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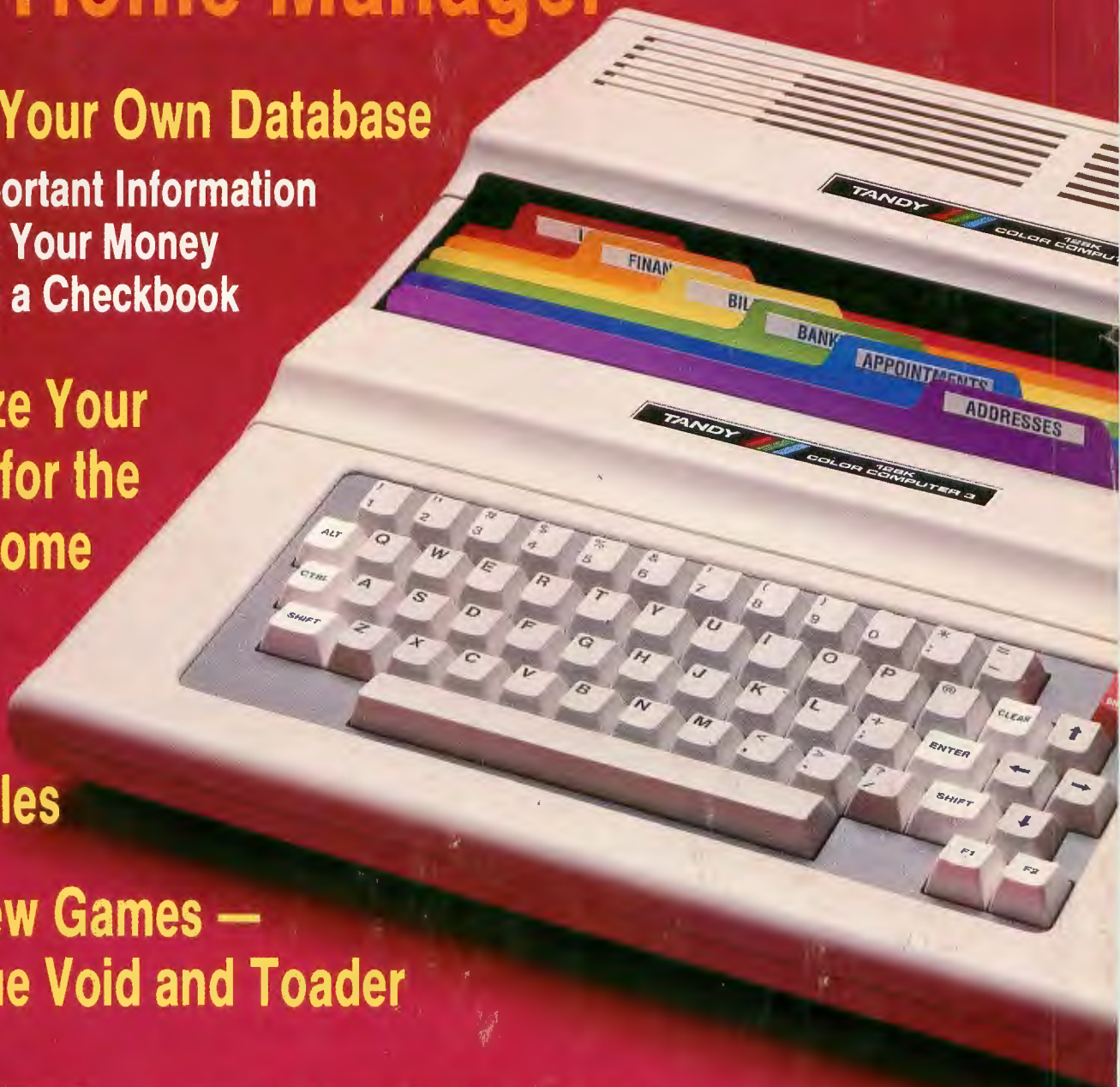
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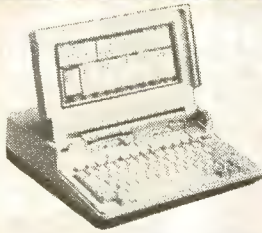
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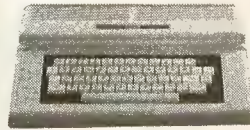
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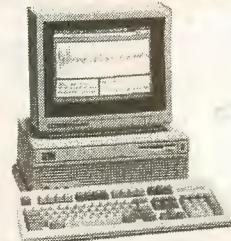
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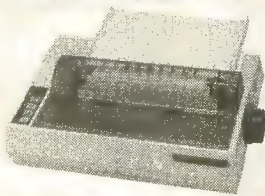
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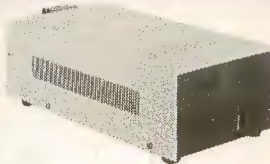
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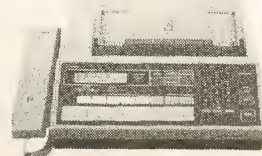
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## OS-9 Pride

### Editor:

Several years ago I bought my first CoCo — a 16K CoCo 2 with ECB and a CCR 81. Getting started was an ordeal — so much to learn and no one who shared my interests. Later I got a CoCo 3, and soon after that I was introduced to THE RAINBOW.

When I first saw THE RAINBOW in the bookstore, it was a sight for sore eyes. I could find no one in the local Radio Shack stores who knew about CoCos. The articles, ads and particularly the information on OS-9 opened up my world. I started adding to my machine — slowly.

By the time I had read a few months of THE RAINBOW (particularly Dale Puckett's column), I was ready to go for broke with OS-9. I was overwhelmed by the amount of information to digest, but soon I was involved in *The Complete Rainbow Guide to OS-9* and *OS-9 Level II: A Beginner's Guide to Windows*.

Once I had my system up and running, things really started to click. Now I feel like I'm in a whole new world. I quit my job and I'm back in school — taking computer programming courses. I love your advertisers and my new vocation. My only gripe is that I use MS-DOS machines at school. Those computers are like souped-up chain saws with dull chains. By comparison, OS-9 is so much more . . . everything. Those 16-bit tools may get the job done a little faster, but I have more fun with my CoCo 3. Many of you may say that OS-9 is difficult to learn, and maybe it is. But it's an affordable system that is very powerful. In a lot of ways it makes MS-DOS hide its head in shame. Just think: All this from a little 8-bit game machine.

Shan J. Gil  
Polson, Montana

## HINTS & TIPS

### Editor:

Just wanted to pass on a little help. I have finally found the printer codes I needed to get William J. Holdorf's *Appointment Calendar* (January '88, Page 100) to work with my system. If there are any other CoCo users with a SG-10 who are having trouble with the head controls in lines 2290 and 2340, my fix involves the "Skip 'n' Print Position." Modify lines 2290 and 2340 in the following manner:

```
2290 PRINT#-2,CHR$(27)CHR$(9B)CHR$(3)
2340 PRINT#-2,CHR$(27)CHR$(9B)CHR$(11)
```

You must also modify the DATA statements in lines 1690 and 1700 to center the month over the calendar.

If anyone has a fix to *DIR Print*, (February '88, Page 80) that works like mine, please let me know. My prints are still single-column (or double-column if I substitute CAT for DIR). All my printer codes check out.

Jerry R Ryals  
HHC DISCOM, Box 151  
Third Infantry Division  
APO NY 09701

## Need More Time?

### Editor:

I enjoyed Mark Webb's *Stock Ticker* (November '88, Page 45), I felt that I would enjoy it more if the bar chart remained on the screen a little longer. I'd like to share the following modification that Mark sent me:

```
1130 FOR PAUSE=1 TO 1500:NEXT PAUSE
1130 RENUM TO 1131
1131 RENUM TO 1132
1132 RENUM TO 1133
```

I sure hope Mark will continue to contribute programs to THE RAINBOW. Does he have any more good material up his sleeve?

Allen Clark  
St. Donat, Quebec

## BACK TALK

### Editor:

In answer to Andrew Martin's request for a patch to get *Profile* to run on Level II, here are patches for both the *Profile* and *MGT* programs. Both programs try to link to the Sys60, which is called CC360 in Level II and does a checksum on the module and then on the shell. I got around the first problem by renaming CC360, but the checksum on the shell gave me a "This is not a Color Computer" message.

The following patches change the execution offset of the modules past the checksum and move the first two instructions of the program to this new starting point. Use these patches on backup copies only. The Level II package does not include a SAVE command. However, the Level II developer's package does. You can also use Level I's SAVE command.

Use the BUILD command to create these files. Enter each line as shown:

```
l profile
c 09 11 12
c 1227 81 32
c 1228 59 c9
```

```
c 1229 26 04
c 122a f5 13
c 122b 35 9f
c 122c 70 09
v
```

```
l mgt
c 0a 00 43
c 543 81 32
c 544 59 c9
c 545 26 04
c 546 f5 13
c 547 35 9f
c 548 70 09
v
```

Then enter the following command lines:

```
load profile
modpatch propatch
save /d0/cmds/profile profile
unlink profile
load mgt
save /d0/cmds/mgt mgt
unlink mgt
```

Follow these lines and your profile disk will work on Level II. The only problem I have found with this patch is that on the startup screen the listing of address files does not always include all files. However, if you type the files' names, they will be loaded into memory properly. The program will work on an 80-column screen.

John Kwiatkowski  
Wilmington, Delaware

## INFORMATION PLEASE

### Editor:

Is there anyone out there with an RS DMP-105 printer who has gotten the two January '88 programs, *Appointment Calendar* (Page 100) and *Job Description* (Page 106), to print properly? If so, I would appreciate some help.

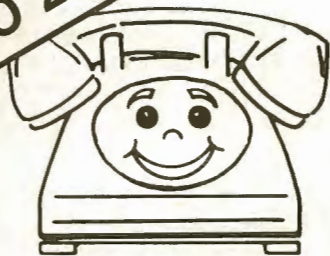
In addition, I'd like to hear from anyone in the Las Vegas, Nevada, area who has a CoCo 2 or 3 and a DMP-105. There are no clubs in this area; maybe we can start one.

Carl Rexrode  
6500 W. Charleston, #76  
Las Vegas, NV 89102

For CALENDAR, change CHR\$(3) to CHR\$(2), and change CHR\$(45) in the same line to CHR\$(155). This will correct the head positioning.

For JOBDISC, delete Line 900 and replace it with 900 GOTO 920. This will defeat the printer-online test. Otherwise, the program should run fine on the DMP-105.

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### REQUEST HOTLINE

*Editor:*

As a faithful reader of THE RAINBOW since September, 1982, I must say that your magazine has always been the best Color Computer magazine. In addition to its good articles, its reviews and comments have always helped me when buying both software and hardware.

Since 1989 will probably be the year for hard drives, it would be good to have a comprehensive article on this — comparing hardware and offering help about partitioning OS-9 and BASIC.

I hope to see such an article soon. Keep up the good work.

*Eduardo S. Prado, Jr.  
San Paulo, Brazil*

*Dr. Martin Goodman, M.D. has been diligently working on such an article. Expect to see it in next month's "More Power to Ya!" issue.*

### Let's Compare

*Editor:*

I like THE RAINBOW's reviews of hardware and software, but is it possible to add some comparison of the various programs

and hardware available? You could test the most-used printers, disk drives, word processors, etc. and compare their features. Maybe you could compile a table that identifies the features of various hardware or software.

*Serge Cote  
Hull, Quebec*

*See the upcoming issues of the RAINBOW for more comparative-type features of this sort.*

### KUDOS

*Editor:*

Five years ago I stood before a computer display and found myself unable to turn the unit on — much less have it do something useful. A couple of 10-year-olds not only turned it on but also managed to make it write their names and do whatever they chose. It was then that I decided I would not allow this technology to intimidate me any longer. I purchased my first CoCo. Slowly I became comfortable with computers both at home and at work. RAINBOW and RAINBOW ON TAPE and DISK made my education joyful and easy.

Games and programs like *VIP* and *Word Power* get regular use in our family, and my wife and our children are also computer-

literate. Thank you and keep up the good work.

*Herb Cober  
Thedford, Ontario*

### Author! Author!

*Editor:*

I would just like to tell you how much my husband and I enjoy your magazine. I have enjoyed keying in some of the programs listed in your magazine. I have also bought one month of RAINBOW ON DISK and really enjoyed all the programs on the disk.

