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# **WOT CoCo**

A CWC/I PUBLICATION  
**March 1985**  
USA \$2.95 CAN \$3.50

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

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Should Know**

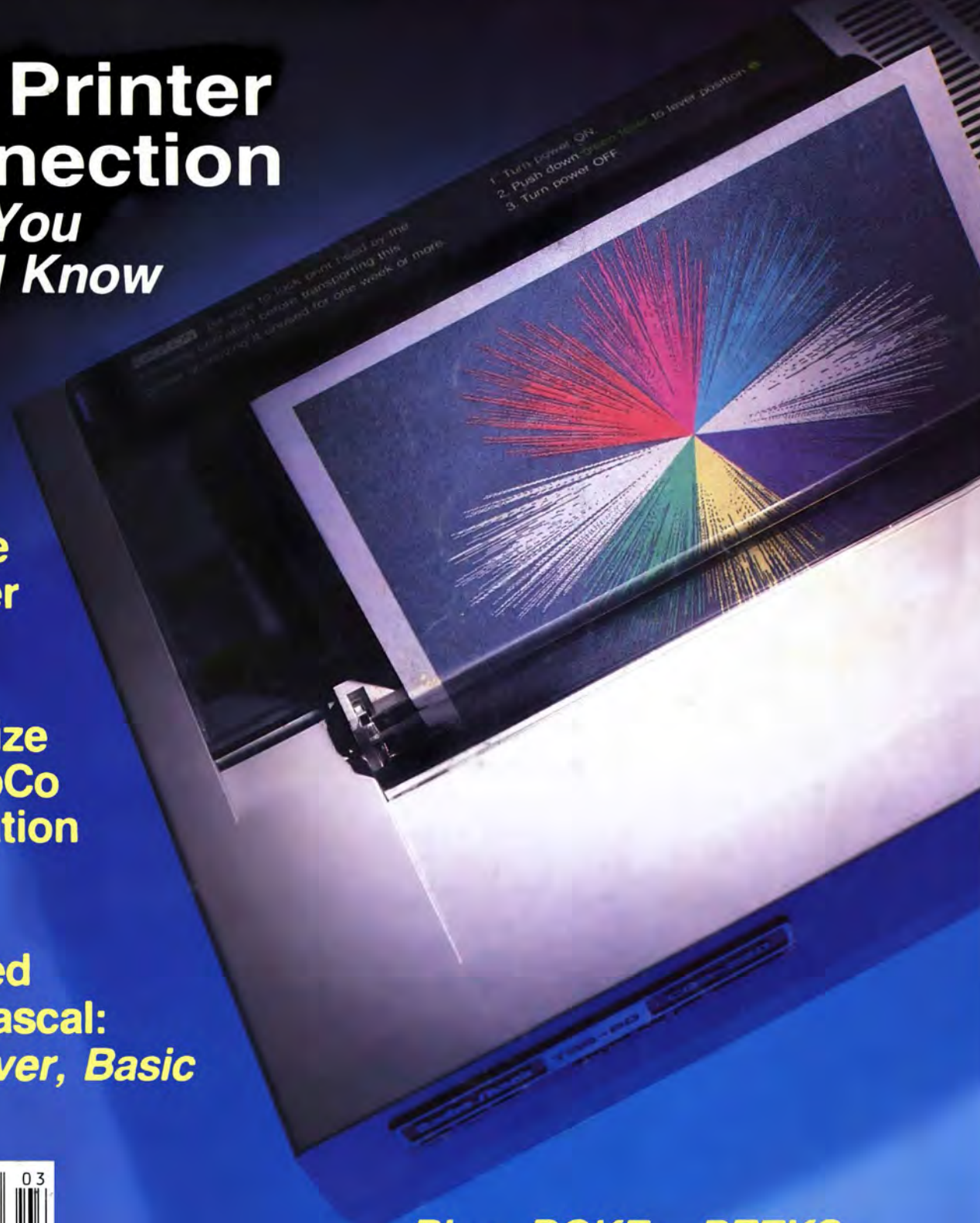
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**Article submissions** from our readers are welcomed and encouraged. Inquiries should be addressed to: *HOT CoCo* Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include an SASE for a copy of our writer's guidelines. Payment for accepted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








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 This symbol indicates the program's placement on the Instant CoCo loader, available on cassette. See our Instant CoCo ad for details.

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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.

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The ergonomically-superior HJL-57 has sculptured, low profile keycaps; and the three-color layout is identical to the original CoCo keyboard.

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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

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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.**

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# DIGRESSIONS

## The Success of Express Order

**T**andy/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 *MicroVerden*; Finland's *Mikro*; France's *Le Monde Informatique*, *Golden* (Apple) and *OPC* (IBM); Germany's *Computerwoche*, *Microcomputerwelt*, *PC Welt*, *Software Markt*, *CW Edition/Seminar*, *Computer Business* and *Commodore Magazine*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *Perso ComWorld*; Mexico's *Computerworld/Mexico* and *CompuMundo*; 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 con-

tains 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)



# Telewriter-64™

## the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
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- **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, Terminat, 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.

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# 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 above-mentioned 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.



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expert programmer write and improve their programs.

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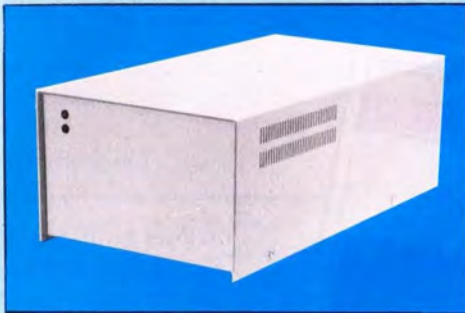


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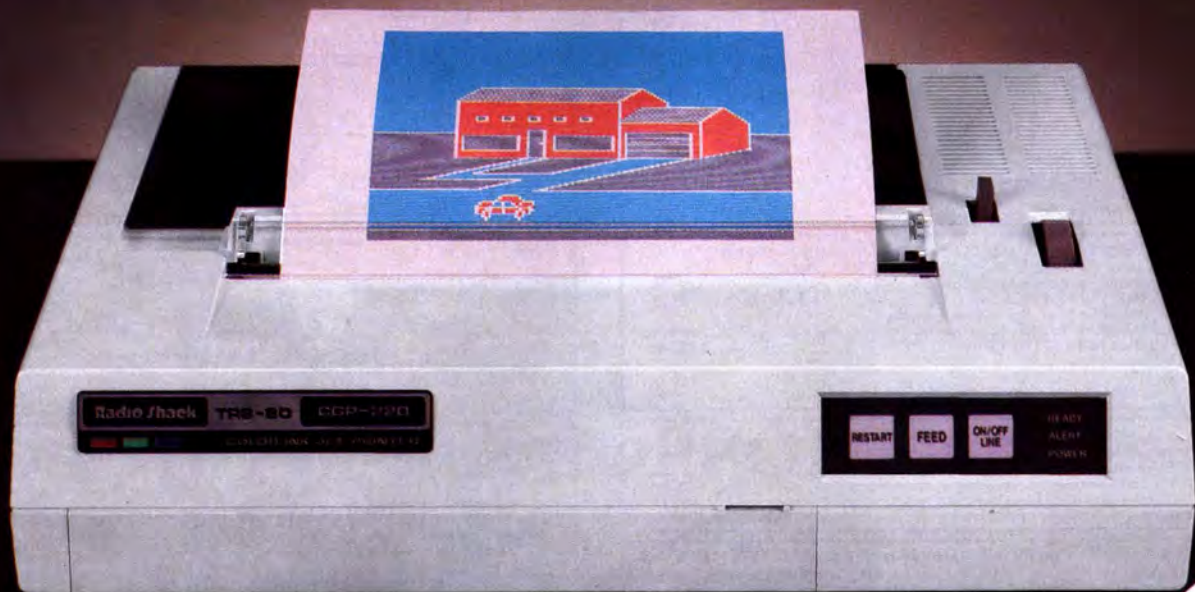
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# Letters to the Editor

## 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

```
10 CLS
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 AS=INKEYS;IF AS="" THEN80
90 A=VAL(AS);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 INKEYS=CHR$(32) THEN100
140 CLS3;GOTO120
150 CLS;PLAY"O1;L4;T50;V30;D;E;
F;G;E":GOTO120
160 CLS
170 IF JOYSTK(0)<16 THEN PRINT@22
4,"LEFT";:SOUND160,1;GOTO200
180 IF JOYSTK(0)>48 THEN PRINT@2
51,"RIGHT";:SOUND140,1;GOTO200
190 CLS
200 IF JOYSTK(1)<16 THEN PRINT@1
5,"UP";:SOUND180,1;GOTO160
210 IF JOYSTK(1)>48 THEN PRINT@49
4,"DOWN";:SOUND20,1;GOTO160
220 IF INKEYS=CHR$(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 INKEYS=CHR$(32) THEN10
320 GOTO 270
```

*Program Listing 1. Simple Joystick Test*

of SOUND XXX,X. Use the space bar to return to the menu from each section.

*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 IS=INKEY:IF IS="" 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)+
FIS(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 Computeware every day with pleasure. I wish the buffer were larger than 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$(1000)
),T(1000)
20 X=1:CLS: INPUT"MAX NO CHARACTER
RS PER LINE =";Y:CLS: IF Y<0 THE
NY=64
30 POKE65495,0: PRINT@0,K+T(X)"/"
Y-K-T(X);: PRINT@23,"LINE"X;
40 PRINT@33,"TAB='_'
    REPEAT='^';
50 IFK=0THENPRINT@(96+T(X)),CHR$(
207)
60 QS=INKEY$: IF QS="" THEN60
70 IF QS=CHR$(9)THEN 60
80 IF QS=CHR$(94)THEN280
90 IF QS=CHR$(95)THEN290
100 IF QS=CHR$(13)THEN230
110 AS=QS
120 V=ASC(AS): IF V>96ANDV<123THE
NV=V-32:GOTO140
130 IFV<91ANDV>64THENV=V+32
140 PRINT@(96+K+T(X)),CHR$(V);CH
R$(207)
150 K=K+1: IF K>Y-4 AND K<Y-1 THE
NSOUND200,1
160 IF AS=CHR$(8)ANDK<2THENA$=""
:K=K-1:GOTO30
170 IF AS=CHR$(8)THENGOSUB240:K=
K-2
180 IF K+T(X)<0 THENK=0:AS=""
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$=B$+AS:GOTO30
230 POKE65494,0:CLS:PRINT#-2,TAB
(T(X));B$:C$(X)=B$:X=X+1:B$="" :Q
S="" :T(X)=0:K=0:GOTO30
240 N$=LEFT$(B$,K-2)
250 B$=N$:AS="" :RETURN
260 N$=LEFT$(B$,K)
270 B$=N$:AS="" :RETURN
280 POKE65494,0:FORZ=1TOX-1:PRIN
T#-2,TAB(T(Z));C$(Z):NEXT:QS="" :
GOTO30
290 IF K>0THEN30
300 PRINT@294,"":INPUT"ENTER TAB
POSITION";T(X):QS="" :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	#Mem- bers	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. Box 4214	Toms River	08753	8	Y	Y	Mickey Zsoldos, Jr. Ron Fish	518-465-9793
NY	Adirondack CoCo Club, Albany Chap.		Albany	12204		Y	Y		
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		

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# The Basic Beat

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

## RAZZLE- DAZZLE VIDEO

by James W. Wood

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 pizzazz 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-

### System Requirements

4K RAM  
Color Basic

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

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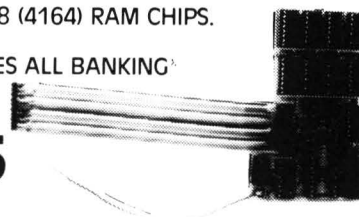
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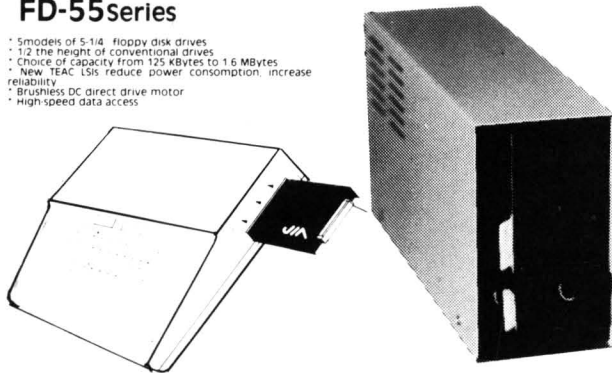
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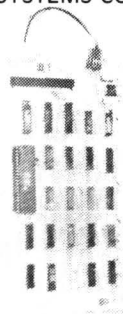


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# The Basic Beat

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 CLEAR6000
10 FOR A=1 TO 255
20 A$=A$+CHR$(191)
30 NEXT A
40 INPUT"LENGTH OF RED (1 TO 255)";L
50 PRINTLEFTS(A$,L)
60 GOTO40
```

## Program Listing 4

```
10 A$="CALIFORNIA"
20 PRINTLEFTS(A$,3)
30 PRINTRIGHTS(A$,5)
40 PRINTMIDS(A$,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 PRINTMIDS(A$,A,1);
60 FORB=1 TO 70:NEXT B,A
```

## Program Listing 6

```
5 CLEAR4000
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 PRINTCS(RND(8));:GOTO50
```

## Program Listing 7

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

## Program Listing 8

```
10 CLS:CLEAR5000
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 FBS=A$+F$+A$:LBS=A$+L$+A$
70 FORA=1TO42
80 SOUND RND(200),1
90 PRINT@160,MIDS(FBS,A,32);
100 PRINT@192,MIDS(LBS,43-A,32);
110 NEXT A:GOTO70
```

## Program Listing 9

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

## Program Listing 10

```
5 CLEAR 8000
10 CLS0
20 FORA=1TO224
30 A$=A$+CHR$(127+16*RND(8))
40 NEXTA
50 FORB=1TO223
60 PRINT@0,MIDS(A$,B,224-B)+MIDS
(A$,1,B);
65 PRINT@224,MIDS(A$,B,224-B)+MI
DS(A$,1,B);
70 NEXT B
80 GOTO50
```

## Program Listing 11

```
10 CLS0:CLEAR5000
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$;
90 FORA=1TO128
100 PRINT@416,MIDS(A$,A,32);
105 NEXTA
110 GOTO90
```

## Program Listing 12

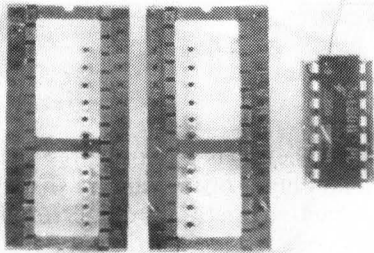
```
1 CLEAR5000
5 S(1)=1:S(2)=2:S(3)=3:S(4)=5
6 S(5)=7:S(6)=10:S(7)=11:S(8)=15

