To use it, insert a JSR $3F79 in your program wherever you think knowledge of the register contents would be useful.

You might be asking, "Why bother, when my editor/assembler includes a register-dump facility? And it doesn't require any JSR instructions to clutter up my code."

The answer is simple. Your register dump doesn't work when you are in Basic, and machine-language subroutines embedded in Basic programs often can't be fully tested except by running them under Basic control. For example, I needed it while writing the next program (SCRDMP) to find out what Basic puts in the B and X registers.

RDUMP consists of one short main program and a collection of equally short subroutines. The main program was taken from *6809 Assembly Language Programming*, by Lance Leventhal, and was modified to print to the screen instead of to a printer.

Since I think anyone writing 6809 Assembly-language programs should not be without Leventhal's book, I won't explain his program. The explanation starting on page 19-4 is much better than I could give, anyway. I will explain the subroutines, however, since several of them might be useful in other programs you write.

PRTHEX converts the contents of the A register into two hex digits and stores them in the locations to which X and X+1 point. If X is between $400 and $5FE, the screen will display the digits.

The MC6847 character-generator chip accepts standard ASCII codes for the uppercase letters, so statements 460–500 are typical of any ASCII conversion. However, the ASCII codes for the digits 0–9 are 48–57, but these values produce reverse-video characters on the screen.

To produce black-on-green digits, the MC6847 must see values from 112–121. Since 55 is already in statement 480, 57 more must be added in statement 510 to complete the conversion.

The Wait subroutine simply loops until you press any key. Without it, the screen would change so fast that you wouldn't see a thing. Wait is far more convenient than a fixed delay.

I could have used just JSR $A928 instead of writing the CLS subroutine. Type EXEC&HA928 and enter it to see what I mean. However, I wanted to do a little experimentation. Try changing the value of CLCHAR to $20 to see a color that is not otherwise available on the CoCo, or try $BF, $A6, or $CE to see some different backgrounds.

The last subroutine, PRTREG, puts the register titles on the screen. While you're unlikely to have any other use for it as is, it demonstrates how to display ASCII data. Again, because of a quirk of the MC6847, you can't use the ASCII code for a space ($20), but you must use the green graphics character ($8F) or the 6847's own space character ($60) instead.

You should CLEAR 200,&H3F78 before loading RDUMP. You don't need EXEC, but you can use it just as a check.

Program Listing 1. Remove

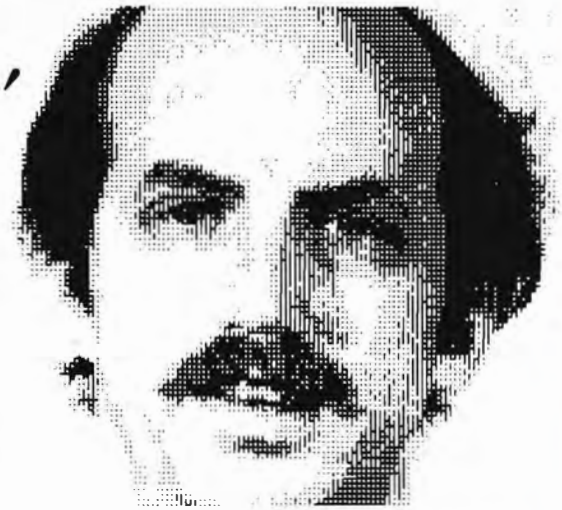
```
00100 *
00110 *  REMOVE  BY R.F.MILLER,JR.
00120 *
00130 *  THIS PROGRAM REMOVES SPACES FROM A BASIC PROGRAM,
00140 *  EXCEPT SPACES ENCLOSED BY QUOTES.
00150 *
00160 ******************************************************
00170          ORG     $3FB4
00180 REMOVE   LDX     <25       LOAD START OF BASIC
00190 NXTLIN   LEAX    4,X       ADDRESS OF FIRST TOKEN
00200 NXTOKE   LDA     ,X+       LOAD TOKEN AND INC
00210          BNE     CONT      IF NOT ZERO,CONTINUE WITH TESTS
00220          LDA     ,X        TWO ZERO'S MARK END OF PROGRAM
00230          BNE     NXTLIN    IF NOT END, THEN NEXT LINE
00240          LDX     <25       RELOAD START OF BASIC
00250 LINE     TFR     X,Y       SAVE ADDRESS IN Y
00260          LEAX    4,X       ADDRESS OF FIRST TOKEN IN LINE
00270 LOOP     LDA     ,X+       FIND ZERO BYTE; X WILL BE
00280          BNE     LOOP         ADDRESS OF NEXT LINE
00290          STX     ,Y        STORE ADDRESS IN POINTER
00300          LDA     ,X        CHECK FOR EOP: IF NOT ZERO,
00310          BNE     LINE         KEEP GOING
00320          LEAX    2,X       ADDRESS FOR START OF VARIABLES
00330          STX     <27       STORE IN BASIC POINTERS:
00340          STX     <29          THESE WILL BE ADJUSTED
00350          STX     <31          BY BASIC AT RUN TIME
00360          RTS               ALL DONE!
00370 CONT     CMPA    #$22      IS IT A QUOTE?
00380          BEQ     QUOTE
00390          CMPA    #$20      IS IT A SPACE?
00400          BEQ     SPACE
00410          BRA     NXTOKE    IF NEITHER, CONTINUE
00420 QUOTE    LDA     ,X+       SEARCH UNTIL SECOND QUOTE
00430          CMPA    #$22         IS FOUND
00440          BNE     QUOTE
00450          BRA     NXTOKE    AFTER QUOTE, CONTINUE
00460 SPACE    BSR     MOVDWN    REMOVE SPACE
00470          LEAX    -1,X      STAY AT SAME ADDRESS
00480          BRA     NXTOKE    GO GET NEXT TOKEN
00490 *
00500 ******************************************************
00510 *
00520 *  MOVDWN SUBROUTINE
00530 *
00540 *  REMOVES SPACE AND MOVES THE REST OF THE BASIC
00550 *  PROGRAM DOWN ONE BYTE.
00560 *
00570 *  ON ENTRY:
00580 *     X IS ADDRESS OF FIRST BYTE TO BE MOVED
00590 *
00600 *  ON EXIT:
00610 *     X IS RESTORED
00620 *     A AND CC ARE ALTERED
00630 *
00640 ******************************************************
00650 *
00660 MOVDWN   PSHS    X         SAVE ADDRESS
00670 SHIFT    LDA     ,X+       LOAD TOKEN; INCREMENT ADDRESS
00680          STA     -2,X      MOVE TOKEN DOWN
00690          BNE     SHIFT     CONTINUE UNTIL ZERO FOUND
00700          LDA     ,X        CHECK FOR SECOND ZERO TOKEN
00710          BNE     SHIFT     IF NOT END OF PROGRAM, CONTINUE
00720          PULS    X         RESTORE ADDRESS
00730          RTS
00740          END
```

END

TALKHEAD

FOR THE 'REAL TALKER'

"Way beyond anything you have ever seen for the CoCo"



That's a strong statement, we know. But wait until you see 'TALKHEAD'! It's a dazzling creation—easily the most impressive display of CoCo graphics you can buy!

If you have a 'REAL TALKER' voice synthesizer, DO NOT deprive yourself of this absolutely incredible Talking Head simulation program! TALKHEAD uses the 'Real Talker' and extremely high speed/high resolution machine language to create an audio-visual simulation that clearly goes way, way beyond anything that you have ever seen on ANY home computer!

TALKHEAD's fast, smooth-talking animation is so stunningly life-like that it resembles a movie more than a cartoon! This page shows some still shots of the actual moving image as it will appear on your TV screen.

And, TALKHEAD is a real snap to use in Basic, thanks to a new command that we give you: SAY. Type SAY "ANYTHING YOU WANT" and Talkhead instantly appears and speaks ANY text—it has an unlimited vocabulary!

The most impressive CoCo program you can buy . . .

'TALKHEAD' is available on cassette or disk (please specify) for ***only $29.95.*** The cassette version can be transferred to disk in case you ever upgrade. TALKHEAD requires 64K of memory and a Colorware 'REAL TALKER' voice pak.

PROGRAM BY TIM JENISON SPEECH PROGRAMMING BY H. PUNYON

ONLY $19.95 ~~$29.95~~ FROM COLORWARE

'TALKHEAD's eyes, mouth and jaw move, realistically animating his speech. The effect is amazing!

MORE SOFTWARE FOR THE 'REAL TALKER' VOICE PAK

STELLAR SEARCH ADVENTURE

If you ever had an urge to command the USS Enterprise, this talking version of 'STELLAR SEARCH' from Owl-Ware is for you! It uniquely combines the best aspects of 'adventure' and graphic 'action' type games and puts the 'Real Talker' voice pak to good use. You'll find graphics galore in this exciting package containing more than 86K of action adventure. Requires 32K and a 'Real Talker' voice pak. ***Cassette....$24.95. Disk....$26.95***

TALKING EDUCATIONAL SOFTWARE

SOFTWARE FOR CHILDREN FROM COMPUTER ISLAND

Math Drill ..... $ 9.95
Foreign Languages..... $ 9.95
Spelling Tester ..... $ 9.95

All 3 for Only $24.95
Requires 16K and a Colorware 'Real Talker' voice pak.

ADVENTURE STARTER

The popular 'ADVENTURE STARTER' from Owl's Nest Software is now available in a speaking version for the 'Real Talker' voice tynthesizer. Adventure Starter is a painless and enjoyable way to learn about computer adventure games. Included are two adventures. The first is "MYHOUSE", an easy game with plenty of help and hints. A second adventure, 'PIRATES', is more challenging. Both are great fun for the adventure minded. This is the only way to get into CoCo adventuring! Requires 16K Extended Basic and a 'REAL TALKER' voice pak. ***Cassette, only $17.95.***

COLORWARE

TOLL FREE 800-221-0916

ORDERS ONLY. N.Y. & INFO CALL (212) 647-2864

★ ORDERING INFORMATION ★ ★ ★

ADD $2.00 PER ORDER FOR SHIPPING & HANDLING.
C.O.D.'S: ADD $3.00 EXTRA.
SHIPPING & HANDLING FOR CANADA IS $4.00
WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.
N.Y. RESIDENTS MUST ADD SALES TAX.
ALL SOFTWARE ON THIS PAGE REQUIRES A COLORWARE 'REAL TALKER' VOICE PAK.

Why do more CoCo owners choose 'REAL TALKER'?

Sure it's priced right, but there's more...

Thousands of 'Real Talker' owners know 'Real Talker' beats ALL other Coco voice synthesizers in ease of use and flexibility. And, NO other Coco talker has a clearer, more intelligible voice. That's quite a lot of advantage when you consider Real Talker's unbeatable price. Yet, Real Talker has some important features that you simply will not find in other Coco talkers:

'Real Talker' is compatible with any 16K, 32K, 64K Extended or non-extended Color Computer. It works with any cassette or disk system and comes complete and ready to talk through your T.V. or monitor speaker. Price includes the 'Real Talker' electronic voice synthesizer in a ROM pack, software on cassette (may be transferred to disk), and user manual.

'SAY' command - You'll have your computer talking brilliantly in just minutes thanks to this powerful new command. Type SAY "ANYTHING YOU WANT" and your words are instantly spoken. It's that simple. Think how easy this makes creating speaking Basic programs. Adding speech to your existing programs is a snap too.

'CONVERT' - This is a truly powerful command for the basic programer. CONVERT automatically transforms a machine language dependent speaking program into a stand-alone Basic program. In other words, you can effortlessly write speaking Basic programs that do not require a machine language translator in memory. This is a unique feature of 'Real Talker'. No other voice synthesizer gives you anything even remotely approaching this type of capability - even synthesizers costing considerably more.

'Real Talker' is a full-featured electronic voice synthesizer unit built into a compact cartridge case. You simply plug it into the side of your computer.

NOW INCLUDED WITH 'REAL TALKER'.....

1. ***'DR. TALK***-This interactive "Eliza" type psychoanalyst program will discuss your innermost problems at length.

2. ***'TALKING BATTLESHIP'***-It's you vs. the computer in this speaking version of the classic game.

3. ***'TALKING BLACKJACK'***- Play for big stakes against a rather talkative casino dealer.

ONLY
$59.95

Other features include software controlled pitch, unlimited vocabulary text-to-speech, and even a program that will recite any ASCII file (such as from Telewriter-64 & other word processors). You also get Colorware's unique full-screen phoneme editor program that let's you experiment with and modify speech at it's most fundimental level.

'REAL TALKER-1' (for the original Color Computer).....***$59.95***

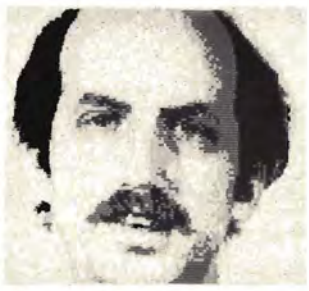
'REAL TALKER-2' (for the Color Computer-2).....***$64.95***

'Y - BRANCHING CABLE' For disk systems. If you have a disk system but do not have a Radio Shack Multi-Slot unit, this economical cable will allow to connect and use your Real Talker and Disk system together.....***27.95***

CALL TOLL FREE (800) 221-0916

TALKHEAD

If you have a 'Real Talker', do not deprive yourself of this absolutely incredible machine-language Talking Head simulation program. While other talking head simulations use a minimal cartoon-like face, TALKHEAD uses high resolution, full-screen, digitized images of an actual person's face to create a life-like animated effect.



ACTUAL UNRETOUCHED PHOTO

SOFTWARE FOR THE 'REAL TALKER'

TALKHEAD can be easily commanded in Basic to appear on screen and say anything you want. Available on cassette or disk for only $19.95, TALKHEAD requires 64K and a Colorware 'Real Talker'.

ONLY $19.95

COLORWARE

COLORWARE INC.
78-03B Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA
MasterCard

★★★ ORDERING INFORMATION ★★★

ADD $2.00 PER ORDER FOR SHIPPING & HANDLING.
C.O.D.'S: ADD $3.00 EXTRA.
SHIPPING & HANDLING FOR CANADA IS $4.00
WE ACCEPT VISA, MASTERCARD, M.O.'S, CHECKS.
N.Y. RESIDENTS MUST ADD SALES TAX.

Program Listing 2. RDUMP

```
00100 *
00110 *  RDUMP
00111 *  FROM 6809 ASSEMBLY LANGUAGE PROGRAMMING
00112 *    BY LANCE A. LEVENTHAL
00113 *    COPYRIGHT 1981 MCGRAW-HILL
00114 *  REPRODUCED BY PERMISSION OF OSBORNE/MCGRAW-HILL
00120 *
00130 *  THIS SUB SAVES ALL REGISTERS IN THE HARDWARE STACK,
00140 *  PRINTS THEM USING A PRINT SUB, AND RESTORES THEM.
00150 *
00160 ********************************************************
00170          ORG $3F79
00180 RDUMP    PSHS    U,Y,X,DP,B,A,CC
00190          LEAU    12,S
00200          PSHS    U
00210          BSR     CLS     CLEAR SCREEN
00220          BSR     PRTREG  PRINT REGISTER TITLES
00230          CLRB
00240          LDX     #$0429  FIRST PRINT LOCATION
00250          TFR     S,U
00260 PRTONE   LDA     ,U+
00270          BSR     PRTHEX  PRINT A AS TWO HEX DIGITS
00280          LEAX    32,X    ADVANCE ONE LINE
00290          INCB
00300          CMPB    #14
00310          BNE     PRTONE
00320          BSR     WAIT    WAIT FOR KEY
00330          PULS    U
00340          PULS    PC,U,Y,X,DP,B,A,CC
00350 ********************************************************
00360 *
00370 *  PRTHEX BY R.F.MILLER,JR.
00380 *
00390 *  THIS SUB PRINTS THE CONTENTS OF THE ACCUMULATOR AS
00400 *  TWO HEX DIGITS AT THE LOCATION CONTAINED IN THE X
00410 *  REGISTER
00420 *
00430 *  REGISTERS AFFECTED: A,CC
00440 *
00450 ********************************************************
00460 PRTHEX   PSHS    A       SAVE A
00470          ANDA    #$0F    LS NYBBLE FIRST
00480          ADDA    #55     CONVERT TO CHAR GEN CODE
00490          CMPA    #65     IS RESULT CODE FOR A-F?
00500          BHS     PRINTL  IF SO, PRINT
00510          ADDA    #57     ADD 57 TO GET CODE FOR 0-9
00520 PRINTL   STA 1,X
00530          PULS    A       GET A AGAIN
00540          LSRA
00550          LSRA
00560          LSRA
00570          LSRA            MS NYBBLE
00580          ADDA    #55
00590          CMPA    #65
00600          BHS     PRINTM
00610          ADDA    #57
00620 PRINTM   STA     ,X
00630          RTS
00640 ********************************************************
00650 *
00660 *  WAIT SUB: WAITS FOR KEY TO BE DEPRESSED
00670 *
00680 *  REGISTERS AFFECTED: ALL EXCEPT B,X
00690 *
00700 ********************************************************
00710 POLCAT   EQU     $A000
00720 WAIT     JSR     [POLCAT]        ROM KEYBOARD STROBE
00730          BEQ     WAIT
00740          RTS
00750 ********************************************************
00760 *
00770 *  SUB TO CLEAR SCREEN
00780 *
00790 *  REGISTERS AFFECTED: A,X,CC
00800 *
00810 ********************************************************
00820 CLCHAR   SET     $8F     GREEN GRAPHICS CHARACTER
00830 CLS      LDX     #$400   FIRST SCREEN LOCATION
00840          LDA     #CLCHAR
00850 CLRN     STA     ,X+
00860          CMPX    #$5FF   LAST SCREEN LOCATION?
00870          BLS     CLRN
00880          RTS
00890 ********************************************************
00900 *
00910 *  SUB TO PRINT REGISTER TITLES
00920 *  BY R.F.MILLER,JR.
00930 *
00940 *  REGISTERS AFFECTED: A,X,Y,U,CC
00950 *
00960 ********************************************************
00970 PRTREG   LDX     #$0425  FIRST TITLE LOCATION
00980          LEAU    RGNAMS,PCR      ADDRESS OF TITLE TABLE
00990          LDA     #14
01000 CONT     LDY     ,U++    GET FIRST TITLE AND INCREMENT
01010          STY     ,X      STORE ON SCREEN
01020          LEAX    32,X    ADVANCE ONE LINE
```

Listing continued

SCRDMP

You have probably seen a number of programs, Basic and machine language, that send the contents of the text screen to the printer. SCRDMP has two features that I have not found in the others. First, it dumps only to the cursor position—printing any blank lines at the bottom of the screen is just a waste of paper.

Second, once it's loaded and executed at the beginning of a programming session, you can call it simply by pressing the shift and up-arrow keys at the same time.

Even though this program is quite short, it is a bit more difficult to explain than the earlier ones. It involves the use of RAM hooks to take control away from Basic, do something, and then return control to Basic.

A hook is a location in RAM where a machine-language op-code and operand are stored on power-up. This is done automatically by the CoCo's initialization routines.

The hook is usually a JMP instruction followed by an address, but it may just be an RTS, which means it isn't being used by your particular version of ROM. The designers did this so that when you install new ROM or a program pack, you can alter the sequence of execution without replacing the old ROM.

The particular hook I use is at locations $16A to $16C, and contains JMP $8CF1 in Extended Color Basic, or RTS in Color Basic. Lines 320–350 in Program Listing 3 take the contents of these locations and move them to the end of DMPROG. Lines 360–390 store the op-code for JMP in $16A and the starting address of DMPROG—the part of this program that actually handles the dump—in $16B and $16C.

You'll only use the statements down to 400 once, when you EXEC after a CLOADM of the program. Then, when the ROM routine that inputs a character from the keyboard jumps to $16A, control is passed to DMPROG. If you've pressed the shift and up-arrow keys, the screen is dumped to the printer. Otherwise, the program returns control to Basic's input routine.

You don't want to print the shifted up-arrow key, but you do want to remove it from the Basic input line buffer after the screen print is done. Lines 490–510 reduce the pointer to the cursor position by one.

Line 650 decrements the B register, which is Basic's counter for the length of the line buffer, by one. Line 660 decrements the X register, which is the pointer to the next byte in the buffer.

Lines 520 and 530 set the device number flag to −2 ($FE in two's complement notation) so the output will go to the printer. The remainder of the program simply takes each character from the screen, converts it from MC6847 code to ASCII, and sends it to the printer. After each character, there is a test to see if the program is at the end of the material (line 590) or at the end of a line (lines 690–750).

When the dump is finished, the program sends a final line feed, resets the device number for output to the screen, and adjusts the B and X registers (as described earlier) before jumping back to Basic.

To use this program, enter CLEAR 200,&H3F8F, then CLOADM "SCRDMP", and EXEC. Whenever you want to print the screen, just press shift and up-arrow, and watch it go.

Final Thoughts

All the ORG and CLEAR addresses given are for a 16K machine. If you have 32K, you can add $4000 (or $H4000) hex or 16384 decimal to these addresses. Or, since I've written all these programs in position-independent code, you can assemble at the ORG values shown and add the 16K offset with the CLOADM command.

The CLEAR must, of course, be one byte below the first address as loaded. Those of you with 4K may have a problem because I'm not aware of any assemblers available for 4K. I will provide a cassette with all three programs for $5, and, if you specify 4K, I'll assemble the programs at the proper addresses. ■

Address correspondence to R. F. Miller, 18608 Heather Court, Homewood, IL 60430.