I especially want to thank Arthur Hallock for his program *Letter Writer* (April '88, Page 48). When I could not use the program with my printer, I wrote Mr. Hallock, and he immediately wrote to tell me where to make changes in the program. I have written to him since with more questions, and he has answered each query within a week.

I also want to thank Rick Cooper, who contributed the program *States* (September '88, Page 60). After I entered that program, I couldn't get it to run. When I wrote to Mr. Cooper, he was most helpful.

It is so surprising to get help from strangers, especially when they are not getting paid extra for it. Thanks to all.

*Eileen M. Huggins  
Salem, New Hampshire*

## CONSUMER ALERT

Editor:

I understand that you make the money to publish your magazine from advertisements. However, I feel that I must write in reference to one of your advertisers: Hard Drive Specialist, of Houston, Texas. I placed an order with this company and charged it to my credit card. After two weeks and no merchandise, I called HDS. I got a real fast Texas Two-Step about back orders and availability. I waited another two weeks; still no merchandise. I called again. This time I was told that it would ship within one week.

Two days later, I found out that the order had been charged to my credit card 36 days prior to my last call. I called again and spoke with three people, the last one stating that she was the individual in charge of shipping. She started Two Stepping again about shipping within a week. I requested that the order be cancelled immediately and that the money be credited back to my credit card.

It has been 14 days since then, but I still have not received a credit back on my charge card.

As I have said, I understand that your magazine depends on advertisers. I just wish you had some way of eliminating companies like this.

Thank you for listening.

Melvin E. Mitts  
Hinesville, GA

We have received a number of complaints from readers recently regarding Hard Drive Specialist. The company's advertising has been suspended from both THE RAINBOW and our sister publication, PCM, until improvement in its service is indicated.

## A CoCo Success Story

Editor:

I suspect almost all of us have heard the condescending comments about the "Trash-80" Color Computer we own, about its limited memory, limited speed, limited everything. I'd like to comment on this.

I won a medal in national speech competition with a speech I wrote, edited, rewrote and formatted on a CoCo 2 (with the original software, no less). I'm 30 years old. Although I nearly did not graduate from high school and had been unemployed for three years, I graduated from a Commercial Foods and Management course as one of the top students because of the computer and math skills I gained on a CoCo 2.

I wrote a neat, two-page resume and printed 50 copies on my CoCo 2. Then I wrote two different forms of cover letters and wrote programs to insert the various addresses in them. Right out of school, I got

six interviews, three job offers (one in management) and a job. Of course, education made a big difference, but without my CoCo I would not have medals, self respect, new friends and a satisfying job.

Would another computer have served? I couldn't afford a different computer as a vocational student, so the point is moot. My CoCo was capable and paid for.

If people tell you that your CoCo isn't good enough, send them to me.

David B. Smith  
Grand Portage, Minnesota

## PEN PALS

• I am a 17-year-old Grade 12 student at St. Jerome's High School in Kitchener and would like to have pen pals from anywhere, but preferably close so we can meet sometimes. I have a 64K CoCo 2, one disk drive, a tape recorder and a DMP-130A printer. I like writing special-purpose programs and would like to help anyone with problems.

Anton Peter Milardovic  
8 Smetana Dr.  
Kitchener, ON  
Canada N2B 3B8

• I am a 16-year-old male and would like to hear from anyone in the United States. I prefer someone around my age, but I will answer anyone. I have a 64K CoCo 2, CoCo 3, disk drive, cassette recorder, Multi-Pak, DMP-130, RS Speech & Sound Pak and Orchestra 90. I am interested in music, graphics, machine language, Adventures and games.

Orman Beckles  
45 Meridian St.  
Malden, MA 02148

• I am 16 years old and looking for pen pals aged 14 to 21. I am interested in everything about my computer. I have a 64K CoCo 2, one FD 500 drive and a DMP-110. I welcome letters from all over the world.

Bednarek Luc  
Hanebergstr. 62  
3960 Beverlo  
Belgium

• I am 16 years old and have a CoCo 2 and 3. I use a cassette recorder but will soon add disk drives. My hobbies include computing, drawing and weight lifting. I prefer pen pals my own age.

Donald Kempton  
P.O. Box 425  
Athens, OH 45701

• I am 19 years old and have a 64K ECB CoCo 2, a disk drive, cassette recorder, and several printers. I would like to have a pen pal from anywhere in the United States, any age, any CoCo configuration.

Albert Noah  
P.O. Box 1142  
Marshall, NC 28753

• My brother and I are looking for pen pals from all over the country. We are: Scott, age 13, and Andy, age 14½. We have an ECB CoCo 2, DMP-105 and DMP-230 printers, DCM-3 modem, FD 502 disk drive, and a CCR-81 cassette recorder. We will do our best to respond to all letters.

Andy and Scott Brady  
51 Barberton Road  
Lake Worth, FL 33467

• I am 13 years old and would like some pen pals from all over the world. I own upgraded CoCos 1 and 2, a DMP-105, FD 502 and a Multi-Pak Interface. I love Adventure games and science. I will answer all letters — no age limits.

Juli Williams  
Star Rt. 24-2A  
Grafard, TX 76045

• I am looking for a pen pal who has the same setup as my system. So far, I have a 64K CoCo 2 and a cassette recorder. I am looking for someone who is a novice like myself who might be able to teach me more about this new computer of mine.

Patti French  
Rt. 2, Box 9  
Grafton, ND

• I am 30 years old, and I would like a few pen pals. I have a CoCo 2, a CoCo 3, a FD 501 disk drive and a tape recorder. I like all games, especially Adventures, war and karate games. I would especially welcome hearing from ladies.

Steven Smith  
1625 Parkside Dr. #B-5  
Bowling Green, KY 42101

• I'm 31 years old and own a CoCo 2, tape recorder and a DWP-230. My interests are BASIC and assembly programming (practical programs for me and games for my kids) and word processing. My other interests are history, literature, politics and religion. I will answer all letters.

Dan Weaver  
66 Bunn St.  
Amsterdam, NY 12010

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type RAI to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type LET to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.





# Word Power 3.2

"... friendly...amazing execution speed...much easier to use than VIP software & 2 other word processing systems I've tried...very user-friendly...massive text storage capacity...highest among word processors..." - Rainbow Oct. 88 Review for Word Power

**More Versatile • More Powerful With Spooler • Calculator • Split-Screen • 2-Column Printing**

Unparalleled Power packed in this 100% ML Word Processor written from scratch for the CoCo 3! No other word processor offers such a wide array of features that are easy to learn & use.

## DISPLAY & SPEED

Word Power 3.2 runs at double-clock speed and uses the true 80-column display with lowercase instead of the graphics screen. The result is lightning fast screen reformatting and added speed! All prompts are displayed in plain English in neat colored windows. The current column number, line number, page number, percentage of free memory is displayed at all times. Even the page break is displayed so you know where one page ends and the other begins. The Setup program allows you to change fore/background colors as well as (in)visible carriage returns. Word Power 3.2 can be used with RGB/Composite/Monochrome monitors as well as TV.

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## MAXIMUM MEMORY

Word Power 3.2 gives you over 72K on 128K and over 450K on 512K CoCo 3 for Text Storage - more memory than any other CoCo word-processor. Period.

## EFFORTLESS EDITING

Word Power 3.2 has one of the most powerful and user-friendly full-screen editor with word-wrap. All you do is type. Word Power takes care of the text arrangement. The unique Auto-Save feature saves text to disk at regular intervals for peace of mind.

Insert/Overstrike Mode (Cursor Style Changes to indicate mode); OOPS Recall during delete; Type-ahead Buffer for fast typers; Key-Repeat (adjustable); Key-Click; 4-way cursor and scrolling; Cursor to beginning/end of text, beginning/end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, to beginning/end of line, complete line, text before/after cursor; Locate/Replace with Wild-Card Search with auto/manual replace; Block Mark, Unmark, Copy, Move & Delete; Line Positioning (Center/Right Justified); Set/Reset 120 programmable tab stops; Word-Count; Define Top/Bottom/Left/Right margins & page length. You can also highlight text (underline-with on-screen underlining, bold, italics, superscripts, etc.). Word Power even has a HELP screen which can be accessed any time during edit.

## SPLIT-SCREEN EDITING

Splits the screen in half so you can view one portion of your text while you edit another. You'll love it!

## MAIL-MERGE

Ever try mailing out the same letter to 50 different people? Could be quite a chore. Not with Word Power 3.2! Using this feature, you can type a letter, follow it with a list of addresses and have Word Power print out personalized letters. It's that easy!

## CALCULATOR

Pop-up a 4-function calculator while you edit! Great for tables!

## SAVING/LOADING TEXT

Word Power 3.2 creates ASCII format files which are compatible with almost all terminal/spell-checking & other word-processing programs. Allows you to Display Free Space, Load, Save, Append & Kill files. The ARE YOU SURE? prompt prevents accidental overwriting & deletion. You can select files by simply cursoring through the disk directory. Supports double-sided drives & step-rates.

## PRINTING

Word Power 3.2 drives almost any printer (DMP, EPSON, GEMINI, OKIDATA, etc). Allows options such as baud rates, line spacing, page/print pause, partial print, page numbering/placement, linefeeds, multi-line headers/footers, right justification & number of copies. The values of these parameters & margins can be changed anytime in the text by embedding Printer Option Codes. The WHAT YOU SEE IS WHAT YOU GET feature allows you to preview the text on the screen as it will appear in print. You can view margins, page breaks, justification & more.

## PRINT SPOOLER

Why buy a hardware Print Spooler? Word Power 3.2 has a built-in Spooler which allows you to simultaneously edit one document & print another.

## TWO-COLUMN PRINTING

This unique feature allows you to print all or portion of your text in two columns! Create professional documents without hours of aligning text.

## SPELLING CHECKER



Word Power 3.2 comes with spelling checker/dictionary which finds & corrects mistakes in your text. You can add words to/delete words from dictionary.

## PUNCTUATION CHECKER

This checker will proofread your text for punctuation errors such as capitalization, double-words, spaces after periods/commas, and more. Its the perfect addition to any word processor.

## DOCUMENTATION

Word Power 3.2 comes with a well-written instruction manual & reference card which makes writing with Word Power a piece of cake! Word Power 3.2 comes on an UNPROTECTED disk and is compatible with RSDOS. Only \$79.95

(Word Power 3.1 owners can get Word Power 3.2 Upgrade FREE by sending proof of purchase & \$5.00 to cover S&H costs & instructions)

**MICROCOM SOFTWARE**    

All Word Power 3.2 orders shipped by UPS Next Day Air at no extra charge within the Continental US. Offer good thru January 15, 1989.

To Order & for info on FREE Gifts: Refer to Page 17 of our 6-page Ad series (Pgs. 9-17)

Credit Card Toll Free Orderline 1-800-654-5244 (9am-8pm 7days/week)

Order Status, Info, Technical Info: 716-383-8830





## Here to Stay

**L**as Vegas — I am pretty worn out right now. It's someone's fault, but I am not sure exactly whose fault it is. I think it is Frank Hogg's fault, but he denies responsibility. If Frank is right, which does happen on occasion, it could be Gordon Monnier's fault. Of course, I have yet to see Gordon here this time.

A fine Texas gentleman, Dick Hatcher, is really ultimately to blame. It was Dick — when he worked with a Color Computer software company called ANTECO — who lured me to this desert town for the Consumer Electronics Show about six or seven years ago. But Dick fled to Thailand. And while he is back in this country (and a renewed subscriber to *RAINBOW* and a new one to PCM), it is hard to cast the blame at his feet.

No, either Frank or Gordon talked me into coming to COMDEX for the first time.

Frank denies it because he says he has never come to COMDEX, only to the now-gone and not-too-lamented National Computer Conference. But I seem to recall his egging me on to go, so I am not sure that he did not send me out as a scout one time.

Gordon, of course, has been here a lot. In fact, Falsoft and MichTron have shared booths on occasion here. Gordon sold software, and we sold magazines (although not too many of them). At least not at COMDEX.

As many of you know, COMDEX is the computer show of the year. This is the 10th annual running of this attraction, which now covers entire exhibit halls in five major hotels and the Las Vegas Convention Center. The famous West Hall of the Convention Center was built by COMDEX (so the story goes) for Las Vegas, so there would be adequate space. There are also some exhibits in something called the "Cashman Field Center," which I guess I will find before I head back to Kentucky.