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$;
90 FORA=1TO128
100 PRINT@416,MIDS(A$,A,32);
105 NEXTA
110 GOTO90
```

END

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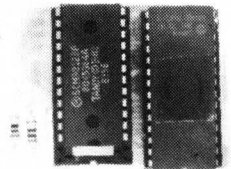
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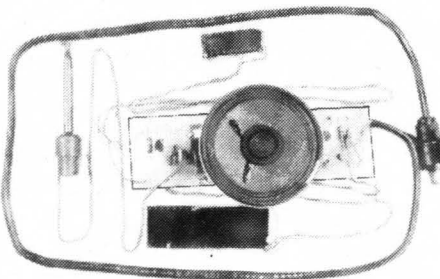
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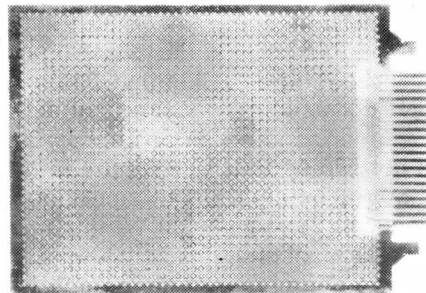
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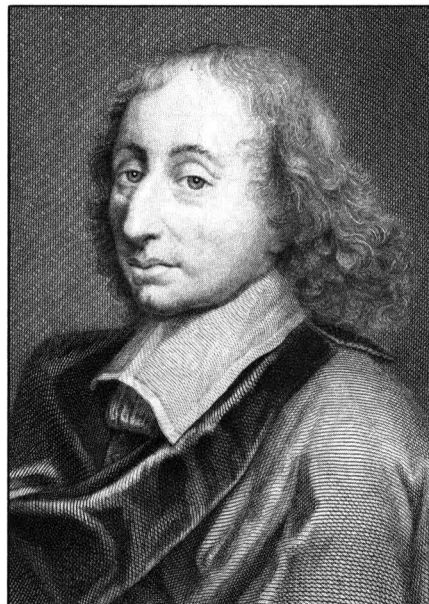
	ease of use	documentation	performance	error handling
10				
9				
8				
7				
6				
5				
4				
3				
2				
1				

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**DEFT Bench (v. 3.3)**  
**DEFT Pascal Workbench (v. 3.4)**  
**DEFT Systems Inc.**  
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**9815 Main Street**  
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**DEFT Pascal Workbench: \$119.95**

Man-**M**ankind 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.

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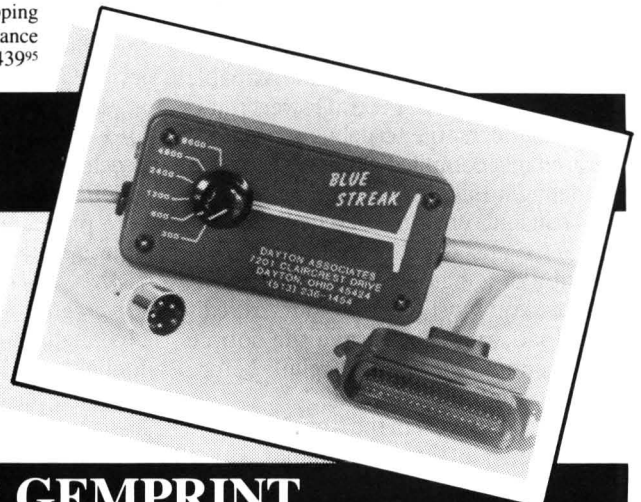
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The output of the linker is the final product of the compilation process—a stand-alone, binary-load module called into service by the usual LOADM and EXEC commands. The DEFT compiler is not present in RAM when you run the final program.

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 capability. 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), Rodney 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. ■



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### SYSTEM REQUIREMENTS:

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

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

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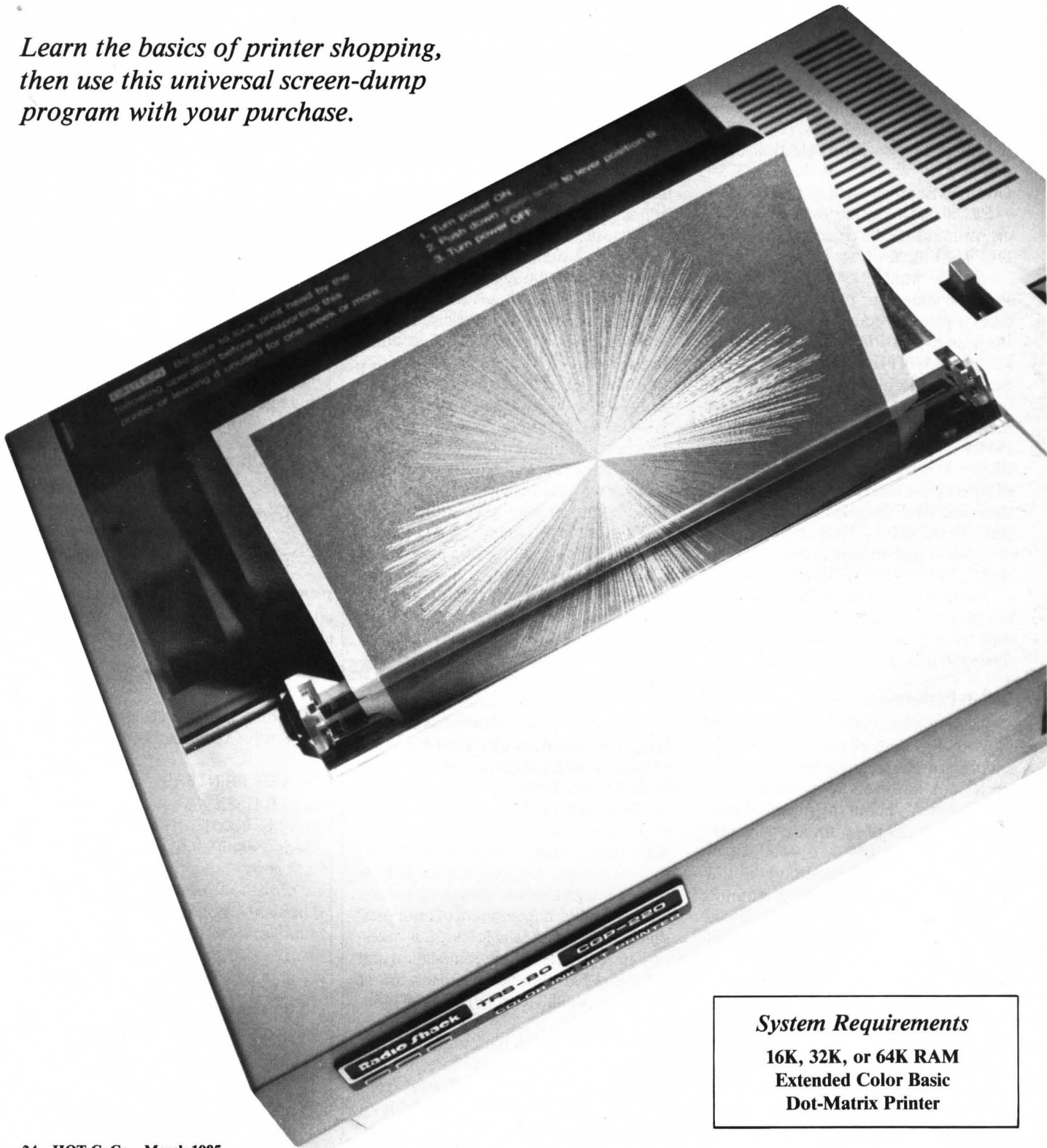
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# Printer Answers

*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



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 con-

trolled 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.

### 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.

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Dayton Associates Inc.  
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Dayton, OH 45424  
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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

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 known 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?) 27 75 112 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 re-

quires 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 Sohag Lane, Columbia, MD 21045.*

Program Listing 1. VersaDump Screen-Print Generator

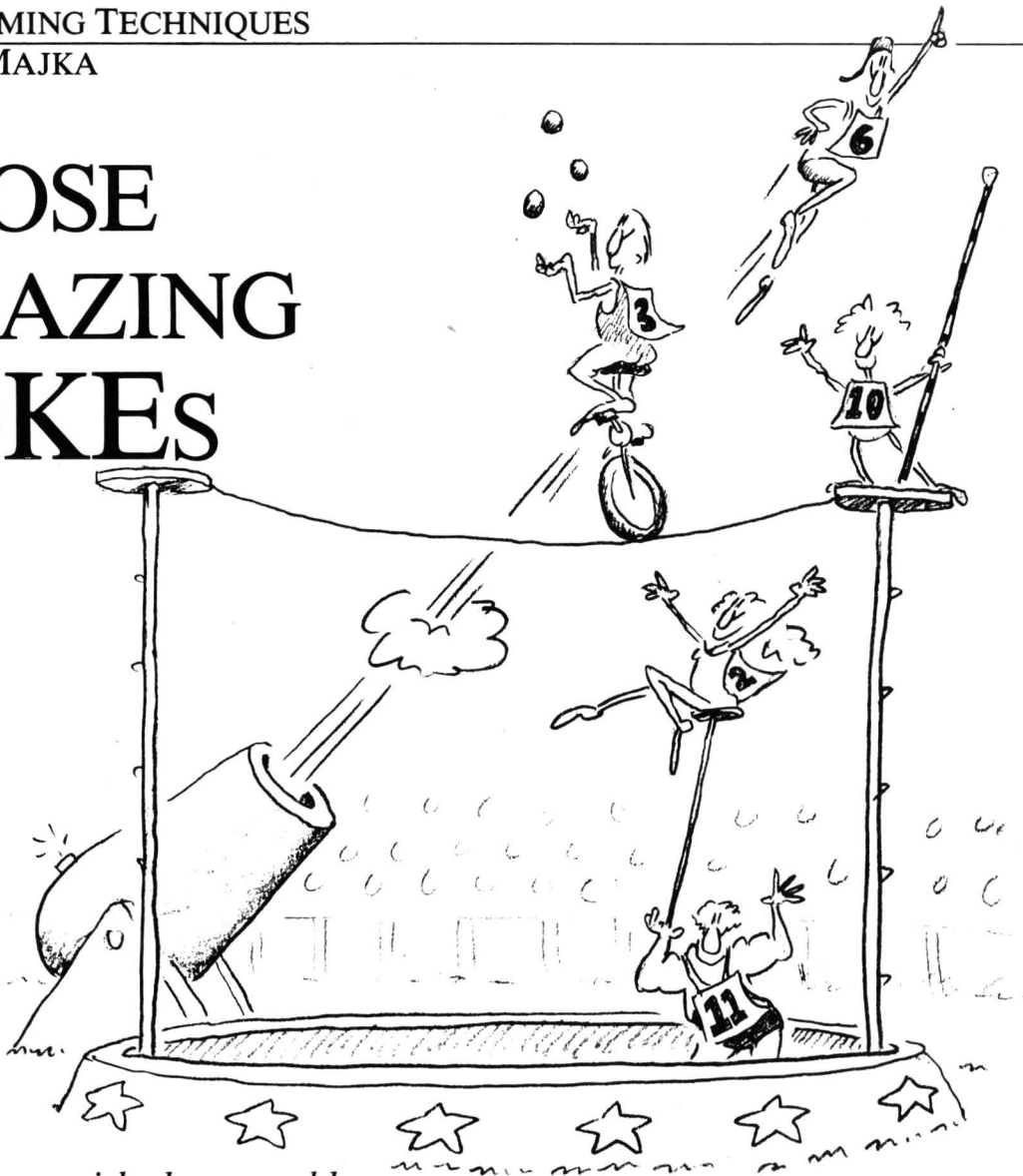
```

1 PRINT@0,STRINGS(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,STRINGS(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";TDS
430 IF TDS="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

# 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

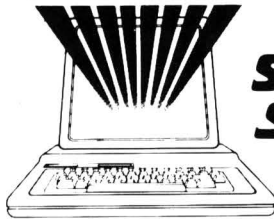
value of bit 6) and one (the position value of bit 0), which yields 65, the number POKEd.

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

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

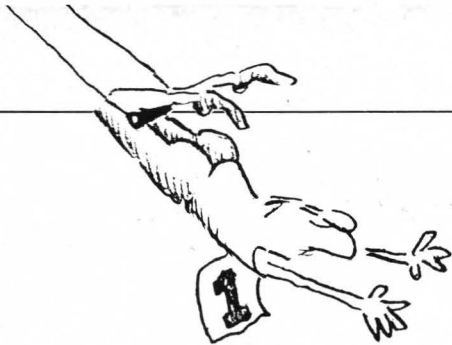


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Sometimes it is useful to know what value a byte contains. The PEEK function can accomplish this. Its format is PEEK (L) where L is any memory location. When this function is used, it returns the contents of the specified byte in decimal. If you must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

### 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 CoCo. 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-

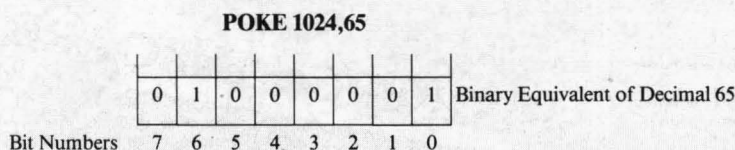


Fig. 1. A Byte of Memory

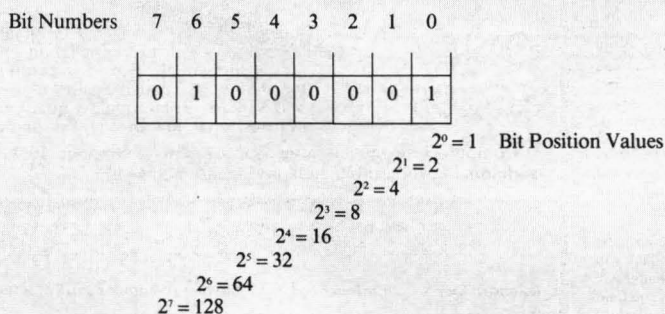


Fig. 2. Bit Position Values

#### 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





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

#### 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

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

3584,0:NEW.

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.

#### 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 Com-

puter 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.

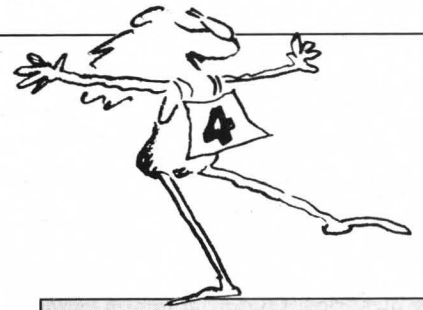
If you want to print out a disk directory on your printer, POKE111, 254: DIR produces a hardcopy of the contents of any disk.

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*

```
1Ø PMODE 4,1:SCREEN1,1:PCLS
2Ø FOR X= 1 TO 255
3Ø CIRCLE(128,96),5Ø,5
4Ø POKE 178,X
5Ø PAINT(128,96),,5
6Ø PCLS:NEXT
```

*Program Listing 2.  
179 POKE Demonstration Program*

```
1Ø PMODE 4,1:SCREEN1,1:PCLS
2Ø FOR X= 1 TO 255
3Ø POKE 179,X
4Ø PCLS
5Ø FOR T= 1 TO 2ØØ:NEXT T,X
```



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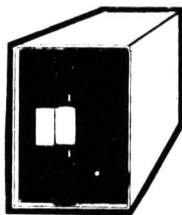
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- Directives:** ORG, REM OR', END, DIM, END, BASE, RAM, ON/OFF, RAM64K, HIRE, GENERATE, DPSET, STACK
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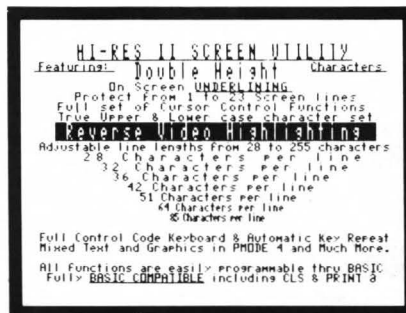
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Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	No	Yes
Solid or Blinking Cursor	Yes	Yes	Yes
CLS command supported	Buff/Black	Buff/Black	Buff/Black
XY Coordinate Cursor	Yes	Yes	No
Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous	Yes	Yes	No
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	Yes	No	No
Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85	Yes	No	No
Characters per line display (programmable)	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	Yes	No	No
Spacing	Yes	No	No
Full Screen Reverse Function Switch to & from the Standard	Yes	Yes	No
16 by 32 Screen for full compatibility	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program's RAM Required in addition to Screen RAM	Yes	Yes	Yes
Screen RAM	2K	2K	2K
Program Price (Tape)	\$24.95	\$19.95	\$29.95



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# Colorful Cap'n Chemistry

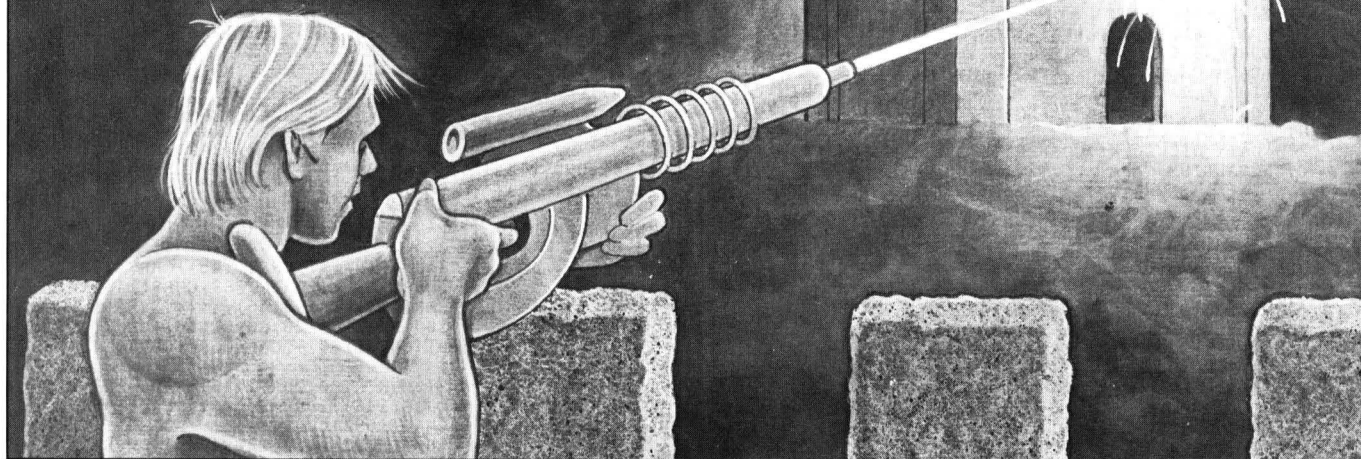


Illustration by Richard Cowdrey

*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

```
1Ø CLS: CLEAR2ØØ: DIMES(5Ø), SØ(5Ø),  
JW(5Ø)  
2Ø FORA=1TO7: READ CØ(A), ICØ(A): N  
EXTA  
3Ø DATA QUIT CHEATING, HA HA, PUT  
THE CHART AWAY, BAD GUESS, SHOW OF  
F, SORRY, GOOD GUESS, EVIL LIKED TH  
AT  
4Ø DATA CAPTAIN IS PROUD, TRY HAR  
DER, YEA TEAM, BOO HISS, GOOD SHOW,  
STUDY MUCH?  
5Ø C(1)=4: C(2)=5: C(3)=3  
6Ø FORA=1TO25: BLS=BLS+CHRØ(128):  
NEXTA  
7Ø FORA=1TO8: RØ=RØ+CHRØ(191): NEX  
TA: LØ=CHRØ(175)+CHRØ(17Ø)+CHRØ(1  
65)+CHRØ(175)  
8Ø PRINTTAB(4)"HELP CAPTAIN CHEM  
ISTRY"  
9Ø PRINTTAB(3)"BATTLE THE FORCES  
OF THE"  
1ØØ PRINTTAB(8)"EVIL ELEMENTS."  
11Ø PRINT: PRINT" YOU ARE TO GIV  
E THE CORRECT"  
12Ø PRINT"SYMBOL FOR EACH ELEMEN  
T NAMED."  
13Ø PRINT"(USE ALL CAPITOL LETTE  
RS.)  
14Ø PRINT"CORRECT ANSWERS STRENG  
THEN THE"
```