Listing continued

```
01030           DECA
01040           BNE     CONT
01050           RTS
01060 RGNAMS    FCC     /SHSLCCA/
01070           FCB     $8F
01080           FCC     /B/
01090           FCB     $8F
01100           FCC     /DPXHXLYHYLUHULPHPL/
01110           END
```

Program Listing 3. Screen Dump

```
00100 *
00110 *  SCREEN DUMP UTILITY
00120 *   BY R.F.MILLER,JR.
00130 *
00140 *  <SHIFT>+<UP ARROW> STARTS THE DUMP.  THE DUMP
00150 *  STOPS AT THE CURSOR POSITION.
00160 *
00170 *  ALL REGISTERS EXCEPT A AND CC ARE PRESERVED.
00180 *
00190 ********************************************************
00200 CHROUT  EQU     $A002   ROM ROUTINE TO OUTPUT CHARACTER
00210 DEVNUM  EQU     $6F     DEVICE NUMBER(0=SCR'N,-2=PRT'R)
00220 CURPOS  EQU     $88     PTR TO CURSOR LOCATION IN MEM
00230 BEGSCR  EQU     $0400   ADDRESS OF BEG OF SCREEN MEM
00240         ORG     $3F90
00250 ********************************************************
00260 *
00270 *  THIS ROUTINE SETS THE RAM HOOK TO JUMP TO THE
00280 *  SCREEN DUMP, AND RETURN TO BASIC IF NO DUMP IS
00290 *  REQUESTED OR WHEN THE DUMP IS COMPLETED.
00300 *
00310 ********************************************************
00320 SCRDMP  LDA     >$16A   GET INSTRUCTION FROM HOOK
00330         STA     JUMP,PCR        STORE IT FOR RETURN
00340         LDX     >$16B   GET ADDRESS FROM HOOK
00350         STX     RETADD,PCR      STORE FOR RETURN
00360         LEAX    DMPROG,PCR      LOAD PROGRAM ADDRESS
00370         STX     >$16B   STORE ADDRESS IN HOOK
00380         LDA     #$7E    LOAD CODE FOR JUMP
00390         STA     >$16A   STORE IT IN HOOK
00400         RTS
00410 ********************************************************
00420 *
00430 *  THIS IS THE DUMP PROGRAM ITSELF.
00440 *
00450 ********************************************************
00460 DMPROG  CMPA    #$5F    WAS <SHIFT>+<UP ARROW> HIT?
00470         BNE     JUMP    IF NOT, GO BACK TO BASIC
00480         PSHS    X,B     SAVE X AND B
00490         LDD     <CURPOS GET CURSOR POSITION
00500         SUBD    #1      ADJUST FOR <SHIFT>+<UP ARROW>
00510         STD     <CURPOS PUT ADJUSTED POSITION BACK
00520         LDA     #$0FE   LOAD PRINTER DEVICE NUMBER
00530         STA     <DEVNUM STORE IT IN DEVNUM
00540         LDX     #BEGSCR LOAD START ADDRESS OF SCREEN
00550         CLRB            SET CHR COUNTER TO 0
00560 LOOP    LDA     ,X+     GET NEXT CHAR FROM SCREEN
00570         BSR     POKASC  SUB CONVERTS TO ASCII
00580         JSR     [CHROUT]        SEND CHR TO PRINTER
00590         CMPX    <CURPOS AT CURSOR YET?
00600         BLO     CHKLF   IF NOT, CHECK FOR END OF LINE
00610         LDA     #$0D    LOAD LINE FEED CODE
00620         JSR     [CHROUT]        SEND LF TO PRINTER
00630         CLR     <DEVNUM RESET DEVICE NUMBER FOR SCREEN
00640         PULS    X,B     RESTORE X AND B
00650         DECB            DEC BUFFER COUNT FOR <SHIFT>^
00660         LEAX    -1,X    ADJ X TO PNT TO BEG OF LINE
00670 JUMP    RMB     1       SPACE FOR JUMP CODE
00680 RETADD  RMB     2       SPACE FOR RETURN ADDRESS
00690 CHKLF   INCB            ADD 1 TO CHR COUNTER
00700         CMPB    #$20    AT END OF LINE?
00710         BLO     LOOP    IF NOT, GO GET NEXT CHR
00720         LDA     #$0D    LOAD CODE FOR LINE FEED
00730         JSR     [CHROUT]        SEND LF TO PRINTER
00740         CLRB            RESET CHR COUNTER TO 0
00750         BRA     LOOP    GO GET NEXT CHR
00760 ********************************************************
00770 *
00780 *  THIS SUB COVERTS THE POKE (OR CHARACTER GENERATOR)
00790 *  CODE IN A TO AN ASCII CODE REQUIRED BY THE PRINTER.
00800 *  THE ASCII CODE IS RETURNED IN A.
00810 *
00820 ********************************************************
00830 POKASC  CMPA    #96
00840         BLO     CONT
00850         SUBA    #64     IF CODE>=96, SUBTRACT 64
00860 CONT    CMPA    #32
00870         BHS     DONE
00880         ADDA    #96     IF CODE <32, ADD 96
00890 DONE    RTS
00900         END
```

END

Mindbusters

THE KNIGHT'S TOUR—A MILLENNIAL PUZZLE

by Richard Ramella

About a thousand years ago, an anonymous chessplayer got an idea for a puzzle that is still fresh today. Place a knight chess piece on any square of an empty chessboard. Move the knight around the board according to chess rules, trying to occupy every square of the board once—but no more than once. It sounds simple, but it's surprising how often players end up several squares shy of completing the board with nowhere to move.

The Knight's Tour is a classic pastime that occupied the minds of people from disparate generations throughout this millennium. Puzzles such as the Knight's Tour were given widespread attention by scholars, mathematicians, scientists, philosophers, and charlatans into the 19th century.

It's no secret that even today some people sense a transcendant connection between numbers and natural events. I discount belief in numerology and astrology. But if, for example, swarms of stellar gasses swirl in the same numerically measured patterns as tiny seashells, then the surprising connection unfolds a small edge of the cosmos—and three of four more puzzles, as well.

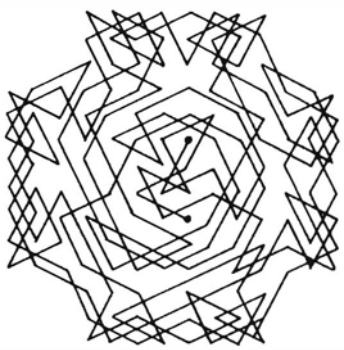
Out of the magic maelstrom of numeric relationships comes understanding of natural processes and, to be frank, a lot of crackpot ideas. Puzzlers of old charted the patterns of their moves in the Knight's Tour, attempting to create harmonious patterns and to bring a bit of order to the universe.

Many solutions are possible. Each traces a unique line pattern in its moves. And some puzzlers, not content with mere designs, numbered each move in an attempt to reveal "magic squares"—eight rows and columns whose sums are the same in all directions. You begin to understand why the folks of past ages worked so avidly on this puzzle. The Knight's Tour was more than a parlor game—it was a quest for reason.

I see the kid in Greenfield, Indiana is yawning. Let's start frying our brains with the game.

How to Play

Once you've entered the puzzle, start it by typing "RUN" and pressing the enter key. The program draws an unpatterned chessboard that is empty except for a small square (the cursor) in its northwest corner. Using the compass directions N, S, E, and W, move the cursor to the square from which you want to begin. After selecting a starting square, press K for knight. The square fills up with a dark pattern that signifies you've landed on it.



To solve the puzzle, you must make moves that are legal to the knight in chess play. In chess, the knight follows an L-shaped pattern: Two squares in one direction and one square to either side. There are eight logical moves; the game recognizes it's commands as three-letter instructions that are based on direction. For example, typing EEN moves the knight two squares east (right) and one square north (up). The full set of moves is EEN, EES, SSW, SSE, NNW, NNE, WWN, WWS.

The program displays the letters of your present move to the right of the board. Tap slowly and rhythmically to register them. If the program misses a tap or you accidentally enter an illegal move, just press the N, S, E, or W key. The fourth tap erases the move string so you can start the move over. The program recognizes and denies attempts to move illegally: off the board, into a previously occupied square, or by unacceptable letter combinations. In the upper right corner, the program displays a linear progression of the moves you make.

Every square you occupy gains you a point. The game ends when you have filled all 64 squares (cause for celebration accompanied by a repeating serenade) or when you have occupied a square from which there is no legal move (which prompts a monotonous tone). In either case, pressing the break key ends the program. After you press the break key, type "Print SC" and press the enter key to see your score.

Next month we look at Victorian Pegs, a mania of the late 19th century. ■

System Requirements

16K RAM
Extended Color Basic

Address correspondence to Richard Ramella, 1493 Mt. View Ave., Chico, CA 95926.

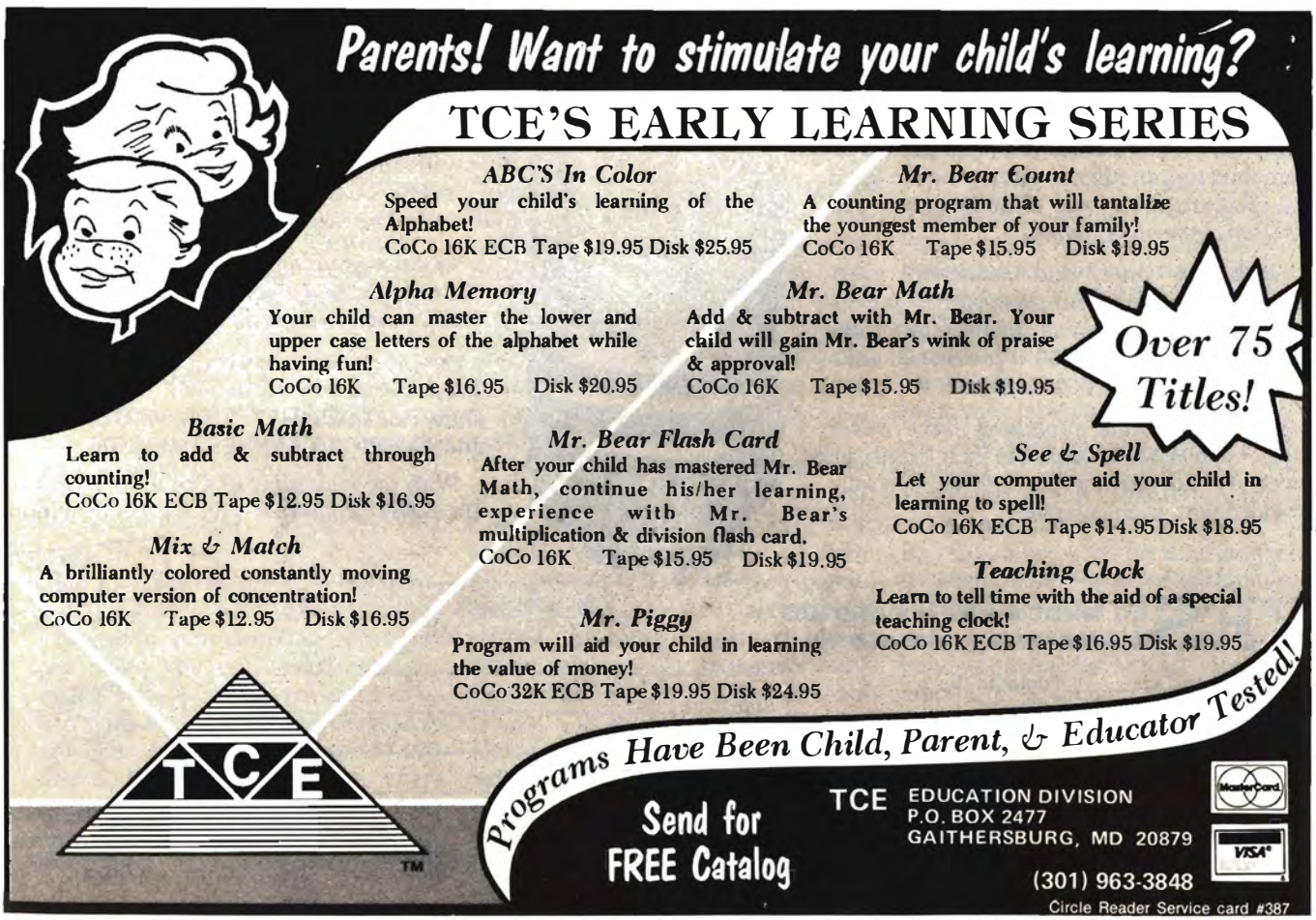
This program is available on our Instant CoCo cassette.

See the Instant CoCo ad elsewhere in this issue.

Program Listing 1. The Knight's Tour

```
100 REM * KNIGHT'S TOUR * TRS-80
 EXTENDED COLOR BASIC 16K / RAME
LLA
110 PMODE 3,1: CLS: PCLS 1: CLEA
R 1000: DIM A(12,12): PRINT @ 23
3,"KNIGHT'S TOUR"
120 FOR A=1 TO 12: FOR B=1 TO12
130 IF A>2 AND A<11 AND B>2 AND
B<11 THEN A(B,A)=1
140 NEXT B,A: Q=220: SCREEN 1,0:
 FOR A=0 TO 192 STEP 24
150 LINE(A,0)-(A,192),PSET: LINE
(0,A)-(192,A),PSET: NEXT
160 X=9: Y=9: A=3: B=3: M$="BAFD
GDGGEDCDEGEFGAB"
170 A$=INKEY$
180 LINE(X,Y)-(X+6,Y+6),PSET,BF
190 IF A$="" THEN 170
200 J=X: K=Y: IF A$="N" AND Y>9
THEN Y=Y-24: B=B-1
210 IF A$="S" AND Y<177 THEN Y=Y
+24: B=B+1
220 IF A$="W" AND X>9 THEN X=X-2
4: A=A-1
230 IF A$="E" AND X<177 THEN X=X
+24: A=A+1
240 IF A$="K" THEN A$="": A(A,B)
=0: GOTO 260
250 LINE(J,K)-(J+6,K+6),PRESET,B
F: GOTO 170
260 X1=X: Y1=Y: GOSUB 520: LINE(
195,2)-(254,61),PSET,B
270 A$=A$+INKEY$
280 IF INKEY$<>"" AND INKEY$<>"N
" AND INKEY$<>"W" AND INKEY$<>"S
" AND INKEY$<>"E" THEN 270
290 LINE(X,Y)-(X+7,Y+7),PRESET,B
: FOR T=1 TO 10: NEXT T: LINE(X,
Y)-(X+7,Y+7),PSET,B
300 IF LEN(A$)>3 THEN A$="": GOS
UB 570
310 H=80: FOR L=1 TO LEN(A$): K$
=MID$(A$,L,1)
320 IF K$="N" THEN LINE(Q,H+25)-
(Q,H),PSET: LINE-(Q+16,H+25),PSE
T: LINE-(Q+16,H),PSET
330 IF K$="W" THEN LINE(Q,H)-(Q+
4,H+25),PSET: LINE-(Q+8,H+12),PS
ET: LINE-(Q+12,H+25),PSET: LINE-
(Q+16,H),PSET
340 IF K$="S" THEN LINE(Q+16,H)-
(Q,H),PSET: LINE-(Q+16,H),PSET:
LINE-(Q,H),PSET: LINE-(Q,H+13),P
SET: LINE-(Q+16,H+13),PSET: LINE
-(Q+16,H+25),PSET: LINE-(Q,H+25)
,PSET
350 IF K$="E" THEN LINE(Q+16,H)-
(Q,H),PSET: LINE-(Q,H+25),PSET:
LINE-(Q+16,H+25),PSET: LINE(Q+9,
H+13)-(Q,H+13),PSET
360 H=H+33: NEXT L
370 IF LEN(A$)<3 THEN 270
380 Y1=Y: X1=X
390 IF X<33 OR Y<57 THEN 400 ELS
E IF A$="NNW" AND A(A-1,B-2)=1 T
HEN A=A-1: B=B-2: A(A,B)=0: X=X-
24: Y=Y-48: GOTO 480
400 IF X>153 OR Y<57 THEN 410 EL
SE IF A$="NNE" AND A(A+1,B-2)=1
THEN A=A+1: B=B-2: A(A,B)=0: X=X
+24: Y=Y-48: GOTO 480
410 IF X<57 OR Y<33 THEN 420 ELS
E IF A$="WWN" AND A(A-2,B-1)=1 T
HEN A=A-2: B=B-1: A(A,B)=0: X=X-
48: Y=Y-24: GOTO 480
420 IF X>129 OR Y<33 THEN 430 EL
SE IF A$="EEN" AND A(A+2,B-1)=1
THEN A=A+2: B=B-1: A(A,B)=0: X=X
+48: Y=Y-24: GOTO 480
430 IF X<57 OR Y>153 THEN 440 EL
SE IF A$="WWS" AND A(A-2,B+1)=1
THEN A=A-2: B=B+1: A(A,B)=0: X=X
-48: Y=Y+24: GOTO 480
440 IF X>129 OR Y>153 GOTO 450 E
LSE IF A$="EES" AND A(A+2,B+1)=1
 THEN A=A+2: B=B+1: A(A,B)=0: X=
X+48: Y=Y+24: GOTO 480
450 IF X>153 AND Y>129 GOTO 460
ELSE IF A$="SSE" AND A(A+1,B+2)=
1 THEN A=A+1: B=B+2: A(A,B)=0:X=
X+24: Y=Y+48: GOTO 480
460 IF X<33 OR Y>129 THEN 470 EL
SE IF A$="SSW" AND A(A-1,B+2)=1
THEN A=A-1: B=B+2: A(A,B)=0: X=X
-24: Y=Y+48: GOTO 480
470 GOTO 270
480 GOSUB 520: A$=""
490 IF A(A-1,B-2)=0 AND A(A+1,B-
2)=0 AND A(A+2,B-1)=0 AND A(A+2,
B+1)=0 AND A(A+1,B+2)=0 AND A(A-
1,B+2)=0 AND A(A-2,B+1)=0 AND A(
A-2,B-1)=0 THEN 510
500 GOTO 270
510 SOUND 1,1:GOTO 510
520 FOR N=0 TO 10 STEP 2
530 LINE(X+3-N,Y+3-N)-(X+3+N,Y+3
+N),PSET,B
540 SOUND 8*RND(13),1: NEXT N: S
C=SC+1
550 IF SC=64 THEN PLAY "T6;O3":
K=RND(15): PLAY MID$(M$,K,4): GO
TO 550
560 LINE(196+(X1/3),Y1/3+2)-(198
+(X/3),Y/3+2),PSET
570 LINE(220,80)-(236,182),PRESE
T,BF: RETURN: END
```

END



See List of Advertisers on page 89

OUR HOTTEST IDEA YET

A FREE PROGRAM WITH EVERY CASSETTE

We want to give you something that *HOT CoCo* can't. That's right! **instant CoCo** will now include a previously unpublished BONUS PROGRAM on each monthly cassette . . **FREE.**

The NEW AND IMPROVED **instant CoCo.** More than just another magazine loader. Each free program is our way of making sure you get state-of-the-art software.

You'll find variety and excitement every month. Everything from great games to helpful utilities. Commercial quality programs that would cost up to $50 if purchased separately in any leading software store.

Since the bonus programs have never appeared in **HOT CoCo** due to their length, all necessary documentation will be specially provided with each cassette.

Save yourself some money. Subscribe to **instant CoCo.** Each month you'll get 10–15 of the best ready-to-run programs from the pages of **HOT CoCo:**

- **The best** action-packed games . . . hours of challenge and entertainment.
- **The best** business, school, home, and hobby programs.
- **The best** utilities . . . ease routine tasks . . . increase your computer's capabilities.

Increase your software library. Order a full 12 month subscription and we'll give you one FREE program on each monthly cassette.

Simply mail in the coupon below, or call TOLL FREE 1-800-258-5473. In New Hampshire, call 1-924-9471. VISA, MASTERCARD, and AMERICAN EXPRESS welcome.

With the new **instant CoCo**, we'll deal you the **BEST** programs—plus a great deal more!

YES! I want a FREE program with every cassette.

- ☐ Please send me _____ copies of the "Best of 83" at $16.47 each.
- ☐ Please send me _____ copies of this month's issue at $11.47 each.
- ☐ Please sign me up for a one year subscription beginning with this month's issue at $99.97.

* Price includes postage and handling. Foreign Air Mail please add an additional 45¢ per cassette or $25 per subscription. US funds drawn on US banks ONLY.

☐ Check Enclosed ☐ MC
☐ VISA ☐ AE

Card # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Please allow 4–6 weeks for delivery. IC8503

instant CoCo • 80 Pine Street • Peterborough, NH 03458

CoCo for Hire

Mailing-List Businesses, Part I

by Terry Kepner and Linda Tiernan

This month we begin a discussion of the mailing-list business, a service that almost anyone with a computer and a printer can start. Mailing-list businesses provide a list of names and addresses on labels for mailing to companies that want to reach people with direct-mail advertising. There are two kinds of list services: mailing-list rental and maintenance of membership or in-house lists. In the second part of the column this month we take a look at home business insurance.

Mailing-List Services

It is easy to turn any list of names into a lucrative business. Advertisers rent mailing lists as a simple and inexpensive means of focusing their campaigns on specific groups of people. Their only stumbling block is finding the right list of names for the markets they've targeted. And many organizations have turned to outside help for maintenance of their lists for mailers on fund drives, advertising bazaars, and so on.

A small-computer mailing-list service is sometimes in a better position to get business than a large one because it can quickly and easily tailor itself to the needs of its market. Very often it deals in mailing lists that are too small to be a worthwhile market for larger services.

Getting Started

Before you begin a mailing-list service, decide what market you want to cover, and how big you want your list to become. Make your decision in advance, for example, on whether you want to do mail-merge operations. Mail merge is the process of printing your list directly onto advertising copy supplied by your customer, one name per page. You need a letter-quality printer with a cut-sheet paper feeder to do mail merge. Both are expensive: Cut-sheet feeders cost between $1,000 and $3,000, and heavy-duty letter-quality printers start at about $1,500. Inexpensive letter-quality printers don't hold up at a steady work pace and frequently break down.

If you go this route, consider what kind of labels you want to provide. Most mailing-list companies provide their customers Cheshire labels, four columns of names and addresses in a square on 13-inch-wide nonadhesive paper. Your alternative is pressure-sensitive labels. Because Cheshire labels are just names and addresses printed on regular paper, they must go to a mailing service that uses a special machine to cut and glue the addresses to envelopes. You might arrange to deliver the labels to the mailing service yourself—an excellent way to pick up good contacts in the industry. You have to buy a wider, more-expensive printer to do Cheshire labels, but they cost your customers much less. It could make a difference if you are up against stiff competition.

Once you have equipment, you need to develop a list. Check the local papers for announcements of meetings of garden clubs, historical societies, car enthusiasts, stamp and coin collecting groups, and so on. Approach these groups about their membership lists.

Church groups and computer clubs are good places to start. Computer clubs will probably already have their members on a list, but you might be able to work a trade for their names based on a service you can provide, such as supplying inexpensive labels. Don't forget to contact service businesses, such as exterminators and pool cleaners, in addition to mail-order manufacturers, with your offer of providing list services. Another good source of names is voter-registration checklists. The local headquarters of political parties will probably be more than happy to sell or loan their lists to you.

An often overlooked source of "names" is the post office boxes at every post office. You don't need to have names; "boxholder" is sufficient. And don't assume that all numbers are in use even if all the boxes are; the post office does not always assign its box numbers consecutively. It's a good idea to go to the post office and check the specific numbers of the boxes in use. There are also companies that capitalize on the current post-office box waiting lists at many post offices by setting up mini post offices at their own addresses.

Once you have a mailing list started, keep adding names to it and making it grow. The more names you have, the more you'll profit each time you sell your list. Keep in mind that every company or group that provides you with names is a potential mailing-list service customer. Be courteous; stress how much you can help them if they'll let you computerize their mailing list. And don't forget to check your own mailbox. Your customers' competitors could be customers, too.

Mailing-List Wisdom

It's a good idea to maintain good relations with the postal service; they have to read your labels. A post office complains to your customers when it has problems with your labels. If it happens more than once, your customers are apt to go somewhere else for their list needs. The post office expects your labels to be in zip-code order in a clear typeface. For large numbers of labels (thousands), they expect you to bundle labels according to zip codes; if it is a second-class mailing, you should write the total number of labels on the outside of the bundles for each zone.