# Max-10™

Best Desktop Publishing / Document Creator for the CoCo 3. Features Pull Down Menus, What You See Is What You Get, UNDO, integrated text & graphics capability, multiple fonts & more. Graphics can be imported from CoCo Max I,II,III, MGE, MGF, 5 Level DS-69, PMODE 4, HSCREEN 2/3 pictures. Supports: DMP 105/130, EPSON MX/FX/RXLX/ Gemini 10 Series, CGP-220 and OKI-92. Only \$79.95



Create distinctive bright yellow diamond shaped car signs. Includes 2 reusable clear plastic sign holders with suction cups, and 50 sheets of bright yellow fan-fold paper. Printer Requirements are the same as for the CoCo Graphics Designer. Only \$29.95

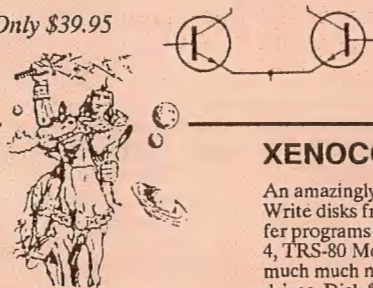
Font Disk #1,#2 for CoCo Graphics Designer: \$19.95 each

## COLOR SCHEMATIC DESIGNER

By Prakash Mishra  
An excellent Circuit Schematic Design Software Package for CoCo 3. Features:

- \* Runs in 640x192 at 1.8 Mhz
- \* Pull Down Menus
- \* Keyboard/Mouse/Joystick Support
- \* RGB/ Composite/Monochrome Monitor Support
- \* 72 Modifiable Symbols
- \* Multiple Hi-Res Fonts
- \* Multiple UNDO Command
- \* Symbol Rotate/Line/Box Draw
- \* Supports 3 Layers of Circuits
- \* Powerful Screen Print Command
- \* Complete Documentation

Only \$39.95



for

## RSB

A Revolutionary Program that allows you to use Basic Programs from OS9!

OS9 Level 2 is the future of the CoCo. Unfortunately, most Basic Programmers are "afraid" of using OS9 because it is completely different from Basic.

Introducing RSB from Burke & Burke. It converts RS-DOS into an OS9 "shell" and allows you to program in Basic from under OS9! You can even take advantage of the OS-9 "built-in" windows to run several BASIC programs at once! And RSB always runs at the full 2 Mhz speed of the CoCo!

If you're new to OS9 or you simply want to take advantage of the advanced features of the OS9 operating system, RSB is for you. Req. OS9 L II. Only \$39.95

### ULTRAPATCH SYSTEM

by Randall Reid

Patches the Superpatch EDTASM + ® for 80 columns, 47K Buffer (approximately 3000 lines!) & more. Req CoCo 3. Only \$19.95

### GAMES

(Disk only)  
(CoCo 1,2 & 3 except where mentioned)

- WARRIOR KING (CoCo 3): \$29.95
- IN QUEST OF STAR LORD (Animated Graphics Adventure for CoCo 3): \$34.95 Hint Sheet: \$3.95
- HALL OF THE KING 1,2,3: \$29.95 Each Trilogy: \$74.95
- FLIGHT 16: \$34.95
- P-51 MUSTANG SIMULATION: \$34.95
- WORLDS OF FLIGHT: \$34.95
- PYRAMIX (Cubix for CoCo 3): \$24.95
- KUNG FU DUDE: \$24.95 CHAMPION: \$19.95
- WHITE FIRE OF ETERNITY: \$19.95
- QUEST FOR THE SPIRIT STONE (CoCo 3): \$18
- WARGAME DESIGNER (CoCo 3): \$29
- TREASURY PACK #1: Lunar Rover Patrol, Cubix, Declathon, Qix, keys of Wizard, Module Man, Pengon, & Roller Controller. Only \$29.95
- TREASURY PACK #2: Lancer, Ms. Gobbler, Froggie, Madness & Minotaur, Ice Castles, Galagon, Devious. Only \$29.95
- SPACE PAC: Color Zap, Invaders, Planet Invasion, Space Race, Space War, Galax Attax, Anaroid Attack, Whirlybird, Space Sentry & Storm Arrows. Only \$29.95
- WIZARD'S CASTLE: A hi-res graphics adventure game filled with traps, tricks, treasures. Only \$19.95
- CLASSIC PAK: Treasury Pack 1, 2, Space Pac & Wizards Castle: Only \$59.95

### XENOCOPY-PC

An amazingly versatile program that allows you to Format/Duplicate / Read/ Write disks from over 300 different computers. For example you could transfer programs between CoCo, IBM, PC-DOS, TRS-80 Model 3, TRS-80 Model 4, TRS-80 Model 100, Xerox 820, Zenith, Kaypro II, Novell, NEC DOS and much much more!! Send for FREE List. Requires an IBM Compatible with 2 drives. Disk \$79.95.

### 512K BACKUP LIGHTNING

(From Colorventure)  
The ultimate CoCo 3 disk copying utility!! Reads your master diskette once and then makes as many copies as you want. It automatically formats an unformatted disk while copying! Supports 35, 40 or 80 track drives with various step rates. A must for any disk user!! Only \$19.95

### PRINTER LIGHTNING

(From Colorventure)  
Never wait for your printer again!! This Print Spooler allows you to print to your printer and simultaneously continue with your programming. No need to wait for those long printouts! Disk Only \$19.95

### BASIC FREEDOM

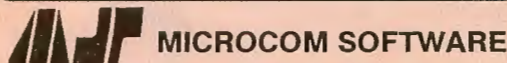
A Full Screen Editor for Basic Programs!! A Must for anyone who writes Basic Programs. Only \$24.95

### VOCAL FREEDOM

Turn your computer into a digital voice / sound recorder. Produces natural voices/ sound effects. Req. inexpensive RS Amplifier (#277-1008) & any microphone. Only \$34.95

### HACKER'S PAC

Allows you to incorporate voices created by Vocal Freedom into your own Basic and ML programs. Only \$14.95



To Order & for info on FREE Gifts: Refer to Page 17 of our 6-page Ad series (Pgs. 9-17) →

Credit Card Toll Free Orderline 1-800-654-5244 (9am-8pm 7days/week)

Order Status, Info, Technical Info: 716-383-8830



It has always been a mammoth job covering this show. The Las Vegas Convention Center itself, which is all there was in the early stages, is so huge that it takes a couple of days to cover — as long as you don't stop to look too long at things. This makes your legs hurt, your feet ache, your arms sore from carrying literature and (worst of all) gives you Las Vegas Throat. You see, this is the desert — no sand dunes or anything, but desert nevertheless. And *desert* means dry. If you talk a lot, you dry out your throat. Some of the professional entertainers have little steam machines attached to their microphones; when they inhale, they get moisture. The closest you get to moisture at the Las Vegas Convention Center during COMDEX is the refreshment stand. And there's a line.

All this is leading up to what I was going to write about, but it would not be fair if you did not know of the terrible privation I am now going through in order to bring you this news. Ah, the woes of a correspondent on assignment!

\* \* \*

What I was going to write about is this: When we did come to COMDEX in the early years, we used to bemoan the fact that only three or four Color Computer software companies ever exhibited anything.

There was, indeed, quite a mishmash of just about everything. As the so-called IBM Standard began to develop with the introduction of the IBM PC, however, there were fewer and fewer alternate computer systems.

About three years ago, Gordon and I were the only ones who had booths that had anything to do with the CoCo. What was interesting, however, was that out of the increasingly pin-striped, button-down crowd, we attracted a hundred or so people who did, indeed, have CoCo's.

They are with us still. Though there is no practical reason for us to have a booth here any more, it is amazing how many people you come to meet in a business over the years, even one as ever-changing as the computer business. Walking around today, getting sore feet, aching legs and the oncoming symptoms of Las Vegas Throat, I was

stopped by a good dozen or so people who wanted to talk about their CoCos and THE RAINBOW.

A small ripple, you say? Yes, of course. But the truth of the matter is that you would have to be at COMDEX to see the overwhelming hold the so-called IBM Standard has on the overall computer industry (and the overwhelming amount of money you could spend on these systems).

Yet here we are. Not seeking out members of the CoCo Community, but finding them everywhere. More interesting, I really do not see, among 1700-plus exhibitors, many products that cannot be run on some version of our Color Computer. I won't even mention the cost of doing so on anything else.

In 1998, I expect to be at the 20th COMDEX and to need a power scooter to see the whole thing. I also expect there to be a thriving CoCo Community and a RAINBOW to support it.

There is something unique about the Color Computer, and I happen to think it is wonderful. I am sure you agree.

— Lonnie Falk

## Real BASIC for OS9!

Only \$39.95!

R.S.B. is a complete, OS9-compatible version of Disk Extended Color BASIC. Burke & Burke has added new software to give you OS9-style graphics, sound, printer, and disk I/O. The BASIC you know and love is now running under Level 2 OS9 windows!

R.S.B. loads and saves files using OS9's file format. The R.S.B. package includes utility programs that let you transfer BASIC programs and data files between OS9 and BASIC disks. Of course, you can't use R.S.B. to run machine language programs, and some BASIC commands work slightly differently under R.S.B.

Your BASIC programs can take full advantage of great OS9 features like hard disks, no-halt floppies, multi-tasking, and 2 MHz operation.

R.S.B. requires a CoCo 3 with at least 128K RAM, a floppy disk controller with either Tandy Disk Extended Color BASIC or DISTO CoCo 3 CDOS ROM, and Level 2 OS9.



Works with all hard & floppy disk systems!

**R.S.B. \$39.95**

Runs in 128K; 512K preferred.

### Wild & MV Version 2.1

Use "wildcards" with most OS9 commands, or rearrange your directory tree. Features recursive directory searches. A hard disk must! \$19.95

### EZGen Version 1.04

Powerful OS9 bootfile editor. Change module names, add or delete modules, patch bytes, or rearrange modules. Works on other files, too. \$19.95

### OS9 Utilities



# Burke & Burke

P.O. Box 1283 Palatine, IL 60078-1283 (312) 397-2898

ILLINOIS RESIDENTS PLEASE ADD 7% SALES TAX. COD's add \$2.20. Shipping (within the USA) \$2.00 per CoCo XT; \$1.50 per disk or ROM. Please allow 2 weeks for delivery (overnight delivery also available for in-stock items). Telephone orders accepted (312) 397-2898.

1989 New Year's Resolutions

- 1) Learn OS9
- 2) Buy a Hard Disk
- 3) Clean Garage

### CoCo XT Facts

Answers to common questions about the CoCo XT

- A true "NO HALT" hard disk system
- Controls 1 or 2 hard drives
- Full ECC / CRC error correction
- Average access 30% faster than SASI
- Uses PC-type hard disk controllers & hard drives
- Does not use or disable interrupts
- Compatible with most RS-232 interfaces
- 20 Meg system cost: under \$450
- Requires Multi-PAK or "electric" Y-cable

### Hard Disk Interfaces



We've sold hundreds of our affordable, high-performance hard disk interfaces to Color Computer enthusiasts worldwide!

Each includes an anodized housing, 100 page user manual, and software for use with OS9. The CoCo XT-RTC adds a battery-powered real time clock / calendar for OS9 and BASIC.

CoCo XT \$69.95  
CoCo XT-RTC \$99.95

XT-ROM: Install XT-ROM in your hard disk controller's BIOS ROM socket. It automatically boots and reboots OS9 from your hard disk. \$19.95

Buy a drive, Western Digital controller, and case from the PC dealer of your choice. Plug them into the CoCo XT, plug the CoCo XT into your Multi-PAK, and install the OS9 or BASIC software. Presto!

### HYPER-I/O Now BASIC runs hard drives, big floppies, and more!

HYPER-I/O modifies the RS-DOS BASIC in your CoCo 1, 2, or 3 to provide a "Dynamic Disk Interface". Use your existing BASIC and RS-DOS software with hard disk interfaces (CoCo XT, DISTO, LR), RAM Disks, and any mix of floppy drives from 160K to 720K each. Fully RESET protected, user configurable, expandable, EPROM-able HYPER-I/O V2.6 is the most versatile hard / floppy disk DOS available. Please specify HYPER-I/O, DISTO HYPER-I/O, or LR HYPER-I/O when ordering.