Listing continued

```

15# PRINT"CAPTAIN'S DESTRUCTO RA
Y.
16# PRINT"INCORRECT ANSWERS HELP
THE"
17# PRINT"EVIL SIDE OF THE ELEME
NTS."
18# PRINT:PRINT"DON'T LET CAPTAIN
N CHEMISTRY BE"
19# PRINT"DESTROYED BY EVIL ELEM
ENTS."
20# PRINT:INPUT"PRESS <ENTER> TO
CONTINUE.";ENS
21# CLS3:FORA=1TO5#;READ E$(A),S
$(A):NEXTA
22# DATA HYDROGEN,H,HELIUM,HE,LI
THIUM,LI,BERYLLIUM,BE
23# DATA BORON,B,CARBON,C,NITROG
EN,N,OXYGEN,O
24# DATA FLUORINE,F,NEON,NE,SODI
UM,NA,MAGNESIUM,MG
25# DATA ALUMINUM,AL,SILICON,SI,
PHOSPHORUS,P,SULPHUR,S
26# DATA CHLORINE,CL,ARGON,AR,PO
TASSIUM,K,CALCIUM,CA
27# DATA CHROMIUM,CR,MANGANESE,M
N,IRON,FE,COBALT,CO
28# DATA NICKEL,NI,COPPER,CU,ZIN
C,ZN,GALLIUM,GA
29# DATA GERMANIUM,GE,ARSENIC,AS
,SELENIUM,SE,BROMINE,BR
30# DATA KRYPTON,KR,RUBIDIUM,RB,
STRONTIUM,SR,SILVER,AG
31# DATA TIN,SN,ANTIMONY,SB,IODI
NE,I,XENON,XE
32# DATA CESIUM,CS,BARIUM,BA,PLA
TINUM,PT,GOLD,AU
33# DATA MERCURY,HG,LEAD,PB,RADO
N,RN,FRANCIUM,FR
34# DATA RADIUM,RA,URANIUM,U
35# CLS#
36# PRINT@32,CHR$(145)+CHR$(145)
;:PRINT@64,CHR$(149)+CHR$(159)+C
HR$(163);
37# PRINT@96,CHR$(149)+CHR$(151)
;:PRINT @128,CHR$(148)+CHR$(156)
;
38# PRINT@29,CHR$(178)+CHR$(178)
+CHR$(178);:PRINT@61,CHR$(191)+C
HR$(189)+CHR$(186);
39# PRINT@92,CHR$(163)+CHR$(191)
+CHR$(19#)+CHR$(186);
40# PRINT@125,CHR$(191)+CHR$(189)
+CHR$(186);
41# PRINT@157,CHR$(188)+CHR$(188)
+CHR$(184);
42# PRINT@16#,"CAPTAIN ";:PRI
NT@192,"CHEMISTRY'S";:PRINT@224,
"CASTLE ";
43# PRINT@183,"EVIL ";:PRINT
@215,"ELEMENT'S";:PRINT@247,"EMP
IRE ";
44# PRINT@29#,"WHAT IS THE SYMBO
L FOR---";
45# R=RND(5#):IF JW(R)=1 THEN 45
#
46# PRINT@354,BL$;:PRINT@374,LEF
T$(BL$,1#);
47# PRINT@418,BL$;:PRINT@48# ,BL$
;
48# PRINT@354,E$(R);:PRINT@374,"
";:INPUTANS
49# IF AN$=S$(R) THEN JW(R)=1:GO
TO5#
492 GOTO 53#
50# NC=NC+1:FORA=1TO3:SOUND15# ,1
:FORB=6 TO 6+NC:SET(B,5,C(A)):NE
XTB:FORB=6 TO 6+NC:RESET(B,5):NE
XTB:NEXTA
51# PRINT@418,C$(RND(7));
52# IF NC=5# THEN 6#
525 GOTO56#
53# NI=NI+2:SOUND3# ,3:FORA=55TO5
5-NI STEP-1:SET(A,5,2):NEXTA:FOR
A=55TO 55-NI STEP-1:RESET(A,5):N
EXTA
54# IF NI=5# THEN 77#
55# PRINT@418,IC$(RND(7))+". IT'
S "+S$(R)+" ";
56# PRINT@48#,"PRESS <ENTER> TO
CONTINUE";
57# IN$=INKEY$
58# A$=INKEY$:IF A$="" THEN58#
59# IFASC(A$)=13 THEN 45#
595 GOTO58#
60# CLS# :PRINT@11# ,CHR$(147)+CHR
$(147)+CHR$(147)+CHR$(147);
61# PRINT@141,CHR$(148)+CHR$(159
)+CHR$(168)+CHR$(168)+CHR$(159)+
CHR$(152);
62# PRINT@174,CHR$(159)+CHR$(159)
+CHR$(159)+CHR$(159);:PRINT@2#7
,CHR$(149)+CHR$(154);
63# PRINT@236,R$;:PRINT@268,CHR$(
191)+CHR$(128)+LEFT$(R$,4)+CHR$(
128)+CHR$(191);
64# PRINT@3#0# ,CHR$(191)+CHR$(128
)+LEFT$(R$,4)+CHR$(128)+CHR$(191
);
65# PRINT@332,CHR$(158)+CHR$(128
)+LEFT$(R$,4)+CHR$(128)+CHR$(157
);
66# PRINT@366,CHR$(175)+CHR$(175)
+CHR$(175)+CHR$(175);
67# PRINT@398,L$;:PRINT@43# ,L$;:
PRINT@462,L$;
68# PRINT@493,CHR$(179)+CHR$(183
)+CHR$(128)+CHR$(128)+CHR$(187)+
CHR$(179);
69# PRINT@36,"YOU HAVE EARNED YO
UR CAPE":FORT=1TO3# :NEXTT
70# FORA=14TO2# :SET(37-A,A,4):NE
XTA
71# SET(17,21,4):SET(17,22,4)
72# FORA=16TO27:SET(A,23,4):NEXT
A
73# FORA=36TO47:SET(A,23,4):NEXT
A
74# SET(46,22,4):SET(46,21,4)
75# FORA=2#0TO14STEP-1:SET(A+26,A
,4):NEXTA
76# GOTO78#
77# FORA=8 TO # STEP-1:SOUND2# ,1
:CLS(A):NEXTA:PRINT@196,"YOU LET
THE CAPTAIN DOWN"
78# PRINT"TRY AGAIN (Y/N)?"
79# A$=INKEY$:IF A$="Y" THEN RUN
795 IF A$="N" THEN END
80# GOTO 79#

```

## Program Listing 2. Stable Valence

```

1# CLS3:CLEAR2# :DIM E$(5#),V$(5
#),JW(5#)
2# FORA=1TO32:BL$=BL$+CHR$(128):
NEXTA
3# FORA=1TO5#;READ E$(A),V$(A):N
EXTA
4# PRINT:PRINTTAB(6)***VALENCE T
IME***
5# PRINT" GIVE THE MOST STABLE
VALENCE":PRINT"FOR EACH ELEMENT
NAMED."
6# PRINT"DON'T FORGET TO USE A N
EGATIVE":PRINT"SIGN FOR NEGATIVE
ANSWERS."
7# PRINT:PRINT"YOU WANT THE LINE
REPRESENTING":PRINT"CORRECT ANS
WERS TO REACH IT'S":PRINT"PLASK
FIRST!!"
8# PRINT:PRINT"PRESS <ENTER> TO
CONTINUE"
9# IN$=INKEY$
10# A$=INKEY$:IF A$="" THEN1#
105 IF ASC(A$)=13 THEN 11#
107 GOTO 1#
11# CLS
12# IN$=INKEY$
13# PRINT:PRINT"DIFFICULTY (E)A
SY, (M)EDIUM, (H)ARD, (I)MPO
SSIBLE";
14# D$=INKEY$:IF D$="" THEN14#
15# IF D$="E" THEN D=153:GOTO2#
16# IF D$="M" THEN D=146:GOTO 2#
17# IF D$="H" THEN D=139:GOTO 2#

```

```

18# IF D$="I" THEN D=132:GOTO2#
19# GOTO13#
20# DATA HYDROGEN,1,HELIUM,#,LIT
HIUM,1,BERYLLIUM,2
21# DATA BORON,3,CARBON,-4,NITRO
GEN,-3,OXYGEN,-2
22# DATA FLUORINE,-1,NEON,#,SODI
UM,1,MAGNESIUM,2
23# DATA ALUMINUM,3,SILICON,4,PH
OSPHORUS,5,SULFUR,6
24# DATA CHLORINE,-1,ARGON,#,POT
ASSIUM,1,CALCIUM,2
25# DATA CHROMIUM,3,MANGANESE,2,
IRON,3,COBALT,2
26# DATANICKEL,2,COPPER,2,ZINC,2
,GALLIUM,3
27# DATA GERMANIUM,4,ARSENIC,-3,
SELENIUM,4,BROMINE,-1
28# DATA KRYPTON,#,RUBIDIUM,1,ST
RONTIUM,2,SILVER,1
29# DATA TIN,4,ANTIMONY,-3,IODIN
E,-1,XENON,#
30# DATACESIUM,1,BARIUM,2,PLATIN
UM,4,GOLD,3
31# DATA MERCURY,2,LEAD,2,RADON,
#,FRANCIUM,1
32# DATA RADIUM,2,URANIUM,6
33# CLS# :PRINT@9,***VALENCE GAME
***;:PRINT@32,"CORRECT";:PRINT@9
6,"INCORRECT";
34# PRINT@257,"WHAT IS THE VALEN
CE OF---";
35# PRINT@57,CHR$(145)+CHR$(147)
+CHR$(146);:PRINT@89,CHR$(145)+C
HR$(159)+CHR$(146);
36# PRINT @12#,CHR$(145)+CHR$(15
9)+CHR$(159)+CHR$(159)+CHR$(146)
;
37# PRINT@D,CHR$(145)+CHR$(147)+
CHR$(146);:PRINT@D+32,CHR$(145)+
CHR$(159)+CHR$(146);
38# PRINT@D+63,CHR$(145)+CHR$(15
9)+CHR$(159)+CHR$(159)+CHR$(146)
;
39# R=RND(5#):IF JW(R)=1 THEN39#
40# PRINT@325,BL$;:PRINT@345,LEF
T$(BL$,7);
41# PRINT@324,E$(R);
42# PRINT@345,"";:INPUT AN$
43# IF AN$<V$(R) THEN NI=NI+1:G
OTO 432
431 GOTO 435
432 IF POINT(NI+1,11)<># THEN48#
434 SET(NI,1# ,8):GOTO45#
435 NC=NC+1
44# IF NC=5# THEN 5#
445 SET(NC,4,3):JW(R)=1:PRINT@38
8,"CORRECT";:GOTO46#
45# PRINT@388,"INCORRECT, IT IS
";V$(R);
46# PRINT@449,"PRESS <ENTER> TO
CONTINUE";:INPUT E$
47# PRINT@388,BL$;:PRINT@449,BL$
;:GOTO39#
48# 'LOSE
49# CLS:FORA=1TO1# :CLS(RND(9)-1)
:SOUNDRND(1#),1:NEXTA:CLS:PRINT
:PRINT"SORRY":PRINT"THE VALENCE
GAME DESTROYED YOU":GOTO58#
50# 'WIN
51# FORB=1TO3:FORA=-1TO6
52# PRINT@57,CHR$(145+16*A)+CHR$(
147+16*A)+CHR$(146+16*A);
53# PRINT@89,CHR$(145+16*A)+CHR$(
159+16*A)+CHR$(146+16*A);
54# PRINT@12#,CHR$(145+16*A)+CHR
$(159+16*A)+CHR$(159+16*A)+CHR$(
159+16*A)+CHR$(146+16*A);
55# SOUNDRND(1#)+1# ,1
56# NEXTA,B
57# CLS:PRINT:PRINT"YOU ARE NOW
A VALENCE PERSON"
58# PRINT:PRINT"PLAY AGAIN? (Y/N
)
59# IN$=INKEY$:IF IN$="Y" THEN RU
N
595 IF IN$="N" THEN END
60# GOTO 59#

```

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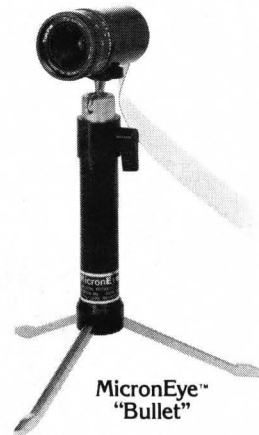
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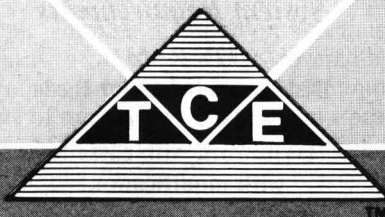
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# EXPENSE REPORTS MADE EASY

*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 ac-

count 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 EXPREPT.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
DS\$(X)	Date of a transportation item
DES\$(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
SAS	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

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						Total Billable Expenses: \$394.10
5. T. ROWE - DIR. OF P.R.						Cash Advance: \$0.00
6. M. JONES - RETIREMENT PARTY						Reimbursement Due Me: \$153.55
7. E. ROSS - DIR. CONSUMER AFFAIRS						BILL WILLIMATIC COMPANY: \$211.70
						BILL FORMATH CORPORATION: \$182.40
KEY: c=cash; n=non-billable; s=billable to secondary account; Number=comment.						

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.