It's important to keep a close watch on your mailing list's return rate—the amount of mailings returned by the post office as "undeliverable" and "address unknown." If the rate is too high (4 percent is average), your customers might feel that you haven't sold them a good list. As a rule of thumb, remove all bad names imme-

diately. But if you are working with a list that you maintain for an organization, such as a church or club, be sure to show them any names you plan to purge in advance. They may want to keep them.

If you maintain lists for several organizations, ask each for permission to sell their lists. Offer a price break on your service in return. In the long run, you'll find it is worthwhile. This leads to what at first might seem to be a paradox—the more frequently you sell a list, the more valuable it becomes. This is because frequent use means that you'll weed out most of the undeliverable returns and that your response statistics are more accurate. Most of your customers will keep records about how many people responded to a mailing. Ask for these figures. You can use them to gauge the status of your list and as references for prospective customers.

Your mailing-list service is only as good as the list you supply. For this reason, you might consider offering a "postcard perk" at periodic intervals, an offer to the people on your list for something of interest, such as cassette tapes priced at wholesale. This helps you gauge the responsiveness of your list and continues to update your list on the status of undeliverable returns.

An important aspect to keep in mind in collecting names for your list is the affluence of the people on the list. Wealthier people are more valuable to your customers. If you're unsure of the demographics of your community, check the local library for a copy of the latest U.S. Census Report for your area. It should contain breakdowns that point out the wealthier areas in your community.

The Mechanics of Mailing Lists

Running a mailing-list business means that you must maintain your equipment meticulously. Be aware of the parts that need watching, such as the tractor feed on the printer, the temperature of the print head, the ribbon and ribbon guides, and any moving parts that could jam. Get the technical manuals for your computer, printer and disk drives, so you can quickly determine the severity of problems you might encounter.

You'll need equipment that can perform well for hours on end, and mailing labels that won't fall off or jam your printer, so don't be too anxious to cut corners when you choose your system. Clean and maintain everything periodically to keep dust, grime, and things like tractor-feed paper holes from jamming your operation, and keep an eye on your equipment while it's printing labels to catch problems early.

Home Business Insurance

Every business needs insurance. In continuing our look at all the factors you should consider when starting a work-at-home business, this month we examine insurance.

Chances are that you already have a homeowner's policy, which is a help for insuring your home business. Most homeowner's policies cover the contents of your home up to about half its value. Usually, coverage is limited to personal possessions, and does not protect anything you use for business purposes. If your daughter earns money by making clothes on the family sewing machine and selling them, the sewing machine and related supplies usually aren't covered by homeowner's policies. Most insurance companies consider your computer to be a home appliance until you use it to generate income. When you use it to make money it becomes a business tool that requires business insurance.

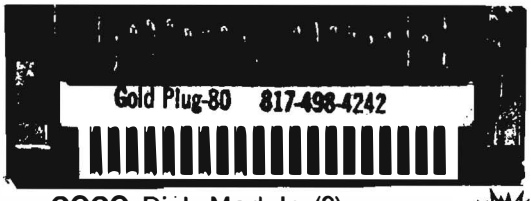
Not all insurance companies follow this pattern. Some include business uses under their homeowner's coverage, provided that money you make with insured equipment does not exceed 10 percent of your total income and that you don't advertise under a business name. If you decide to establish a company name and buy equipment with business checks, you exclude the computer and all other business materials from protection by a homeowner's policy. You'll run into a similar problem if you set up a room in your house, such as a den or a remodeled attic, to serve as a work center for a home business. Everything in such a room is excluded from standard homeowner's policies.

Circle Reader Service card #216

TRS-80+ MOD I, III, COCO, TI99/4a
TIMEX 1000, OSBORNE, others

GOLD PLUG - 80

Eliminate disk reboots and data loss due to oxidized contacts at the card edge connectors. **GOLD PLUG 80** solders to the board edge connector. Use your existing cables (if gold plated).



Ground tab extension

COCO Disk Module (2)	$16.95
Ground tab extensions	INCL
Disk Drives (all R.S.)	$7.95
Gold Disk Cable 2 Drive	29.95
Four Drive Cable	39.95

new
SPECIAL PRICE

USA shipping $1.45 Can/Mex $4.
Foreign $7. Don't wait any longer TEXAS 5% TAX

Available at your favorite dealer or order direct from

E.A.P. CO.
P.O. BOX 14
KELLER, TEXAS 76248

(817) 498-4242 MC/VISA

+ trademark Tandy Corp

If you advertise professionally, make more than 10 percent of your gross income with your home business, or work out of a room in your home that you've set aside for that purpose—you need a separate insurance policy for your business. And it's going to cost you. Moreover, you might be violating the residential zoning laws for your location, which could force you to file for a special zoning exception or a variance.

This is not a new problem or one particular to computerists. Carpenters and plumbers have been coping with it for many years. What you need is a rider policy, such as a marine-coverage rider, attached to your homeowner's policy that makes provision for business items stored at home. This kind of policy often covers equipment carried in cars during local calls or on trips—the only stipulation being that you must lock the vehicle at all times. Having insurance for moving your equipment by car could be important if, for example, you are a student who makes frequent trips to and from campus.

"Most insurance companies consider your computer a home appliance until you use it to generate income."

There are some other options. You should be able to find insurance companies selling computer endorsements, but you must have your homeowner's policy with that particular company. And there are a few companies that are offering policies that are tailored expressly for people who want to protect their business or personal investment in their computers.

Most home insurance companies offer apartment owner's insurance. It's possible that the company will send an agent out to evaluate your apartment in order to determine your insurance needs. You can receive blanket protection or coverage on a list of possessions that you itemize. Students can even get special policies that protect their equipment while they are living in dormitories.

The amount of protection you need and the policy you select should be dictated by your particular situation and long-term goals. It's a good idea to start small and add to your protection as your business grows.

Next month we'll finish up our examination of mailing-list services with a look at what rates to charge, how to advertise, and what hardware and software you'll need. ■

Address correspondence to Terry Kepner, P.O. Box 481, Peterborough, NH 03458. Terry Kepner is a freelance writer and programmer. He writes monthly columns for 80 Micro, Pico, Portable 100, *and* Under Color. *He's been writing about computers since 1979. Linda Tiernan is a librarian with a master's degree in bio-medical research. She has worked with computers since 1980.*

Circle Reader Service card #270

The other source.

Great ideas you won't find at Radio Shack.
Look for them at your bookstore or wherever
Wiley Press Computer Books are sold.

COCO™ LOGO for the TRS-80® Color Computer
Dale Peterson, Don Inman, and Ramon Zamora
A beginner's guide to using the LOGO language on the TRS-80 Color Computer, *Coco LOGO* is easy enough for youngsters to master, yet challenging enough for the whole family. From startup games, simple learning programs, and some LOGO applications, *Coco LOGO* shows you how to create LOGO's famous turtle graphics and use the LOGO editor. Explanations and screen illustrations are included for every step of the learning process. $12.95

COLOR COMPUTER® APPLICATIONS and MORE COLOR COMPUTER® APPLICATIONS
John P. Grillo and J.D. Robertson
Learn computer graphic techniques while you design brilliant letters, game symbols—even life forms... then explore advanced graphics and sound capabilities with *More Color Computer Applications*. Programs for both are available in the *More Color Computer* book/disk set.
COLOR COMPUTER $10.95
MORE COLOR COMPUTER $14.95
Book/Disk Set $39.90

COCO EXTRAVAGANZA
Roger Valentine $12.95
Book/disk set $37.90

Wiley Press guides have taught more than three million people to program, use, and enjoy microcomputers. Look for them at your favorite bookshop or computer store! For a complete list of Wiley's Color Computer titles, write to Gwenyth Jones, Dept. 5-1546

WILEY PRESS
a division of John Wiley & Sons, Inc.
605 Third Avenue, New York, N.Y. 10158
Prices subject to change and higher in Canada.

5-1546 **WILEY PRESS COMPUTERBOOKS**

See List of Advertisers on page 89

The Learning Page

What Does My Family Need?

by Nancy Kipperman

There you sit with your 16K Color Computer. You thought it would be all you'd ever need when you purchased it. Now that the kids are old enough, they want equal time on your computer. You keep hearing and reading that educational software is a great learning tool. Soon you have to decide if your computer will meet their needs as educational software becomes more important in their lives.

What are your options? Do you need to upgrade your machine to 32K or 64K? Will your cassette recorder do for the next few years, or should you be saving your pennies toward a disk drive?

Get That Upgrade?

Ted Malaska, president of TCE Programs in Gaithersburg, MD, has some definite ideas about upgrading your computer. His company is one of the few that has specialized in software for 16K machines. "This year TCE will introduce many programs that require at least 32K," says Malaska. "My basic advice is to buy or upgrade your system to 64K and worry about the rest of the options later." Almost all new programs from TCE will require 64K. School systems that invested in 16K CoCos because they were the least expensive are now adding disk drives and upgrading. "You definitely need Extended Color Basic," states Malaska. "Six months down the road, if you don't own a 32 or 64K machine with Extended Color Basic, you'll miss out on 50 percent of what's new on the market."

Lloyd Dorsett of Dorsett Educational Systems Inc., Norman, OK, disagrees with this. He advertises 320 full-time audio talk/tutor programs on cassettes. The tapes he markets run on the Color Basic 16K machine, and he still sells some titles that run on 4K CoCos. Dorsett says, "My company is turning out more than 200 new programs a year and selling them through dealers, directly to schools, and through our catalog to individuals. We expect to manufacture software on cassette for the 16K for a long while yet, and we're bringing out new titles all the time." No new titles are available for the 4K machines, but tape programs covering basics like reading, arithmetic, and algebra are still available from Dorsett.

Disk Drive First

Tom Prosen, courseware development manager at Sunburst Communications, Pleasantville, NY, advises you to save your dollars for a disk drive if you want to use manufactured software in the future. "We are still developing software on the 32K machine and will be, at least up until next summer. All our software is on disk, however, not tape."

"The wave of the future will be on disks," agrees Ellen Saltzman, director of conversions and marketing for Children's Computer Workshop, a division of Children's Television Workshop in New York City. "The products that we have developed for Tandy's Home Education Systems' (T.H.E.S.) software packages are all on disk. Disks are easier to use, although they're more fragile than tapes."

Malaska explains the shift from tape to disk by saying, "A program that is built on a disk is much more sophisticated than one on tape. You gain the capabilities of a program produced for an Apple, for example."

All the software sold through the Tandy Home Education Systems Division's catalog and home consultants is on disk. Each software package is enclosed in a cardboard, book-shaped container. Velcro holds the cover of the book shut, and disks and documentation fit neatly in an inside pocket. These containers have titles on the front and on the spine of the book/package and will fit nicely on a bookcase shelf. However, this software is specifically designed for the person who has a 64K machine and a disk drive.

John Sheridan, assistant brand manager of Spinnaker Software Corp., Belmont, MA, feels that you might very well end up wanting to use both a tape cartridge and a disk with your computer. "A 16K machine is fine for early learning games," comments Sheridan. "The cartridges at this level are less information intensive and they are also more likely to survive a dog bite or other mishap than a disk."

As your child becomes older, however, Sheridan feels a disk drive is a plus. "The user becomes more involved with the computer and wants to interact more with the machine. Now you might want the 32K and the disk drive. The disk offers more game play for the money. From the manufacturer's viewpoint, he can offer more quality without having to raise the price. Our company has some of its programs on disk as part of T.H.E.S.'s software packages, and the same programs are available on cassette in stores."

What to Do?

It looks as if there are no easy answers. The ages of your children will determine at least a part of your decision; your pocketbook could determine the rest. Young children probably will be happy with the programs provided on tape, but there is definitely a shift to disk underway. The majority of manufactured educational software for middle- and high-school students will appear on disk.

The question to ask yourself is, "What are my family's needs now and what will they be in the next five or ten years?" Based on the answer to that question, you'll have to decide what, if anything, to buy and in what order to purchase it. Of course, by the time you make your decision, there may be new products available for less money. . . always a possibility in this rapidly changing field of computers. ■

MOVING?

Let us know 8 weeks in advance so that you won't miss a single issue of **HOT CoCo**. Attach old label where indicated and print new address in space provided. Also include your mailing label whenever you write concerning your subscription. It helps us serve you promptly.

Write to: Subscription Department •PO Box 975• Farmingdale, NY 11737

☐**Extend my subscription one additional year for only $24.97.**

☐**Payment Enclosed** ☐**Bill Me**

Canada & Mexico $27.97/1 yr. only
US funds drawn on US bank.
Foreign surface $44.97/1yr. only
US funds drawn on US bank.

Please write in new address here and attach old label or fill in below.

Affix Old Label Here

name_____

address_____

city_____ state_____ zip_____

New Address

name_____

address_____

city_____ state_____ zip_____

HOT CoCo•PO Box 975•Farmingdale, NY 11737

Circle Reader Service card #236

FREE 10 DISKETTES OR 20 C-20 CASSETTES

A subscription to the **'Coco-Cassette'** gets you a tape or disk full of 10 **quality programs** delivered to you by first class mail every month. The documentation included will help you run great **utilities** like 'Word Processor,' and 'Budget Analyzer,' or enjoy great **games** like 'Frogjump' and 'Caterpillar Cave' **FOR AS LITTLE AS 46 CENTS EACH!**

★ **Limited offer** ★ Subscribe for a year on cassette and receive **20 Free C-20 cassettes** or subscribe for a year on disk and receive **10 Free 5¼ single sided double density diskettes!**

Now available on disk!

PRICES

	TAPE	DISK
1 YR (12 ISSUES)	55.00	70.00
6 MO (6 ISSUES)	30.00	40.00
Single Copies	6.00	8.00

★ 16K extended required
★ Some programs require 32K, and/or disk
★ Over 3000 satisfied customers
★ Back issues available from July '82 (over 280 programs to choose from!)
★ Also available for Commodore 64.

Mich. Res. add 4%
Overseas ADD $10 to subscription and $1.00 to single issues.
PERSONAL CHECKS WELCOME!

T & D Subscription Software
P.O. BOX 256-C
HOLLAND, MI 49423
(616) 396-7577

Circle Reader Service card #70

Saguaro Software

New From Saguaro Software!

Eagle
A graphic-enhanced lunar lander simulator The pilot breaks out of lunar orbit and attempts a soft landing on the lunar surface. Joysticks control thrust and craft altitude On advanced levels, problems such as fuel leaks and computer screen failures can provide hair-raising final approaches A great tool for that future astronaut or physicist. 32K, 2 Joysticks required Available in tape or an enhanced disk version Tape - $24.95 Disk or Amdek - $29.95

Sketchpad
A graphics drawing program designed to provide the computer hobbyist with easy manipulation of the powerful graphics capabilities of the CoCo. Advanced programmers can design graphics screens and characters for Basic and ML programs and games. Sketchpad was used to create the graphics for "Eagle" (see above) 32K, 2 Joysticks and disk drive required. Disk or Amdek - $29.95.

Testmaker
Menu-driven series that creates mult choice & T/F tests Output to screen or printer 32K Disk, $29.95

Maycode
A6809 disassembler Reads & converts object codes to 6809 Assem Lang Mnemonics. 16K min. Tape, $24.95 Disk or Amdek, $29.95.

TDIR
A menu-driven tape directory. Allows complete directory control. 16K Tape, $24.95

Alphacopy
A disk organizer - writes the programs in alphabetical order on your disk. 32K Disk, $24.95

Gift Certificates Available
Write For Our Catalog!

The Digestive System
An educational quiz game for 2 players that covers different aspects of the human digestive system Each question is assigned a point value relative to its difficulty. A fun way to learn about a not-so-fun subject. 16K.

The Circulatory System
Using the same format as "The Digestive System," this program covers the heart, lungs, veins, arteries, blood, etc 16K **Both Only:**
Tape - $19.95. Disk or Amdek - $24.95.

Raid On Boordanovka
Your mission, should you decide to accept it, is to steal Russia's newest weapon and save the world Text adventure with 50 rooms Tape - $24.95. Disk or Amdek - $29.95

Search For The Llangth
After years of study & searching, you have at last traced the alien race of Llangth to this valley Now your quest for the power of Llangth begins! Tape - $24.95 Disk or Amdek - $29.95

Treasure Hunt
A graphics text adventure You walk with our graphics character through desert, mountains and city to seek the illusive treasure of gold Super graphics with a person who walks with you at each turn Disk or Amdek only - $29.95

Do or Die!
The year is 4001 A.D You are a cargo trucker delivering a load in the Dorian star system. Your mission is to get back to your home planet of Irat, alive Can you survive the journey? Tape - $24.95. Disk or Amdek - $29.95.

OTHXO
Othello™ machine language game for the 16K Co-Co. 2 modes of play - you against a friend or you against the computer. Object of the game is to change the opponent's spots to yours by placing your marker at the end of a row started by your marker. Not as easy as it sounds! Tape - $24.95 Disk or Amdek - $29.95.

History From 1863 to 1976
On two 16K non-extended tapes For 1-4 people, informative & fun way to learn important dates in world history Written for students by a teacher. Tape - $19.95. Disk or Amdek - $24.95.

Stars of Amer./ Civil War	19.95
Loveless Manor 32K	19.95
Co-Co Receivables 32K Disk	29.95
Kidstuf	19.95
CONFUSION Tape	19.95
Ultimate Bingo Tape	19.95
Co-Co Keno Tape	24.95

Add $5.00 For Disk or Amdek

Worlds Of Flight	23.75
Sailor Man	23.75
To Preserve Quandic Disk	29.75
Gravitor	18.75
Compleat Enchanter	18.75
Lizpack Stat Anal. 8 Disks	145.00
Telepatch 64K	11.75
Demon+ 64K	26.75
Rainbow Screen Machine	22.75
Super Screen Machine	33.75
FILMASTR	23.75

Add $3.00 For Disk, $6.00 For Amdek

Order Line 1-800-223-5369, Ext. 260
Monday-Friday 9 AM - 5 PM Mountain Time
Question Line - (602) 623-3321
7331 E. BEVERLY DRIVE • TUCSON, AZ 85710
Arizona Residents Add 7% Tax • Add $1.50 Shipping Per Program ($5 Max)

Amdek Dual 3" Disk Drive
$350
Includes Box Of Diskettes & Cable
If You Can Find
A Better Price,
Show Us...We'll Beat It!

New!
Amdek Color Monitors
Color 300 • Color 500
Call For Absolute Lowest Price!

ESK 5 1/4" Disk SSDD 10 For **$16**
100% Tested - 10 Yr. Guar.

This Month's Special!
Amdek 3" Diskettes
10 For **$25** Reg. $35
Good Through March 15, 1985
Limit 3 Boxes • While Supply Lasts

✔ See List of Advertisers on page 89

68Ø9 On Line

THE COMPLETE TERMINAL

by Bobby Ballard

Once you have your Color Computer, what else does it take to get on line? Let's tackle the topic of The Complete Terminal. I'll give you a rundown on what additional equipment and software you'll need and an idea of what it will cost to join the Network Nation.

Any CoCo with at least 16K is adequate for communications. This allows you to use software that will turn your CoCo into a smart terminal—one that can communicate with a host and store text. If you still have only 4K memory, I suggest you upgrade to at least 16K if you are serious about getting into communications.

Software

With smart-terminal software, you can not only send and receive messages, but also upload and download programs, text, or other information. Smart-terminal software costs nearly the same as dumb-terminal software, so I recommend going the smart-terminal route. Prices for smart-terminal software range from $30 to $50. (See "Six Smart Ways to Go On Line," by W.C. Banta, *HOT CoCo,* August and September 1984, pp. 22 and 20, for a review of six popular cassette-based, smart-terminal programs.)

Some smart-terminal software offer extra features such as high-resolution display, automatic capture and buffer controls, selectable baud rates, an editor, changeable protocol settings, and changeable printer-port settings, to name a few.

Peripherals

One peripheral is a must: a modem. There are many to choose from, but I have a quick way to narrow it down to a few. Look only at the inexpensive models, costing from $70 to $100. You can do a lot of accessing with these modems, and you can always upgrade to a more expensive model later if you find there is a need.

There is much variety in modems even at the low-buck level. The most obvious difference between models is direct-connect versus acoustic coupler. With an acoustic coupler, you place the phone's handset into fittings on the modem. If you have modular phone plugs, you can use a direct-connect modem. These modems let you hook up the phone, modem, and computer at once and leave them that way—a convenient way to go.

There is another advantage to using a direct-connect modem: You don't run the risk of outside noise interference. Outside noise can interfere with your signal using an acoustic coupler.

Another modem feature to consider is the baud rate. You are charged less for 300-baud service on most commercial networks such as CompuServe, and 300-baud modems are usually cheaper. But you can save money on long-distance phone charges by using a 1,200-baud modem. (Next month I'll discuss how to save on connect charges in more depth.)

You can also buy auto-dial/auto-answer modems, which will automatically dial a BBS for you or answer incoming calls if you operate your own BBS. These modems cost as much as a 64K CoCo 2 or more, so I don't recommend them unless you have a real need.

If you would like your equipment to do all the dialing for you, buy an inexpensive memory phone or memory dialer. They are cheaper than paying for this feature in a modem, and you can use them for voice numbers, too.

I feel like I couldn't get along without a disk drive, but a cassette system is more than adequate for communicating. In fact, if you use a ROM-pack terminal package, you don't even need cassettes. But if you want to download programs, for instance, you need some kind of storage device.

A printer is a very handy item when going on line, though it, too, is not absolutely necessary. With it, you can get printouts of log-on procedures, bulletin board messages, or program listings for future reference. Check the ads in this magazine for discounts on printers. Popular dot-matrix models often sell for under $300.

A printer usually competes with the modem for the CoCo's serial port, however. I recommend getting a modem-printer switch to save wear and tear on your cables and serial port. This device lets you go from modem to printer, or vice-versa, without plugging and unplugging cables. These devices are inexpensive—usually $20 to $30.

Graphics

CompuServe offers Color Computer software that allows the uploading and downloading of graphics. (For more information on CompuServe in general, see last month's 6809 On Line.) It's called Vidtex (not to be confused with Radio Shack's Videotex), and it costs $39.95 on disk or cassette and requires 32K RAM. Contact them at 5000 Arlington Centre Blvd., Columbus, OH 43220, 800-848-8990.

Once you have your 16K CoCo and cassette recorder, you can put together a good terminal setup for about $100 without a printer. Even with a minimal system, there is a lot of communicating to be done.

Now that I've got you on line, be sure to follow this column each month. I'll keep you up to date on all topics relating to CoCo telecommunicating. ■

Your comments on 6809 On Line are welcome. Write Bobby Ballard c/o HOT CoCo, *80 Pine St., Peterborough, NH 03458.*

This Publication is available in Microform.