**\$29.95**

HYPER-III (Adds RAM Disk and Print Spooler to HYPER-I/O on the CoCo 3) \$12.95

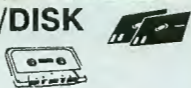


VISA

# COCO 3 UTILITIES GALORE

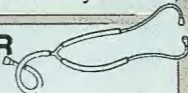
(CoCo 2 Versions Included where specified)

## SUPER TAPE/DISK TRANSFER



\* Disk-to-Disk Copy \* Tape-to-Disk Copy  
\* Tape-to-Disk Auto Relocate  
\* Disk-to-Tape Copy \* Tape-to-Tape Copy  
Copies Basic/ML/Data Files. CoCo 1,2 or 3.  
Req. min. 64K Disk System. Disk Only **\$24.95**

## COCO CHECKER



Something possibly wrong with your CoCo? CoCo Checker is the answer. Will test your ROMs, RAMs, Disk Drives & Controller, Printer, Keyboard, Cassette, Joysticks, Sound, PIAs, VDG, Internal Clock Speed, Multi-Pak Interface and more! Only **\$24.95**

## DISK UTILITY 2.1A



A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename & kill file entries. Lightning fast Disk I/O for format, copy & backup. Single key execution of Basic/ML programs. This will become your MOST USED program!! CoCo 1,2 or 3. Req. Min. 64K. Disk Only **\$24.95**

## MAILLIST PRO



The ultimate mailing list program. Allows you to add, edit, view, delete, change, sort (by zip-code or name) and print labels. Its indispensable!! Disk **\$19.95** (CoCo 2 version included)

## DISK LABEL MAKER

Allows you to design professional disk labels! Allows elongated, normal and condensed format for text. Double Strike, Border Creation, and multiple label printing. Its a MUST for any user with a disk drive. Supports DMP 105/106/110/120/ 130/430, GEMINI, STAR, EPSON and compatibles. (CoCo 2 version included). Only **\$19.95**

## COCO UTIL II



(Latest Version): Transfer CoCo Disk files to IBM compatible computer and vice-versa. Requires 2-Drive IBM Compatible. Disk **\$39.95**

## RGB PATCH

Displays most games in color on RGB monitors. CoCo 3 Disk **\$24.95**

## COMPUTERIZED CHECKBOOK



Why bother with balancing your checkbook? Let the CoCo do it for you. Allows you to add, view, search, edit, change, delete and printout (in a table/individual entry format) checkbook entries. Updates balance after each entry. Allows files for checking, savings, and other accounts. Disk **\$19.95**. (CoCo 2 version included)

## BOWLING SCORE KEEPER



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# OS 9

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## How To Read Rainbow

When we use the term CoCo, we refer to an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

The BASIC program listings printed in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character “goes under” what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have “key boxes” to show you the *minimum* system a program needs. But, do read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service.

## Using Machine Language

The easiest way to “put” a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of putting an ML listing into CoCo is called “hand assembly” — assembly by hand, which *sometimes* causes problems with ORIGIN or EQUATE statements. You ought to know something about assembly to try this.

Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200, &H3F00: I=&H3FB0
20 PRINT "ADDRESS: "; HEX$(I);
30 INPUT "BYTE": B$
40 POKE I, VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of I to &H7FB0.

## OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: CMDS and SOURCE. It also contains a file, read.me.first, which explains the division of the two directories. The CMDS directory contains executable programs and the SOURCE directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the SOURCE directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9

programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't “learned” OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

- 1) Type `load dir list copy` and press ENTER.
- 2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the system master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
- 3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
- 4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the CMDS directory, enter `dir cmds`. Follow a similar method to see what source files are in the SOURCE directory.
- 5) When you find a program you want to use, copy it to the CMDS directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmcs/ filename /d0/cmcs/ filename -s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmcs/ filename /d0/cmcs/ filename`

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

## The Rainbow Seal



The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification.

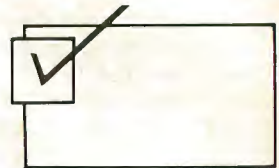
The Seal is not a “guarantee of satisfaction.” The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product per-

taining to CoCo. A Seal will be awarded to any commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

## Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a “check sum” system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use Rainbow Check PLUS, type in the program and save it for later use, then type in the command `RUN` and press ENTER. Once the program has run, type `NEW` and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since Rainbow Check PLUS counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 159, 166, 166, 132, 28, 254
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

# Books That Can Launch A 1000 Programs!!

**Pokes, Peeks and Execs** are your guides into the jungle of computer programming. These commands give you the power of Machine Language without leaving the security of BASIC. Each book is a collection of "inside" information, with explanations and examples to help you immediately put it to use. Everyone from the novice to the professional will find these handy books a wealth of information.

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- SUPER EXTENDED BASIC UNRAVELLED: SUPER EXTENDED BASIC ROM Disassembly for CoCo 3. \$24.95
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- CoCo 2 Service Manual: \$29.95
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- Rainbow Guide To OS9 Level II: \$19.95
- Rainbow Guide To OS9 II (disk): \$19.95
- Complete Guide To OS9 (Level 1): \$19.95
- Complete Guide To OS9 (2 Disk): \$29.95
- CoCo 3 Secrets Revealed: \$19.95
- Basic Programming Tricks: \$12.95
- Assembly Language Programming(tepeco): \$18
- Addendum For CoCo3 (tepeco): \$12
- Color Computer Disk Manual (with ref card): \$29.95
- Start OS-9 (Book & Disk): \$32.99

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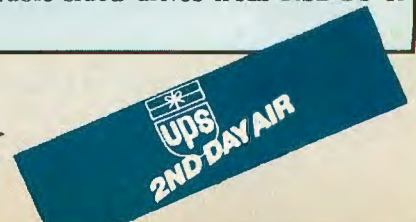
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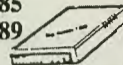
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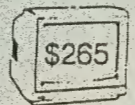
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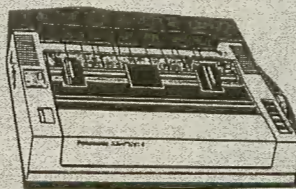
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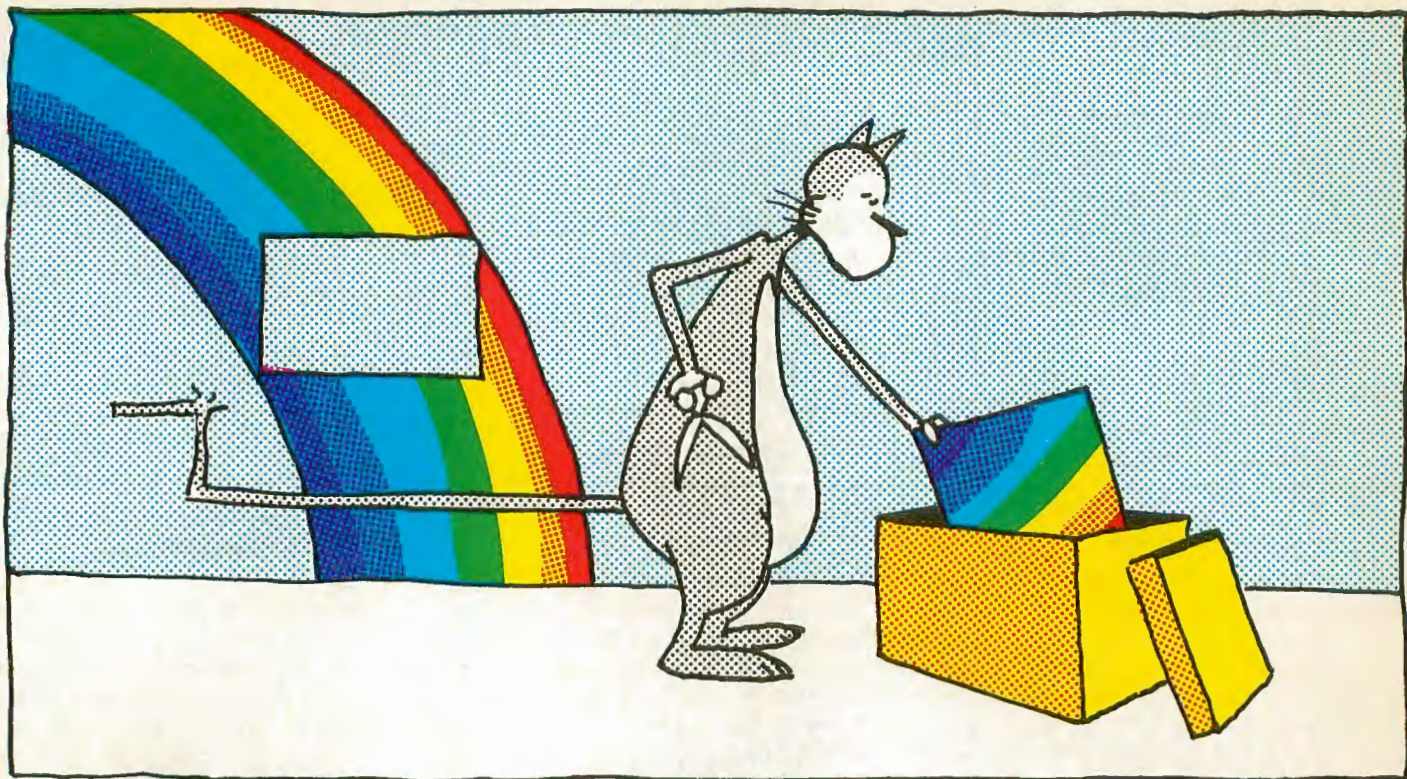
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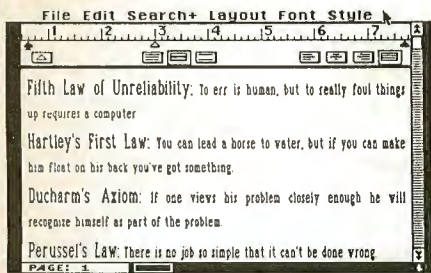
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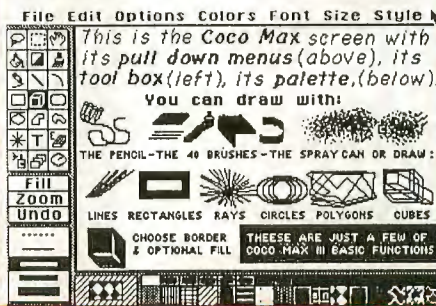
The latest in CoCo word processors and the only one with true WYSIWYG (What You See Is What You Get) output. Mix graphics with text. Max-10 is great for anything from greeting cards up to newsletters. Just turn the next page for a full list of Max-10's unbelievable features.



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The ultimate graphics creation program. See the list of features on the next page. Also read the superb review in *The Rainbow*, April 1988.



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- Longhand 24
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# REAL DESKTOP

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# AND



CoCo Max III is absolutely the best drawing package available for the CoCo 3, and it does more than just let you draw. CoCo Max III includes animation, text, color mixing and more features than you would think possible. It combines incredible speed with dazzling graphics and it is a joy to use even its most powerful features.

Pictures, graphs, flyers, cards, signs, school projects, labels, buttons and anything else you might dream of creating is now possible with CoCo Max III. Is it any wonder that the majority of CoCo Gallery pictures in the last five months were created with CoCo Max?

Thousands of CoCo users have found that you don't have to be an artist to have fun with CoCo Max. You'll wonder why you waited so long to get the incredible CoCo Max III.