### 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

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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 non-billable, 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

```

20 REM ** PROVIDES A FORMATTED P
RINTOUT OF A 1-5 DAY EXPENSE REP
ORT.
30 CLEAR1000
40 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$(
3),DES(3),COS(12)
50 CLS:PRINT@232,"INITIALIZING..
..":GOSUB1000:"INITIALIZATION.
60 CLS:PRINT@11,"MAIN MENU":PRI
NT:PRINT@71,"<I> INPUT DATA":PRI
NT:PRINT@135,"<C> CHANGE DATA":P
RINT:PRINT@199,"<S> SAVE TO DISK
"
70 PRINT@263,"<L> LOAD FROM DISK
":PRINT@327,"<P> PRINT REPORT":P
RINT@391,"<E> EXIT PROGRAM":PRIN
T@451,"YOUR CHOICE-I-C-S-L-P-E--
>"
80 X$=INKEY$:IF X$="" THEN 80
90 CLS:ON INSTR("ICSLPE",X$) GOT
O110,140,730,770,370,410
100 PRINT "INVALID ENTRY" PLEAS
E REDO.":SOUND 100,5:FOR X=1TO10
00:NEXT X:GOTO60
110 GOSUB2000:"INPUT DAILY DATA
120 GOSUB3000:"DO ALL HORIZONTAL
TOTALS.
130 GOSUB4000:"DO ALL VERTICAL T
OTALS.
140 IN=14:"THE PARAMETER "IN" IS
AN INPUT TO THE SUBROUTINE. IF
IS USED TO TOTAL ROW 14 TO GET A
TOTAL OF THE DAILY TOTALS.
150 GOSUB3500:"DO ROW 14 TOTAL.
160 GOSUB4600:"INPUT TRANSPORTAT
ION DATA.
170 CLS:PRINT"TOTAL DAILY EXPENS
E IS:":PRINTUSING"$$$###.##":XP
(14,6):PRINT
180 PRINT"TOTAL TRANSPORTATION E
XPENSE IS ":PRINTUSING"$$$###.##
":TC:PRINT
190 GT=XP(14,6)+TC:PRINT"GRAND T
OTAL EXP. IS ":PRINTUSING"$$$###
.##":GT
200 GOSUB6500:"GET TOTAL NON-BIL
LABLE EXPENSES.
210 PRINT:INPUT"HOTEL BILLED DIR
ECT":HD
220 IF SA$="Y" THEN GOSUB7000:"G
ET SECONDARY ACCOUNT TOTAL.
230 TB=GT-NB-HD
240 PRINT:PRINT"TOTAL BILLABLE E
XP. IS ":PRINTUSING"$$$###.##":
TB:PRINT
250 GOSUB6000:"GET TOTAL CASH EX
PENDED.
260 AD=0:INPUT"AMOUNT OF CASH AD
VANCE":AD
270 RE=CA-AD
280 PRINT:PRINT:IF RE>=0 THEN PR
INT"REIMBURSEMENT DUE ME IS:
":PRINTUSING"$$$###.##":RE
290 IF RE<0 THEN PRINT"REIMBURSE
MENT DUE COMPANY IS:":PRINTUSI
NG"$$$###.##":ABS(RE)
300 PRINT"TOTAL NON-BILLABLE EXP
ENSE IS:":PRINTUSING"$$$###.##
":NB
310 B1=TB-B2
320 PRINT"TOTAL TO BE BILLED TO
"B1$" IS:":PRINTUSING"$$$###.##
":B1
330 IF SA$="Y" THEN PRINT"TOTAL
TO BE BILLED TO "B2$" IS:":PRI
NTUSING"$$$###.##":B2
340 PRINT:PRINT "TO CONTINUE, P
RESS ANY KEY."

```

*Listing continued*

## DISKETTES AND 680X SOFTWARE

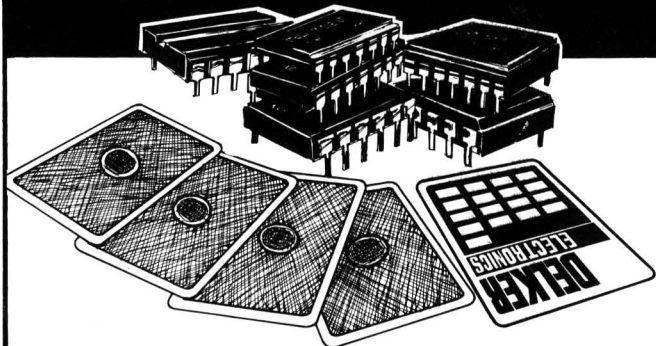
- SUPER SLEUTH DISASSEMBLER** EACH \$99-FLEX, \$101-OS-9  
interactively generates source on disk with labels, includes xref  
specify 6800,1,2,3,5,8,9/6502 version or Z-80/8080/85 version  
OS-9 version also processes FLEX object file format  
**OBJECT-ONLY versions:** EACH \$50-FLEX & OS-9, \$49-COCO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

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# HOT CoCo

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

Listing continued

```
350 XS=INKEY$:IF X$="" THEN 350
360 GOTO60
370 IF N=0 THEN PRINT@230,"NO DA
TA IN COMPUTER!":SOUND 100,5:FOR
X=1TOL000:NEXT X:GOTO60
380 IF PEEK(65314)=4 THEN GOSUB8
000 ELSE GOTO400:IF PRINTER IS
READY, GET PRINTOUT OF EXPENSE R
EPORT.
390 GOTO60
400 CLS:PRINT@5,"PRINTER IS NOT
READY!":SOUND 100,5:FOR X=1TOL00
0:NEXT X:GOTO60
410 END
570 '
580 'RECALCULATE AFTER CHANGING
DATA.
590 '
600 GOSUB3000:'DO ALL HORIZONTAL
TOTALS.
610 GOSUB4000:'DO ALL VERTICAL T
OTALS.
620 IN=14:GOSUB3500:'DO ROW 14 T
OTAL.
630 TC=0:FOR X=1TOM
640 TC=TC+T1(X)
650 NEXT X
660 CLS:PRINT"TOTAL DAILY EXPENS
E IS:";PRINTUSING"$S####.##";XP
(14,6):PRINT
670 PRINT"TOTAL TRANSPORTATION E
XPENSE IS ";PRINTUSING"$S####.##
";TC:PRINT
680 GT=XP(14,6)+TC:PRINT"GRAND T
OTAL EXP. IS ";PRINTUSING"$S###
.##";GT
690 GOSUB6500:'GET TOTAL NON-BIL
LABLE EXPENSES.
700 IF SA$="Y" THEN GOSUB7000:'G
ET SECONDARY ACCOUNT TOTAL.
710 TB=GT-NB-HD
720 PRINT:PRINT"TOTAL BILLABLE E
XP. IS ";PRINTUSING"$S####.##";
TB:PRINT
730 GOSUB6000:'GET TOTAL CASH EX
PENDED.
740 GOTO270
970 '
980 'INITIALIZATION.
990 '
1000 FOR I=1TOL14
1010 FOR J=1TOL6
1020 XP(I,J)=0
1030 NEXT J
1040 NEXT I
1050 FOR I=1TOL13
1060 FOR J=1TOL5
1070 F1(I,J)=0
1080 F2(I,J)=0
1090 F4(I,J)=0
1100 NEXT J
1110 NEXT I
1120 FOR X=1TOL12
1130 COS(X)="
1140 NEXT X
1150 FOR X=1TOL3
1160 F3(X)=0
1170 F5(X)=0
1180 NEXT X
1190 A=5:C=0:N=0:Y=0
1200 ITS(1)="BREAKFAST"
1210 ITS(2)="LUNCH"
1220 ITS(3)="DINNER"
1230 ITS(4)="TIPS"
1240 ITS(5)="VALET-LAUNDRY"
1250 ITS(6)="TELEPHONE"
1260 ITS(7)="HOTEL ROOM"
1270 ITS(8)="ENTERTAINMENT"
1280 ITS(9)="TAXIS"
1290 ITS(10)="PARKING"
1300 ITS(11)="TOLLS"
1310 ITS(12)="CAR RENTAL"
1320 ITS(13)="OTHER"
1330 ITS(14)="Daily Total"
1340 RETURN
1385 '
1390 'CHANGE DATA.
1395 '
1400 CLS:IF N=0 THEN 7300 ELSE P
RINT@69,"DO YOU WANT TO CHANGE:"
1405 PRINT@133,"<D> DAILY ITEM":
PRINT@165,"<T> TRANSPORTATION IT
EM":PRINT@197,"<M> COMMENTS":PRI
NT@229,"<H> HOTEL BILLED DIRECT"
:PRINT@261,"<C> CASH ADVANCE":PR
INT@293,"<R> RECALCULATE":PRINT@
325,"<E> EXIT TO MAIN MENU"
1410 PRINT@386,"YOUR CHOICE-D-T-
M-H-C-R-E-->"
1415 XS=INKEY$:IF X$="" THEN 141
5
1420 CLS:ON INSTR("DTMHCRE",X$)
GOTOL445,1555,1650,1865,1900,600
,60
1425 PRINT" INVALID ENTRY! PLEA
SE REDO.":SOUND 100,5:FOR X=1TOL
000:NEXT X:GOTOL400
1430 '
1435 'CHANGE DAILY ITEMS.
1440 '
1445 PRINT"CHANGE WHAT DAY (1-5)
";INPUT J
1450 IF J=0 THEN 1400 ELSE IF J>
5 OR J>N THEN PRINT:PRINT" INVA
LID ENTRY! PLEASE REDO.":SOUND 1
00,5:FOR X=1TOL000:NEXT X:PRINT:
GOTOL445
1455 CLS:PRINT:FOR I=1TOL13
1460 PRINT I"- ITS(I);:PRINT@200
+I*32,USING"####.##";XP(I,J)
1465 NEXT I
1470 GOSUB1935
1475 IF I=0 THEN CLS:PRINT"CHANG
E A FLAG (Y/N)":GOTOL485
1480 PRINT"ENTER CORRECT AMOUNT
FOR ITS(I);:INPUT XP(I,J)
):PRINT:PRINT:GOTOL455
1485 XS=INKEY$:IF X$="" THEN 148
5 ELSE IF X$<>"Y" THEN 1400
1490 CLS:PRINT:FOR I=1TOL13
1495 PRINT@I*32,I"- ITS(I);:PRI
NT@200+I*32,USING"####.##";XP(I,J
);:IF F1(I,J)=1 THEN PRINT"C";:E
LSE IF F1(I,J)=2 THEN PRINT"N";:
ELSE IF F1(I,J)=3 THEN PRINT"CN"
;
1500 IF F4(I,J)=6 THEN PRINT"S";
1505 IF F2(I,J)<>0 THEN PRINT F2
(I,J)
1510 NEXT I
1515 PRINT@448,"CHANGE FLAG FOR
WHAT ITEM #";:INPUT I:IF I<1 OR
I>13 THEN I=0
1520 IF I<>0 THEN PRINT"ENTER CO
RRECT FLAG FOR ITEM":I":INPUT F
6$ ELSE GOTOL400:'CHANGE ONLY TH
E LETTER FLAG HERE. TO CHANGE TH
E COMMENT NUMBER, CHOOSE "COMMEN
TS" FROM THE CHANGE MENU.
1525 IF F6$="C" THEN F1(I,J)=1:F
4(I,J)=0 ELSE IF F6$="N" THEN F1
(I,J)=2:F4(I,J)=0 ELSE IF F6$="C
N" THEN F1(I,J)=3:F4(I,J)=0
1530 IF F6$="S" THEN F1(I,J)=0: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 1490 ELSE F
1(I,J)=0:F4(I,J)=0:GOTOL490
1540 '
1545 'CHANGE TRANSPORTATION ITEM
S.
1550 '
1555 PRINT"CHANGE WHICH TRANSPOR
TATION ITEM (1-3)";:INPUT X
1560 IF X=0 THEN 1400 ELSE IF X>
M THEN PRINT" INVALID ENTRY! PL
EASE REDO.":SOUND 100,5:FOR X=1T
OL000:NEXT X:GOTOL555
1565 CLS:PRINT"1. DATE: "D$(X):P
RINT:PRINT"2. TYPE: "TR$(X):PRIN
T:PRINT"3. DESTINATION: "DES(X):
PRINT:PRINT"4. AMOUNT: ";:PRINTU
SING"####.##";T1(X)
1570 PRINT:PRINT" ENTER NUMBER
OF ITEM TO BE CHAN
GED";:INPUT T:IF T=0 THEN 1595 E
LSE IF T>4 THEN 1400 ELSE ON T G
OTO1575,1580,1585,1590
1575 PRINT"ENTER CORRECT DATE":I
NPUT D$(X):GOTOL565
1580 PRINT"ENTER CORRECT TYPE":I
NPUT TR$(X):GOTOL565
1585 PRINT"ENTER CORRECT DESTINA
TION":INPUT DES(X):GOTOL565
1590 PRINT"ENTER CORRECT AMOUNT"
:INPUT T1(X):GOTOL565
1595 IF T=0 THEN CLS:PRINT"CHANG
E A FLAG (Y/N)?"
1600 XS=INKEY$: IF X$="" THEN 16
00 ELSE IF X$<>"Y" THEN 1400
1605 CLS:PRINT"AMOUNT: ";:PRINTU
SING"####.##";T1(X);:IF F3(X)=1
THEN PRINT"C";:ELSE IF F3(X)=2 T
HEN PRINT"N";:ELSE IF F3(X)=3 TH
EN PRINT"CN";
1610 IF F5(X)=6 THEN PRINT"S"
1615 PRINT:PRINT"ENTER CORRECT F
LAG";:INPUT F7$
1620 IF F7$="C" THEN F3(X)=1:F5(X
)=0 ELSE IF F7$="N" THEN F3(X)=
2:F5(X)=0 ELSE IF F7$="CN" THEN
F3(X)=3:F5(X)=0
1625 IF F7$="S" THEN F3(X)=0: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$="CN
S" THEN F3(X)=3:F5(X)=6
1630 IF F7$<>" " THEN 1400 ELSE F
3(X)=0:F5(X)=0:GOTOL400
1635 '
1640 'CHANGE COMMENTS MENU.
1645 '
1650 CLS:PRINT@40,"DO YOU WANT T
O:
1655 PRINT@100,"<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"
1660 PRINT@357,"YOUR CHOICE-C-D-
A-E-->"
1665 XS=INKEY$:IF X$="" THEN 166
5
1670 CLS:ON INSTR("CDAE",X$) GOT
OL695,1740,1815,1400
1675 PRINT" INVALID ENTRY! PLEA
SE REDO.":SOUND 100,5:FOR X=1TOL
000:NEXT X:GOTOL650
1680 '
1685 'CHANGE ONE COMMENT.
1690 '
1695 GOSUB5800
1700 PRINT:PRINT"ENTER # OF COMM
ENT TO CHANGE":INPUT K:IF K=0 TH
EN 1650 ELSE IF K>C THEN PRINT"
INVALID ENTRY! PLEASE REDO.":SO
```