University Microfilms International

Please send additional information for

Name

Institution

Street

City

State Zip

300 North Zeeb Road
Dept P.R.
Ann Arbor, Mi. 48106

Circle Reader Service card #60

COLOR TREK — Blast Klingons and save the Federation in this game of both skill and strategy. Includes an instructions program and ten levels of difficulty. Requires 16K of memory.
Cassette $7.95

ADVANCED D&D NON-PLAYER CHARACTER MAKER — Takes into account spells, weapons, hit points, level, class, gender, race, alignment, constitution bonus, racial adjustments, and minimum requirements. Whew! A must for all dice weary DM's. Requires 16K of memory.
Cassette $14.95

ARE YOU BORED WITH YOUR 4K COLOR COMPUTER?

COLOR ALEPH PROGRAM PACKAGE — Includes COLOR CYCLES, COLOR BLACKOUT, and COLOR MAZE. Each is progressively difficult and requires only 4K of memory.
Cassette $11.95

COLOR CYCLES — Play chicken against motorcycles of light with up to seven enemies at one time. Written in machine language.
Cassette $4.95

COLOR BLACKOUT — Armed with only a tennis racquet and five balls, you must knock out the colored bars piece by piece. Joysticks are required.
Cassette $4.95

COLOR MAZE — Ruh for your life through a twisty maze. All the while, an angry ghost is chasing at your heels throwing paralysis rays. Be wary of the meddlesome programming wizard who rearranges the maze around you. Includes machine language subroutines.
Cassette $4.95

Aleph Unlimited
P. O. Box 8007
Stockton, California 95204

Circle Reader Service card #131

CONVERT YOUR ANALOG WORLD TO DIGITAL

ANALOG TO DIGITAL CONVERTERS FOR COLOR 1 OR 2 COMPUTERS

– CCAD-B –

FEATURES:
- MENU DRIVEN SOFTWARE
- 12 BIT RESOLUTION
- 16 INPUT CHANNELS
- ON-BOARD USER AMPLIFIERS
- 3 TTL ALARM LINES
- DISK OR TAPE SOFTWARE INCLUDED

ORDER:

CCAD-B & DISKETTE	$199.00
CCAD-B & TAPE	$190.00

– AD-8 –

FEATURES:
- 8 BIT RESOLUTION
- 8 INPUT CHANNELS
- OPTIONAL MENU DRIVEN SOFTWARE

ORDER:

AD-8 HARDWARE	$69.95
AD-8 TAPE	7.95
AD-8 DISKETTE	9.95

THINC
TECHNICAL HARDWARE, INC.
P.O BOX 3609
FULLERTON, CA 92634

Circle Reader Service card #126

HEROES & TROLLS

A THRILLING MATH FACTS GAME
- ***COLOR • SOUND***
- ***ACTION***

Math drill in an exciting action game. Players go on a heroic mission to free a royal family held in a maze by invisible trolls who spring into view when heroes get too close. Beware of the snorting dragon with three lives. The game is propelled by doing arithmetic drill at any of three levels of difficulty. Two players can each select a different skill level and a different math function, to make the game fair. With only one player, the computer plays as an opponent of average skills. Program requires 32K Extended Color Basic. Reviewers praise it; kids love it.

Tape or Disk: $29.95 (Money-back guarantee.)

COGNITIVE DEVELOPMENT CO.
fun things for the mind
Suite 141, 12345 Lake City Way NE
Seattle, WA 98125
(206) 382-6661

Name _____

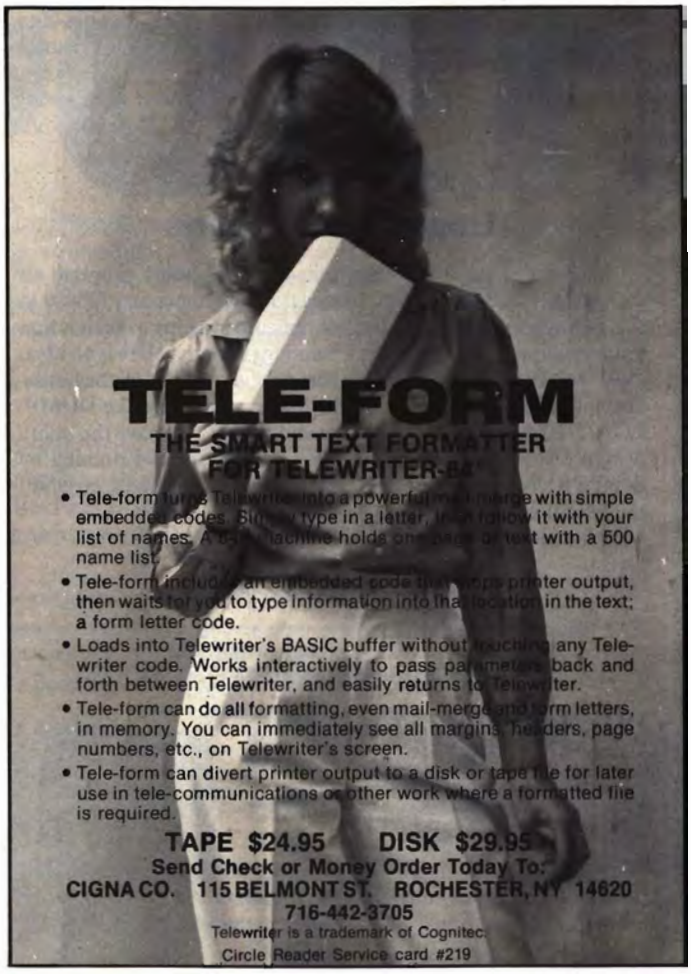
Address _____

City _____ State _____ Zip _____

☐ Enclosed is my check for $29.95
Charge my ☐ Visa, or ☐ Mastercard

Card # _____ Exp. Date _____

Signature _____



✓ See List of Advertisers on page 89

Reader's Forum

Find Your Place

When you assemble a long machine-language program using EDTASM+ or an equivalent, you usually know where it begins because of the ORG statement, but you never know where in memory the program will end. Here is a trick I use to know where I am.

Always use the first label of your program beginning with Z, like ZINIT or ZSTART, and at the end before the END statement, put a dummy label such as ZZZEND FCB 0. Never use any other label beginning with Z in the rest of your program.

As at the end of the assembly of the program the assembler lists in alphabetical order all the labels used, the last two shown will always be the two beginning with Z. With this you will know exactly where the program begins and ends in memory. You can also convert a hexadecimal in decimal number by this expression: PRINT &HXXXX where XXXX stands for the hexadecimal number.

Alain Dussault
Laval, Quebec

Joystick Response

To make your joysticks more responsive in a Basic program, type EXEC 43486. The position of the joysticks will then be read into memory locations 346-349.

These memory locations contain the following: 346—the right joystick's left-right position; 347—the right joystick's up-down position; 348—the left joystick's left-right position; 349—the left joystick's up-down position.

Knowing this you can write responsive joystick routines into your own Basic programs. (Note: This might not work on some programs.)

Richard Wasserman
Brooklyn, NY

Loader Program Does Housekeeping Chores

Assume that you have a machine-language utility program on disk named DUMP/BIN that loads up in high memory (26000 in this example) and you have trouble remembering just what it is that your are supposed to do to get it running properly. Here is an idea.

Write a Basic loader program that will take care of all the housekeeping chores for you. Name the loader something like DUMPLOAD/BAS and save it to the same disk that you have the utility program stored on. Then you get the utility up and running by doing a RUN "DUMPLOAD/BAS". Your Basic loader program might look like this:

```
10 POKE 65344,0:REM SHUTS DOWN DI
SK DRIVE
20 CLEAR 200,25999:REM PROTECTS M
EMORY FROM 26000 UP
30 IF PEEK 65314<>6 THEN 900:REM
CHECK PRINTER STATUS (6=ON)
40 PRINT #-2,CHR$(27) CHR$(69):RE
M SETS UP PRINTER FONT (EPSON)
50 LOADM "DUMP/BIN":REM LOADS MAC
HINE-LANGUAGE PROGRAM
60 EXEC: REM EXECUTES ML PROGRAM
70 GOTO 910
900 PRINT "YOU FORGOT TO TURN THE
PRINTER ON. START OVER."
910 END
```

Use your imagination and you will see all kinds of possibilities for Basic loader programs. In the example above only a few things are accomplished. Some loaders will be assigned many more tasks. For instance, printer activities can be more extensive than shown in the above example. A loader can be used with machine-language programs and adapted for use with Basic programs as well. If "DUMP" were a basic program, line 50 would be: LOAD "DUMP/BAS",R and line 20 and 60 would be deleted. Other lines can be added as needed.

Tom Garcia
Tuscon, AZ

CLEAR Often

Sometimes you just don't have enough RAM and you get OS (out of string space) and OM (out of memory) errors even if you have shortened your program as much as possible. In such a case, try inserting CLEAR (just CLEAR, not CLEAR 300 or CLEAR 200,17000) at the beginning of your menu line.

This prevents strings and arrays from being carried over into those parts of the program where they are not needed. Otherwise, the computer will keep storing every string, variable, and array that the program has used, and waste precious RAM.

CLEAR clears everything, so if you have a variable that you must carry over, you can protect it by POKEing it someplace before the CLEAR, and PEEKing it back afterwards.

Anna Reeves
Espanola, WA

Keytone Aid

Program Listing 1, Keytone, produces a short tone each time you press a key on the computer.

The program consists of a Basic driver and the machine code. The positive feedback of hearing the tone eliminates the need to check the screen each time you press a key. This can be particularly useful when entering programs or data sets.

Key in the listing, then save it on tape before running. Enter RUN and the program will automatically load at the top of RAM, regardless of the machine's memory size. It will be protected from Basic by the CLEAR statement in line 20. The Basic driver will be erased from memory once loading is completed. You can turn the sound off by entering EXEC. Type EXEC again and the sound will return.

The machine-language routine is written in position-independent code, so you can load it anywhere in memory if you don't want it at the top of RAM. Also, you can make of copy of the machine-language code by entering CSAVEM"KEYTONE",ST,HI,ST.

Jack Shaffer
Oakwood, IL

```
10 CLS:GOSUB80
20 CLEAR200,HI-43
30 GOSUB80:ST=HI-43
40 FORX=ST TOHI:READOP$:N=VAL("&
H"+OP$)
50 S=S+N:POKEX,N:NEXT
60 IFS<>4992THENPRINTTAB(8)"* DA
TA ERROR *":SOUND10,10:STOP
70 EXEC ST:NEW
80 HI=PEEK(116)*256+PEEK(117):RE
TURN
90 DATA 30,8D,00,16,BF,01,6B,30,
8D,00,03,9F,9D,39,CC,8C,F1,FD,01
,6B,30,8C,E9,9F,9D,39,34,36,CC,0
0,04,DD,8D,58,D7,8C,BD,A9,56,35,
36,7E,8C,F1
```

Program Listing 1. Keytone

Circle Reader Service card #325

This Publication is available in Microform.

University Microfilms International

Please send additional information
for _____
Name _____
Institution _____
Street _____
City _____
State _____ Zip _____

300 North Zeeb Road
Dept. P.R.
Ann Arbor, Mi. 48106

Circle Reader Service card #536

ATM-80

DATA ACQUISITION & CONTROL SYSTEM FOR THE COLOR COMPUTER

APPLICATIONS:
• ENERGY MANAGEMENT • PROCESS CONTROL • SCIENTIFIC EXPERIMENTS • ROBOTICS • TECHNICAL EDUCATION • SECURITY SYSTEMS

FEATURES:
• 20us 8-BIT A-TO-D CONVERTER • 32-CHANNEL ANALOG MULTIPLEXER • PROGRAMMABLE GAIN AMPLIFIER • PEAK DETECTOR AMPLIFIER • 8-BIT D-TO-A CONVERTER • 4-BIT I/O PORT (PROGRAMMABLE) • 2K RAM • CONTROL SOFTWARE IN ROM • USER'S MANUAL

ASSEMBLED & TESTED $184.95
MANUAL . . . . . $ 15.00

CLOCK/CAL/MEM CARTRIDGE

FEATURES:
• COUNTS HOURS, MIN., SEC., MONTH, DATE, DAY OF WEEK, YEAR, LEAP YEAR • PROGRAMMABLE INTERRUPT TIMER (.5, 5.0 AND 60 SECOND INTERVALS) • ROM BASED CONTROL SOFTWARE • 8K RAM SPACE • CLOCK BACKUP BATTERY

ASSEMBLED & TESTED . . . . . $ 89.95
W/8K RAM $119.95

For more information, call or write to.

CYBERTRON TECHNOLOGY
3131 TIMMONS #723
HOUSTON, TEXAS 77027
(713) 840-1272

ADVENTURUS SUPREMUS 4.6B

Are you an adventurer with at least some experience? Are you just a little tired of games set in some repetitive science fiction or medieval type setting? Adventurus Supremus 4.6B offers a different type of adventure, realistic yet humorous. Challenging, comical, and farcical, it offers an out of the ordinary adventure experience, that's just the change that you need. Only those with at least some adventuring experience need apply.

16k Color Basic Minimum Required (On Tape)

Send 9.95 (check or M.O.) to:

Bacchus Computer Software
143 East Michigan Avenue
Paw Paw, MI 49079

We Pay the Shipping!

RAINBOW

Circle Reader Service card #214

SUPPORT

(sə·pôrt) v.t. **1**. To bear the weight of, especially from underneath; uphold in position; keep from failing, etc. **2**. To bear or sustain (weight; etc.) **3**. To keep from failing; strengthen: *PBJ, Inc. supports their product line with technical personnel that are always there to help you.* **4**. To serve, to uphold or corroborate (a statement, theory, etc.) substantiate; verify: *PBJ, Inc. receives testimonials on a daily basis that support their product line.* **5.** To provide (a person, institution) with maintenance; provide for: *PBJ, Inc. supports the CoCo user by consistently creating new advancements in their field.*

Synonym: **PBJ, Inc.**

A long description indeed, yet very applicable to the kind of servicedelivered by PBJ, Inc. When the serious CoCo user needs back-up support, technical information or assistance, PBJ, Inc. is there! From the products they manufacture through to the strategic solutions they offer, PBJ, Inc. has rightfully gained the reputation of "the company with *the most support* for the Color Computer."

pbj inc.

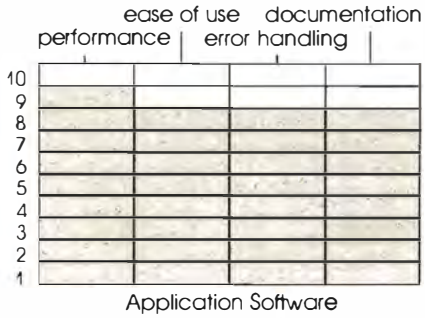
"Innovative Products for the CoCo User"

Call or write today for our **FREE** Catalog ...
P.O. Box 813 • North Bergen, N.J. 07047 • **201-330-1898**

*Derived from Funk & Wagnall's International Dictionary

✓ See List of Advertisers on page 89

REVIEWS



OS-9 Textools
Computerware
4403 Manchester Ave.,
P.O. Box 668
Encinitas, CA 92024
619-436-3512
OS-9, disk drive
$29.95

by Lawrence O. Parker

Operating systems are a collection of special-purpose, or utility, programs that are organized to manage the computer's resources: disks, printer, monitor, and memory. Operating systems free programmers to create and execute computer programs. The more special-purpose programs an operating system has, the better it is likely to perform. OS-9 has only the bare necessity of utility programs. That's why I am intrigued when I find a product that contains additional utilities.

OS-9 Textools from Computerware is a package of 17 utility programs for the OS-9 user. According to Computerware, they are called textools because the majority of commands can manipulate text files.

Metafeatures

One of the most outstanding features of OS-9 Textools is borrowed from Unix: The use of "meta characters" in the pathlist specification, which lets you access a group of files with a single command. A pathlist is a list of directory names that include everything from the root directory down to the file you want to access. What are meta characters? They are characters that you use for any special purpose. For example, OS-9 uses the exclamation point to indicate two or more concurrent programs whose standard input or output paths connect to each other to form a pipeline. Textools uses the # symbol followed by a numeric value to alter the size of memory used by commands.

Here is a list of OS-9 Textools' meta characters and the actions they represent:

*	*matches any string of characters in a file name*
?	*matches a single character in a file name*
[	*defines the beginning of a range string*
]	*defines the ending of a range string.*

Meta characters are similar in concept to an old programing aid called wildcards. For example, T*T matches all file names that start and end with the letter T, such as Test, Totaltest, and Tomstest. The characters *A* match any file name containing the letter A. You might also define a range of characters to match a single character position. You accomplish this by enclosing the range in brackets.

CONTENTS

edited by J. Scot Finnie

Compelling Commands

Some of Textools' utilities make use of "regular expressions," another idea borrowed from Unix. Regular expressions are a means of using a string of characters to represent certain nonprintable characters, or characters in other forms. For example, a form feed has a hex value of OC, but you can express it as the string \F. Another example is apparent in how you express a number and its base. The regular expression for decimal 123 is \D123. Hex FF becomes \xFF. Octal 127 becomes \127.

Textools' documentation states that Textools commands use only the standard path input and output. That means that you can redirect input and output or, in other words, pipe it from one utility to another. This is the essence of the true power of this program. Textools lets you combine several commands together to perform one function.

Table 1 is a full list of OS-9 Textools' commands with descriptions of what they do. Let's look a little closer at a few of the Textools commands. CAT copies input from the standard input (or specified files) and displays it to the standard output path. This might sound like the OS-9 BUILD utility, but you can also redirect two or more files to an output file, as in this command string that emulates MERGE:

cat filea fileb >newfile.

Another feature of the CAT command is an optional parameter field that lets you select a range of lines for display, similar to the LIST command in Basic.

FGREP is a very handy command. Similar commands are available on almost every mainframe system. Because the system allows regular expressions within the target string, it is possible to search for a match with any ASCII character. An impressive

DATAMAN INTERNATIONAL

VISA 1-416-529-1319 MC

PLEASE INCLUDE $2.50 SHIPPING

PRINTMASTER

A full featured screen print program that will work with any printer capable of dot addressable graphics is now available for the color computer. This value packed program should be on everyones 'must have' list. Just look at these powerful specifications:-

Automatic PMODE recognition.
Menu driven or called from Basic
Vertical and horizontal stretching (zoom)
Full or partial screen rotation
8 color recognition & separation
Vertical & horizontal concatenation
Inverse printing.
All of the above will work on the full screen or on any portion that you specify.

$33.95US
$39.95Cdn

$37.95US
$33.95Cdn

ROMMASTER

Rommaster is a circuit board with a rotary switch and sockets for three EPROM's (24 or 28 pin) that can be individually selected. You can now have up to three versions of Basic and three versions of Extended Basic in your Coco at the same time.
If you wish you can burn your own EPROM's and have them available on power up at the flick of a switch. If you develop software for sale it is essential that your programs be tested on all versions and configurations of ROM's before you release them.

$39.95US 2/$75
$49.95Cdn 2/$95

Double sided prototype boards

$9.95US $12.95Cdn

Blank keyboard overlays

$0.75US $0.99Cdn

DATAMAN INTERNATIONAL
125 SOUTH FIFTH STREET
LEWISTON, N.Y. 14092

DATAMAN INTERNATIONAL
420 FERGUSON AVE. N.
HAMILTON,ONT.,L8L 4Y9

list of options give you further control of the standard output path.

The PR command makes nicely formatted reports or simple listings. The normal output format has a five-line header containing the file name, page number, time, and date. The last five lines are reserved for a five-line footer. There are numerous options, allowing a great deal of flexibility in the format appearance.

You can use the RPL command, as in the string that follows, to set up a stock form letter that can replace name strings:

```
rpl "Jane Doe" "Sue Peterson" <master.letter>/p
```

This command replaces every instance of "Jane Doe" with "Sue Peterson."

Suppose you have developed a new Basic program. If you're like me, you probably create a segment and then save it as a backup. This process yields several versions of the program. Wouldn't it be nice to be able to delete all those versions you no longer need with one command? The UPS command was designed for this kind of purpose—when you need to apply the same command to several files with different names. For skeptics there is a verify option, -V, that prints a line indicating successful completion of each command.

CAT concatenates text files and lists to standard ouput.

FGREP searches a file for a pattern.

LOWER converts all characters to lowercase.

LS lists file names, one per line.

PACK compresses spaces to save space.

PR lists and formats files to standard output.

QSORT performs a quick, in-memory sort.

RPL replaces string1 with string2.

SPLIT splits large files into smaller ones.

TAIL prints the last part of a file.

TIME times the execution of a command.

TR translates characters while copying from standard input to standard output.

UNIQ compresses consecutive, multiple lines into one line.

UNPACK converts compressed spaces to full spacing.

UPPER converts all lowercase letters to uppercase.

UPS repeats command processing.

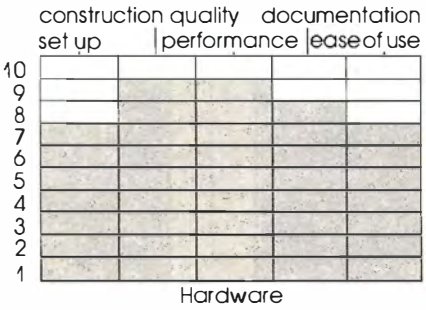
WC counts characters, words, and lines.

Table 1. A Description of OS-9 Textools' Commands

Summary

I found the manual for OS-9 Textools to be very easy to read and understand. It provides several examples for each command; the action of each is functionally defined. I did get a "file not found" error when trying to fully qualify the path name within the standard output on several occasions. However, I was able to overcome the error by first changing the default directory path. This can cause some confusion though, especially when the command you are trying to execute is not in the new path. You can enter the fully qualified path name or load the command before you change the directory name.

My overall impression of Textools is favorable. The utility is sure to become a valued addition to my OS-9 library. I think you will find it to be as handy and easy to use as I have. ■



Color Burner
EPROM Burning System
Green Mountain Micro
Roxbury, VT 05669
802-485-6112
32K, Extended Color Basic
$57 kit, $69.95 assembled and tested

by James J. Barbarello

For those who are new to Color Computing, Dennis Kitsz is an accomplished designer of computer software and hardware. His projects are sound and never unnecessarily complicated. These traits are inherent in his EPROM programmer product, the Color Burner. The manual that accompanies the Color Burner describes it as "a plug-in module for the TRS-80 Color Computer that programs data into erasable, programmable, read-only memories (EPROMs)." The manual notes that EPROMs are "used for plug-in cartridge program packs. . .and for storage of other vital data."

The Color Burner lets you program 2716 (2K), 2732 (4K), 2764 (8K), 27128 (16K), and 68764 (8K, Extended Color Basic, ROM-compatible) EPROMs. Functions include read, write, verify, and erase-verify. (EPROMs must be erased with a separate, ultraviolet light source.)