CoCo Max III is the best because it includes:

- a huge picture area (two full hi-res 320x192 screens)
- a large editing window
- Zoom mode for detail work
- 28 drawing tools which you just point and click on
- shrink and stretch
- rotation at any angle (1.5 degree steps)
- 512K memory support (all features work with 128K too)
- an Undo feature to correct mistakes - you can even Undo an "Undo"
- Animation
- special effects
- color sequencing (8 colors, variable speed)
- thirteen fonts (more available)
- each font has eight different sizes
- five style options (bold, italic, 3D, etc.) for thousands of font/size/style combination possibilities.
- the CoCo Show "slide show" program
- color editing of patterns
- automatic pattern alignment
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- spray can
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- Y-cable or multipack not required
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- disk is not copy protected
- amazing "flowbrush"
- RGB and composite monitor support
- replace color
- printing on black and white printers in five shades of gray
- full color printing with optional drivers for the NX-1000 Rainbow and CGP220
- entirely rewritten for the CoCo 3

There are no limits to what you can do with this fabulous program. Speed, ease, animation, power and color, all in one package. CoCo Max III is the ultimate program for the CoCo 3. -Rainbow review 4/88

### CoCo Max III: \$79.95

Max-10 owners: deduct \$10

#### System Requirements:

CoCo 3 disk system and a Joystick or Mouse

#### Printer drivers included:

IBM/Epson and compatibles, GEMINI, DMP105/106/130, OKI182/192, CGP220 (B&W), DMP110, DMP200

**Color printer drivers** (prints 125 different colors) Star NX-1000, CGP-220, or Okimate 20 each **\$19.95**

### For all CoCo Max Versions

**Max Edit Font Editor:** A font is a set of characters of a particular style. With Max Edit you can create new fonts or modify the existing ones. **\$19.95**

**Max Font disks** (send for list) each **\$19.95**

**Max Font Set** (95 fonts on 4 disks) **\$49.95**

**DS69/69B Digitizers:** allows you to capture the image from a VCR or video camera and bring it into your computer. CoCo Max will let you load digitized pictures and modify them.

**DS-69** (2 images per second. Requires multipak) **\$99.95**

**DS-69B** (8 images/second) **\$149.95**

### CoCo 1 & 2 Owners

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(See previous ads or write for information)

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set of 3 disks: **\$29.95**

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# PUBLISHING

COLORWARE

# Max-10

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You probably already have a word processor, and you probably wish it had these features:

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- ▶ True WYSIWYG (What You See Is What You Get) including variable size fonts, styles (bold, italics, etc.) and graphics.
- ▶ Can print multiple columns on a page.
- ▶ Not limited by printer capabilities: fonts up to 24 points (1/3") high, superscripts, small print, etc.
- ▶ Fully integrated spelling checker (incredibly fast), no need to exit program to check spelling.
- ▶ Graphics can be imported from just about anything (CoCo Max; MGE; BASIC; even Macintosh pictures from a BBS) and resized to fit your document.
- ▶ Full screen preview including graphics.

Max-10 has all these unique features, plus all the features you are used to in your current word processor. Even with all this, you don't give up anything. Max-10 is easier to use, more intuitive, faster and more powerful than anything else. It's not just a word processor, it's a desktop publisher.



Some of the many features of Max-10:

- Blinding speed - printing in multiple columns - online dictionary
- spell checking - graphics can be mixed with text - full justification of proportionally sized characters - bold, italic, underline superscript and subscript type styles - superb file support, just point and click - "Undo" lets you correct mistakes - easy to use, no commands to remember - any graphics program can be used
- pictures can be shrunk or stretched to fit - right and left alignment - centering - variable line spacing - page numbering - current page number displayed on the screen - variable tab stops - left and right margins - tabs and margins can vary in the same document
- cut and paste text and graphics anywhere in the file - page break shows on the screen - pull down menus are quick and simple to use
- lightning fast access to any point in the document with the scroll box - twenty fonts (styles and sizes), more available - any number of character sizes and styles can be mixed on the same line - up to more than 120 characters per line, depending on font size, style and letters - headers and footers, even with graphics - file compatibility with other word processors - right, left, bottom and top margins
- word wrap - set starting page - type ahead - key repeat - key click - scroll up and down - ASCII file output for compatibility
- disk directory - kill files- block cut, copy and move - global search and replace - paragraph indent - clipboard - merge - show file (on disk) - free memory display - page count - paragraph count - word count - graphics can be resized and moved - multiple fonts - error recovery - true lowercase - 512K memory support (all features work with 128K too) - complete point and click cursor control - moving, clearing and changing blocks of text is ridiculously easy, just point and click at each end of the text block - onscreen ruler - preview file before loading - search and replace - disk is not copy protected - more than 35 pages of text



## CoCo Max III and Max-10 Perfect Together

You do not need CoCo Max III to insert and print graphics in Max-10. Max-10 works with any graphics creation program, and you can also use graphics downloaded from bulletin boards.

Similarly, you do not need Max-10 to create graphics with text in CoCo Max III. There are tremendous lettering capabilities in CoCo Max III, with its many fonts, styles, and sizes.

Together Max-10 and CoCo Max III are an unbeatable combination. This desktop publishing system is better than anything you've ever seen on a CoCo. We are so confident that you will use, and enjoy using the two software packages, that we offer an unconditional money back guarantee. Stop wasting your time and effort using inferior or obsolete products. Move up to the new generation of CoCo software now.

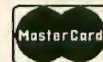
Max-10: \$79.95

CoCo Max III owners: deduct \$10

Max-10 requires a CoCo 3, at least 1 disk, & joystick or mouse  
Printer drivers included: IBM/Epson and compatibles; DMP  
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-Cray Augsburg, June '88 Rainbow Review

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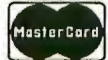
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VIP Writer III comes with a configuration / printer installation program which lets you customize VIP Writer III to suit your own liking. You can set screen width and colors as well as margins and more. You can also install your own printer and set interface type (serial, parallel or J&M), baud rate, line feeds, etc. Once done, you never have to enter these parameters again! VIP Writer III will load & go with your custom configuration every time!

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VIP Writer III has 106K total text storage in a 128K CoCo 3 (495K in 512K). VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII files. You can use VIP Writer III to even type BASIC programs! There is a 48K text buffer (438K in a 512K CoCo 3) and disk file linking allowing virtually unlimited text space. VIP Writer III works with up to four disk drives and lets you display directories and free space as well as rename or kill disk files. In addition VIP Writer III is 100% compatible with the RGB Computer Systems Hard Disk.

### POWERFUL EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead • typamatic key repeat and key beep for flawless text entry • end of line bell • full four way cursor control with scrolling • top of textfile • bottom of textfile • page up • page down • top of screen • bottom of screen • beginning of line • end of line • left one word • right one word • DELETE character, to beginning or end of line, word to the left or right, or entire line • INSERT character or line • LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards • BLOCK copy, move or delete with up to TEN simultaneous block manipulations • TAB key and programmable tab stops • word count • line restore • three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and multiple copy printing.

Writer III or Library /W owners: Upgrade to the VIP Writer III 2.0 for \$10 + \$3 S/H. Send ORIGINAL disk and \$13 total.

### AUTOMATIC TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! Parameters can be altered ANYWHERE!

### PREVIEW PRINT FORMAT WINDOW

VIP Writer III features an exclusive format window which allows you to preview your document BEFORE PRINTING IT! You are able to move up, down, left and right to see centered and justified text, margins, page breaks, broken paragraphs, orphan lines etc.

### PRINTING VERSATILITY

VIP Writer III prints TWICE as fast as any other CoCo word processor! It supports most serial or parallel printers using J&M JFD-CP or Rainbow interface and gives you the ability to select baud rates from 110 to 19,200. You can imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has TWENTY programmable printer macros which allow you to easily control all of your printers capabilities such as bold, underline, italics and superscript using simple key strokes. Other features include: multiple copy printing • single sheet pause • line feeds.

### BUILT IN PRINT SPOOLING

VIP Writer III has a print spooler with a 57,000 character buffer which allows you to print one document WHILE you are editing another. You don't have to wait until your printer is done before starting another job! Some word processors DO NOT include this feature!

### 50,000 WORD SPELLING CHECKER

VIP Writer III includes VIP Speller (not FREEWARE) to check your text for misspelled words. It has a 50,000 (not 20,000) word dictionary that can be added to or edited.

### QUALITY DOCUMENTATION

VIP Writer III comes with a well written 125 page manual which is Laser printed, not dot-matrix like the competition. It includes a tutorial, glossary of terms and examples for the beginner as well as a complete index! VIP Writer III is truly the BEST you can buy.

VIP Writer III includes VIP Speller 1.1. DISK \$79.95

Available through Radio Shack Express Order Cat. #900-0908

VIP Writer owners: Upgrade to the VIP Writer III 2.0 for \$49.95 + \$3 S/H. Send ORIGINAL disk and \$52.95 total.

## VIP Database III

VIP Database III features selectable screen displays of 40, 64 or 80 characters by 24 lines with choice of 64 foreground, background, hilite and cursor colors for EASY DATA ENTRY. It uses the CoCo 3's hardware screen and double clock speed to be the FASTEST database available! VIP Database III will handle as many records as will fit on your disks and is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. IN-MEMORY SORT of records is LIGHTNING FAST and provides for easy listing of names, figures, addresses, etc., in ascending or descending alphabetical or numeric order. Records can be searched for specific entries using multiple search criteria. The built-in mail-merge lets you sort and print mailing lists, print form letters, address envelopes - the list is endless. The built-in MATH PACKAGE even performs arithmetic operations and updates other fields. VIP Database III also has a print spooler and report generator which uses print forms you create. DISK \$69.95

Available through Radio Shack Express Order Cat. #900-0915

VIP Database owners: Upgrade to the VIP Database III for \$39.95 + \$3 S/H. Send ORIGINAL disk and \$42.95 total.

## VIP Library /WDCE

The VIP Library /WDCE combines all six popular VIP application programs - VIP Database III, VIP Writer III, VIP Speller, VIP Calc III, VIP Terminal and VIP Disk-ZAP - into one program on one disk! The program is called VIP Desktop. From the desktop you have instant access to word processing with a spelling checker always in attendance, data management with mail merge, spreadsheet financial analysis, telecommunications and disk maintenance. DISK \$179.95 For VIP Library shipping please add \$4 USA, \$5 Canada, \$10 Foreign.

VIP Library owners: Upgrade to the VIP Library /WDCE for \$99.95 + \$3 S/H. Send ORIGINAL disk and \$102.95 total.

## VIP Calc III

**FAST 4 color POPUP menus • PRINT SPOOLER 32, 40, 64 and 80 Column HARDWARE display Runs VERY FAST at double clock speed!**

Now every CoCo 3 owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some. VIP Calc III allows a large worksheet with up to 512 columns by 1024 rows! In addition, VIP Calc III has up to 16 windows which allow you to compare and contrast results of changes. Other features include 8 AND 16 digit precision • trig. functions • averaging • algebraic functions • column and row ascending and descending SORTS • locate formulas or titles in cells • block move and replicate • global or local column width • limitless programmable functions • create BAR charts. Embed printer control codes for customized printing. Combine spreadsheet data with VIP Writer documents to create ledgers, projections, statistical & financial budgets and reports. DISK \$69.95

VIP Calc owners: Upgrade to the VIP Calc III for \$29.95 + \$3 S/H. Send ORIGINAL disk and \$32.95 total.

All products run under RSDOS and are not copy protected.

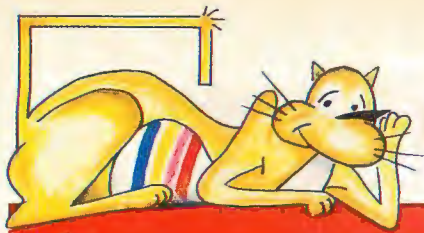


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Non VIP Library orders add \$3 for shipping and handling in USA, Canada \$4, Foreign \$6. COD orders add an additional \$2.25. Checks allow 3 weeks for delivery. Money order and VISA / MASTERCARD orders are shipped the same day.