Listing continued

Listing continued

```
UND 100,5:FOR X=1T01000:NEXT X:G
OT01700
1705 PRINT"ENTER CORRECT COMMENT
#"K:INPUT COS(K)
1710 IF LEN(COS(K))>40 THEN PRIN
T"YOU HAVE EXCEEDED 40 CHARACTER
S! PLEASE REDO.":SOUND
100,5:FOR X=1T01000:NEXT X:GOT01
705
1715 CLS:GOSUB500:PRINT:PRINT"P
RESS ANY KEY TO CONTINUE"
1720 X$=INKEY$:IF X$="" THEN 172
0 ELSE GOT01650
1725 '
1730 'DELETE A COMMENT.
1735 '
1740 CLS:GOSUB500
1745 PRINT:PRINT"ENTER # OF COMM
ENT TO DELETE":INPUT L
1750 IF L=0 THEN 1650 ELSE IF L>
C THEN PRINT" INVALID ENTRY! PL
EASE REDO.":SOUND 100,5:FOR X=1T
01000:NEXT X:GOT01740
1755 FOR I=1T013
1760 FOR J=1T05
1765 IF F2(I,J)=L THEN F2(I,J)=0
ELSE IF F2(I,J)>L THEN F2(I,J)=
F2(I,J)-1
1770 NEXT J
1775 NEXT I
1780 FOR K=L TO C-1
1785 COS(K)=COS(K+1)
1790 NEXT K
1795 C=C-1:GOT01740
1800 '
1805 'ADD A COMMENT.
1810 '
1815 PRINT"ADD COMMENT FOR WHAT
DAY (1-5)":INPUT J
1820 IF J=0 THEN 1650 ELSE IF J>
5 OR J>N THEN PRINT" INVALID EN
TRY! PLEASE REDO.":SOUND 100,5:F
OR X=1T01000:NEXT X:GOT01815
1825 CLS:PRINT:FOR I=1T013
1830 PRINT I"- "IT$(I);:PRINT@20
+I*32,USING"####.##";XP(I,J)
1835 NEXT I
1840 PRINT"COMMENT IS FOR ITEM #
":INPUT I:IF I<1 OR I>13 THEN
I=0:GOT01650
1845 IF C=>12 THEN PRINT"MAXIMUM
NUMBER OF COMMENTS HAS
BEEN ENTERED!":SOUND 100,5:FOR
X=1T01000:NEXT X:GOT01650
1850 IF C<12 THEN C=C+1:PRINT"EN
TER COMMENT #"C"::LINEINPUT CO
S(C):F2(I,J)=C
1855 IF LEN(COS(C))>40 THEN PRIN
T:PRINT"YOU HAVE EXCEEDED 40 CHA
RACTERS! PLEASE REDO.":S
OUND 100,5:FOR X=1T01000:NEXT X:
:PRINT:GOT01845
1860 GOT01650
1865 PRINT"HOTEL BILLED DIRECT I
S NOW: ";:PRINTUSING"####.##"
;HD:PRINT"DO YOU WANT TO MAKE A
CHANGE (Y/N)?"
1870 X$=INKEY$:IF X$="" THEN 187
0 ELSE IF X$<>"Y" THEN 1400
1875 PRINT"ENTER NEW AMOUNT FOR
HOTEL BILLED DIRECT":INPUT
HD
1880 GOT01400
1885 '
1890 'CHANGE AMOUNT OF CASH ADVA
NCE.
1895 '
1900 PRINT"CASH ADVANCE IS NOW: "
;:PRINTUSING"####.##";AD:PRINT"D
O YOU WANT TO MAKE A CHANGE (
```

```
Y/N)?"
1905 X$=INKEY$:IF X$="" THEN 190
5 ELSE IF X$<>"Y" THEN 1400
1910 PRINT"ENTER NEW AMOUNT FOR
CASH ADVANCE":INPUT AD
1915 GOT01400
1920 '
1925 'SUBROUTINE FOR CHANGING DA
TA.
1930 '
1935 PRINT"ENTER # OF ITEM TO CH
ANGE":INPUT I:IF I<1 OR I>13 TH
EN I=0
1940 RETURN
1970 '
1980 'INPUT DAILY DATA.
1990 '
2000 CLS
2010 PRINT"NUMBER OF DAYS COVERE
D (1-5)"
2020 N$=INKEY$:IF N$="" THEN 202
0
2030 N=VAL(N$)
2040 IF N<1 OR N>5 THEN PRINT:PR
INT" INVALID ENTRY! PLEASE REDO
.":PRINT:SOUND 100,5:FOR X=1T010
00:NEXT X:GOTO2010
2045 PRINT:LINEINPUT"TRAVEL REPO
RT OF:":X$
2050 PRINT:LINEINPUT"PURPOSE OF
TRAVEL?":PR$
2060 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
00,5:FOR X=1T01000:NEXT X:GOTO20
60
2070 PRINT"IS THERE A SECONDARY
ACCOUNT (Y/N)?"
2080 SA$=INKEY$:IF SA$="" THEN 2
080
2090 IF SA$<>"Y" THEN 2110
2100 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 100,5:FO
R X=1T01000:NEXT X:GOTO2100
2110 FOR J=1TON
2120 CLS:PRINT"DATE OF DAY" J;:I
NPUTDT$(J):PRINT
2130 FOR I=1T013
2140 PRINTIT$(I);:INPUT XP(I,J):
IF XP(I,J)=0 THEN 2170
2150 GOSUB5500:'CHECK IF FLAGS A
RE NEEDED.
2160 CLS
2170 IF OT$<>" " THEN 2200:'DON'T
RENAME "OTHER" IF PREVIOUSLY DO
NE.
2180 IF XP(13,J)>0 THEN PRINT"WH
AT ITEM IS ";CHR$(34);"OTHER";CH
R$(34);:INPUT OT$:IF LEN(OT$)>7
THEN PRINT"PLEASE REDO IN NO MOR
E THAN 7 CHARACTERS.":SOUND 10
0,5:FOR X=1T01000:NEXT X:GOTO218
0
2190 IT$(13)="OTHER:"+OT$
2200 NEXT I
2210 NEXT J
2220 RETURN
2270 '
2280 'DO ALL HORIZONTAL TOTALS.
2290 '
3000 FOR IN=1T013
3010 GOSUB3500
3020 NEXT IN
3030 RETURN
3470 '
3480 'DO ONE HORIZONTAL TOTAL.
3490 '
3500 XP(IN,6)=0
3510 FOR J=1TON
3520 XP(IN,6)=XP(IN,6)+XP(IN,J)
3530 NEXT J
3540 RETURN
3970 '
3980 ' DO ALL VERTICAL TOTALS.
3990 '
4000 FOR IN=1TON
4010 GOSUB4500
4020 NEXT IN
4030 RETURN
4470 '
4480 'DO ONE VERTICAL TOTAL.
4490 '
4500 XP(14,IN)=0
4510 FOR I=1T013
4520 XP(14,IN)=XP(14,IN)+XP(I,IN
)
4530 NEXT I
4540 RETURN
4570 '
4580 'INPUT TRANSPORTATION DATA
4590 '
4600 TC=0:CLS:INPUT"HOW MANY ITE
MS OF TRANSPORTATION";M:'THERE I
S ROOM FOR 3 TRANSPORTATION ITEM
S.
4610 IF M>3 THEN PRINT" THERE
IS ROOM FOR ONLY 3 TRA
NSPORTATION ITEMS.":SOUND 100,5:
FOR X=1T01000:NEXT X:PRINT:GOTO4
600
4615 IF M<1 THEN 4710
4620 FOR X=1TOM
4630 CLS:PRINT"ENTER COST OF TRA
NSPORTATION ITEM "X;:INPUT T1
(X)
4640 TC=TC+T1(X)
4650 GOSUB5500:'CHECK IF CASH, N
ON-BILLABLE ITEM, SECONDARY ACCO
UNT CHARGE, OR IF THERE IS A COM
MENT.
4660 IF A<>5 THEN F3(X)=A
4670 INPUT"DATE";D$(X)
4680 INPUT"TYPE";TR$(X)
4690 INPUT"DESTINATION";DE$(X)
4700 NEXT X
4710 RETURN
5485 '
5490 'FLAG ITEMS: CASH; NON-BILL
ABLE; SECONDARY ACCOUNT CHARGE;
COMMENTS.
5495 '
5500 A=5:PRINT"FLAG THIS ITEM (Y
/N)?:":EQUATING A TO 5 CLEARS T
HE FLAG VARIABLE.
5505 X$=INKEY$:IF X$="" THEN 550
5 ELSE IF X$<>"Y" THEN CLS:RETUR
N
5510 CLS
5515 IF SA$<>"Y" THEN PRINT@41,"
FLAG ITEM MENU":PRINT@101,"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 GOT05525
5520 PRINT:PRINT:INPUT" YOUR C
HOICE-1-2-3-4-5-->":A:GOTO5535
5525 PRINT@41,"FLAG ITEM MENU":P
RINT@101,"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

```
5530 PRINT:INPUT" YOUR CHOICE-
1-2-3-4-5-6-->";A;GOTO5545
5535 IF A<1 OR A>5 THEN PRINT@48
0," INVALID ENTRY! PLEASE REDO
":SOUND 100,5:FOR X=1TO1000:NEX
T X:CLS:GOTO5515
5540 GOTO5550
5545 IF A<1 OR A>6 THEN PRINT@48
4,"INVALID ENTRY! PLEASE REDO.":
SOUND 100,5:FOR X=1TO1000:NEXT X
:CLS:GOTO5525
5550 IF A=5 THEN CLS:RETURN
5555 IF TC<>0 THEN 5570
5560 IF A=1 OR A=2 OR A=3 THEN F
1(I,J)=A ELSE GOTO5580
5565 GOTO5510
5570 IF A=1 OR A=2 OR A=3 THEN F
3(X)=A ELSE GOTO5580
5575 GOTO5510
5580 IF A=4 THEN 5700
5585 IF TC<>0 THEN 5595:'IF TRAN
SPORTATION ITEMS HAVE BEEN ENTER
ED, GET FLAG IF NEEDED.
5590 IF A=6 THEN F4(I,J)=A:GOTO5
510
5595 IF A=6 THEN F5(X)=A:GOTO551
0
5670 '
5680 'ENTER COMMENTS.
5690 '
5700 C=C+1
5710 IF C>12 THEN CLS:PRINT"MAXI
MUM NUMBER OF COMMENTS HAS
BEEN ENTERED!":SOUND 100,5:F
OR X=1TO1000:NEXT X:GOTO5740:'TH
ERE IS ROOM FOR UP TO 12 COMMENT
S OF UP TO 40 CHARACTERS EACH.
5720 PRINT:PRINT"ENTER COMMENT N
O."C":;:LINEINPUT COS(C):F2(I,J
)=C
5730 IF LEN(COS(C))>40 THEN PRIN
T:"PRINT"YOU HAVE EXCEEDED 40 CHA
RACTERS! PLEASE REDO.":S
OUND 100,5:FOR X=1TO1000:NEXT X:
GOTO5720
5740 GOTO5510
5770 '
5780 'LIST COMMENTS ON SCREEN.
5790 '
5800 IF C<=6 THEN FOR K=1TOC ELS
E FOR K=1TO6
5810 PRINT K"- "COS(K)
5820 NEXT K
5830 IF C<=6 THEN RETURN ELSE PR
INT"PRESS ANY KEY TO CONTINUE"
5840 X$=INKEY$:IF X$="" THEN 584
0
5850 FOR K=7TOC
5860 PRINT K"- "COS(K)
5870 NEXT K
5880 RETURN
5970 '
5980 'GET CASH ITEM TOTAL.
5990 '
6000 CA=0:'INITIALIZE CASH TOTAL
TO ZERO.
6010 FOR I=1TO13
6020 FOR J=1TON
6030 IF F1(I,J)=1 OR F1(I,J)=3 T
HEN CA=CA+XP(I,J)
6040 NEXT J
6050 NEXT I
6060 FOR X=1TOM
6070 IF F3(X)=1 OR F3(X)=3 THEN
CA=CA+T1(X)
6080 NEXT X
6090 RETURN
6470 '
6480 'GET NON-BILLABLE ITEM TOTA
L.
6490 '
6500 NB=0:'INITIALIZE NON-BILLAB
LE ITEM TOTAL TO ZERO.
6510 FOR I=1TO13
6520 FOR J=1TON
6530 IF F1(I,J)=2 OR F1(I,J)=3 T
HEN NB=NB+XP(I,J)
6540 NEXT J
6550 NEXT I
6560 FOR X=1TOM
6570 IF F3(X)=2 OR F3(X)=3 THEN
NB=NB+T1(X)
6580 NEXT X
6590 RETURN
6970 '
6980 'GET SECONDARY ACCOUNT TOTA
L.
6990 '
7000 B2=0:'INITIALIZE SECONDARY
ACCOUNT TO ZERO.
7010 FOR I=1TO13
7020 FOR J=1TON
7030 IF F4(I,J)=6 THEN B2=B2+XP(
I,J)
7040 NEXT J
7050 NEXT I
7060 FOR X=1TOM
7070 IF F5(X)=6 THEN B2=B2+T1(X)
7080 NEXT X
7090 RETURN
7270 '
7280 'SAVE DATA TO DISK.
7290 '
7300 IF N=0 THEN PRINT@230,"NO D
ATA IN COMPUTER!":SOUND 100,5:FO
R X=1TO1500:NEXT X:GOTO600
7310 PRINT"ENTER NAME OF FILE TO
BE SAVED USING THIS FORMAT: M
MMDD-YY (FOR EXAMPLE: JAN2
0-84)":LINEINPUT NF$
7320 PRINT:PRINT" SAVING "NF$
" TO DISK"
7330 OPEN"O",#1,NF$
7340 WRITE#1,N,M,C,PR$,SA$,B1,B1
$,B2,B2$,TC,HD,GT,TB,CA,AD,RE,NB
,OTS
7350 FOR J=1TON
7360 WRITE#1,DT$(J)
7370 FOR I=1TO13
7380 WRITE#1,IT$(I),XP(I,J),F1(I
,J),F2(I,J),F4(I,J)
7390 NEXT I
7400 NEXT J
7410 FOR IN=1TO14
7420 WRITE#1,XP(IN,6)
7430 NEXT IN
7440 FOR IN=1TON
7450 WRITE#1,XP(14,IN)
7460 NEXT IN
7470 FOR X=1TOM
7480 WRITE#1,T1(X),F3(X),F5(X),D
$(X),TR$(X),DE$(X)
7490 NEXT X
7500 FOR K=1TO12
7510 WRITE#1,COS(K)
7520 NEXT K
7530 CLOSE#1:GOTO600
7670 '
7680 'LOAD DATA FROM DISK.
7690 '
7700 PRINT"NAME OF FILE TO BE LO
ADED FROM DISK (MMMDD-YY
)":LINEINPUT NF$
7710 PRINT:PRINT" LOADING "NF$
" FROM DISK"
7720 OPEN"1",#1,NF$
7730 INPUT#1,N,M,C,PR$,SA$,B1,B1
$,B2,B2$,TC,HD,GT,TB,CA,AD,RE,NB
,OTS
7740 FOR J=1TON
7750 INPUT#1,DT$(J)
7760 FOR I=1TO13
7770 INPUT#1,IT$(I),XP(I,J),F1(I
,J),F2(I,J),F4(I,J)
7780 NEXT I
7790 NEXT J
7800 FOR IN=1TO14
7810 INPUT#1,XP(IN,6)
7820 NEXT IN
7830 FOR IN=1TON
7840 INPUT#1,XP(14,IN)
7850 NEXT IN
7860 FOR X=1TOM
7870 INPUT#1,T1(X),F3(X),F5(X),D
$(X),TR$(X),DE$(X)
7880 NEXT X
7890 FOR K=1TO12
7900 INPUT#1,COS(K)
7910 NEXT K
7920 CLOSE#1:GOTO600
7970 '
7980 'PRINT EXPENSE REPORT.
7990 '
8000 PRINT@220,"PRINTING EXPENSE
REPORT"
8005 REM INSERT BETWEEN QUOTES I
N LINE 8010 YOUR COMPANY'S NAME
OR YOUR OWN
8010 PRINT#-2,CHR$(27);CHR$(33);
TAB(21)"HILTON N. WASSERMAN & AS
SOCIATES, INC.":CODES SET PRINT
ER FOR BOLD TYPE.
8020 PRINT#-2:PRINT#-2,TAB(27)"T
RAVEL EXPENSE REPORT";CHR$(27);C
HR$(34):'GO BACK TO REGULAR TYPE
8030 PRINT#-2:PRINT#-2:PRINT#-2,
"Travel Report of: ";XX$
8040 PRINT#-2:PRINT#-2,"Purpose
of Travel: ";PR$
8050 PRINT:PRINT#-2:PRINT#-2,TAB
(32)"DAILY EXPENSES"
8060 GOSUB9000:'DRAW 80 COLUMN L
INE.
8070 PRINT#-2
8080 PRINT#-2,TAB(5)"Date";
8090 FOR J=1TON
8100 PRINT#-2,TAB(J*11+5);DT$(J)
;
8110 NEXT J
8120 PRINT#-2,TAB(70)"Item Total
"
8130 GOSUB9000:'DRAW 80 COLUMN L
INE.
8140 PRINT#-2
8150 FOR I=1TO13
8160 PRINT#-2,IT$(I);
8170 FOR J=1TON
8180 PRINT#-2,TAB(J*11+4);:IF XP
(I,J)<>0 THEN PRINT#-2,USING"###
#.##";XP(I,J);:ELSE PRINT#-2,TAB
(J*11+7)"----";
8190 F=0:'WILL BE USED TO ENABLE
A LEADING BLANK TO BE INSERTED
IF AN ITEM HAS ONLY A COMMENT FL
AG.
8200 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.
8210 IF F1(I,J)=1 OR F1(I,J)=2 O
R F1(I,J)=3 THEN F=1
8220 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 MIDS TO CHOOSE W
HAT IS PRINTED.
8260 '
8270 F2$(I,J)=STR$(F2(I,J))
8280 IF F2(I,J)<> AND F=0 THEN
PRINT#-2, "MIDS(F2$(I,J),2,2);
ELSE IF F2(I,J)<> THEN PRINT#-2
,MIDS(F2$(I,J),2,2);:FLAG COMME
NT NUMBER.
8290 NEXT J
8300 PRINT#-2,TAB(70);:PRINT#-2,
USING"$$$$$.##";XP(1,6):'PRINT
ITEM TOTALS.
8310 NEXT I
8320 GOSUB9000:'DRAW 80 COLUMN L
INE.
8330 PRINT#-2
8340 PRINT#-2,ITS(14);
8350 FOR J=1TON
8360 PRINT#-2,TAB(J*11+3);:PRINT
#-2,USING"$$$$$.##";XP(14,J);:'
PRINT DAILY TOTALS.
8370 NEXT J
8380 PRINT#-2,TAB(70);:PRINT#-2,
USING"$$$$$.##";XP(14,6):'PRINT
TOTAL OF TOTALS.
8390 GOSUB9000:'DRAW 80 COLUMN L
INE.
8400 PRINT#-2
8410 PRINT#-2,TAB(45)"Total Dail
y Expenses: ";TAB(70);:PRINT#-2,U
SING"$$$$$.##";XP(14,6)
8420 PRINT#-2
8430 PRINT#-2,TAB(28)"TRANSPORTA
TION EXPENSES"
8440 GOSUB9000:'DRAW 80 COLUMN L
INE.
8450 PRINT#-2
8460 PRINT#-2,"Date";TAB(15)"Typ
e";TAB(28)"Destination";TAB(46)"
Amount"
8470 GOSUB9500:'DRAW 55 COLUMN L
INE.
8480 FOR X=1TOM
8490 IF T1(X)<> THEN PRINT#-2:P
RINT#-2,DS(X);TAB(15)TR$(X);TAB(
28)DES(X);TAB(45);:PRINT#-2,USIN
G"$$$$.##";T1(X);
8500 IF F3(X)=1 THEN PRINT#-2,"c
";:ELSE IF F3(X)=2 THEN PRINT#-2
,"n";:ELSE IF F3(X)=3 THEN PRINT
#-2,"cn";:'FLAG CASH OR NON-BILL
ABLE TRANSPORTATION ITEM.
8510 IF F5(X)=6 THEN PRINT#-2,"s
";:'FLAG SECONDARY ACCOUNT TRANS
PORTATION ITEM.
8520 NEXT X
8530 PRINT#-2
8540 GOSUB9500:'DRAW 55 COLUMN L
INE.
8550 PRINT#-2
8560 PRINT#-2,TAB(40)"Total Tran
sportation Expenses: ";:PRINT#-2
,TAB(70);:PRINT#-2,USING"$$$$$.
##";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"$$$$.##";GT
8610 IF CO$(2)<> THEN PRINT#-2
,"2. "CO$(2);ELSE GOTO8620
8620 PRINT#-2,TAB(46)"Less Non-B
illable Items: ";TAB(70);:PRINT#
-2,USING"$$$$.##";NB
8630 IF CO$(3)<> THEN PRINT#-2
,"3. "CO$(3);ELSE GOTO8640
8640 PRINT#-2,TAB(45)"Less Hotel
Billed Direct: ";TAB(70);:PRINT
#-2,USING"$$$$.##";HD
8650 IF CO$(4)<> THEN PRINT#-2
,"4. "CO$(4) ELSE PRINT#-2
8660 IF CO$(5)<> THEN PRINT#-2
,"5. "CO$(5);ELSE GOTO8670
8670 PRINT#-2,TAB(46)"Total Bill
able Expenses: ";TAB(70);:PRINT#
-2,USING"$$$$.##";TB
8680 IF CO$(6)<> THEN PRINT#-2
,"6. "CO$(6) ELSE PRINT#-2
8690 IF CO$(7)<> THEN PRINT#-2
,"7. "CO$(7);ELSE GOTO8700
8700 PRINT#-2,TAB(57)"Cash Advan
ce: ";TAB(70);:PRINT#-2,USING"$
$$$$.##";AD
8710 IF CO$(8)<> THEN PRINT#-2
,"8. "CO$(8);ELSE GOTO8720
8720 IF RE=> THEN PRINT#-2,TAB(
49)"Reimbursement Due Me: ";TAB(
70);:PRINT#-2,USING"$$$$.##";R
E
8730 IF RE< THEN PRINT#-2,TAB(4
8)"Reimbursement Due Co.: ";TAB(
70);:PRINT#-2,USING"$$$$.##";A
BS(RE)
8740 IF CO$(9)<> THEN PRINT#-2
,"9. "CO$(9) ELSE PRINT#-2
8750 IF CO$(10)<> THEN PRINT#-2
,"10. "CO$(10);ELSE GOTO8760
8760 PRINT#-2,TAB(45)"BILL "B1$
";TAB(71);:PRINT#-2,USING"$
$$$$.##";B1
8770 IF CO$(11)<> THEN PRINT#-2
,"11. "CO$(11);ELSE GOTO8780
8780 IF B2<> THEN PRINT#-2,TAB(
45)"BILL "B2$";TAB(71);:PRINT#
-2,USING"$$$$.##";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