Unlike more expensive brands, the Color Burner does not contain a built-in power supply. Instead it uses three 9-volt alkaline batteries that provide enough power to program about 100K of EPROMs (or up to fifty 2716 EPROMs, for example).

The Color Burner requires "personality modules" for different kinds of EPROMs. Physically, it is a 16-pin DIP (dual in-line package) header on which you make interconnections with thin wire.

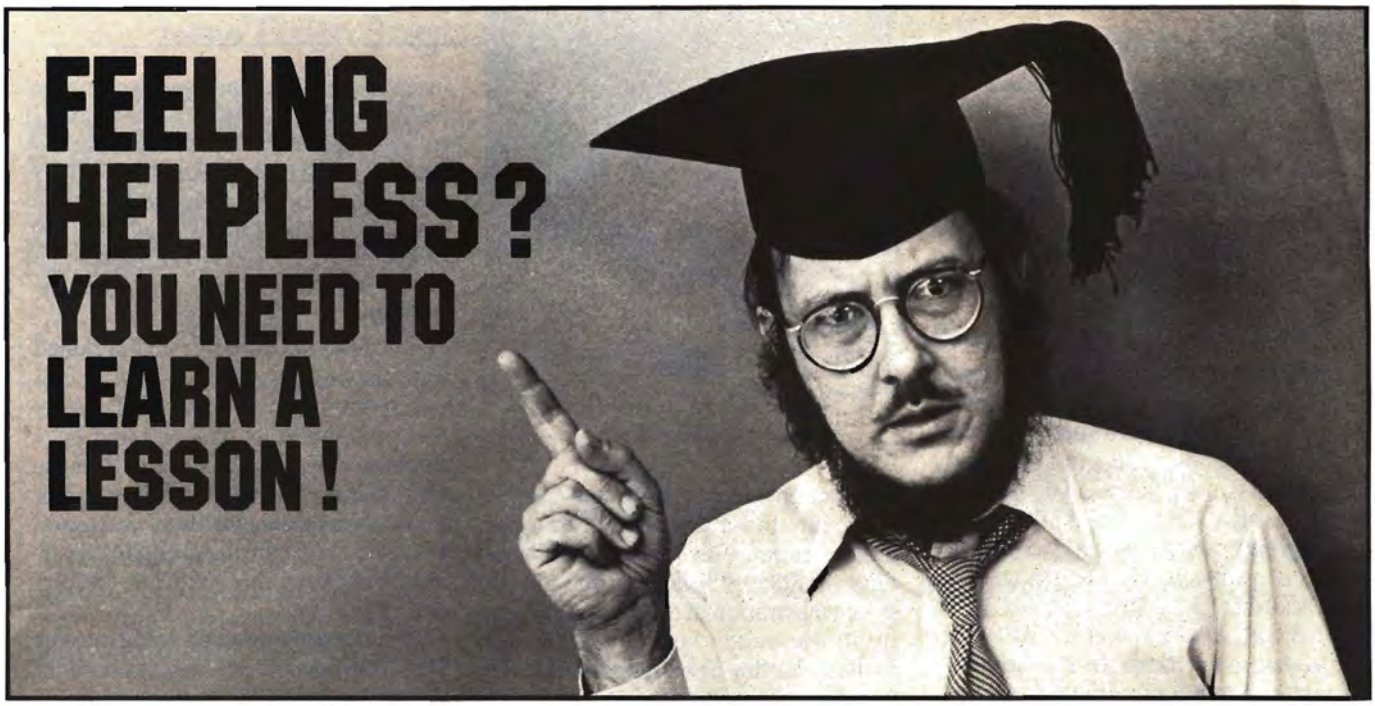
Construction

The Color Burner package includes the burner itself, an instruction manual, and the operating software on cassette. The burner is a well-designed and constructed 3¾- by 4¾-inch, double-sided, solder-masked, glass-epoxy, printed-circuit board (PCB) with gold-plated edge contacts. (A solder mask is a coating that covers all PCB circuitry except the soldering points. It minimizes the possibility of short circuits.)

The Color Burner contains two socketed 6821 PIAs, a 7406 TTL IC, a low-insertion, 28-pin socket for the EPROMs, the personality module, a 16-pin DIP socket for the personality module, three 9-volt battery clips, and a number of transistors, diodes, resistors, and capacitors. The operating software comes on a standard C-10 cassette.

Documentation

The Color Burner's documentation consists of a 42-page instruction manual. Of this, 10 pages are devoted to kit-assembly instructions, testing, and troubleshooting. There is also a four-page reprint from the Color Burner construction project printed in Dennis



MICRO LANGUAGE LAB: LEARNING THE 6809

Feeling at the mercy of a programmer somewhere? Mystified by a machine? My Micro Language Lab will give you the power to end those helpless feelings.

Here's why. The heart of *any* computer program *anywhere* is machine language. Every piece of software uses it — your favorite game, spreadsheet, word processor, data base manager, or recipe file. Every time you hit "Enter", it's working. All the languages and operating systems are created from it. Basic, Fortran, Pascal, Flex, OS-9, TRSDOS... they're 6809 machine language, the whole lot!

And you can learn the language of the 6809, the programming heart of your Color Computer, with my Micro Language Lab.

Not everyone can program. Writing a few lines in Basic now and then doesn't make you a programmer. But if you *can* program, then my Micro Language Lab will teach you — the right stuff, the right way.

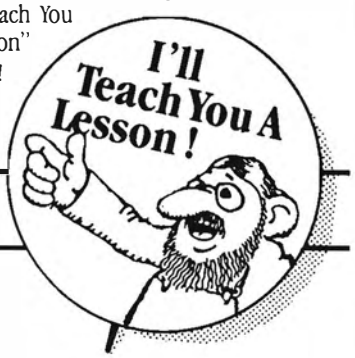
I'll teach you in 24 half-hour lessons on 12 audio cassettes, with a 220-page textbook, with data booklets, with 35 sample programs, and with a programming reference card. You'll spend 50 hours or more with my course, listening, watching, and working. And when you're done, you'll be programming your Color Computer in the 6809's language.

Stop ignoring those gnawing feelings of helplessness. The 6809 is where the power lies in your computer. Turn on that power with the Micro Language Lab.

- **Micro Language Lab,** $99.00 (plus $3.50 shipping and handling)

Requires 16K Extended Basic EDTASM +

Not sure? Write or call for a Table of Contents and sample pages — and your "I'll Teach You A Lesson" button!



ALSO AVAILABLE FROM GREEN MOUNTAIN MICRO

(Add $2.50 shipping and handling to your order)

Lowerkit III

- Full-time upper and lowercase installs in 15 minutes.
- Normal and reverse video standard
- Fully compatible with all Alpha and Graphic modes

$79.95 assembled and tested
$49.95 complete kit of parts
Important! Specify Color Computer or Color Computer II

TV Buff II, clear image for video monitors, $19.95 (specify CoCo or CoCo2)

CoCoPort parallel interface (now includes plastic case), $54.95 / $44.95 kit

ColorPack ROM/RAM pack, $29.95 (specify configuration) / $19.95 kit / case $3.00 extra

64K memory upgrade kit with full instructions, $49.95 / with memory test on tape, $54.95

Color Quaver Software Music Synthesizer on tape (requires 32/64K), $19.95

Color Burner EPROM Programmer (2716/32/32A/64/64A/128, 68764/66) with software, $69.95 / $56.95 kit

User Group, Educational, Club and Dealer Discounts are available.

TRS-80 and TRSDOS are trademarks of Tandy Corporation. Flex is a trademark of TSC, Inc. OS-9 is a trademark of Microware Corporation.

Green Mountain Micro
Bathory Road, Box H
Roxbury, Vermont 05669
802 485-6112

Hours: 9am - 5pm EST, Monday - Friday
COD/VISA/MASTERCARD

See List of Advertisers on page 89

Circle Reader Service card #98

Kitsz's "Custom Color" column in the March, May, and June issues of *The Color Computer Magazine*. The manual reserves eight pages for source listing of the Basic and Assembly-language operating software. In addition, there are product sheets for the 2716 and 68764 EPROMs, and the printed-circuit artwork for the Color Burner's PCB.

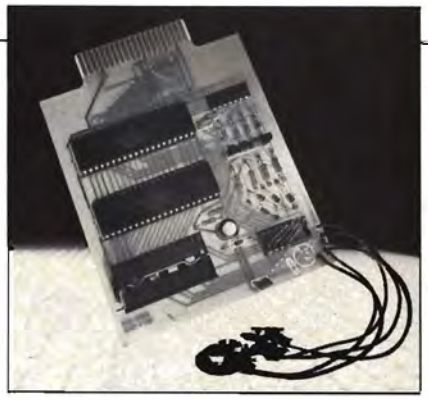
This is quality documentation. The manual contains a table of contents, boxed notes, and pointers (a nice touch). It walks you through the use of the burner and answers just about any question you might have. I do have one minor gripe, however. I think it would have been useful to the novice to have specifics about what to do with an EPROM after it is programmed. (This is a drawback common to all EPROM-programming packages I've seen.) A simple note about where to obtain program packs and associated printed-circuit boards, and how to install an EPROM would have perfected this otherwise flawless manual.

Although the instructions are completely correct, there are two minor points of information that could use clarification. The first concerns the instructions for loading and running the software. Step 4 tells you to keep the tape player on until the main menu appears. Step 5 instructs you to type "RUN" when the OK returns. Instead of telling you to wait for the menu, step 4 should just warn you to keep the tape deck in the play mode because running the program (step 5) executes a CLOADM command that loads the machine-language subroutines to follow. The manual should also note here that you must have all three plugs inserted into your cassette deck. Otherwise the tape will continue to move past the beginning of the machine-language utility, and the CLOADM command will cause an input/output (I/O) error.

A second point that needs clarification is a reference to removing a battery before inserting or removing an EPROM. Because there are three batteries, immediate questions come to mind: "Which battery do I remove? If I remove the wrong one, will I damage something?" The reason for this nonspecific statement in the manual is that the batteries are in series; disconnecting any one removes power and ensures that nothing can be damaged.

Set Up

Pages 12 and 13 of the manual contain a sample session and a step-by-step procedure for setting up and using the Color Burner. First you wire a personality module by following the appropriate illustration in the manual. If you apply too much heat to the header while soldering, you might melt the plastic and cause the metal pins to move out of position. You'll need to place the header, the burner, your data, the correct EPROM, three fresh 9-volt alkaline batteries, and the Color Burner software next to your CoCo. Then you insert the burner without batteries into your turned-off CoCo. Because the burner has no case, you might want to support it by placing a ¼-inch piece of cardboard or wood between the bottom of the burner and the bottom of the ROM port. The battery clips shouldn't touch the burner or any other metal surface. When you have made all the above preparations, you are ready to run the Color Burner software.



Green Mt. Micro's Color Burner

Using the Color Burner

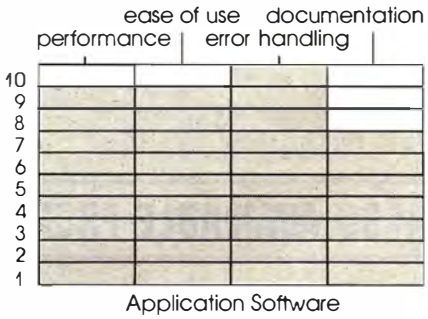
With set up complete, you follow the instructions in the manual or use the built-in help facility, which duplicates important information from the manual that you need during a session. Color Burner's software prompts you at every step. Its screen presentations are nice, but I didn't like the reverse-color lowercase characters.

You begin using the Color Burner by identifying the kind of EPROM you wish to program. You insert the wired personality module into the 16-pin DIP socket on the programmer, being careful not to turn the burner sideways. Then you load in the data. This is done by typing in the object code with the help of the software's monitor facility, transferring the code from a previously created tape, or loading it from another EPROM that you install temporarily in the burner. Once the data is loaded, you insert the receiving EPROM in the 28-pin socket and connect the three batteries. The manual explains how to enter starting and ending addresses. Remember that the ending address that you specify must be the actual address plus one. (An actual ending address of $3OFF should be entered as $3100.)

Summary

The Color Burner is a well-designed and constructed product. The operation software works perfectly. I can detect no flaws in its structure and have not been able to make it crash. Because you can purchase this EPROM burner as a full kit or an assembled and tested unit, the Color Burner is equally desirable to both advance hardware hackers and beginners.

If you are planning on going into the EPROM-burning business, you might want to choose one of the more expensive burners. Aside from the savings they provide on alkaline batteries, these burners are a little easier to use. But as the article reprinted with the documentation suggests, "EPROM programmers are seldom used often enough to justify their $100 or higher cost." If you're in the market for an EPROM burner for occasional use, the Color Burner is a smart choice. The $70 or $80 you could save by selecting this product over its competition can pay for more than a few blank EPROMs. ■



Crypton
First Coast Systems
P.O. Box 5396
Jacksonville, FL 32207
904-771-5274
Disk Drive
$24.95

by Terry Kepner

Crypton is a complex but easy-to-use program for protecting sensitive information from prying eyes. It is almost frighteningly easy to use. You

New From Saguaro Software!

EAGLE

A graphic-enhanced lunar lander simulator. The pilot breaks out of lunar orbit and attempts a soft landing on the lunar surface. Joysticks control thrust and craft altitude and information is continually displayed on horizontal and vertical velocities, acceleration values, vertical and horizontal distances from target, fuel consumption and much more. On advanced levels, problems such as fuel leaks and computer screen failures can provide hair-raising final approaches. Disk version allows choice of landing site between Mars and Earth's moon. Takeoffs from the surface can be made and the upper stage placed back in orbit. The simulation is as educational as it is fun and exciting. A great tool for that future astronaut or physicist. 32K, 2 joysticks required. Available in tape or an enhanced disk version.

Tape - $24.95 Disk or Amdek - $29.95

SKETCHPAD

Sketchpad is a graphics drawing program designed to provide the computer hobbyist with easy manipulation of the powerful graphics capabilities of the Coco. Advanced programmers can design graphics screens and characters for Basic and ML programs and games. Sketchpad was used to create the graphics for "Eagle."

Two joysticks control cursors that provide end-points and boundaries for lines, boxes, circles, ellipses and painting. Point-to-point drawstrings may be plotted on the screen and then rotated, enlarged or shrunk, moved or inverted. Patterns may be programmed in easily to create dazzling illusions using lines, boxes, circles, ellipses and drawstrings. Sketchpad supports all PMODES and color sets and gives false colors in Pmodes 1 and 4. Text and graphics can be combined on high-resolution screens. All pictures and drawstrings can be saved to disk for future use. 32K, 2 joysticks required. Disk only. $29.95

TDIR

Tape Directory

TDIR is a menu-driven, user-friendly tape directory program. When installed and maintained on your cassette tapes, it allows complete directory control of your tapes. This means you will no longer need to go through a complete tape to discover that the program you wanted is on another tape.

TDIR also eliminates the drudgery of trying to remember tape position settings, or program names. All this, and more, is controlled by TDIR. 16K tape, $24.95.

MAYCODE

Disassembler For The TRS-80™ Color Computer

A 6809 disassembler. It will read Object Codes from memory and convert them to standard 6809 ossembly language mnemonics, which can be disassembled to the screen, printer, cassette, or disk. When output is to tape or disk, the source code can then be loaded into EDTASM for modification, even changing the origin address. 16K min., 32K recommended. Tape, $24.95. Disk or Amdek, $29.95

The Digestive System

An educational quiz game for 2 players covering different areas of the human digestive system. Each question is assigned a point value relative to its difficulty. A fun way to learn about a serious subject. 16K

The Circulatory System

Using the same format as "The Digestive System," this program covers the heart, lungs, veins, arteries, blood, etc. 16K

BOTH ONLY:
Tape - $19.95 Disk or Amdek - $24.95

TESTMAKER

The TESTMAKER series is a menu-driven, user-friendly system of programs. These programs are internally linked, meaning that once you have begun, the program will automatically control the operation of the system.

TESTMAKER will allow the user to create both multiple choice and true-false tests. These tests may be run on the screen for an immediate test of the student or they may be printed and passed out to the class for a more standard exam.

TESTMAKER also has the feature of allowing an unlimited number of files with an unlimited file length. This means that the educator may create tests weeks, months, or years ahead and keep them on file until needed. This also means that each test may have as many questions as the educator wishes. 32K disk. $29.95

ALPHACOPY

The Disk Organizer

An alphabetized disk directory is great, but if that should crash it doesn't help tell you where the programs are. ALPHACOPY will write the programs in alphabetical order. Each program will be written on the same or consecutive sectors, making rebuilding of the disk much easier than the other currently available "zapping" utilities. 32K disk. Disk or Amdek, $24.95

MORE SAGUARO!

OTHXO	24.95
Co-Co Keno	24.95
Ultimate Bingo/Jackpot	19.95
Confusion	19.95
Kidstuff 32K	19.95
Stars of Amer./Civil War	19.95
History - 1863 to 1976	19.95
Treasure Hunt Disk Only 64K	29.95
Raid On Burdanovka 32K	24.95
Search For The Llangth	24.95
Do Or Die	24.95

Add $5.00 For Disk or Amdek

OTHER FAVORITES!

Worlds Of Flight 32K	23.75
Sailor Man 64K	23.75
SR-71 32K	22.75
To Preserve Quandic - Disk 32K	29.75
Gravitor	18.75
Compleat Enchanter 32K	18.75
Lizpack Stat. Anal. - 8 Disks	145.00
Telepatch 64K - Disk Only	14.75
Demon+ 64K	26.75
Rainbow Screen Machine	22.75
Super Screen Machine	33.75

Add $3.00 For Disk, $6.00 For Amdek

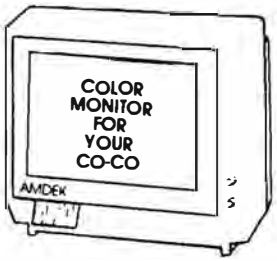
Hardware, Too!

Amdek Dual 3" Disk Drive

$349

Includes Box Of Diskettes
And Drive Cable

If You Can Find A Better Advertised Price, Show Us... We'll Beat It!



Amdek Color Monitors

Color 300 • Color 500

Call For Lowest Prices Anywhere!

ESK 5 1/4 Disks - SSDD	Box Of 10	$16
ESK 5 1/4 Disks - DSDD	Box Of 10	$21
100% Tested Disk • 10 Year Exchange Warranty		
Amdek 3" Diskettes	Box Of 10	$35

This Month's Special!

Amdek 3" Diskettes

10 For $25 Reg. $35

Good Through March 15, 1985
Limit 3 Boxes • While Supply Lasts

We Have Gift Certificates!

In Any Amount
Write For Our Catalog

Saguaro Software

MasterCard™

24 HOUR ORDER LINE

602-623-3321

VISA®

7331 E. Beverly Drive • Tucson, AZ. 85710

Arizona Residents Add 7% Tax • Add $1.50 Shipping Per Program ($4.50 Max.)
Dealer Inquiries Invited • Some Quantities Limited

Circle Reader Service card #160 ***AUTHORS! ASK ABOUT OUR ROYALTY PROGRAM***

load and run Crypton, select the scramble/unscramble menu option, and then give the program three selection keys, a key phrase, and the name of the file you want to encrypt. Crypton immediately loads the file, scrambles it according to your key phrase, and writes it back to disk. And that's it. Now no one else can read your file.

Anyone attempting to read the file without the benefit of Crypton and the proper keys will see only useless garbage—a stew of both standard and nonstandard ASCII characters. Your data is safe. Any attempt to discover the keys by using random combinations is doomed to failure; such attempts make the file increasingly more difficult to read.

When you first run Crypton, you're given four menu options: list files on a disk, read a file, Crypton (command for scrambling and unscrambling a file), and return to Basic. The list option lists the files in the directory of the disk you specify. Files that have been encoded appear in reverse video. The read option lists a file you select on your screen. If a file has been encoded, it is listed in code, not decoded before listing to the screen. This prevents someone with access to your system from using the read option to scan an encoded file.

The Crypton option is what the program is all about. This command is used to scramble and unscramble a disk file. The procedure is based on the "book volume" key-selection method: You select a book, choose a page, and pick a line from that page as the scramble key sequence. The encoding cipher uses this key to generate the substitution sequence, which constantly changes as it processes the file. When you choose the Crypton option on the menu, you're asked for the volume, page, and line numbers you selected to locate the key. Then you type in the key phrase, which can be up to 256 characters in length.

When you want to look at a scrambled file, you must first unscramble it using Crypton. Crypton displays the volume, page, and line numbers used to locate the key phrase after you select the proper disk drive and file. All you have to do is get the book and correctly enter the right line into your CoCo. (Only you or those you tell will know which books in your home or office you are using as cipher keys.) Crypton unscrambles the file and then writes it back to the disk to complete the job.

"If you need a powerful and easy-to-use method of protecting your data, get Crypton."

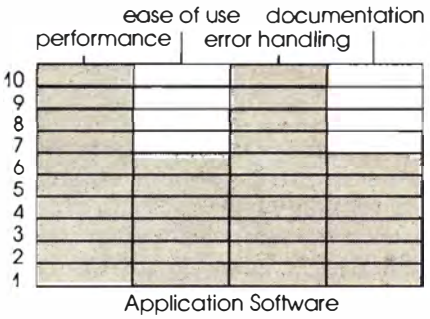
If you make a mistake by typing in the wrong phrase, then you've actually encoded the file a second time; you'll have to use both key phrases in the proper sequence to decipher the file. This is both an advantage and a disadvantage. It's a problem if you mistype a character and don't notice it. If you continue from that point to try to decode the file, it could become hopelessly lost. The advantage is that no one can break the system by simply trying one key phrase after another.

Crypton is based on the Playfair digraph-substitution cipher, but it uses a four-dimensional matrix instead of the standard two-dimensional grid. This yields a total of 10^{506} different key-phrase possibilities. According to the documentation, it would take a computer about 70 years to list every possible key phrase at a rate of 10 per second. That should provide enough combinations to frustrate almost any data thief.

I have only two real complaints about Crypton. The first is that the program doesn't tell you when it's finished. Instead, it waits for you to press the enter key before returning to the main menu display. At first, I thought it might be slow, but a one-line text file didn't seem to take any less time than a 1K file (only a second or so). When I got tired of waiting for a press-enter-to-continue prompt and pressed the enter key, the program started the drives for a moment and returned to the main menu. This is more of an annoyance than a problem.

My second complaint is that the documentation is only two pages long, leaving much to the imagination. If you've never worked with encryption programs or coded messages, it'll take a little while to figure out what you need to do. It might be helpful if the package included a page discussing techniques for selecting key-phrase books. For example, you should not use books that are personal favorites or other obvious printed materials that an astute thief might be able to figure out and use to break into your data.