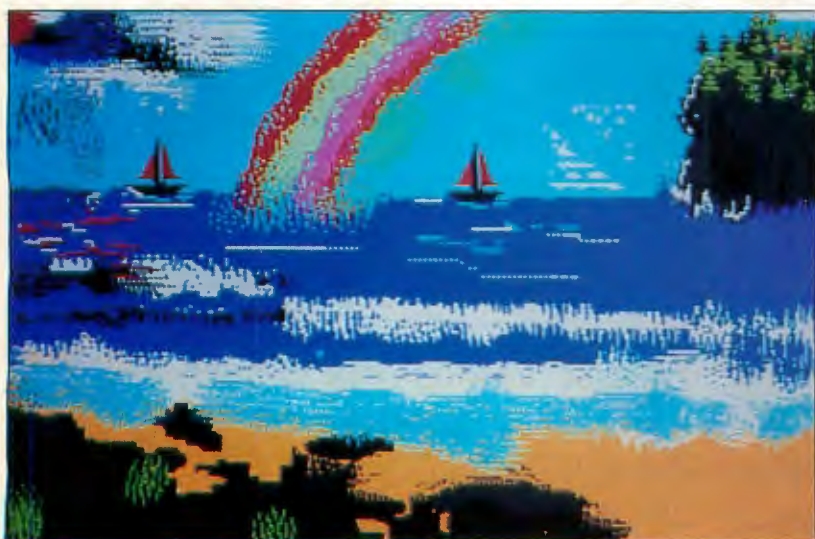


The  
**CoCo Gallery**

*Live at Rainbowfest Princeton  
October 21-23, 1988*



1



3

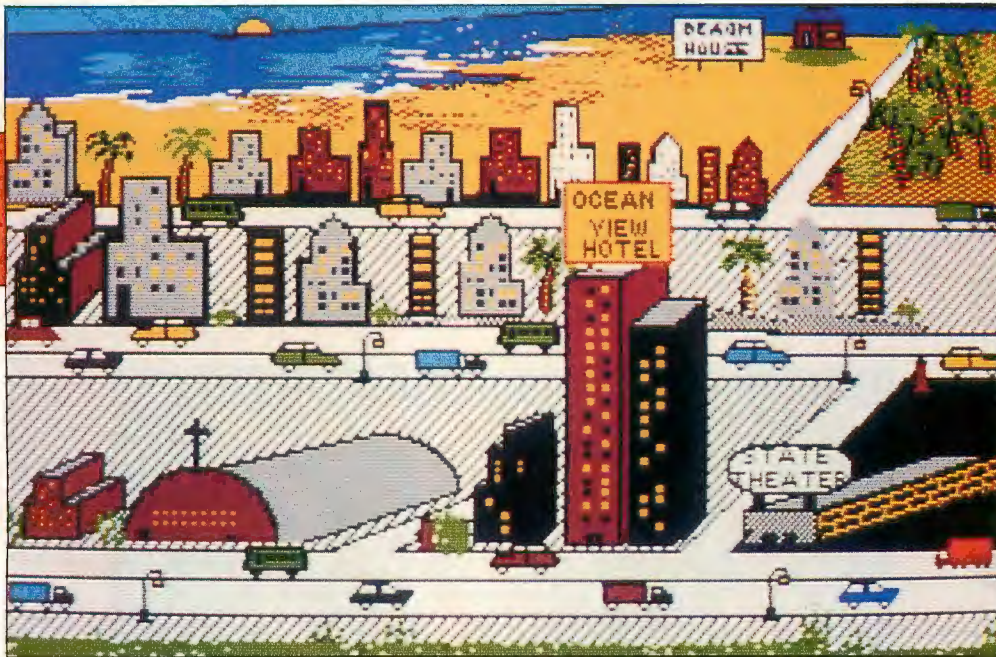
**SHOWCASE YOUR BEST!** You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will forward two first prizes of \$25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of \$15 and one third prize of \$10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Tony Olive, Curator



2

**See Page 33 for the next CoCo Gallery Live exhibition at RAINBOWfest in Chicago!**

**(1) 1st Place**  
**Evil Unleashed** by Lori Dies

Lori, of Milton, Ontario, drew this nightmare creature using *The Rat*. It was the decisive winner at the show.

**(2) 2nd Place**  
**Seaside City** by Howard C. Rouse

Where's the beach? Imagine sleeping on this tranquil, private beach far from the bustling city in the foreground. Howard lives in Ocala, Florida, and produced this graphic with *CoCo Max III*.

**(3) 3rd Place**  
**Red Sails** by Howard C. Rouse

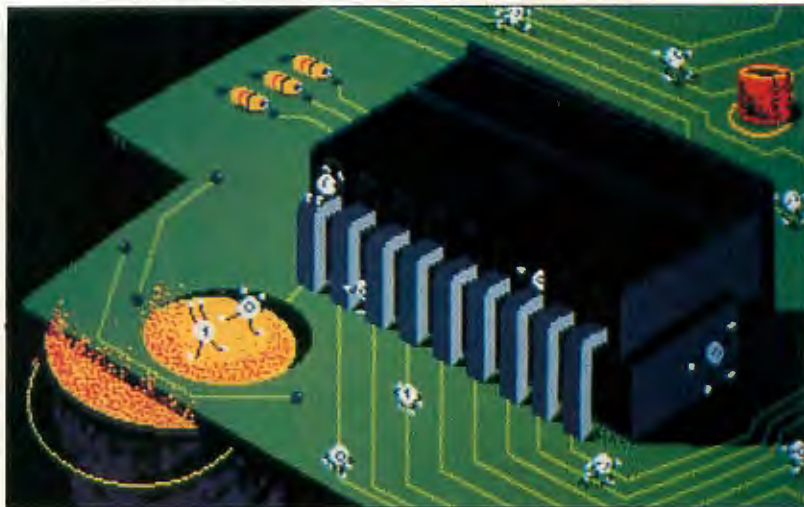
Those of us facing the cold winter will enjoy this ocean view. Howard is retired and finds the time to create wonderful graphics combining the best features of *CoCo Max III* and *Color Max 3*.

**(4) Honorable Mention**  
**Bit Bucket** by Tracy Lammardo

Tracy, of Clifton Park, New York, used *Max 9 (OS-9)* to draw this abstract creation. She is a graphic designer and uses computer graphics and desktop publishing in her work.

**(5) Honorable Mention**  
**The King** by Logan Ward

NASCAR fans will recognize this car, which was sent to us by the creator of *CoCo Cat* and *Maxwell Mouse*. Logan lives in Memphis, Tennessee, and generated this design with *Color Max 3*.



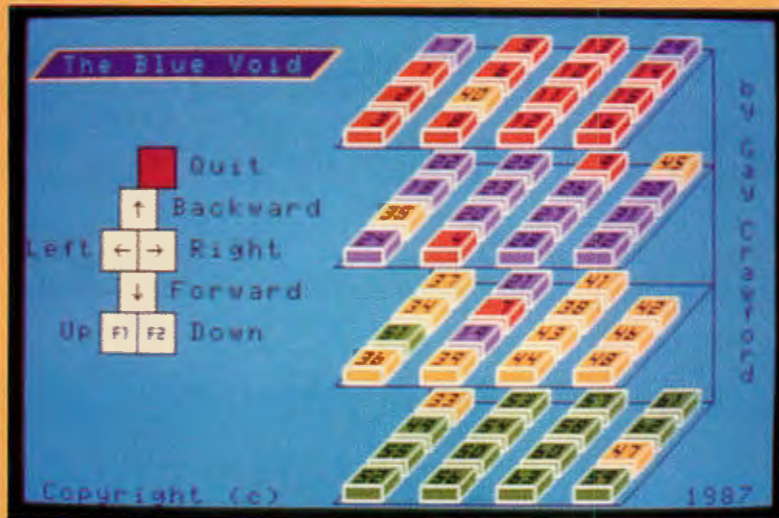
4



5



How many tiles  
did you want scrambled?



# Tangled Tiles

By Gay Crawford

**B**lue Void is both a game and puzzle written for the Color Computer 3. The puzzle may look simple, but it is challenging enough to make you tear out your hair. The program will run on any 128K CoCo 3, with or without disk drives. I wrote the program with an RGB monitor in mind, so if you are using a composite monitor or TV, you may want to change the color values in lines 1480 through 1530. Remember: The display will not be as

*Gay Crawford was president of the Kansas City Color Computer Users Group for two years and is the Co-SysOp of the BBS, The Frisky CoCo. She lives in Olathe, Kansas, with her husband, Tom, and spends her time caring for her two daughters, three CoCos and her cat, Macro.*

clear without an RGB monitor.

To begin, just load the program from disk or tape and run. The computer will create a four-tiered game board. The computer will place 63 colored tiles on this board. No tile is placed at one corner of the last tier; this area is the "blue void." Once the tiles are on the screen, the computer will display brief instructions. When you are ready to play, press any key to begin.

You are asked for the number of times you would like random tiles to be moved. You may choose any number from one to 999; however, I suggest that you start with a number less than 10. Your CoCo will scramble tiles and display a diagram showing the keys used to make all possible moves. Your goal is to unscramble the tiles by moving them, one by one, into the empty space, or void. You can move a tile to

the front, back, left or right of each tier, and from one tier to another. However, you can move only one tile at a time, and that tile can move only one space at a time. When a tile is moved, its original location becomes the void.

There is neither a time limit nor a score for your efforts. Take your time to avoid scrambling the tiles further. If you become frustrated, press BREAK to exit the game. The tiles will be repositioned, and you can either start again or end the game entirely.

The program starts by setting up necessary arrays, variables, and data strings and creating the display (lines 10 through 470). By mixing initialization program lines with the lines that draw the screen, you make the beginning smoother. This keeps you from staring at a still screen while the computer gets ready.

# Telewriter-128™

## the Color Computer 3 Word Processor

### TELEWRITER: UNDISPUTED #1

If you've read the other word processor ads, you've probably had your fill of cold lists of features, and claims of ultimate speed, power, and ease of use. So let's try to get past the overblown claims and empty buzz words—with 2 simple facts:

Fact 1: Telewriter is undisputedly the #1 most popular word processor on the Tandy Color Computers.

Fact 2: Telewriter's exemplary ease of use and power have been acclaimed in numerous magazine reviews and in thousands of letters and calls from end users.

### THE OTHERS DON'T UNDERSTAND

So why has Telewriter gained such a large and loyal following, while other Color Computer word processors have come and gone? Ironically, our competitors' ads tell you *exactly* why.

For them, word processing is nothing more than features and numbers. The longer the list of features, and the bigger the numbers, the better the word processor. Or so they think.

They just don't understand that power and ease of use are not gained by tacking on random features or throwing in freebie utilities or forcing you to use a cumbersome mouse.

*Real Power, true Ease of Use, and genuine Speed* can only be attained through thoughtful, logical, intelligent design, attention to detail, and a commitment to the act and the art of writing. That's the Telewriter tradition, and that's the reason for Telewriter's phenomenal success.

### TELEWRITER-128: INTELLIGENT DESIGN PERFECTED

And now, Telewriter-128, the latest Telewriter, uses the added hardware power of the Color Computer 3 to bring this intelligent design to its logical perfection.

Telewriter-128 adds unsurpassed speed and important new features to the already impressive arsenal of Telewriter-64. Not just speed for speed's sake, or features for the sake of advertising—but speed where it counts and features that make you a more efficient, more effective writer.

*Rainbow magazine* put it this way: "Telewriter-128 will set the word processing standard for the Color Computer 3 because it is so simple and user friendly. . . . The 81-page tutorial/user's manual is nicely done. It is written in easy to understand language but the program itself is so easy. . . . Most people will be able to use the software right out of the package."

### TELEWRITER-128 OR DESKTOP PUBLISHING

Desktop publishing is nice for adding pictures and fancy fonts to newsletters or business presentations—but its graphics orientation sacrifices some important capabilities when it comes to working with words.

If your main concern is expressing ideas through words (notes, letters, reports, papers, novels, etc.), the dedicated word processing power of Telewriter-128 still provides the most efficient tool for the job. Each tool has its place—desktop publishing for striking visuals, Telewriter-128, for effective writing.

### TELEWRITER-128 OR TELEWRITER-64

You can no longer afford to be without the ease, power, and efficiency, that Telewriter brings to everything you write.

**FEATURES THAT MATTER:** Telewriter's outstanding design and its complete set of features, put it in a class by itself, for smooth, efficient writing and letter perfect printed documents. Telewriter-128 includes:

Unbeatable SCREEN PERFORMANCE: lightning fast paging and scrolling, on-screen text that never lags behind your typing, and a response that is always instantaneous, no matter how much text is in the buffer, or where you are in the document.

26 User definable MACRO KEYS type your often used phrases and titles with a single keypress—saving you time and freeing your concentration for writing. User settable DUAL SPEED CURSOR moves you anywhere on the line, on the page, or in the document, fast or slow—you decide, with the touch of a finger. Fast PRINT PREVIEW MODE shows you text as it will print: headers, footers, margins, page breaks, page numbers, justification—saves time and paper and guarantees perfect looking documents everytime.