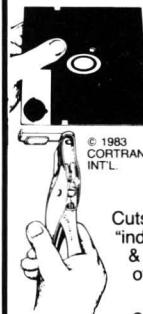
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# DON'T PRINT THERE!

*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 begin-

ning 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/assembler, 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 "AUTO-PAGE" 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
              00170
7FC1 21 31    00180 ATOPGE BRN      FINIS
7FC3 34 06    00190      D          D Preserve the "D" register.
              00200
7FC5 B6 006F  00210      LDA      DEVNUM Is the character being
7FC8 81 FE    00220      CMPA     #0FOE sent to the printer?
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      #SOD
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
              ***** DEFINE THE VARIABLES *****
7FF8 00 00580 LINE  FCB      0
7FF9 0000 00590 RETURN FDB     0
              00600 DEVNUM EQU     111
              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

```

**System Requirements**  
**16K RAM**  
**Extended or Disk Color Basic**  
**Printer**

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

```

1Ø FOR M=163Ø8 TO 16378
2Ø READ V$
3Ø POKE M,VAL("&H"+V$)
4Ø NEXT M
5Ø CLS
6Ø PRINT "DO YOU WISH TO SAVE TH
E OBJECT"
7Ø PRINT"CODE ON CASSETTE? ";R$
8Ø A$=INKEYS:IF A$="" THEN 8Ø
9Ø IF A$<>"Y" THEN 12Ø
1ØØ INPUT "CASSETTE READY";Z$
11Ø CSAVEM "AUTOPAGE",163Ø8,1637
8,163Ø8
12Ø EXEC 163Ø8
13Ø END
14Ø DATA FC, Ø1, 68, FD, 3F, F9
15Ø DATA CC, 3F, C1, FD, Ø1, 68
16Ø DATA 39, 21, 31, 34, Ø6, B6
17Ø DATA ØØ, 6F, 81, FE, 26, 26
18Ø DATA B6, ØØ, 9C, 81, 5Ø, 27
19Ø DATA Ø4, 81, ØØ, 26, 1B, B6
2ØØ DATA 3F, F8, 4C, B7, 3F, F8
21Ø DATA 81, 3B, 26, 1Ø, C6, Ø8
22Ø DATA 86, ØD, AD, 9F, AØ, Ø2
23Ø DATA 5A, 26, F9, 86, Ø1, B7
24Ø DATA 3F, F8, 35, Ø6, 6E, 9F
25Ø DATA 3F, F9, ØØ, ØØ, ØØ

```

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

```

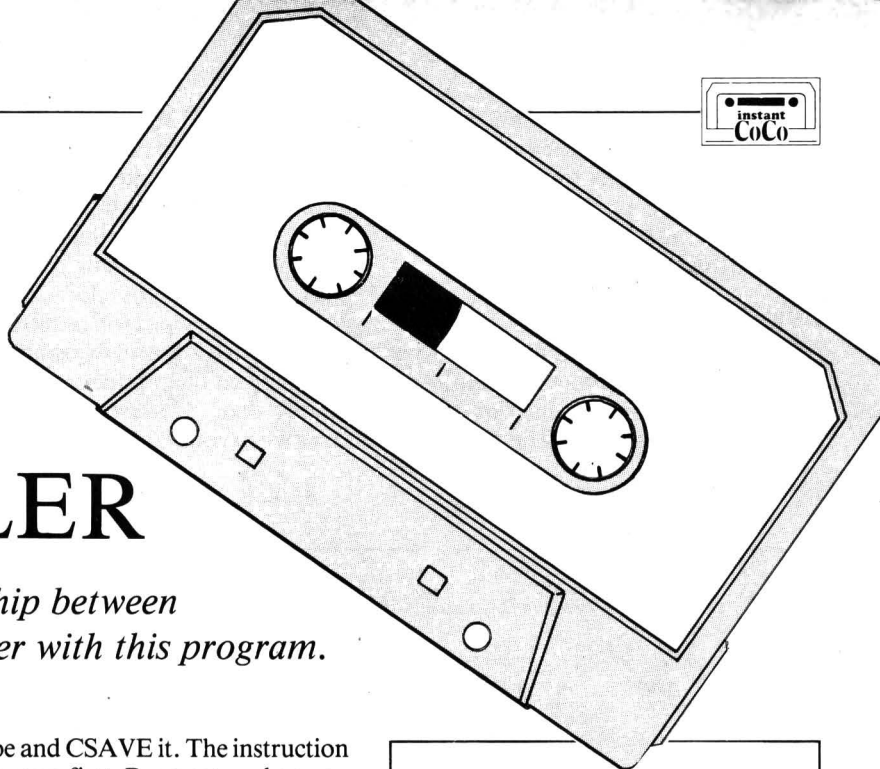
1Ø FOR M=32692 TO 32762
2Ø READ V$
3Ø POKE M,VAL("&H"+V$)
4Ø NEXT M
5Ø CLS
6Ø PRINT "DO YOU WISH TO SAVE TH
E OBJECT"
7Ø PRINT "CODE ON CASSETTE? "
8Ø A$=INKEYS:IF A$="" THEN 8Ø
9Ø IF A$<>"Y" THEN 12Ø
1ØØ INPUT "CASSETTE READY";Z$
11Ø CSAVEM "AUTOPAGE",32692,3276
2,32692
12Ø EXEC 32692
13Ø END
14Ø DATA FC, Ø1, 68, FD, 7F, F9
15Ø DATA CC, 7F, C1, FD, Ø1, 68
16Ø DATA 39, 21, 31, 34, Ø6, B6
17Ø DATA ØØ, 6F, 81, FE, 26, 26
18Ø DATA B6, ØØ, 9C, 81, 5Ø, 27
19Ø DATA Ø4, 81, ØØ, 26, 1B, B6
2ØØ DATA 7F, F8, 4C, B7, 7F, F8
21Ø DATA 81, 3B, 26, 1Ø, C6, Ø8
22Ø DATA 86, ØD, AD, 9F, AØ, Ø2
23Ø DATA 5A, 26, F9, 86, Ø1, B7
24Ø DATA 7F, F8, 35, Ø6, 6E, 9F
25Ø DATA 7F, F9, ØØ, ØØ, ØØ

```

END



# 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.*

## Program Listing 1. CoCo Cassette Control Basic Driver

```

1Ø CLS
2Ø PRINT"      co"CHR$(128)"co"CHR
R$(128)"cassette"CHR$(128)"contr
ol":PRINT@32,STRINGS(32,131);
3Ø PRINT"      THIS PROGRAM WILL L
OAD,":PRINT"      PROTECT, AND AUTOM
ATICALLY"
4Ø PRINT"      EXECUTE A MACHINE LAN
GUAGE":PRINT"      UTILITY WHICH WIL
L CONTROL"
5Ø PRINT"      YOUR CASSETTE RECORDE
R FROM":PRINT"      THE KEYBOARD. Y
OU WILL BE"
6Ø PRINT"      ABLE TO CONTROL BOTH
THE":PRINT"      MOTOR AND AUDIO FUN
CTIONS"
7Ø PRINT"      BY SIMPLY PRESSING TH
E DOWN":PRINT"      ARROW KEY. THE
COMPUTER"

```