If you need a powerful and easy-to-use method of protecting your data, get Crypton. Encoding your files requires a little extra work; you must decipher them everytime you want to access them. But that's a small price to pay to protect your sensitive data from prying eyes. ■



Device Descriptor
DSS Peripherals
(Saturn Electronics)
62 Commerce Drive
Farmingdale, NY 11735
516-249-3388
OS-9, disk drive
$24.95

by Terry Kepner

Device Descriptor is a modification utility for the Radio Shack OS-9 disk system. With this utility installed on your system's disk, OS-9 is modified to work with 35, 40, and 80-track disk drives. In addition, Device Descriptor lets you run single- or double-sided disks, and gives you faster track-to-track access times. Radio Shack drives use 30 milliseconds (ms) to step from one track to another, but some commercial drives can go as fast as 6 ms.

This is a very important utility if you want to use more powerful disk drives with your Color Computer. Device Descriptor lets you add five tracks of storage space to your boot drive in most cases. And when you decide to add a second, third, or fourth drive, you can get a 40-track, double-sided drive with double the normal available space for only a little bit more than the price of a standard drive. If you really need extra storage space, you can get an 80-track, double-sided drive that has more room than four standard Radio Shack drives.

Three of those would give you 2 megabytes.

What's in a Name?

This package has to have the worst name ever given to a program. The name tells you absolutely nothing about what the program does. It derives from the fact that the utility modifies the device descriptor routine of OS-9. This routine tells the operating system what devices are present and how to use them, and adjusts the system to access the increased capability available with non-Tandy disk drives.

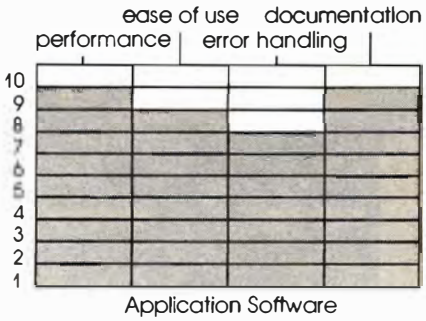
Device Descriptor's packaging and instructions leave much to be desired. If you looked at the package before you read this review, you probably wouldn't know what the program does because all you can see is the utility's name and its instructions for installation on your OS-9 disk. Only after you open the package and read the instructions for installation do you discover how to use the program and why you might want to buy it. The packaging should include a cover sheet that advertises the program's capabilities and restrictions.

Installing Device Descriptor is easy—just follow the instructions exactly. No explanation of them is provided for the novice; the company assumes that you are familiar with OS-9 and all its more exotic commands. Device Descriptor's installation instructions cover both single- and dual-drive systems—anyone with a disk drive can use this utility.

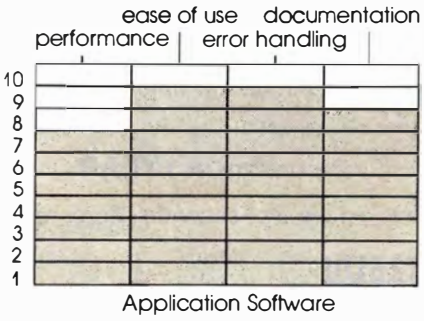
After you have created a bootable system disk containing the new program, the instructions tell you how to set the utility's parameters to match your nonstandard system. The instructions assume that you are completely familiar with Debug; that is what you use to modify the device-descriptor routine.

When you have the parameters established, you follow the instructions to save them on the boot disk. The only restriction to using Device Descriptor is that you can't use a double-sided drive as drive 0. This is because the OS-9 Boot program searches only one side of a disk during the initial phase of loading the OS-9 system, before you load Device Descriptor into memory.

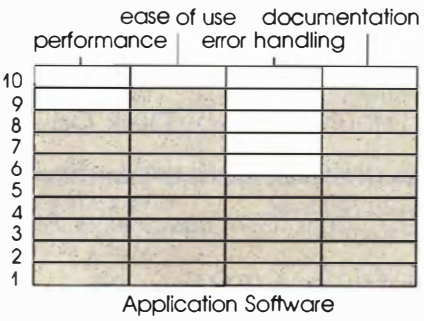
Overall, Device Descriptor is a worthwhile addition to your OS-9 system if you intend to use higher-capacity disk drives with your system. ■



Graphic Master



Text Master



In Assembly Language

Graphic Master
16K, cassette
$39.95 ($49.95 in Canada)
Text Master
64K, Extended Color Basic
$23.95 ($29.95 in Canada)
In Assembly Language
$23.95 ($29.95 in Canada)
The Dataman
420 Ferguson Ave. N.
Hamilton, Ontario
L8L 4Y9, Canada
416-529-1319

by Graham L. Heywood

Sooner or later mere game playing is bound to leave you flat. And you might be a little frustrated with your applications software because it doesn't do precisely what you want it to do. If you are adventurous, you could find yourself customizing the software you buy; you might even begin designing your own. Dataman has some programs that are very helpful to people developing their own Color Computer Software.

Graphic Master

Graphic Master gives you an extra 32 programming commands that fall into six categories: screen commands, line commands, point commands, player commands, miscellaneous commands, and a nongraphic command.

The screen commands contain various routines that let you flip through pages quickly, invert the screen, and move from one page into the next with a curtain effect. The line commands have three modes of operation: OR, EOR, and AND. You can place the figures you create anywhere on the screen and rotate them for viewing from any angle.

The point commands are similar to the line commands. The player commands operate like a combination of sprites (a feature of Commodore computers, for example) and Extended Color Basic's PUT command. Some options of the player commands allow detection of collisions between the player image and background objects.

Among the miscellaneous commands are some powerful window-scrolling features that would have made great additions to Extended Color Basic. It is fairly easy to implement them in machine language, but extremely difficult to do so in Basic. The miscellaneous commands also include DYE, which replaces Extended Color Basic's PAINT and produces some patterns that appear as new colors for the Color Computer. DYE paints the entire screen in about a quarter of a second; Extended Color Basic takes about 15 seconds for the same task. The nongraphic command, CSAVEM, is for Color Basic users.

Graphic Master must be resident in memory for you to use any of its commands with other software. This is a drawback if you want to create stand-alone software with it. Graphic Master's documentation is satisfactory. Recent improvements (not reviewed here) include new documentation and a method for accessing the upper 32K of the CoCo.

Text Master

Because it requires 64K, Text Master is not for everyone. But if you have that much RAM, Text Master gives you the ability to mix text and graphics on

NEW DISK DRIVES

STARTING AT

$129.00

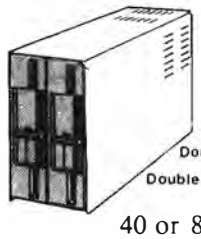
WITH CASE & POWER SUPPLY

$169.95

TANDON MPI TEAC

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

New Low Price!



40 or 80 Tracks
1/2 Hght. Teac/Panasonic

CALL FOR SALE PRICES

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

SATISFACTION GUARANTEED!! ALL DRIVES FULLY TESTED&WARRANTEED

Complete Disk Drive with Power Supply&Case ..... Teac $169.95

Two Drives in Dual Case & Power Supply ..... Teac $279.95

1/2 ht double sided double density Disk Drives (Panasonic/Teac) Tracks 40 *only* **$159.00**

1/2 ht double sided double density Disk Drive with ps&case Tracks 40 ..... $199.95

free 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 5 MS TRK TO TRK & UP)
POWER SUPPLY and CASE, TWO DRIVE CABLE WITH ALL GOLD CONNECTORS
J&M CONTROLLER, MANUAL and DOCUMENTATION ..... ~~$329.95~~ ..... $ SALE!

BUY THE BEST FOR LESS! CALL!

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 ..... ~~$399.95~~ Super!! ..... SALE!

TAKE ADDED SAVINGS ON TWO DRIVE SYSTEMS

DISKETTES **with free library case** ..... 10 Diskettes CONTROL DATA $17.95

Unadvertised Specials .... $Call

Drives cleaned, aligned & tested $29.95

TECHNICAL STAFF ON DUTY, PLEASE CALL FOR ASSISTANCE.

CALL US TODAY!! (617)234-7047
ORDER TOLL FREE **1-800-635-0300**

* DEALER INQUIRIES INVITED.
(617) 234-7047

TRUE DATA PRODUCTS

195 Linwood Street, P.O. Box 546
Linwood, Massachusetts 01525
(617) 234-7047
HOURS MON-SAT 9-6 (EST)

We welcome
• Visa / Master Charge
• Checks (allow 2 weeks for clearing)
• C.O.D. Add $2.00

Circle Reader Service card #93

screen. It uses PMODE4 graphics to give you upper- and lowercase letters. And you can use it to redefine the keyboard and set up auto-repeat keys. Text Master provides quite a few graphic functions that are impossible to create in Basic.

Text Master gives you several character sets, ranging from 32 to 85 characters per line. As you might expect, the 85-character mode is practically illegible on a television screen because each character is only three pixels wide. It is much easier to read on a monitor. The program has a proportional-space mode in three type styles based on the character set you choose.

You can vary the appearance of Text Master's characters by POKEing a multiple of eight into location 65314. One problem with this is that only half the screen is visible when you have double-height characters. You can also alter the characters with the character editor. It can create an old-English or a serif typeface, for example. In addition, you can use it to define a small character block, such as a printer control character.

"I would have bought In Assembly Language just for its multitasking routine. . . ."

Ideally, Text Master should be used in conjunction with a customized word processor. Such a word processor would give you most of the features of a very expensive package. When you couple it with a bit-addressable printer, special effects such as overstrike, superscript, subscript, and even upside-down characters become available.

In Assembly Language

This package is not a utility but is a collection of practical machine-language routines. I would have bought the package just for its multitasking routine; I have been searching for something like it for months.

In Assembly Language contains routines that read the keyboard and joystick, and handle files, strings, numeric input and display, random-number generation, sound generation, high-resolution vectoring, multitasking, auto-executing, and threaded code. In essence, threaded code is the basis of an interpreted language. Pascal is a good example of threaded code.

The subroutine of In Assembly Language comes on cassette along with a concise manual that explains each routine and its function. Every machine-language programmer could use a library of subroutine modules that save many hours of rewriting. In Assembly Language is a very useful package to have if you are writing machine language. ■

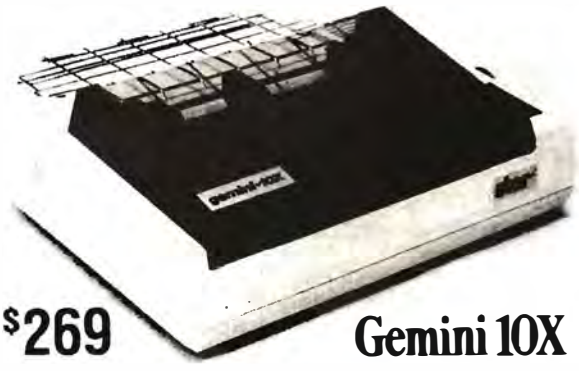
Circle Reader Service card #97

Star PRINTERS

PRINTER CABLES AND INTERFACES AVAILABLE
Call for current pricing

- 100 - 120 - 160 CPS
- Bidirectional Logic Seeking
- Friction and Tractor
- 9X9 Dot Matrix
- True Decenders
- High Res-Bit Image Block Graphics
- 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 15 (15 Inch Carriage, 100cps) Friction and Tractor	$CALL
GEMINI 15X (15 Inch Carriage, 120cps) Friction and Tractor	$CALL
DELTA 10 (10 Inch Carriage, 160cps) Friction and Tractor	$CALL



$269 Gemini 10X

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:

$59.95

COMPLETE SYSTEM

ONLY ~~319.95~~ NEW LOW PRICE

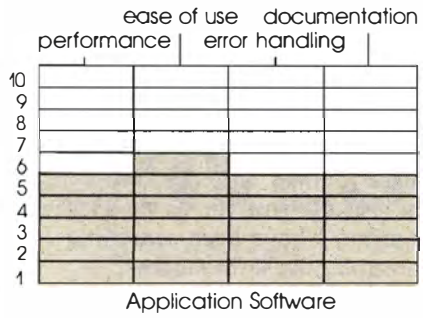
Nothing more to buy!

Dealer inquiries invited

TRUE DATA PRODUCTS
195 Linwood Street, P.O. Box 546
Linwood, Massachusetts 01525

CALL US TODAY!! (617)234-7047
ORDER TOLL FREE 1-800-635-0300

See List of Advertisers on page 89



TRS-Copy
Catalog no. 26-3263
Radio Shack
1400 One Tandy Center
Forth Worth, TX 76102
64K, OS-9, disk drive
$24.95

by Jeffrey S. Parker

If you've wanted to transfer files from RS-DOS to OS-9, now you can. TRS-Copy is a utility program that runs on OS-9 and can transfer text or data files between these operating systems. This could be extremely useful for transferring files that contain mailing lists, inventories, and so on.

TRS-Copy can copy only ASCII files. OS-9 defaults to an ASCII format unless you specify otherwise when saving, but RS-DOS for the CoCo defaults to binary when you save. This means that you have to check the directory to be sure the files you want to copy are in ASCII format. If not, you have to rename your files and use a different save format to place them in ASCII: (Save "text/tst", A).

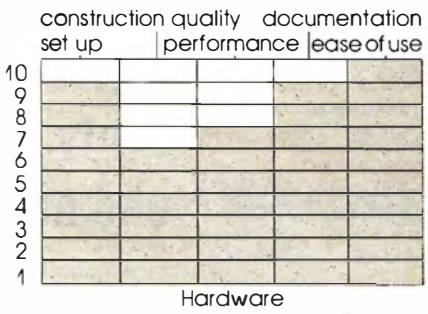
TRS-Copy faithfully copies files between systems, but it can copy only the image of a control or special character —not its function. Once transferred, these characters won't be activated by other operating systems. TRS-Copy can transfer programs, but it can't run them. If you transfer a Basic program from RS-DOS to OS-9, you need Basic-09 to run that program.

You can only run TRS-Copy from OS-9, where it resides in the commands directory of the OS-9 system disk. To run TRS-Copy, you have to formulate a multiple-command line to include the RS-DOS file and to designate the OS-9 file. The TRS-Copy manual depicts the multiple-command line as "TRS-Copy file name/extension path name." It doesn't give an example such as "TRS-Copy test/bas:2/d1/testfile," until the last page, which contains a similar example for an explanation of a two-drive transfer.

TRS-Copy requires disk swapping if you have one disk drive. It lets you know whether you have inserted the wrong disk on the first two swaps (source or destination). After that, however, you're on your own. The manual suggests write-protecting the source disk before attempting a file transfer.

TRS-Copy has some drawbacks. The greatest of these is inadequate documentation. If you are looking for straight file transfer, then this is an effective program. But if you have a need for more sophisticated data transfers, there are programs available with greater capabilities. ■

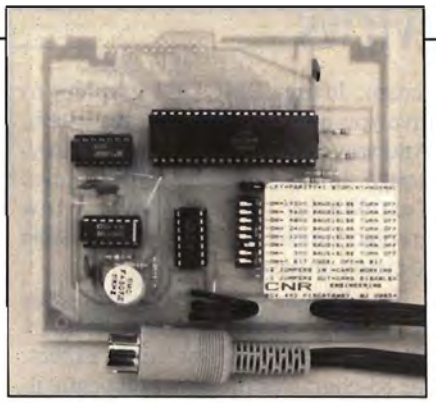
"You can only run TRS-Copy from OS-9."



SP-2 Interface for Epson printers
CNR Engineering
P.O. Box 492, 57 Harte Place
Piscataway, NJ 08854
201-752-0144
$49.95

by Graham L. Heywood

One of the first peripherals the average owner considers purchasing is a printer, and the Epson family of printers is a popular choice. But the Epson requires a parallel input, and the CoCo comes with a serial input. What you need to attach your Epson to the CoCo is a serial-to-parallel interface. The SP-2 is just that. It fits inside your Epson printer and tames your CoCo to communicate in the Epson's language.



The SP-2 Interface

The SP-2 comes wrapped, very sensibly, in aluminum foil for protection from static electricity. It's a good idea not to remove the foil until you have read the accompanying documentation.

My first impression of the interface's construction was favorable. The printed-circuit board is nicely laid out, evenly spaced, with all tracks well tinned. However, a couple of alterations were made in the board I received that are not up to the product's original standard of construction.

Installation of the SP-2 is fairly easy. Take off the access cover and set the 12 DIP (dual in-line package) switches according to the documentation, which supplies this information for FX-80, RX-80, and MX-80 models. Once you have set the switches, all that is left is the easy task of inserting the board.

The SP-2 is configured at 600 baud, no parity, and 8-bit ASCII code when shipped—the standard parameters for CoCos sold currently. You can switch the configuration for earlier model CoCos by moving a single switch from off to on. The SP-2 offers you the choice of seven baud rates, from 300 to 19,200. Because the CoCo defaults to 600 baud, you must remember to alter location 150 to conform to the other speeds you may choose.

The documentation that comes with the SP-2 explains the installation procedure more than adequately. It provides all the information you need to use the board, including a circuit diagram and parts list, and manages it in a clear and concise style. Like all good interfaces, the SP-2 becomes a transparent part of the system, and it performs well within its specified parameters. ■

CONTROL LIGHTS AND APPLIANCES 24 HOURS A DAY AUTOMATICALLY

Program the Household Controller Using Your Color Computer 2

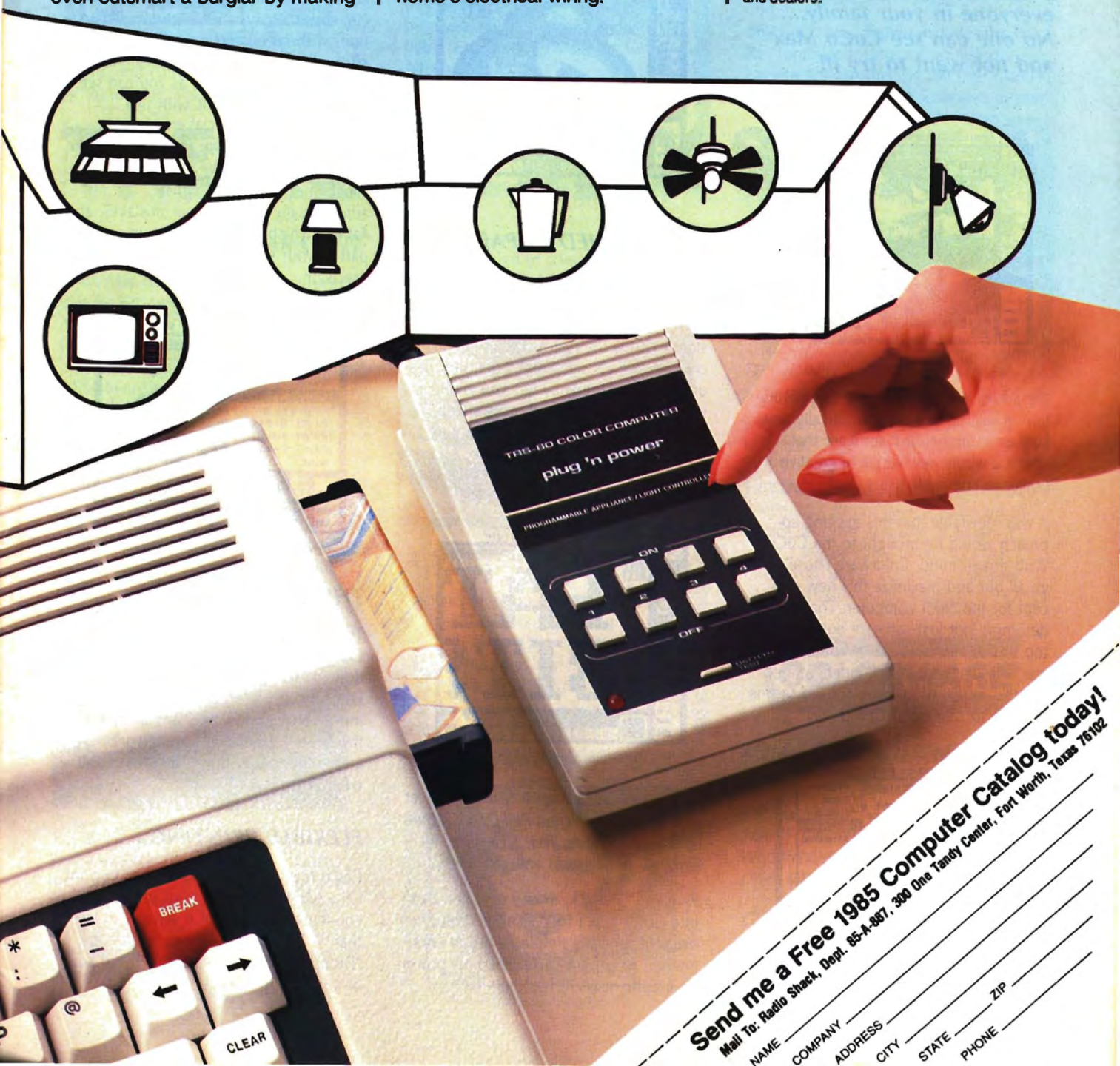
Our Appliance/Light Controller is an incredible device that makes your life easier. It can wake you to a TV or stereo, brew your coffee in the morning, pre-cool a room in the afternoon, start dinner before you leave work, and hundreds of other chores—all automatically. You can even outsmart a burglar by making your home look and sound lived in day and night.

Simply connect the Controller to your Color Computer, and enter the desired times and events. Disconnect the Controller and your computer is free to use as you wish. Then, connect lamps and appliances to Plug 'n Power™ modules (sold separately) and plug the modules into wall outlets. The Controller sends on/off signals over your home's electrical wiring.

Get the Appliance/Light Controller (26-3142, $99.95) at Radio Shack today—and computerize your home for improved security, convenience and energy savings.

Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION
Circle Reader Service card #4

Prices apply at participating Radio Shack stores and dealers.



Send me a Free 1985 Computer Catalog today!
Mail To: Radio Shack, Dept. 85-A-867, 300 One Tandy Center, Fort Worth, Texas 76102

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

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, elipse, etc.) to create perfect illustriations with speed and ease. There's a ***Pencil,*** an ***Eraser*** and even a selection of ***Caligraphy 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 supercapabilities 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 3-½ 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 ¼ page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to ⅛ page size.

THE COCO MAX SYSTEM

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 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.

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-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***

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-

COLORWARE

TOLL FREE ORDER LINE:
(800) 221-0916

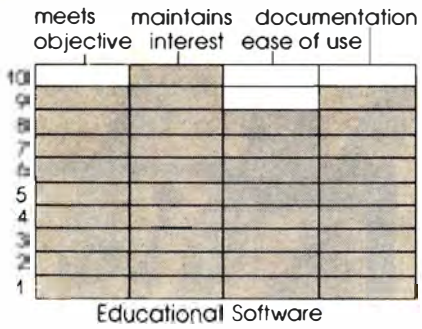
Colorware Inc.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA

MasterCard

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.