Instant, ON-LINE HELP summarizes all Telewriter-128 commands and special symbols. The On-line OPTIONS MENU lets you instantly customize the writing environment at any time to suit your precise needs (Screen/character color, Monochrome on/off, Key repeat/delay rate, 2 Cursor repeat/delay rates, Case-sensitivity of search, Auto file backup on/off, and more). A SINGLE FUNCTION KEY takes you instantly to any menu, so you never have to stop and think.

The 24, 25 or 28 LINE SCREEN DISPLAY option lets you see 16% more on-screen text (28), or wider line spacing (25). The auto-loading OPTIONS FILE stores all your Macros, Print Format settings, and Options Menu settings, so they are always there everytime you run Telewriter-128. 3 pop-up STATUS WINDOWS tell you cursor position, word count,

Telewriter-128 for the Color Computer 3 costs \$79.95 on disk, \$69.95 on cassette.

For the Color Computer 1&2, Telewriter-64 costs \$59.95 on disk, \$49.95 on cassette.

To order by MasterCard or Visa, call (619) 755-1258 anytime, or send check to:

#### COGNITEC

704 Nob Avenue  
Del Mar, CA 92014

(Add \$2 S&H. Californians add 6% tax. To upgrade from TW-64 to TW-128 send original TW-64 disk and \$41.95.)

Telewriter is also available through your nearby Radio Shack Computer Center and participating Radio Shack stores and dealers—or order direct from Express Order by dialing 1-800-321-3133.

Ask for: Telewriter-128 (disk) . . . cat #90-0909  
Telewriter-64 (disk) . . . cat #90-0254  
Telewriter-64 (cass) . . . cat #90-0253

free space, etc.

The QUICK SAVE feature lets you instantly save your current document with just 2 keystrokes and without leaving the editor. CURSOR THROUGH DIRECTORY to Load, Append, Rename and Kill files—so you'll never type a filename after the first time. HANGING INDENTS help you organize ideas on the page more effectively. Also: Footers, Multiple Print, Print to Disk, Key Click, Key Repeat, 40/80 Column Option, Overstrike, Word Delete, Nested Macros, Definable Foreign and Math Symbols and more. . . .

And, of course, Telewriter-128 incorporates all the Features of TELEWRITER-64, like: Works with *absolutely any printer* that works with your Color Computer (1, 2, or 3). Uses simple Embedded Control Codes so *all* intelligent features of your printer are easily accessed, including: Underlining, Boldface, variable Fonts, Sub-script, Super-script, Italics etc.

Format commands allow dynamically changing Margins, Headers, Spacing, Centering, etc., anywhere in the document. Format menu sets Margins, Spacing, Page numbering, Baud rate, Lines per page, Justification. Chain Printing means the size of your printed document is unlimited. Also Single page and Partial Print.

Fast full-screen editor with wordwrap, text alignment, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, settable tabs, word and line counter, full error protection. Insert or delete anywhere on screen. Simple, easy to remember, "mnemonic" Editor Commands. Load, Save, Append, Partial Save files to disk or cassette. Kill, rename and list disk files. ASCII file compatibility.

After laying out the tiles, the computer displays the instructions. Lines 590 through 610 display the text for a certain amount of time and wait for a key to be pressed. The length of time is determined by Variable L and can be changed by altering the value 1000 in Line 610. This routine allows the computer to wait if the users do nothing, but also allows users to continue if they do not want to wait.

Line 1030 contains the values of the keys the computer recognizes. Every time a key is pressed during the game, the key is compared with the values contained in K\$. If no matching value is found, that keystroke is ignored.

Arrays are used to keep track of the data for the numbers on the tiles, the tile positions and valid moves. Array A(216) contains codes that identify whether or not a position is legal. Without this ability, you could move tiles off the edge of the board or to nonexistent levels. Array WY(64) identifies the position of each tile. Array

D1(16) contains codes for each tile shape on any level. Although all the tiles may appear the same at first glance, a tile in the back is of a different shape from one in the front because the entire tile cannot be seen. Finally, Array N\$(9) holds the data for drawing the numerals, for they must be redrawn each time a tile is moved.

I use subroutines extensively in the program. They are a good way to do similar tasks many times while keeping the program compact. For example, one main subroutine handles the actual moving of the tiles (located in lines 1550 through 1640). This subroutine in turn calls other subroutines that take care of calculating the position for a tile (lines 2310 through 2380), erasing a tile (lines 2130 through 2220), and redrawing a tile in a different location (lines 1730 through 1850). Some of these subroutines even jump to other subroutines, so following this program can get rather complicated. Although complicated, this method let me use the same routines

to play the game, lay out the tiles at the beginning of the game and replace them for each new game. Lines that begin with an apostrophe are REMARK statements. Do not remove these lines, for without them the computer would not know where to go.

Generally, I place all subroutines and DATA statements near the end of my program. Since I write lots of programs, this consistency keeps things neat and makes debugging the program easier.

My greatest computing thrill comes from using my CoCo to create something and watching other people enjoy what I have created. Perhaps this game will provide you some enjoyment and offer some ideas you can use to experience that same thrill.

*(Questions or comments concerning this program may be directed to the author at 1001 Fredrickson, Olathe, KS 66061. Please include an SASE when requesting a reply.)* □

✓	220	.....56	1650	.....195
	280	.....94	1930	.....153
	680	.....89	2150	.....125
	950	.....56	2430	.....129
	1160	.....229	END	.....200
	1410	.....123		

**The Listing: BLUEVOID**

```

1 '*****
2 '*      THE BLUE VOID      *
3 '*      COPYRIGHT (C) 1987  *
4 '*      BY GAY D. CRAWFORD *
5 '*****
6 '
10 CLEAR400
20 DIM A(216),WY(64),D1(16),N$(9)
)
30 RGB:POKE &HFFD9,0:HSCREEN2
40 CLS:B=44:GOSUB1480
50 HDRAW"BM13,13C5G12R122E12L122
"
60 HPAINT(15,14),5,5
70 HDRAW"BM14,14C1G10R118E10L118
"
80 HPAINT(32,16),1,1
90 ONBRKGOTO2500:ONERRGOTO2500
100 FORL=1 TO 216:A(L)=0:NEXTL
110 HCOLOR0

```

```

120 HPRINT(2,2),"The Blue Void"
130 FORL=1 TO 64:WY(L)=L:NEXTL
140 FORJ=1 TO 4
150 FORK=1 TO 4
160 FORL=1 TO 4
170 A(B)=1:B=B+1:NEXTL
180 B=B+2:NEXTK:B=B+12:NEXTJ
190 HCOLOR1
200 HPRINT(1,23),"Copyright (c)
      1987"
210 FORL=1TO 16:READ D1(L):NEXTL
220 A$="by Gay Crawford":Y=3
230 FORL=1 TO LEN(A$)
240 H$=MID$(A$,L,1)
250 HPRINT(38,Y),H$:Y=Y+1
260 NEXTL
270 N$(0)="L3G4R3E4"
280 N$(4)="G2NG2L3E2"
290 N$(1)="BL2LRG4"
300 N$(2)="NL3G2L3G2R3"
310 N$(3)="NL3G2NL2G2L3"
320 N$(5)="L3G2R3G2L3"
330 N$(6)="BL3G4R3E2L3"
340 N$(7)="BL3R3G4"
350 N$(8)="L3G4R3E2NL3E2"
360 N$(9)="BG4E4L3G2R3"
370 P$="L120G40R40ND5R80E40D46"
380 E$="C0L16G8DR15D6RE8U6"
390 DP$="L16G8ND2R16D6NLE8U6"
400 DW$="L16G8D6R16E8U6"
410 HDRAW"BM292,12C1XP$:XP$:XP$:
L120G40R120E40"

```

```

42Ø 'lay tiles
43Ø FORL=1TO63:BN=L:GOSUB231Ø
44Ø F=INT(S/16)+3
45Ø H$="BM"+STR$(X)+"", "+STR$(Y)
46Ø GOSUB181Ø
47Ø NEXT
48Ø HPRINT(2,6),"The object of"
49Ø HPRINT(1,7),"the game is to"
50Ø HPRINT(1,8),"unscramble the"
51Ø HPRINT(1,9),"colored tiles."
52Ø HPRINT(2,11),"Use the arrow"
53Ø HPRINT(1,12),"keys, as well
"
54Ø HPRINT(1,13),"as the F1 & F2
"
55Ø HPRINT(1,14),"to move a tile
"
56Ø HPRINT(1,15),"into the empty
"
57Ø HPRINT(1,16),"space, or the"
58Ø HPRINT(1,17),"Blue Void."
59Ø L=1
60Ø IFINKEY$<>""THEN62Ø
61Ø L=L+1:IFL=1ØØØ THEN62Ø ELSE6
ØØ
62Ø HCOLORØ:HLINE(Ø,32)-(128,144
),PSET,BF
63Ø 'start to play
64Ø HCOLOR9:B=173:VP=64:LM=Ø:SV=
Ø
65Ø HPRINT(1,7),"How many tiles"
66Ø HPRINT(1,8),"would you like"
67Ø HPRINT(1,9),"scrambled?"
68Ø HCOLOR1:X=7:S$=""
69Ø I$=INKEY$:IFI$=""THEN69Ø
70Ø IFI$=CHR$(13) THEN 8ØØ
71Ø IFI$=CHR$(8) THEN 77Ø
72Ø IFI$<"Ø"ORI$>"9"THEN69Ø
73Ø IFX>9 THEN69Ø
74Ø S$=S$+I$
75Ø HCOLOR1:HPRINT(X,11),I$
76Ø X=X+1:GOTO69Ø
77Ø IFLen(S$)=Ø THEN S$="" ELSES
$=LEFT$(S$, (LEN(S$)-1)):X=X-1
78Ø HCOLORØ:HLINE(X*8,87)-(X*8+7
,95),PSET,BF
79Ø GOTO69Ø
80Ø IFVAL(S$)<1 THEN62Ø
81Ø SS=VAL(S$):HCOLORØ
82Ø HLINE(8,56)-(118,96),PSET,BF
83Ø FORSL=1TOSS
84Ø R=RND(6)
85Ø ONR GOSUB166Ø,167Ø,168Ø,169Ø
,170Ø,171Ø
86Ø IF A(B+V)=Ø THEN 84Ø
87Ø IF WY(VP+M)=LM THEN 84Ø
88Ø GOSUB155Ø
89Ø NEXTSL
90Ø HDRAW"BM58,68C9R8U16L16D16R8
D16R8D16L8D16R8D16L32U16R8NR16U1
6L8U16R8U16R8"
91Ø HPAINT(5Ø,71),1Ø,9
92Ø HPAINT(38,119),2,9
93Ø HPAINT(56,56),8,9
94Ø HDRAW"BM58,84C9L8NL8D16NL8NR
8BD16D16"
95Ø HDRAW"BM5Ø,73C9NG2NF2D6BD13B
L4L6NE2NF2BR14R6NH2NG2BL1ØBD13D6
NH2NE2"
96Ø HDRAW"BM4Ø,126C9U2NR2U2R2BR2
RD4BR1ØU2NR2U2R2BR2R2D2L2D2R2"
97Ø HPRINT(9,7),"Quit"
98Ø HPRINT(8,9),"Backward"
99Ø HPRINT(Ø,11),"Left      Right
"
1ØØØ HPRINT(8,13),"Forward"
1Ø1Ø HPRINT(2,15),"Up      Down"
1Ø2Ø 'make moves
1Ø3Ø K$=CHR$(1Ø)+CHR$(8)+CHR$(94
)+CHR$(9)+CHR$(4)+CHR$(1Ø3)
1Ø4Ø ONBRK GOTO123Ø
1Ø5Ø I$=INKEY$:IFI$=""THEN1Ø5Ø
1Ø6Ø K=INSTR(K$,I$)
1Ø7Ø IFK=Ø THEN1Ø5Ø
1Ø8Ø ONK GOSUB166Ø,167Ø,168Ø,169
Ø,170Ø,171Ø

```

## THE BEST COCO ASSEMBLY LANGUAGE PROGRAMMING BOOKS IN PRINT

"Assembly Language Programming for the CoCo" (The Book) and the CoCo 3 (The Addendum).  
Professionally produced (not just skimpy technical specifications). THE CoCo reference books.