```

8Ø PRINT"      WILL RESPOND WITH EIT
HER A":PRINT"      cassette on OR of
f PROMPT."
9Ø PRINT@484,"PRESS ENTER TO CON
TINUE":LINEINPUT ZZ$
1Ø CLS:PRINT@259,"L  O  A  D
I      N      G"
11Ø ED=PEEK(39)*256+PEEK(4Ø)
12Ø ST=ED- 131
13Ø FOR X=ST TO ED
14Ø READ D:POKE X,D:SUM=SUM+D
15Ø NEXT X
16Ø IF SUM <> 15782 THEN CLS:PRI
NT@263,"!!!DATA ERROR!!!":END
17Ø EXEC ST
18Ø CLEAR 2ØØ,ST
19Ø DATA 48, 141, Ø, 9, 191, 1,
1Ø7, 111
2ØØ DATA 141, Ø, 1, 57, Ø, 129,
1Ø, 38
21Ø DATA 86, 52, 2Ø, 1Ø9, 141, 2
55, 245, 38
22Ø DATA 34, 246, 255, 1, 2Ø2, 8
, 247, 255
23Ø DATA 1, 246, 255, 35, 2Ø2, 8
, 247, 255
24Ø DATA 35, 246, 255, 33, 2Ø2,
8, 247, 255
25Ø DATA 33, 99, 141, 255, 215,
48, 141, Ø
26Ø DATA 49, 32, 32, 246, 255, 1
, 196, 247
27Ø DATA 247, 255, 1, 246, 255,
35, 196, 247
28Ø DATA 247, 255, 35, 246, 255,
33, 196, 247
29Ø DATA 247, 255, 33, 111, 141,
255, 181, 48
3ØØ DATA 141, Ø, 28, 198, 13, 16
6, 128, 189
31Ø DATA.162, 13Ø, 9Ø, 38, 248,
53, 2Ø, 126
32Ø DATA 14Ø, 241, 67, 65, 83, 8
3, 69, 84
33Ø DATA 84, 69, 32, 32, 79, 78,
13, 67
34Ø DATA 65, 83, 83, 69, 84, 84,
69, 32
35Ø DATA 79, 7Ø, 7Ø, 13
36Ø CLS
37Ø PRINT:PRINT
38Ø PRINTTAB(5)"CO":PRINT
39Ø PRINTTAB(8)"CO":PRINT
4ØØ PRINTTAB(11)"CASSETTE":PRIN
T
41Ø PRINTTAB(14)"CONTROL":PRINT
42Ø PRINTTAB(17)"EXECUTED"
43Ø PRINT:PRINT:PRINT
44Ø END

```

## System Requirements

16K RAM  
Extended Color Basic

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# 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

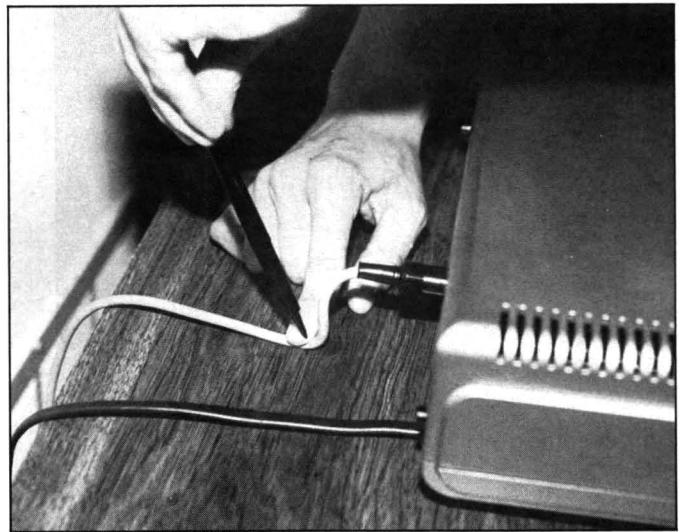
where you want them to go. Route all cables down and to the rear through the surface and back so that you won't see them when you're done. If your desk has a kick panel, plan to hide the wires behind it. If it has none, attach the wiring to the underside of the work surface after routing. Now mark where 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 1/4-inch drill bit.  
Spade bit (3/4- 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.*

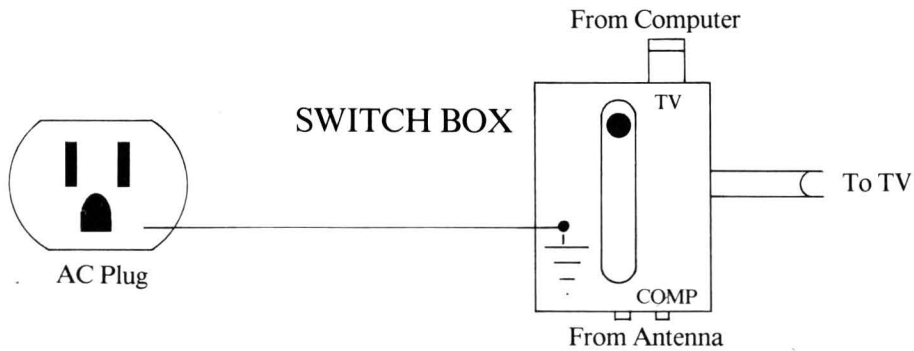


Fig. 1. Eliminating Television Interference

### Cutting, Sanding, Staining

Protect the surface on the desk that will show later with tape or newspaper. Use the 1/4-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. Voilà! The finished product will be both a joy to work at and pleasing to the eye.

# COLOR CODE CHALLENGE

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

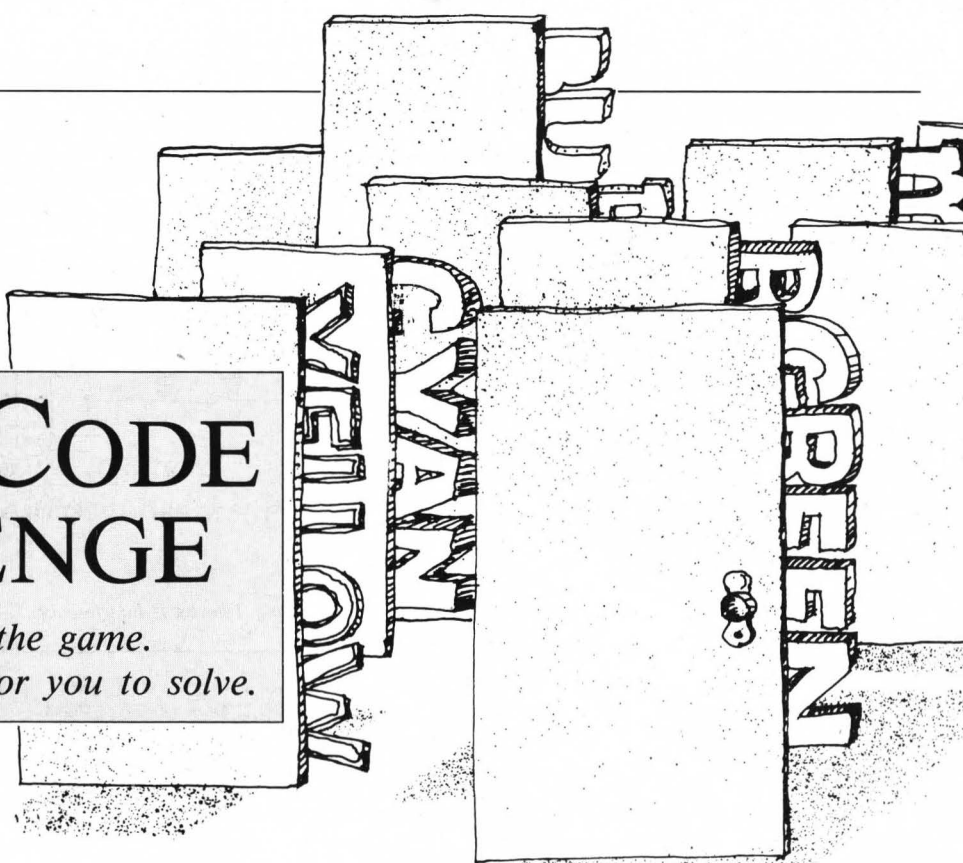


Illustration by Bob Dukette

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 PRINTØX,CHR$(143);
13Ø NEXTX:PRINTØ77,"SECRET CODE"
;
132 Y=Ø
135 FOR X=32TO256STEP32
14Ø PRINTØX,CHR$(143+Y);
15Ø Y=Y+16:NEXTX
2ØØ PRINTØ34,"Ø=GREEN ";
21Ø PRINTØ66,"1=YELLOW ";
22Ø PRINTØ98,"2=BLUE ";
23Ø PRINTØ13Ø,"3=RED ";
24Ø PRINTØ162,"4=BUFF ";
25Ø PRINTØ194,"5=CYAN ";
26Ø PRINTØ226,"6=MAGENTA";
27Ø PRINTØ258,"7=ORANGE ";
29Ø X=142
3ØØ T=Ø:Q=Ø
31Ø PRINTØX,CHR$(134);:A$=INKEYS
:PRINTØX,CHR$(143);:PRINTØX,CHR$(
137);
34Ø PRINTØX,CHR$(137);
35Ø IF VAL(A$)=9OR VAL(A$)=8THEN
31Ø
36Ø IF A$=""THEN31Ø
362 IF A$ <>""THEN4ØØ
365 GOTO31Ø
4ØØ PRINTØX,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 PRINTØX,"X";:Q
=Q+1
63Ø IF D(P)=2THEN PRINTØX,"O";
64Ø IF D(P)=ØTHEN PRINTØX,"-";
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 PRINTØY, CHR$(143+(R(X)*16))
;
75Ø Y=Y+2:NEXT X
755 FOR X=192TO479
76Ø PRINTØX,CHR$(175);
765 NEXT X
77Ø PRINTØ227,"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 PRINTØY, CHR$(143+(R(X)*16))
;
83Ø Y=Y+2:NEXT X
835 PRINTØ66,"YOU FAILED TO BREA
K THE CODE";
84Ø PRINTØ133,"BETTER LUCK NEXT
TIME";
845 FOR X=192TO319
85Ø PRINTØX,CHR$(246);:NEXTX
86Ø PRINTØ361,"ANOTHER GAME?";
865 PRINTØ39Ø,"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:PRINTØ41,"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



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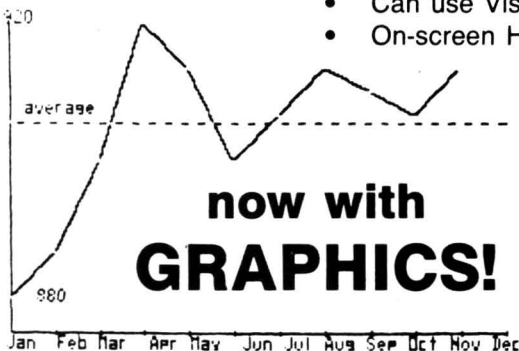
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# Three Little Utilities

*Add these handy routines  
to your programmer's toolbox.*

**H**ave 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

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

Table 1

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.

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



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 NXTOKO  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     NXTOKO   IF NEITHER, CONTINUE
00420 QUOTE  LDA      ,X+     SEARCH UNTIL SECOND QUOTE
00430          CMPA     #$22     IS FOUND
00440          BNE     QUOTE
00450          BRA     NXTOKO   AFTER QUOTE, CONTINUE
00460 SPACE  BSR      MOVDWN   REMOVE SPACE
00470          LEAX     -1,X    STAY AT SAME ADDRESS
00480          BRA     NXTOKO   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!

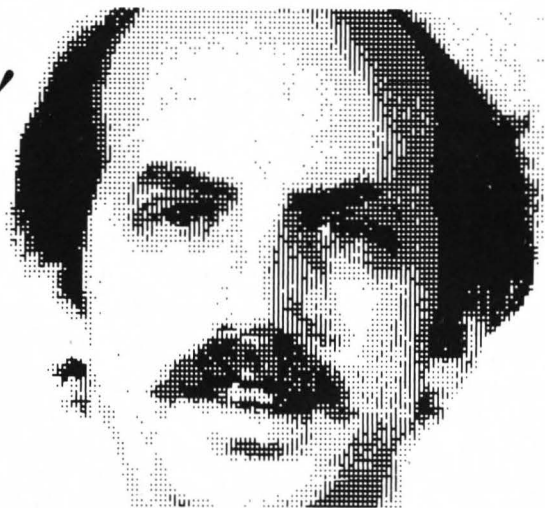
TALKHEAD's fast, smooth-talking animation is so stunningly life-like that it resembles a movie more than a cartoon! This page shows some still shots of the actual moving image as it will appear on your TV screen.

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!

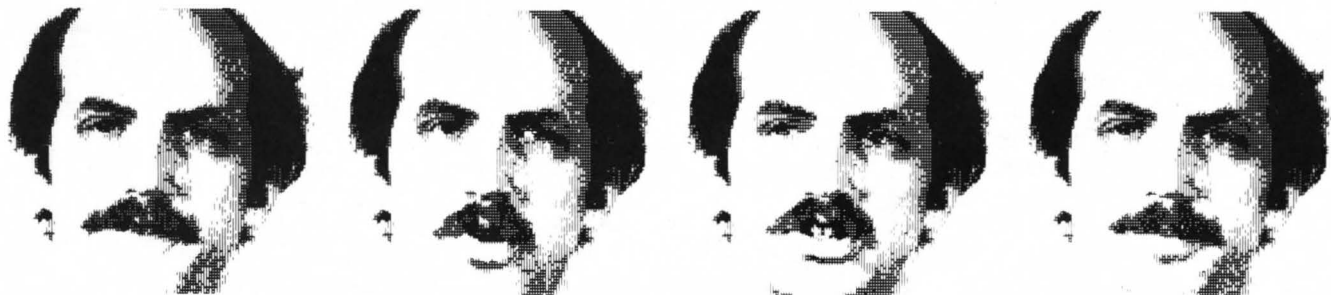
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'TALKHEAD' is available on cassette or disk (please specify) for **only \$29.95**. The cassette version can be transferred to disk in case you ever upgrade. TALKHEAD requires 64K of memory and a Colorware 'REAL TALKER' voice pak.

PROGRAM BY TIM JENISON      SPEECH PROGRAMMING BY H. PUNYON



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

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### 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**

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The popular 'ADVENTURE STARTER' from Owl's Nest Software is now available in a speaking version for the 'Real Talker' voice synthesizer. 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.**



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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:

**'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.

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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 fundamental level.

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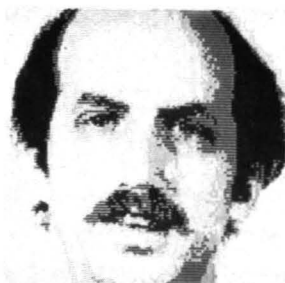
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## TALKHEAD

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.



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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 CLRFB
00240 LDX #S0429 FIRST PRINT LOCATION
00250 TFR S,U
00260 PRTONE LDA ,U+
00270 BSR PRTHX 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 * PRTHX 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 PRTHX PSHS A SAVE A
00470 ANDA #S0F 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 #S400 FIRST SCREEN LOCATION
00840 LDA #CLCHAR
00850 CLRN STA ,X+
00860 CMPX #S5FF 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 #S0425 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. SCRDMMP 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 DMPPROG. Lines 360-390 store the op-code for JMP in \$16A and the starting address of DMPPROG—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 DMPPROG. 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.

Listing continued

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

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.

### 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 SCRDMPLDA >$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 DMPPROG,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 DMPPROG 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 <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



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 transcendent 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.

## THE KNIGHT'S TOUR—A MILLENNIAL PUZZLE

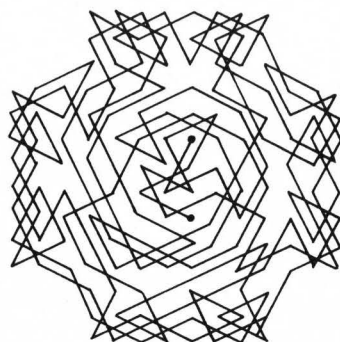
by *Richard Ramella*

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 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 its 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, WNW, 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.



## 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:CLEAR
R 1000: DIM A(12,12): PRINT @ 23
3,"KNIGHT'S TOUR"
120 FOR A=1 TO 12: FOR B=1 TO 12
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$="": A(A,B)
=0: GOTO 260
250 LINE(J,K)-(J+6,K+6),PRESET,BF:
GOTO 170
260 X1=X: Y1=Y: GOSUB 520: LINE(
195,2)-(254,61),PSET,B
270 A$=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$=""
490 IF A(A-1,B-2)=0 AND A(A+1,B-
2)=0 AND A(A+2,B-1)=0 AND A(A-2,
B+1)=0 AND A(A+1,B+2)=0 AND A(A-
1,B+2)=0 AND A(A-2,B+1)=0 AND A(
A-2,B-1)=0 THEN 510
500 GOTO 270
510 SOUND 1,1:GOTO 510
520 FOR N=0 TO 10 STEP 2
530 LINE(X+3-N,Y+3-N)-(X+3+N,Y+3
+N),PSET,B
540 SOUND 8*MRND(13),1: NEXT N: S
C=SC+1
550 IF SC=64 THEN PLAY "T6;O3":
K=MRND(15): PLAY MID$(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



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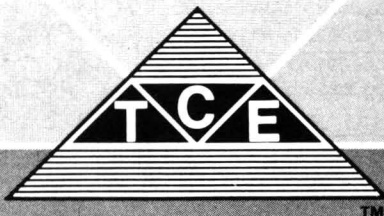
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# CoCo for Hire

## 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-

## CoCo for Hire

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.

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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

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

and from campus.

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.

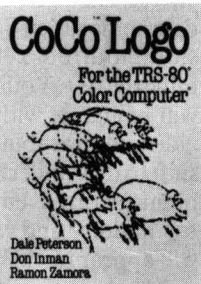
Next month we'll finish up our examination of mailing-list services with a look at what rates to charge, how to advertise, and what hardware and software you'll need. ■

*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.*

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# 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. ■

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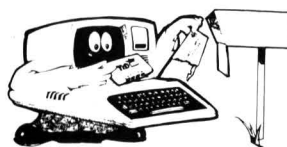
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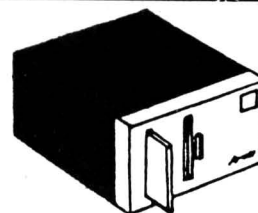
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# 6809 On Line

## 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.

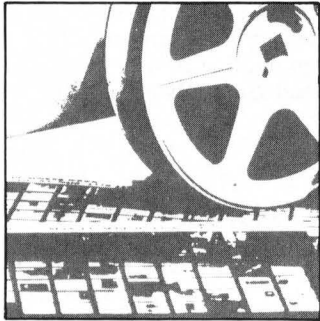
Now that I've got you on line, be sure to follow this column each month. I'll keep you up to date on all topics relating to CoCo telecommunicating. ■

---

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



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# 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 O. 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 you 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 DUMP-LOAD/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  
Tucson, 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*

## Keystone Aid

Program Listing 1, Keystone, 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.

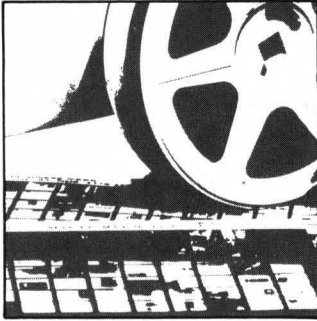
The machine-language routine is written in position-independent code, so you can load it anywhere in memory if you don't want it at the top of RAM. Also, you can make a copy of the machine-language code by entering CSAVEM"KEYSTONE",ST,HI,ST.

*Jack Shaffer  
Oakwood, IL*