Heroes and Trolls
Cognitive Development Co.
Suite 141, 12345 Lake City Way N.E.
Seattle, WA 98125
206-367-3470
16K, disk drive
$29.95

by Scott and Beth Norman

Heroes and Trolls is an original drill from Cognitive Development. One or two players may play, or none—the computer can also play itself while you watch. Heroes and Trolls lets you puzzle out a maze, rescue enchanted victims, battle trolls and dragons, and joust with an opponent. All this and math facts, too? You bet!

If you play alone, you have a choice of being either the Hero of Spades or the Hero of Hearts. The computer plays the other hero. Then you choose your operation (addition, subtraction, multiplication, or division) and your skill level (low, medium, or high). Players can select whatever skill level or operation they want, regardless of another's choice. This is a good idea because it lets two people with varying skill levels compete fairly.

Heroes and Trolls pits you against foes and decides all outcomes by asking you to solve math problems. When you are playing against the computer, it doesn't challenge itself with math problems. It is programmed to succeed 90 percent of the time. The manual says, ". . .a child playing at the proper skill level ought usually to beat the computer. . . ." If you answer a problem incorrectly, the computer crosses out your mistake and shows the right response. This is an excellent feature.

Game Scenario

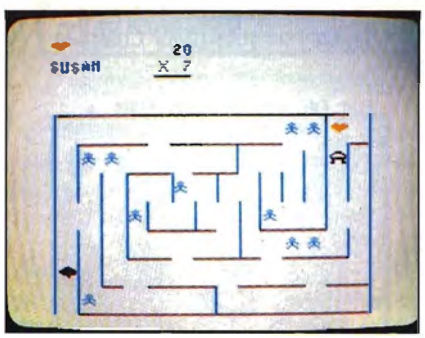
As the game begins, evil trolls have magically turned Good King John and nine members of his royal family into statues in an underground maze guarded by an invisible dragon. The program displays a map of this maze on screen, and stick figures represent the 10 statues. The heroes start from opposite corners. You move your hero through the maze by using the four arrow keys. The heroes are identified by their insignia (a spade or a heart), which also represent their positions on the screen. The object of Heroes and Trolls is to free all the members of the Royal Family and keep as many as you can on your side. You free them by moving your hero to a statue and then successfully answering a math problem.

Each rescued person joins others you might have collected in a chain following your rescuing hero. Members of a chain bear the insignia of their hero. (This looks really cute on the screen.) Although one hero cannot pass through the other's train of followers, if a hero catches up to the end of the other's line, the last member in line can be stolen if the player correctly answers a math problem.

Hidden within Heroes and Trolls' maze are 10 trolls. Whenever you get too close to one, it jumps out and "attacks" you. (What it really does is block your way—there is no violence in this game.) You can defeat a troll by answering a math problem. But if you respond incorrectly, the troll carries off one of your followers, whom you must rescue all over again.

The dragon is another threat to the concerns of a hero. Like the trolls, the dragon hides in the maze and appears only when you get too close to it. If you defeat it by completing a math fact, it disappears until you get near it again. The second time you defeat it, it remains visible. By the third defeat, it is permanently vanquished.

You can also win followers by jousting with the other hero. You begin a joust by attempting to move onto your opponent's square. Each player is given a math problem that is appropriate to the operation and skill level he or she has chosen. If one hero is correct and the other is not, the player with the correct answer receives a follower. Otherwise, it is a draw and the game continues.



Heroes & Trolls

How It Stacks Up

Heroes and Trolls ends when the 10 members of the Royal Family have been freed from their statue forms and are following one or the other of the two heroes. The game awards one point for each follower, one point for each defeated troll, and three points for the dragon if it has been permanently vanquished. The game also displays the percentage of each player's correctly answered math problems.

Here are a few examples of problems from each level of Heroes and Trolls' multiplication operation.

Low: 0 * 2, 0 * 6, 5 * 4, 3 * 7, 8 * 9.
Medium: 0 * 8, 1 * 25, 18 * 4, 29 * 3, 46 * 4.
High: 4 * 6, 25 * 4, 32 * 9, 8 * 59, 92 * 4.

Sometimes there is a problem in the low levels with repetition. For example, the program once gave me "8 / 8" four times in a row while I was playing in the low-level division mode. And sometimes the high-level problems are easier than those in the low and medium levels. Once I received "98 + 1" in high-level addition. However, these are minor problems.

I have a serious problem with the few bugs that cause the program to hang up or crash back into Basic every now and then. That shouldn't happen, especially in a program meant for unsupervised use by students. Also, when the computer displays a math problem on the screen, you must type the answer in from left to right. This is awkward because it is opposite from the way most schools teach students to solve these problems. It's best to keep scratch paper handy to avoid the need to mentally reverse the order of the numbers in solutions before entering them.

Despite these drawbacks, Heroes and Trolls is a program to consider. It uses graphics and sound extremely well and maintains the interest of young players with the best. I think it makes a better-than-average math drill because it's not merely a monotonous electronic-flashcard program. Heroes and Trolls is a fun application of math drills in an intriguing game setting. ■

HOT CoCo INDEX TO ADVERTISERS

Advertising Offices: (603) 924-7138 or (800) 441-4403

*This advertiser prefers to be contacted directly. For further information from our advertisers, please use the Reader Service card.

COMING NEXT MONTH

Telecommunications is rapidly becoming one of the major applications for home computer users, and with good reason. It seems like new consumer networks and databases, hobbyist bulletin boards, and financial services are springing up every day. There is something there for you, and April's *HOT CoCo* will show you how to take advantage of the Network Nation.

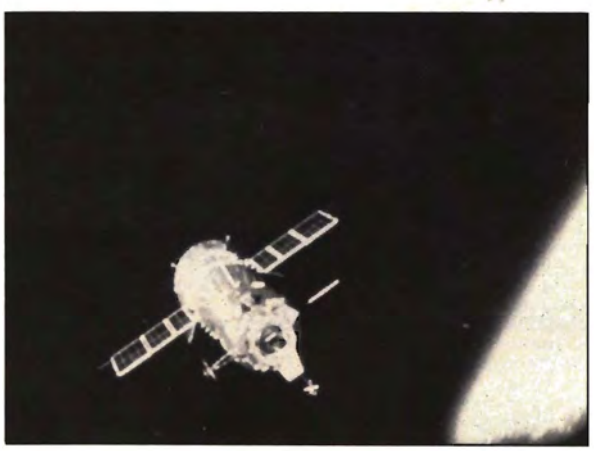
Jeffrey Parker takes a look at disk-based smart-terminal programs in the first of a two-part series. He'll describe the differences in operation and features to help you pick the best one for you.

Our 6809 On Line columnist, Bobby Ballard, gives you the rundown on equipment and its cost for those of you looking to get started. Telecommunicating is not as costly as you might expect.

Would you like to try a simple hardware project? Mick McGuire shows you how to build an RS-232 switcher. It lets your printer and modem share the serial port on your CoCo.

And let's not forget the icing on the cake: a nationwide list of CoCo bulletin boards. You will not be lonesome for electronic socializing this spring with this list.

For those of you really into telecommunications, we have R. Dewain Poe's satellite-tracking



program. This article is perfect for hams and space buffs, and a companion program features wonderful graphics.

Educators and educatees are not left out. Education Editor Nancy Kipperman takes a look at networking with CoCos in the classroom, and Paul Kimmelman summarizes what's available in electronic learning.

And last but not least, all our regular columnists will be back in April with the quality advice and commentary you've come to expect. ■

Doctor ASCII

by Richard E. Esposito and Jesse W. Jackson

Got a problem with your Color Computer? Ask the Doctor to solve it. Write to Doctor ASCII, HOT CoCo, *80 Pine St., Peterborough, NH 03458. Be sure to include a stamped, self-addressed envelope if you want a reply. Due to the volume of mail this column receives, we cannot guarantee that your question will be published.*

Q • Can I alter the 30-millisecond stepping rate of my disk-drive head with only a line or two of Basic code?—*Pastor Douglas Courter, Winchester, VA*

A • The JDOS operating system (J&M System, 137 Utah NE, Albuquerque, NM 87108) has a RATE command that you can enter directly or from a Basic program that changes the stepping rate to 6, 12, 20, or 30 milliseconds. By the way, if anyone is getting I/O errors with the new JDOS 1.1 ROM, enter RATE 3 to set the stepping rate to 30 milliseconds.

It's not so simple with the Radio Shack DOS, as it has no RATE command. However, if you have 64K or can burn an EPROM, you can change the stepping rate with Program Listing 1, Disk POKE. This program POKEs the appropriate values into the Disk Basic ROM to change the stepping rates. It also lets you change the number of tracks allowed. This won't give you more space with Basic, but if you use DSKINI and DSKI$/DSKO$, you can get up to 40 tracks.

Q • How can I access all the features of my Prowriter printer, changing character pitch and using special characters, with Color Disk Scripsit?—*Bernard G. Stittleburg, Sturbridge, MA*

A • Color Disk Scripsit limits you to four printer commands of 3 bytes each, which Radio Shack defines as start underline, end underline, start elongation, and end elongation. For instance, if you don't need elongation, define the start and end elongation to be start and end character pitch or whatever.

Q • I have an F board 64K CoCo, Color Basic 1.1, Extended Basic 1.0, and one disk drive with the 1.1 Disk Basic ROM. When using Telewriter-64, the program halts with an NF or similar error when I try to access the Disk I/O menu option. I can lock into the disk operation (with no way out) by typing CLEAR 10:LOADM"S/XXX". Is there a fix for this?—*L.S. Coker, Ontario, Canada*

Program Listing 1. Disk POKE

```
10 REM "DISKPOKE"
20 REM (C) 1984 BY J.W. JACKSON
30 REM FOR HOT COCO READERS
40 REM  WITH DISK BASIC 1.0
50 REM  OR DISK BASIC 1.1 AND
60 REM  64K RAM
70 REM
80 DIM R(4)
90 V=PEEK(&HC004)-&HD6' GET VERS
ION
100 GOSUB610'64K BOOT
110 R$=" 6122030"
120 T=PEEK(&HD446+V*&HEE)
130 S=PEEK(&HD526+V*&HED) AND 3
140 CLS
150 PRINT@3,"STEP RATE = ";
160 PRINT MID$(R$,S*2+1,2)" MILL
ISECONDS
170 PRINT@38,"# TRACKS = ";
180 PRINT T
190 PRINT@70,"SELECT FUNCTION
200 PRINT" 1 = QUIT
210 PRINT" 2 = STEP RATE POKE
220 PRINT" 3 = TRACK LIMIT POKE
230 INPUT" <1-3> ";F$:F=VAL(F$)
240 ON F GOSUB 250,280,370:GOTO1
40
250 STOP
260 REM
270 REM STEP RATE POKE
280 CLS
290 PRINT@70,"SELECT STEP RATE
300 FOR I=0TO3
310 PRINT@134+I*32,I" = "MID$(R$
,2*I+1,2)" MILLISECONDS
320 NEXT
330 INPUT" <0-3> ";S$
340 IF S$<"0" OR S$>"3" THEN GOS
UB 450:GOTO260
350 S=VAL(S$):GOSUB490
360 RETURN
370 REM
380 REM TRACK LIMIT SET
390 CLS
400 PRINT@70, "SELECT TRACK LIMI
T
410 INPUT" <1-40> ";T$
420 T=VAL(T$)
430 IF T<1 OR T>40 THEN GOSUB 45
0:GOTO390
440 GOSUB 550:RETURN
450 PRINT@454,"INVALID RESPONSE
460 PRINT@486," PRESS A KEY";
470 SOUND 1,1:SCREEN 0,1
480 IF INKEY$=""THEN 480 ELSE RE
TURN
490 REM
500 REM STEP RATE POKES
510 POKE &HD526+V*&HED,&H50 OR S
' STEP IN RATE SET
520 POKE &HD6CD+V*&HF3,&H00 OR S
' RESTORE RATE SET
530 POKE &HD723+V*&HF3,&H14 OR S
' SEEK RATE SET
540 RETURN
550 REM
560 REM TRACK NUMBER  LIMIT POKE
S
570 POKE &HD446+V*&HEE,T 'DSKI$
TRACK LIMIT
580 POKE &HD572+V*&HED, T+1'DSKI
NI TRACK LIMIT
590 POKE &HD595+V*&HED,T+1'DSKCO
N TRACK LIMIT
600 RETURN
610 CLS:PRINT@258,"LOADING 64K B
OOT"
620 FOR I= 3584  TO  3608
630 READ X
640 POKE I,X
650 NEXT I
660 EXEC3584
670 IF PEEK(&HABEE)=&H4F AND PEE
K(&HABEF)=&H4B THEN POKE &HABEE,
&H6F:POKE &HABEF,&H6B
680 RETURN
690 DATA  52, 1, 26, 80, 142, 12
8, 0, 183
700 DATA  255, 222, 236, 132, 18
3, 255, 223, 237
710 DATA  129, 140, 255, 0, 45,
241, 53, 1
720 DATA  57, 255, 0, 255, 0, 25
5, 0, 255
730 END'DISKPOKE
```

END

A. Telewriter-64 requires that the file S/XXX reside on drive 0 when you type RUN"U". If you meant NE error, that means your CoCo couldn't find the file. Check for S/XXX on drive 0. If it isn't there, try copying S/BIN or S/ASC to S/XXX, and then type RUN"U". Also, make sure you didn't copy the old version of S/XXX from Telewriter 2.0; it won't work. If you really meant NF error, that means "NEXT without FOR," and something is wrong with the file U. Make another backup and try again.

Q. Why does my Color Computer give a syntax error when I type PRINT &9? All other numbers give values.—*Paul E. Jones, Princeton, KY*

A. PRINT &(number) prints the decimal value of the octal number. In octal, only the digits 0 to 7 are used, hence the error. The fact the PRINT &8 prints "8" is a bug, as it should also result in an error.

Q. Do the 128K memory upgrades really upgrade your computer to 128K? Will they let you write a program 128K long?—*Chris Webb, Danville, VA*

A. The 128K upgrade (three companies are currently offering them: Dynamic Electronics Inc., Box 896, Hartselle, AL 35640; R.G.S. Micro Inc., 759, Victoria Square 405, Montreal, Canada H2Y 2J3; and DSL Computer Products Inc., P.O. Box 1176, Dearborn, MI 48121) gives you two more banks of 32K, like the one that is disabled when you first turn on your machine. The CoCo's 6809E is an 8-bit microprocessor and can address only 64K of memory at a time. The only way to use more than 64K is by bank switching, where one section of memory is swapped for another.

Programs that require more then 64K must be written so that the computer does not try to execute parts of a program while they are swapped out. The CoCo's Basic interpreter would need extensive modification to support swapping. Radio Shack's OS-9 operating system is a good candidate to support 128K, but at this writing, I have not seen a 128K OS-9 for the CoCo.

Q. When using artifact colors in my 16K, NC board CoCo, I get colors different from those mentioned in *HOT CoCo*. My TV is properly adjusted, and the CLS colors are correct. But when mixing modes using SCREEN 1,1, I get the colors black, buff, green, and magenta, The green and magenta are very bright. How can I get black, blue, red, and white?—*Jon Alcin, Lompoc, CA*

A. Artifacting is "fooling" the color circuitry by introducing color burst when there shouldn't be (according to the PMODE statement). Here's what I've heard: Artifacting is due to leakage of the 6847 VDG circuitry, but I'm not sure about that; mixed modes I can understand. When Radio Shack came out with the E board revision, artifacted color was affected, and they added a 3.58 MHz tuned circuit to "leak" into the color modulator for artifacting.

The CoCo 2 has a 555 timer with its reset pin connected to the VDG's GMO pin, its trigger pin connected to the VDG's HS* pin, and its output pin drives a transistor inverter connected to the VDG's Color A output through a high impedence. Since GMO is low in PMODEs 0, 2, and 4, this circuit is reset (inactive) then. But in PMODEs 1 and 3, the 555 pulses each HS* pulse, which fires the one-shot chip and pulls the VDG's Color A ouput toward ground.

This simulates color burst, resulting in artifacted color. Why? The Color A ouput is a three-level analog ouput from the VDG that is combined with the four-level analog Color B ouput and the Y ouputs to specify one of eight colors in NTSC coding. In PMODEs 0, 2, and 4, Color A must be a steady level, resulting in a two-color mode. However, consider what happens when you switch to PMODE 3. Any leakage on the Color A input changes the level of Color A, giving you artifacted colors. I'm still not sure why you don't always get artifacted colors in PMODEs 1 and 3.

See "Introduction to Multicolor Graphics," by Ken Anderson, *HOT CoCo*, August 1983, p. 40, for some programs to experiment with artifacting.

Q. Will the speed-up POKE (POKE 65495,0) shorten the SAM chip's life by overheating it? Also, you once mentioned that it is possible to speed the CoCo's operation by replacing the 6809 CPU with either a 68A09 or 68B09 chip. How do you do this and which chip is faster? Finally, can I use a parallel printer with Telewriter-64?—*John A. Giedrys, Lakewood, OH*

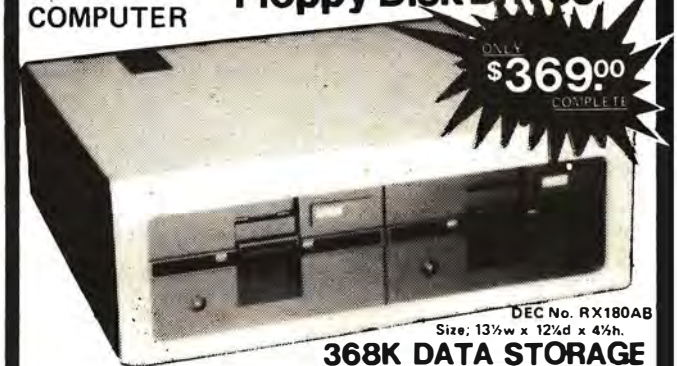
A. Increasing cycle time means more switching cycles per second for the SAM, CPU, and most of the CoCo's other chips. When a device switches state, it must absorb or transfer energy very quickly to discharge or charge stray capacitance. This causes additional heat at increased cycle rates. The SAM normally runs hot, and this condition is worsened by doubling the cycle rate. The added heat does age your SAM, so try heat-sinking it or adding a cooling fan.

Replacing The CPU with a faster version will not give you faster processing time. Does your keyboard accept the letter O in high-speed mode? Many CoCos don't due to the 6821 PIA chip and the extra loading (more capacitance). The associated chips (PIAs, memory, and so on) must also be capable of the higher rates. The 68A09 and 68B09 are guaranteed to operate at 1.5 MHz and 2 MHz, respectively. Otherwise, they are the same as the 6809. If you get a 68B09, replace the 6821s with 68B21s, and the RAM (memory) chips should have less than 300 ns access time.

Telewriter-64 will support a parallel printer if you have a serial-to-parallel interface between the CoCo and the printer. Serial-to-parallel interfaces are available from many sources and cost about $50 on the average. Check the ads in this magazine. ■

Circle Reader Service card #363

COLOR COMPUTER Floppy Disk Drives



DEC No. RX180AB
Size; 13⅛w x 12¼d x 4½h.

368K DATA STORAGE

WE SUPPLY: Dual (2) 5¼" Floppy Disk Drives (all mounted in a case, with fan & power supply) as shown in photo; A Disk Controller Module,; and Interface Cables.
The Drives are 40 track, single sided, double density.
The Disk Controller is a J&M Disk Controller with JDOS Extended Disk BASIC V 1.11 Fully Compatable with CoCo I or II, and CoCo Software. Interface will handle up to 3 Drives.
Use Order No. 430599 . . . . . $369.00 each.
PLUS $8.00 shipping and handling.

DISK CONTROLLER
We also sell the disk controller seperately.
Supplied with Maunal & Interface Cables.
Use Order No. 430600 . . . $144.00 each.
Plus $5.00 shipping and handling.

PHONE ORDERS
(617) 532-2323

FREE 40 PAGE CATALOG
PACKED WITH COMPUTER & HI-TEK MATERIAL

ELECTRONIC SUPERMARKET
P.O. Box 988 Lynnfield, MA. 01940
(617)532-2323
TELEX 882687
DINERS CLUB Also Accepted

See List of Advertisers on page 89

NEW! HDS FLOPPY DRIVE CONTROLLER

FEATURES:

- GOLD PLATED EDGE CARDS
- DUAL SELECTABLE ROM SOCKETS
- NO POTS TO ADJUST
- COMPATIBLE WITH COCO I & II
- 120 DAY WARRANTY
- DOUBLE AND SINGLE DENSITY
- FULLY SOCKETED BOARD

REDUCE YOUR I/O ERRORS WITH THE NEW HARD DRIVE SPECIALIST FLOPPY DRIVE CONTROLLER FOR THE COLOR COMPUTER. GOLD EDGE CARD CONNECTORS AND THE ABSENCE OF POTENTIOMETERS MAKE THIS THE BEST BOARD AVAILABLE TO DATE. SOLD WITH AND WITHOUT ROM (Read Only Memory)

COMPLETED & TESTED BOARD WITH ROM $139.00
(INCLUDES CASE, AND DOS INSTRUCTIONS)
COMPLETED & TESTED BOARD WITHOUT ROM..... $119.00
(INCLUDES CASE)
BARE BOARD WITH INSTRUCTION MANUAL $39.95
(ADD $40. FOR COMPLETE PARTS KIT, ADD $20. FOR ROM)

HARD DRIVE SPECIALIST

Ordering Information
We accept Visa, Mastercard, Wire Transfers, and Certified checks for quickest shipping. Orders received on personal checks are held

Circle Reader Service card #455

Dealer inquiries invited
16206D Hickory Knoll, Houston, Texas 77059

Order Line
1-800-231-6671
Local Sales and Service Line
1-713-480-6000

MUL-T-SCREEN

RAINBOW CERTIFICATION SEAL

COLOR CHARACTER GENERATOR

A NEW DIMENSION IN COLOR COMPUTING

RAINBOW CERTIFICATION SEAL

- 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

Circle Reader Service card #91

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

VISA MasterCard

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.

Gameware

Major Istar

Welcome to the 21st century. You are Major Istar who is on a journey to a research station located at the bottom of the sea. Your mission is to answer a call for help from a Huey-14, a service droid whose message was terminated before he could complete it.

Major Istar is a part of a new generation of high-resolution graphic adventures. What makes this game different are action situations—arcade simulations—that require quick reflexes. They make Major Istar an arcade-graphic-adventure game.

The game opens on a hi-res display of a console as you guide your submarine on the surface of the ocean. The commands are typical of adventure games: "go north," "get blaster," and so on. Your first obstacle is locating the dome that encloses Trident research center. The program packaging includes a Room Map Worksheet to help players trace their paths.

Once you find the entrance to Trident, you will encounter the first action scene. Don't be deceived by the calmness of the ocean as you try to dock your sub using a joystick. Use the game-save feature at this point to avoid having to restart the game if you don't quite dock your sub.

When you enter the domed city, you must find objects that you'll need to complete your mission. But you won't know what your mission is until you find.... Well, you'll have to figure that out for yourself.