```
1Ø CLS:GOSUB8Ø
2Ø CLEAR2ØØ,HI-43
3Ø GOSUB8Ø:ST=HI-43
4Ø FORX=ST TOHI:READOP$:N=VAL("&
H"+OP$)
5Ø S=S+N:POKEX,N:NEXT
6Ø IFS<>4992THENPRINTTAB(8)** DA
TA ERROR **:SOUND1Ø,1Ø:STOP
7Ø EXEC ST:NEW
8Ø HI=PEEK(116)*256+PEEK(117):RE
TURN
9Ø DATA 3Ø,8D,ØØ,16,BF,Ø1,6B,3Ø,
8D,ØØ,Ø3,9F,9D,39,CC,8C,F1,FD,Ø1
,6B,3Ø,8C,E9,9F,9D,39,34,36,CC,Ø
Ø,Ø4,DD,8D,58,D7,8C,BD,A9,56,35,
36,7E,8C,F1
```

Program Listing 1. Keystone

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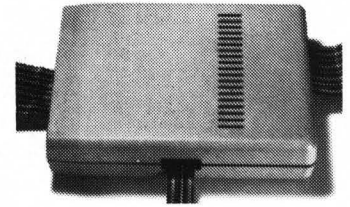
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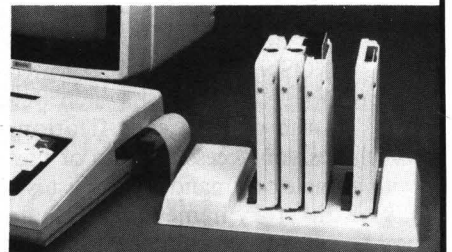
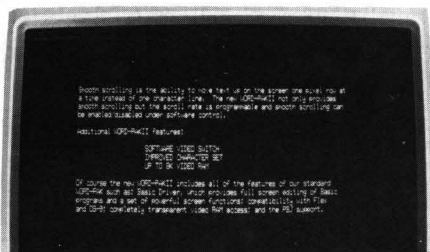
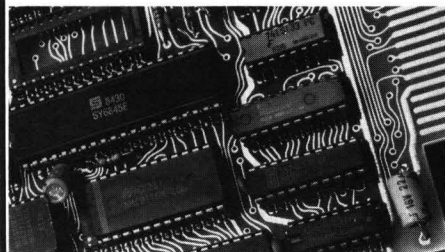
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# REVIEWS

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*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 non-printable 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

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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

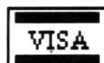
everything from the root directory down to the file you want to access. What are meta characters? They are characters that you use for any special purpose. For example, OS-9 uses the exclamation point to indicate two or more concurrent programs whose standard input or output paths connect to each other 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 programming 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.

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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

**CAT** concatenates text files and lists to standard output.

**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 Texttools' Commands

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.

### Summary

I found the manual for OS-9 Texttools 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 Texttools 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. ■

	construction	quality	documentation
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Hardware

**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 Kitz is an accomplished designer of computer software and hardware. His projects are sound and never unnecessarily compli-

cated. 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 3¼- 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

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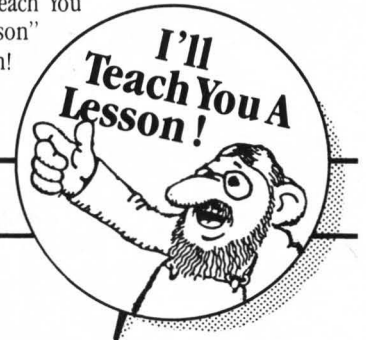
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## REVIEWS

Kits's "Custom Color" column in the March, May, and June issues of *The Color Computer Magazine*. The manual reserves eight pages for sourcelisting 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.

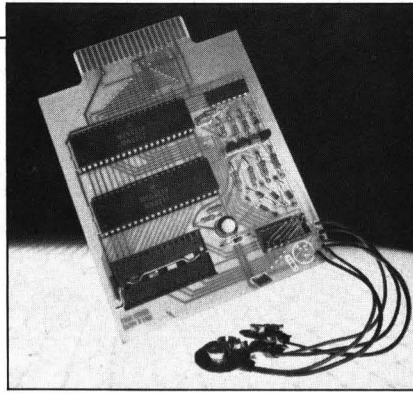
This is quality documentation. The manual contains a table of contents, boxed notes, and pointers (a nice touch). It walks you through the use of the burner and answers just about any question you might have. I do have one minor gripe, however. I think it would have been useful to the novice to have 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 non-specific 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 con-



*Green Mt. Micro's Color Burner*

tain 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 1/4-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.

### 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 \$30FF 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. ■

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Application Software

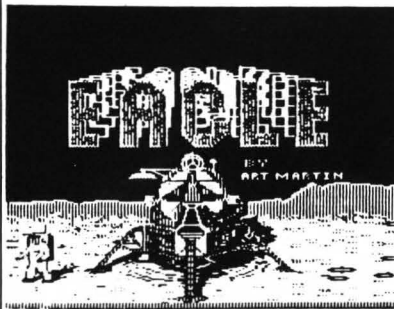
**Crypton**  
**First Coast Systems**  
**P.O. Box 5396**  
**Jacksonville, FL 32207**  
**904-771-5274**  
**Disk Drive**  
**\$24.95**

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!



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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 drawings 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 drawings. 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 drawings 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

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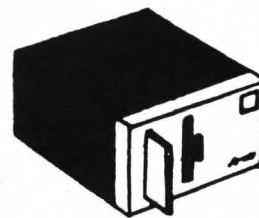


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# Saguaro Software

Circle Reader Service card #160

## REVIEWS

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

*"If you need a powerful and easy-to-use method of protecting your data, get Crypton."*

back to the disk to complete the job.

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. ■

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Application Software

**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.

# REVIEWS

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. ■

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Application Software

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Application Software

**Graphic Master**  
**16K, cassette**  
**\$39.95 (\$49.95 in Canada)**  
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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

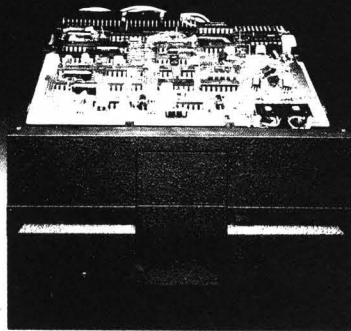
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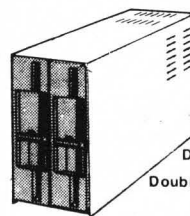
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

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# REVIEWS

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 con-

*"I would have bought In Assembly Language just for its multitasking routine. . . ."*

trol character.

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. ■

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# stair

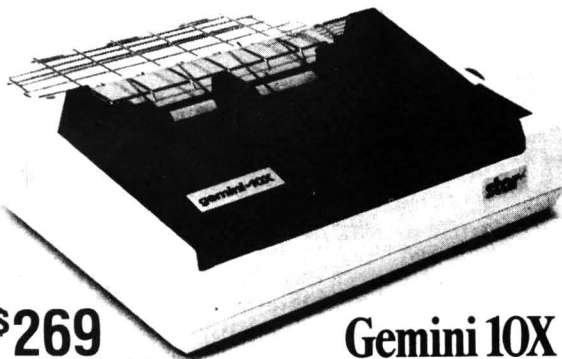
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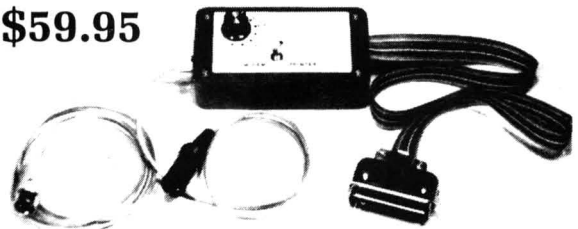
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by Jeffrey S. Parker

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 ex-

ample 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

*"You can  
 only run  
 TRS-Copy  
 from OS-9."*

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. ■

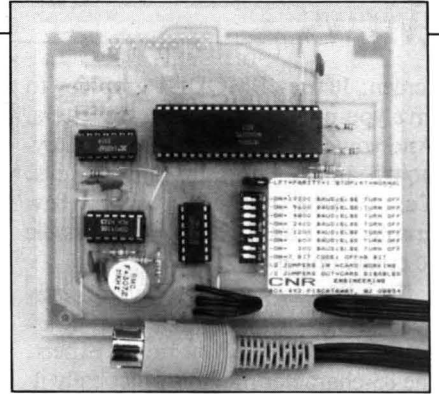
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Hardware

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**\$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



The SP-2 Interface

inside your Epson printer and tames your CoCo to communicate in the Epson's language.

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. ■

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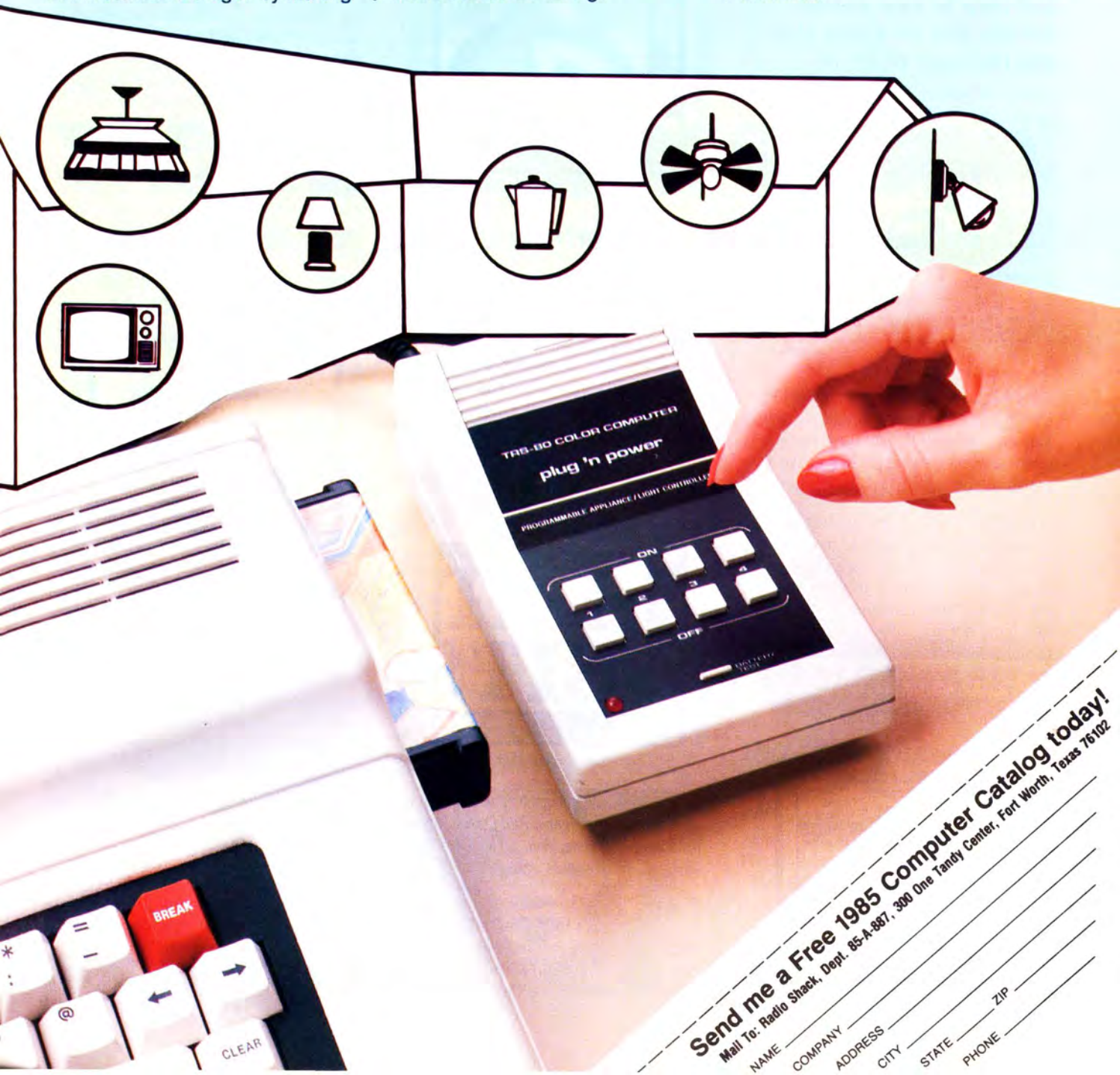
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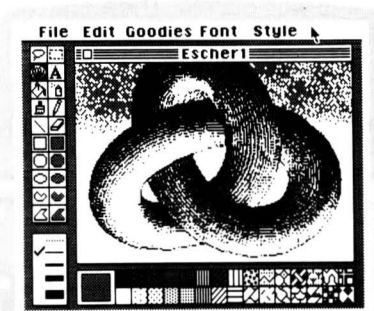
# CoCo Max

*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!*



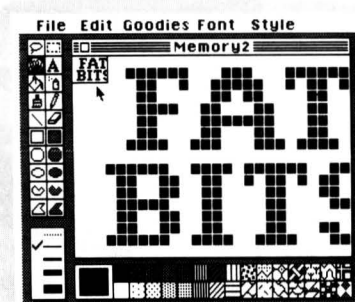
We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

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. Its unrivaled performance lets you create with more brilliance and more speed than any similar system – much more than you ever imagined possible. And, you can do it in black & white or color.



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

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

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



## THE BIG PICTURE

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

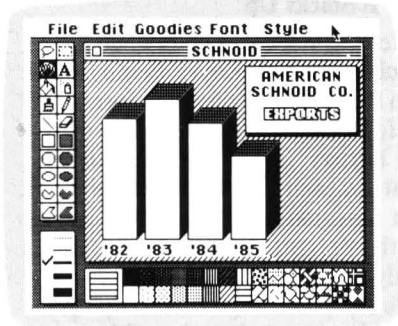
## FLEXIBLE PRINTING...

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

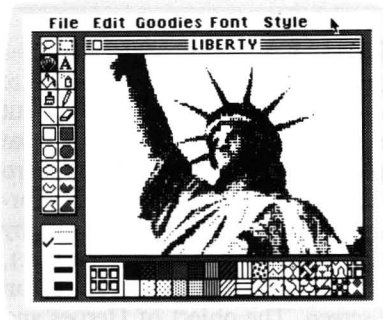


## FREEDOM TO CREATE...

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



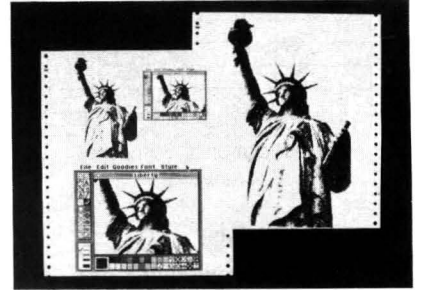
graphs, and computer art – for serious use or just for creative fun.



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

Plug your same joystick, mouse or touch

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



## COCO MAX REQUIREMENTS

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

# THE COCO MAX SYSTEM

## AN ABSOLUTE GUARANTEE

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

## THE HARDWARE...

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



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

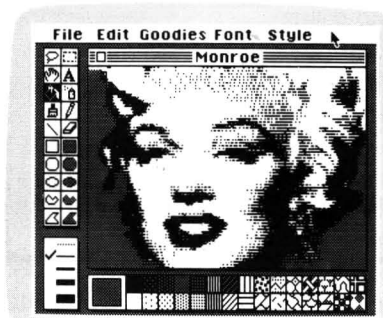
Most graphic programs ignore this hardware limitation of the Color Computer and give you only low-res control. Others attempt to overcome the limita-

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



## A DIGITIZER OPTION...

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



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

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Educational Software

**Heroes and Trolls**  
**Cognitive Development Co.**  
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 Seattle, WA 98125  
 206-367-3470  
 16K, disk drive  
 \$29.95

by Scott and Beth Norman

**H**eroes 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.

**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.

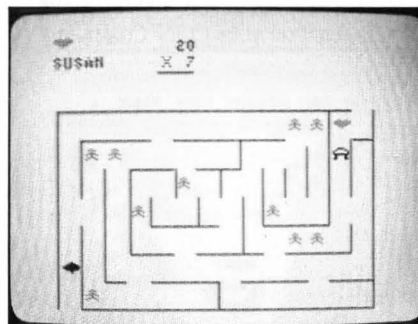
Here are a few examples of problems from each level of Heroes and Trolls' multiplication operation.

- 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. ■



Heroes & Trolls

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## 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.

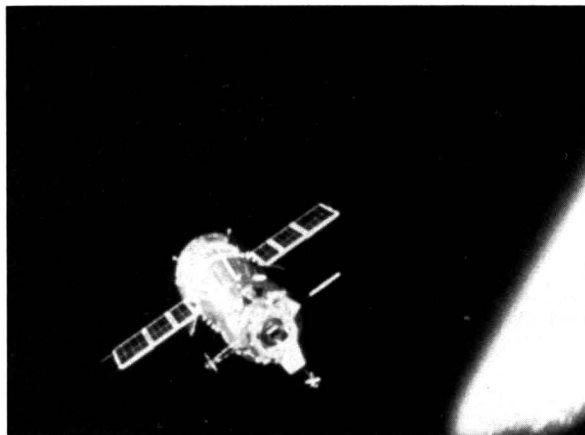
Jeffrey Parker takes a look at disk-based smart-terminal programs in the first of a two-part series. He'll describe the differences in operation and features to help you pick the best one for you.

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 DSKIS/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 RS=" 6122030"
120 T=PEEK(&HD446+V*&HEE)
130 S=PEEK(&HD526+V*&HED) AND 3
140 CLS
150 PRINT@3,"STEP RATE = ";
160 PRINT MIDS(R$,S*2+1,2)" MILL
ISECONDS
170 PRINT@38,"# TRACKS = ";
180 PRINT T
190 PRINT@70,"SELECT FUNCTION
200 PRINT" 1 = QUIT
210 PRINT" 2 = STEP RATE POKE
220 PRINT" 3 = TRACK LIMIT POKE
230 INPUT" <1-3> ";FS:F=VAL(FS)
240 ON F GOSUB 250,280,370:GOTO1
40
250 STOP
260 REM
270 REM STEP RATE POKE
280 CLS
290 PRINT@70,"SELECT STEP RATE
300 FOR I=0TO3
310 PRINT@134+I*32,I" = "MID$(RS
,2*I+1,2)" MILLISECONDS
320 NEXT
330 INPUT" <0-3> ";SS
340 IF SS<"0" OR SS>"3" THEN GOS
UB 450:GOTO260
350 S=VAL(SS):GOSUB490
360 RETURN
370 REM
380 REM TRACK LIMIT SET
390 CLS
400 PRINT@70,"SELECT TRACK LIM
T
410 INPUT" <1-40> ";TS
420 T=VAL(TS)
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 'DSKIS
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 than 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.** Artifacts are "fooling" the color circuitry by introducing a color burst when there shouldn't be (according to the PMODE statement). Here's what I've heard: Artifacts are 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 artifacts.

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 impedance. 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 output toward ground.

This simulates color burst, resulting in artifacted color. Why? The Color A output is a three-level analog output from the VDG that is combined with the four-level analog Color B output and the Y outputs 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. ■

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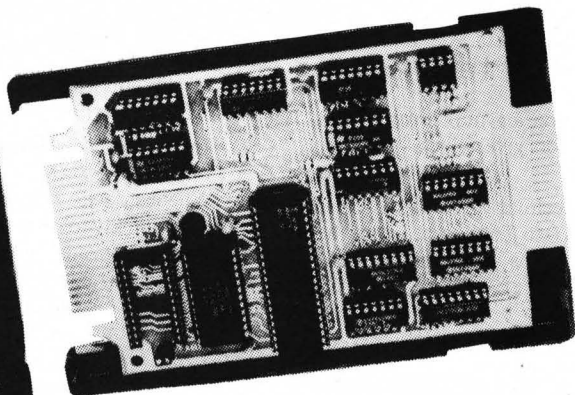
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# Gameware



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



Trekboer

quality adventure game from Mark Data Products that provides high-resolution graphics and a challenging mission.

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.

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 requires 64K and a disk drive. Professional Software Inc., 51 Fremont Street, Needham, MA 02194. 617-444-5224.

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## 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, Berkeley, CA 94710. The book is 256 pages and sells for \$21.95.

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## 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 Epsoms 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.

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## Printer Elevation

Putting your printer on a pedestal? Suncom, a manufacturer of computer peripherals, accessories, and software has introduced 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



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# PRODUCT NEWS

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.

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