The first action scene is frustrating, but wait until you stumble on the room full of robot guards running amok. You'll have to use your head, along with good joystick control, to discover how to bypass the robots.

Major Istar requires that you use imagination and skillful reflexes to accomplish its mission. The graphics are excellent. The action situations are challenging. If you are looking for something different in an adventure game, this is probably it.

Major Istar (Under the Doomed Sea) is from Computerware, P.O. Box 668, Encinitas, CA 92024. It requires 32K and a joystick, and costs $24.95 on cassette and $27.95 on disk, plus $2 for shipping and handling.

Trekboer takes you on a journey through the galaxy, exploring strange planets in search of a cure for the deadly virus that threatens the existence of Earth. Trekboer is another quality adventure game from Mark Data Products that provides high-resolution graphics and a challenging mission.

Trekboer

As the game begins, you are at the controls of a starship, but you'll have to learn all the secrets of running an interstellar space ship before you can start the quest. When you are familiar with the control and navigation systems, you can journey to any of the four planets in the galaxy. Each planet varies in climate and terrain—make sure you are properly prepared for your expeditions.

The object is to find an antidote and return to Earth to end your mission. Exploring strange planets piques your curiosity for what lies beyond the doors of your ship every time you touch down. This is by no means an easy adventure, so keep your imagination and a little common sense about you to make your way through this one. It might be Mark Data's most challenging graphic adventure game so far.

Trekboer is from Mark Data Products, 24001 Alicia Parkway, 207, Mission Viejo, CA 92621. It requires 32K, and costs $24.95 on cassette and $27.95 on disk.

Galagon is a superb clone of a popular arcade game. Your spaceship moves horizontally along the bottom of the screen. Strings of attacking ships enter from all sides, flying in swirling patterns and dancing across the screen in an attempt to trap you. Galagon pits your slow-firing spaceship against the fast-moving but often predictable movements of the enemy craft. After you face two waves of attacks you enter the "challenge stage," where you must shoot a certain percentage of aliens for maximum bonus points. You'll encounter no missiles from the aliens in this stage.

One unique aspect of this game is that you can acquire double firepower by allowing the "Boss" ship to capture you temporarily. The double firepower lets you rack up many more points and increase your "hit-miss ratio."

On a scale of one to 10, Galagon gets a nine from me. (Its sound could be better.) This game is as good as the arcade version and it's more challenging.

Galagon is from Spectral Associates, 3418 South 90th Street, Tacoma, WA 98409. It requires 32K and a joystick, and sells for $24.95 on cassette and $27.95 on disk—*P.P.*

Galagon

PRODUCT NEWS

edited by J. Scot Finnie

Information used in the Product News section is supplied through manufacturers' press releases. *HOT CoCo* has not tested or reviewed these products and cannot guarantee any manufacturers' claim.

Once Over Easy And Playing Zookey

Easy-Edit is a text editor from Mark Data Products that is designed to make text handling in Assembly language and Basic easy. Easy-Edit has its own built-in operating system, 32/64K memory sense, a 51-column by 24-line screen, auto-repeat keying, and error reporting. It is fully compatible with popular assemblers. The master disk and instructions come packaged in a three-ring binder. Easy-Edit requires 32K and one disk drive, and sells for $34.95.

Zookey is an educational typing tutor from Mark Data Products that combines game-play action with high-resolution graphics. The program's speed and skill levels are adjustable to fit the learning needs of both beginning typists and old hands. Zookey is written in Assembly language and requires 32K. It sells for $24.95 on cassette and $27.95 on disk. For more information on these products, contact Mark Data Products, 24001 Alicia Parkway, 207, Mission Viejo, CA 92691. 714-768-1551.

Reader Service ✓ 551

The Enhancer

The Enhancer is a utility package that increases the capabilities of 64K, Extended Color Basic Color Computers. It has a high-resolution mode that lets you display text and graphics at the same time. This feature has 224 characters including lowercase letters and several control characters for cursor movement. The Enhancer's display is 32 by 24 characters. You can use it to define the letter keys as any combination of up to 100 characters. It has a switchable auto-repeat-key function and can disable the break key. It can also recover a program after you've used the NEW command.

You use Basic commands to access all of the Enhancer's features. And the utility stays out of the way because it resides in the upper 32K of RAM. The Enhancer costs $18 on cassette and $21 on disk. Write for information to H.D.R. Software, 27 Doyle Street, St. John's, Newfoundland A1E 2N9, Canada.

Reader Service ✓ 557

Move Over Macpaint

CoCo Paint is a disk-based graphics development system for your 64K Color Computer. It is an integrated package of programs and utilities that gives you control of the creation and copying of graphics. You can use the keyboard, a joystick, a mouse, or a graphics tablet with CoCo Paint. It gives you three pages of work space that is available at all times. You can save your artwork to disk, print it out, or transmit it with a modem.

With CoCo Paint you can combine graphics and text; create your own character set; make full use of "stamps," including storing, recalling, moving, expanding, or shrinking stamps; zoom in on any portion of the workspace; create circles; and paint with and create your own textures. CoCo Paint supports most printers with graphics capability. And you can change baud rates for your printer or modem from within CoCo Paint.

A users manual and a reference card come with CoCo Paint. The program is available for $39.95, $49.95 in Canada, plus $2.50 for shipping from Four Star Software, P.O. Box 730, Streetsville, Ontario L5M 2C2, Canada.

Reader Service ✓ 558

Trivia Fever

What's heating up in family gameland for the Color Computer? Professional Software's trivia-game package is disk based, but also provides questions in book form for trips. Trivia Fever offers seven categories with thousands of questions. But Professional Software didn't stop there; the company is offering a second disk, Volume 2, with thousands of additional questions. For sports enthusiasts, there is a Super Sports Edition.

Professional Software's Trivia Fever

Trivia Fever gives you options on how you want to play the game. It has three skill levels and options for timing answers and randomly selecting categories. The categories are Science and Technology, Films and Entertainment, Geography, Famous People, History, Nature and Animals, and Sports. Trivia Fever sells for $39.95. It requries 64K and a disk drive. Professional Software Inc., 51 Fremont Street, Needham, MA 02194. 617-444-5224.

Reader Service ✓ 550

Nolo Contendre

How to Copyright Software is a self-help book from Nolo Press that helps software writers without law experience understand the process and legalities of copyrighting software. *How to Copyright Software* was written by attorney and computer law professor, M.J. Salone. It covers use of preexisting material, how and why to register copyrights, copyright infringement, international protection, trademarks, and more. *How to Copyright Software* is published by Nolo Press, 950 Parker Street, Berkely, CA 94710. The book is 256 pages and sells for $21.95.

Reader Service ✓ 556

Feeding Your Epson

The Micro-Grip V is an attachment for Epson MX, FX, or RX, 70 or 80 tractor-feed printers that makes single-sheet correspondence an easier process. The product replaces the tractor-feed system with a simple friction feed to let you serve your printer one sheet at a time—a must for Epsons on a diet. Discounts are available on multiple-unit purchases. The Micro-Grip V sells for $39.95 from Bill Cole Enterprises, P.O. Box 60, Wollaston, MA 02170-0060. 617-773-2653.

Reader Service ✓ 555

Printer Elevation

Putting your printer on a pedestal? Suncom, a manufacturer of computer peripherals, accessories, and software has intoduced a line of printer stands that saves space and is designed to fit almost any printer. Suncom's printer stands come in five models that tilt the printer up from the rear at a 35-degree angle to make printouts

The JBM Group brings you OS-9* SOFTWARE SOLUTIONS!

NuBASE: *The uncomplicated data base* $150

At last- a data base manager so versatile that you can use it to do what *you* want with your data. It's not complicated or overbearing; in fact, it's so easy to use that you'll be up and running in minutes.

Simple, user-specified masks insure data accuracy. Data integrity is assured through the use of highly crash-resistant software. *See* what you're doing through the interactive generation of screens, files and reports.

NuBASE is as affordable as it is complete. There's nothing else to buy; one price brings you the comprehensive package, including a ready-to-use mailing list application to get your NuBASE working for you on day one.

CAL $69

Appointment calendar program to help keep your important dates straight.

- Simple command structure
- Lists appointments by day, week or month
- Revises dates, times, relevant information on existing schedule entries
- Default calendar file for each user
- Unlimited alternate calendar files
- System-wide master file for scheduling common appointments

HELP $69

User-expandable generic help facility

- Includes data for online help with OS-9 utilities
- Fast, efficient disk storage
- Three-level nesting • Wild Card searching
- Automatic display of available help
- Steps the user until he finds the answer

GENUS $49

A new stand-alone sort for OS-9 that keeps asking for more data!

- Easy-to-understand prompts ask you for all information necessary to sort your data files
- Allows sorting in ascending or descending order
- Allows unlimited number of sort keys of different types
- Saves both disk and memory space by summing numeric fields as it sorts

THE MESSAGE $89

The only interoffice memo system currently available for OS-9 Level II users.

- Eliminates lost and confused interoffice memos
- Interfaces easily with your existing word processor or editor; no new commands needed
- Allows hardcopy printout, verification of received messages, immediate reply to sender
- Transmit new messages OR existing files to single user, or 'broadcast' to all users
- Preview Line indicates number, size and topic of stored messages
- Saves time, money, energy; cuts down on 'office aggravation'

DISK BACKUP $99

Controlled hard disk-to-floppy backup with restore capability

- Handles files larger than output media
- Single file, Wild Card search, current directory only, current-and-all-subdirectories
- Date and time for incremental backup
- Operator-friendly, handles error conditions smoothly
- Use to create optimized disks

For more information or to place an order, contact:

Dept. HC 17

The JBM Group, Inc.

Continental Business Center
Front & Ford Streets
Bridgeport, PA 19405

the JBM group

TWX: 510-660-3999

215-275-1777

VISA MasterCard

PA res. add 6% sales tax.
US orders, add $5.00 postage and handling.

*OS-9 is a registered trademark of Microware Corporation

See List of Advertisers on page 89

Circle Reader Service card #190

easier to read. They also have rubber feet to reduce vibration. Prices range from $17.95 to $29.95. Suncom, 260 Holbrook Drive, Wheeling, IL 60090. 312-459-8000.

Reader Service ✔ 561

Universal Quiet

Jensen Engineering has released two new models of acoustic enclosures (peace of mind!) that are designed to fit most any printer. They are priced at $149 and $169. For more information call 800-358-8272 or 707-544-9450 in CA. Jensen Engineering Inc., 1589 Hampton Way, Santa Rosa, CA 95407.

Reader Service ✔ 552

Docs for CoCo Entrepreneurs

How to Sell Your Color Computer Software is a new manual for budding creators and marketers of Color Computer software. The book tells how to obtain national directory listings, price new software products, locate and qualify new advertisers, write users manuals, and operate a successful mail-order-fulfillment service. It is designed to guide emerging CoCo entrepreneurs through the maze of information that can limit the exposure of new software products. *How to Sell Your Color Computer Software* is published by Associated Technology, Rt. 2, Box 448, Estill Springs, TN 37330 and costs $22. Contact Jack Edwards at 615-967-9159, extension 219.

Reader Service ✔ 554

Education Reviews

A new, larger, and more frequent school-year version of *The Digest of Software Reviews: Education* recently began publication. Its publishers have expanded it to include 50 percent more software titles. Subscribers will receive 700 pages of information covering 300 of the most reviewed educational software items. Each subscription includes a binder and a set of 21 index tabs by subject. *The Digest* is shifting to monthly publication to be more timely. The subscription price of *The Digest* is $147.50 per year, but some discounts might apply. For more information, write or call Simone Nelson, School and Home CourseWare Inc., 301 West Mesa, Fresno, CA 93704. 209-431-8300.

Reader Service ✔ 562

Geography

Geography USA is a five-level educational program that covers the 48 contiguous states. The program provides five full-screen color maps and displays a report card that analyzes your performance at the end of each section. According to its manufacturer, this program is suitable for students from the lowest grades to post-high school because of its multilevel structure. Level one is an introduction to maps and the names of states. Advanced students and adults will find more challenging levels that ask you to name a state's neighbors and its most important resource. Geography USA costs $19.95 for cassette or disk. It requires 16K and runs on the Color Computer and the MC-10. For more information, write or call Viking Inc., 910 Soo Blvd., Rice Lake, WI 54868. 715-234-2680.

Reader Service ✔ 559

VOPRAC

Equinox Software, makers of educational software, have announced VOPRAC, a program designed by a special education teacher. VOPRAC is a vocabulary program aimed at students who have exceptional difficulty in getting information from books, but who do much better when listening. The program comes with a ROM-pack speech synthesizer or is available without it if you already have one of the major brands.

VOPRAC consists of two programs, a demo tape, and a short game tape that might be a reward for successful practice. One program is designed to help you create practice tapes and has many options for formatting them. It prints vocabulary words on the screen while pronouncing, defining, and using them in sentences. It can also give a quiz on spelling and meaning. The student uses the second program to play the practice tapes. High-school students might use both programs as a study aid.

VOPRAC is available for 16K, Extended Color Basic CoCos from Equinox Software, Route 1, Box 191, Outlook, WA 98938. It costs $79.95 with speech synthesizer, which is also compatible with other commercial software. For more information, contact J.C. Welch at 509-837-4639.

Reader Service ✔ 560

PERRY COMPUTERS

Circle Reader Service card #124

COLOR COMPUTERS

CALL TOLL FREE 1-800-248-3823

COLOR COMPUTER, DISK DRIVE AND PRINTERS

	LIST PRICE	OUR PRICE
26-3136 16K Extended Color Computer 2	$ 139.95	$ 120.00
26-3127 64K Extended Color Computer 2	$ 199.95	$ 169.00
26-3029 Disk Drive 0 for Color Computer	$ 349.95	$ 295.00
26-1161 Disk Drive 1, 2, 3 for Color Computer	$ 279.95	$ 230.00
26-1276 DMP-105 80 cps Dot Matrix	$ 199.95	$ 169.00
26-1271 DMP-110 50/25 cps Triple Mode Printer	$ 399.95	$ 299.00
26-1255 DMP-120 120 cps Dual Mode Matrix	$ 499.95	$ 385.00
26-1257 DWP-210 14 cps Daisy Wheel Printer	$ 459.00	$ 485.00

COLOR COMPUTER SOFTWARE

	OUR PRICE
Telewriter 64 Tape	$ 49.95
Telewriter 64 Disk	$ 59.95
VIP Writer	$ 59.95
VIP Speller	$ 49.95
VIP Database	$ 59.95
VIP Terminal Disk	$ 49.95
TOM MIX Software	$ CALL
RADIO SHACK Software	15% Off

OTHER PRINTERS AND ACCESSORIES

	OUR PRICE
EPSON Printer	$ CALL
OKIDATA Printer	$ CALL
STARGEMINI 10X Printer	$ 275.00
COMREX CR-II Daisy Wheel Printer	$ 415.00
C.ITOH 8510 Prowriter Printer	$ 335.00
BOTEK Serial to Parallel Interface	$ 59.00

MONITORS

	OUR PRICE
COMREX 12" Green Monitor	$ 95.00
COMREX 12" Amber Monitor	$ 110.00
COMREX 13" Color Monitor	$ 285.00
AMDEK 300A Monitor	$ 155.00
VIDEO PLUS Monitor Adaptor	$ CALL
GORILLA Monitor	$ 85.00

COLOR ACCESSORIES

	LIST PRICE	OUR PRICE
26-2226 RS-232 Program Pak	$ 79.95	$ 68.00
26-3012 Deluxe Joystick (EACH)	$ 39.00	$ 34.00
26-3017 64K RAM Kit	$ 69.95	$ 59.00
26-3008 Joysticks	$ 24.95	$ 21.00
26-3016 Keyboard Kit	$ 39.95	$ 34.00
26-3018 Extended Basic Kit	$ 39.95	$ 34.00
26-1175 Direct-Connect Modem I	$ 99.95	$ 85.00
26-1173 Direct-Connect Modem II	$ 199.95	$ 169.00
Signalman Modem 300/1200 Baud	$ 399.00	$ 275.00
Hayes Modems		$ 215.00

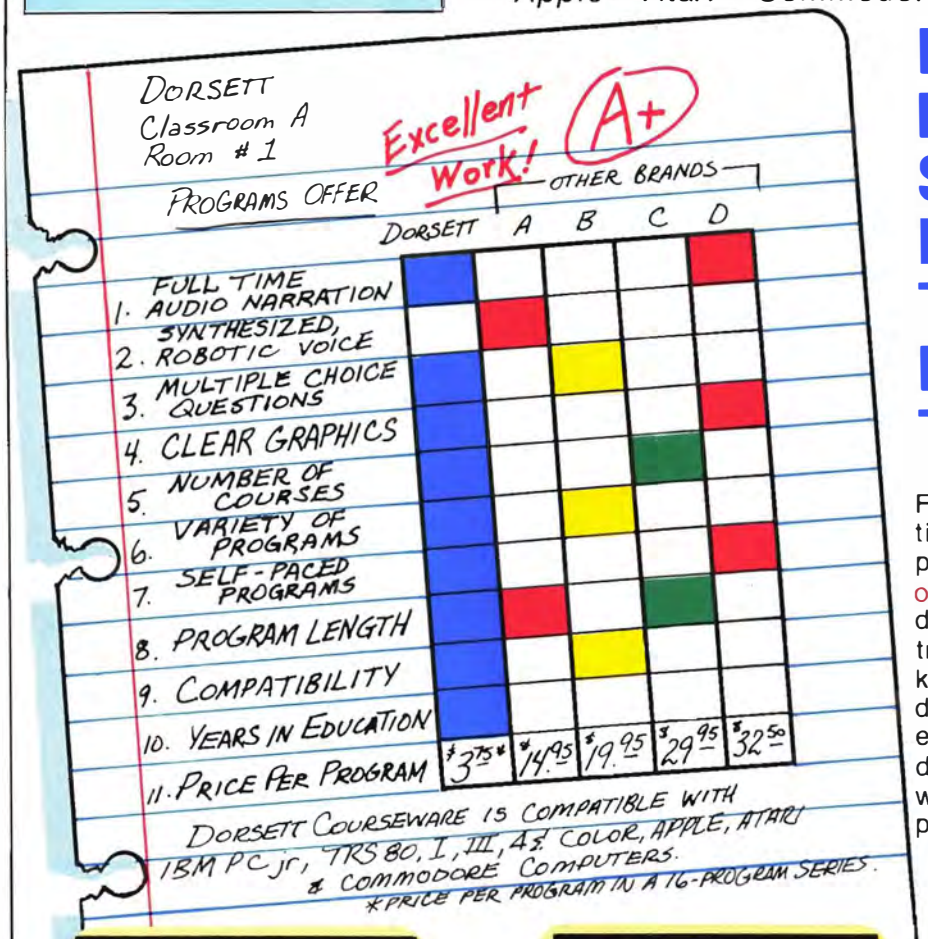
All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. For shipping, add 2% (minimum shipping charge $3.00). C.O.D. accepted. ($4.00 charge per carton on C.O.D. Call for further COD information.) M.C., Visa, AX, add 3%.

PERRY COMPUTERS • 137 NORTH MAIN STREET • PERRY, MI 48872

AVAILABLE NOW FOR **IBM PC Jr.**

For Your TRS-80 Color Computer

Apple • Atari • Commodore • TRS 80 I, III, 4 & Color



DORSETT EDUCATIONAL SOFTWARE PASSES THE COST-EFFICIENCY TEST!

For computer assisted instruction, our software more than passes the test...it EXCELS! With over 1000 educational programs* designed specifically to concentrate learning for all users, from kindergarten level to advanced individual studies, from slow learners to exceptionally bright students, you'll get positive results with our quality, economically-priced courseware.

** 500 Programs Available for TRS 80 Color. 400 for IBM PC Jr*

Interactive Tutorial Programs

Over 1000 Programs with Full Time Audio Narration, Pictures & Text!

We're Your Educational Software Source for Grades K-12 and Advanced Studies

Course	*No. of Programs*
Reading	256
Mathematics	128
Comprehension	48
History	32
Algebra	16
Spelling	16
Government	16

16 Programs in each of the following:
Children's Tales - Carpentry - Electronics -Health Services - Office Skills - Statistics - First Aid/Safety - Economics - Business - Accounting -Psychology - AND MANY MORE!

Dealer Inquiries Welcome

For your Atari 400/600/800/1200, you will need the Atari Cassette Recorder and the Dorsett 4001 Educational Master Cartridge, **$9.95.** For your Apple II, you will need the Dorsett M402 T/T plug-in board, **$99.00,** and the M401 stereo cassette player, **$79.00.** All programs listed are available for TRS 80 I, III, 4, which require the M203 speaker converter, **$99.00,** and 401 stereo cassette player, **$79.00.** For the PC Jr. a cassette adapter cable and a good cassette recorder is required. A Radio Shack CCR-81 or CCR-82 is recommended.
$59.00 for an album containing a 16-program course (8 cassettes with 2 programs) each at **$3.75** per program). **$8.60** for a 2-program cassette.

Send for a catalog of over 1000 programs for Atari, TRS 80, Apple, IBM PC Jr., Commodore, etc.

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

MasterCard VISA

Circle Reader Service card #209

Heat Up Your COCO

With J&M'S *Hot* Disk Controller

DRIVE 0 SYSTEM $289

Upgrade your COCO by adding J&M's famous disk controller, our advanced JDOS operating system, and a top quality drive all for only $289.

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

JFD-COCO DISK CONTROLLER $139

The J&M Systems' JFD-COCO Disk Controller has set new standards in performance and quality. Gold contacts assure reliability, built-in digital phase lock loop data separator means NO adjustments, and the JFD-COCO is plug compatible with both the original COCO and the new COCO-2.

JDOS

JDOS implements all RS DOS basic commands, plus many more, including auto line numbering, up and down arrow keys for scrolling, DOS to boot OS/9*, FLEX*, and error trapping. JDOS supports RS compatible disk formats, plus handles 40 track single side and double side drives.

DISK DRIVES

A drive is just a drive without a case. We manufacture our own high quality cases and TransPower power supplies. Gold contacts are brought out at the back for easy connection.

*MEMORY MINDER**

Memory Minder is a disk drive test program that makes the following major checks of your drives without disassembly or special test equipment: head alignment, disk speed, index hole timing, azimuth, hysteresis, read sensitivity, and clamping. Memory Minder can be used to actually align the drives while viewing the graphics on the screen. This program is a must for anyone who values the data that is saved on diskettes.

MM-COCO-1 Memory Minder for single side drives $79
MM-COCO-2 Memory Minder for double side drives $99

*FLEX is a registered trademark of Technical Systems Consultants, Inc.
*OS/9 is a registered trademark of Microware, 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 CENTRAL SE
ALBUQUERQUE, NEW MEXICO 87123
505/292-4182

We accept MasterCard and Visa
Circle Reader Service card #101