**THE BOOK** - 289 pages of teaching assembly language for the CoCo 1 & 2. It's used as a school text and is an intro to Computer Science. It describes the 6809E instructions, subroutines, interrupts, stacks, programming philosophy, and many examples. Also covered are PIAs, VDG, SAM, kybd, jstck, sound, serial port, and using cassette and disk. \$18.00 + \$1.50 s/h.

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```

1090 IF A(B+V)=0 THEN SOUND 120,1:
GOTO 1050
1100 GOSUB 1550
1110 WC=64
1120 IF WY(WC) <> WC THEN GOTO 1050
1130 WC=WC-1:IF WC=0 THEN 1140 ELSE
1120
1140 HCOLOR8:SV=1
1150 HPRINT(1,5),"Congratulation
s"
1160 ON BRK GOTO 2500
1170 FOR L=1 TO 12
1180 FOR K=3 TO 6:PALETTE K,RND(63)
1190 PLAY"L16T16O4CG":NEXT K,L
1200 GOSUB 1480:HCOLOR0
1210 HLINE(0,50)-(128,132),PSET,
BF
1220 HCOLOR9
1230 HCOLOR0:HLINE(0,40)-(126,13
2),PSET,BF
1240 HCOLOR9
1250 HPRINT(1,7),"Would you like
"
1260 HPRINT(1,8),"to play anothe
r"
1270 HPRINT(1,9),"game? (Y/N)"
1280 I$=INKEY$:IFI$="" THEN 1280
1290 IFI$="N" THEN GOTO 2500
1300 IFI$ <> "Y" THEN 1280
1310 'reset tiles
1320 HCOLOR0:HLINE(8,40)-(126,80
),PSET,BF
1330 IFSV=1 THEN 640
1340 IF WY(64)=64 THEN 1370
1350 L=64:GOSUB 2310
1360 GOSUB 2100:WY(64)=64
1370 FOR L=63 TO 1 STEP -1
1380 IF WY(L) <> L THEN GOSUB 1400
1390 NEXT L:GOTO 640
1400 BN=L:GOSUB 2310
1410 F=S/16+3:WY(L)=L
1420 H$="BM"+STR$(X)+"", "+STR$(Y)
1430 V=0:R=D1(D)
1440 ON R GOSUB 1730,1730,1810,1
730,1730,1810
1450 RETURN
1460 'end of main routine
1470 'subroutines
1480 PALETTE 0,29:PALETTE 1,8
1490 PALETTE 2,63:PALETTE 3,38
1500 PALETTE 4,43:PALETTE 5,52
1510 PALETTE 6,16:PALETTE 7,63
1520 PALETTE 8,36:PALETTE 10,62
1530 PALETTE 9,0:RETURN
1540 'swap tile
1550 WY(VP)=WY(VP+M):BN=WY(VP):L
M=WY(VP):B=B+V
1560 L=VP+M:GOSUB 2310:R=D1(D)
1570 F=HPOINT(X-1,Y+2)'get color
1580 ON R GOSUB 1870,1920,1970,20
20,2070,2100'erase & recnstr
1590 L=VP:GOSUB 2310:R=D1(D)
1600 H$="BM"+STR$(X)+"", "+STR$(Y)
1610 ON R GOSUB 1730,1730,1810,1
730,1730,1810'draw whl or partl
1620 PLAY"L16T16O4AB"
1630 VP=VP+M:WY(VP)=64
1640 RETURN
1650 'pick a direction
1660 V=-1:M=-1:RETURN
1670 V=6:M=4:RETURN
1680 V=1:M=1:RETURN
1690 V=-6:M=-4:RETURN
1700 V=-36:M=-16:RETURN
1710 V=36:M=16:RETURN
1720 'draw partial tile
1730 IF V=1 THEN GOSUB 1810:RETUR
N
1740 HDRAW"XH$;C7XDP$;"
1750 HPAINT(X-2,Y+2),F,7
1760 HDRAW"XH$;C2XDP$;G8"
1770 HPAINT(X-9,Y+13),F,2
1780 GOSUB 2400
1790 RETURN
1800 'draw whole tile
1810 HDRAW"XH$;C7XDW$;"
1820 HPAINT(X-4,Y+2),F,7
1830 HDRAW"XH$;C2XDW$;G8NL16D6"
1840 GOSUB 2400
1850 RETURN
1860 'rear left corner d=1
1870 GOSUB 2130
1880 H$="BM"+STR$(X+1)+"", "+STR$(
Y+5)
1890 IF L=1 THEN HDRAW"XH$;C1L19
G4" ELSE HDRAW"XH$;C1L19NU5G4"
1900 RETURN
1910 'side tile d=2
1920 GOSUB 2130:IF V <> 1 THEN GOSUB
2240
1930 H$="BM"+STR$(X)+"", "+STR$(Y)
1940 IF V=-1 THEN HDRAW"XH$;C1BL
13BG2G9" ELSE HDRAW"XH$;C1BL13BG
2G7"
1950 RETURN
1960 'front left corner d=3
1970 GOSUB 2190:GOSUB 2240
1980 H$="BM"+STR$(X+1)+"", "+STR$(
Y+2)
1990 IF V=1 THEN HDRAW"XH$;C1BL1
6NE2G10" ELSE HDRAW"XH$;C1BL16G1
0"
2000 RETURN
2010 'rear tile d=4
2020 GOSUB 2130
2030 H$="BM"+STR$(X+1)+"", "+STR$(
Y+5)
2040 HDRAW"XH$;C1L22"
2050 RETURN
2060 'middle tile d=5
2070 GOSUB 2130:GOSUB 2240
2080 RETURN

```



```

2090 'front tile d=6
2100 GOSUB2190:GOSUB2240
2110 RETURN
2120 'erase partial tile
2130 IF V=-1 THEN GOSUB2190:RETU
RN
2140 H$="BM"+STR$(X)+", "+STR$(Y)
2150 HDRAW"XH$;XE$;"
2160 HPAINT(X-2,Y+2),0,0
2170 RETURN
2180 'erase whole tile
2190 H$="BM"+STR$(X)+", "+STR$(Y)
2200 HDRAW"XH$;C0L16G8D6R16E8U6"
2210 HPAINT(X-2,Y+2),0,0
2220 RETURN
2230 'redraw rear tile
2240 IF V=1 THEN RETURN
2250 C=HPOINT(X-2,Y-3)
2260 H$="BM"+STR$(X+2)+", "+STR$(
Y-1)
2270 HDRAW"XH$;C2D5L16U5"
2280 HPAINT(X,Y),C,2
2290 RETURN
2300 'calculate x,y for each til
e
2310 S=L-1
2320 X1=(S/4-INT(S/4))*-40+190
2330 X2=INT(((S/16)-INT(S/16))*4
)
2340 X2=X2*32:X=X1+X2
2350 Y1=(S/4-INT(S/4))*40+7
2360 Y2=INT(S/16):Y=Y1+(Y2*46)
2370 D=((S/16-INT(S/16))*16)+1
2380 RETURN
2390 'draw numbers
2400 L$=STR$(BN):DL=LEN(L$)-1
2410 D=VAL(RIGHT$(L$,1))
2420 D$=N$(D)
2430 HDRAW"XH$;C9BL6BD2XD$;"
2440 D$=MID$(L$,DL,1)
2450 IFD$="" THEN2480 ELSE D=VAL
(D$)
2460 D$=N$(D)
2470 HDRAW"XH$;C9BL12BD2XD$;"
2480 RETURN
2490 DATA 1,2,2,3,4,5,5,6,4,5,5,
6,4,5,5,6
2500 WIDTH40:HSCREEN0
2510 POKE&HFFD8,0:CLS0
2520 LOCATE9,10
2530 ATTR 1,0
2540 PRINT"Thanks for playing"
2550 LOCATE12,12
2560 PRINT"The Blue Void"
2570 FORL=1TO2000:NEXTL:WIDTH32:
RGB

```

# SPECIAL EVENT!

## COCO GALLERY LIVE SHOWCASE YOUR BEST AT RAINBOWFEST

We are taking the popular "CoCo Gallery" on the road to RAINBOWfest Chicago — and we'd like you to submit your own graphics creations to be exhibited at the show!

### RULES

- You can enter color or black-and-white photographs or printouts of your original artwork produced on the CoCo 1, 2 or 3. Entries must be framed, mounted or matted, and may not be smaller than 5-by-7 inches or larger than 11-by-14 inches.
- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries must be mailed to THE RAINBOW before March 31, 1989, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, April 15th.
- All entries to CoCo Gallery Live become the property of Falsoft, Inc., all rights are reserved.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, April 16, 1989, and winning entries will be published in the August '89 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.

# RAINBOW FEST

CHICAGO

April 14-16

**R**AINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer.

Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time**. Chicago is the show to get information on capabilities for the CoCo, along with a terrific selection of the latest CoCo software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

**Set your own pace** between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

**Many people who write for THE RAINBOW** — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **CoCo Gallery Live Showcase**, where CoCo artists enter their own graphics creations for display at the show. Cash prizes are presented and winning entries are decided by votes from RAINBOWfest attendees. (See the following page for more

details.) As an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

If you missed the fun at our last RAINBOWfest in Princeton, why don't you make plans now to join us in Chicago? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Chicago area.

**The Hyatt Regency Woodfield — Schaumburg, Illinois offers special rates** for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 3 p.m.

**Tickets for RAINBOWfest** may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

**The POSH way to go.** You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

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## COCO COMMUNITY BREAKFAST

### Rick Adams — Software Developer

Our keynote speaker for the traditional CoCo Community Breakfast is Rick Adams, who is the founder of Color Central Software and the author of programs like *DELPHIterm*, *Tandy's Temple of ROM* and Activision's CoCo 3 version of *Shanghai*.

Mr. Adams will describe his life as a programmer on the "front lines" of the ongoing efforts to program software for the CoCo 3, including humorous "war stories" from some of his software developments.

### Don't forget . . .

If yours is one of the first 500 ticket orders, a coupon for a complimentary issue of *The Second RAINBOW* book of Simulations will be enclosed with your tickets — if yours is one of the first five orders received from your state, a coupon for a complimentary RAINBOWfest T-shirt will be enclosed with your tickets. So hurry up and place your order to take advantage of this offer.

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**Dates:** April 14-16, 1989

**Hotel:** Hyatt Regency Woodfield

**Rooms:** \$66 per night,  
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**Advance Ticket Deadline:** March 31,  
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Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

*The first in a series of tutorials to help you create your own database system*

# The Do-It-Yourself Database: Subroutines and Program Code

By Richard Perlman

**Y**our Color Computer is a powerful piece of hardware that can be used for more than game playing and word processing. You can use it to keep track of finances, important dates, appointments, collections, catalogs, things loaned and borrowed, and so on.

For this, you need a *database* and a disk on which to store the information.

To set up a database, you don't have to know much about the system or disks. You don't need to use assembly language, and you don't have to be an experienced BASIC programmer. All you

must do is follow the steps described here. I will demonstrate the coding and programming techniques you need. When we're done, you'll have a working database you can use to manage money, pay bills and balance a checkbook. And if that isn't to your liking, you can modify your database any way you choose. (I have one version that keeps track of my videotape collection.)

If you already have a disk drive, you can code and run all my examples. If you don't own a disk, you can try many of them and learn more about your CoCo. Although I won't bombard you with lots of super-technical information, I would like to offer some useful programming tips before we begin our database.

## What Is a Database?

A database is information stored by following a set of rules. When most of us think of databases, we think of computers. A database doesn't have to be on a computer, however. We are all familiar with the telephone book, and that list of names, phone numbers and addresses is a database. The telephone book is a database because it follows a set of rules — the data is kept in alpha-



*Richard Perlman spends his time at work helping others use their PCs. At home, he shares his CoCo 2 with his wife and two children.*

betical order by name, and the name is followed by the appropriate address and telephone number. If the telephone company chose not to follow these rules, it would be more difficult — perhaps impossible — to use the information at all. And it wouldn't be a database.

A computerized database uses the computer's disk memory to store information. It also uses programmable logic to add information to the database (front-end) and to retrieve information (output-writer). Remember: If you can't easily add data to or retrieve data from your system, you don't have a useful database.

Many computer systems use a menu format for both the front-end and output-writer. A menu is a list of choices displayed on the screen. You choose one from the list, and the system takes it from there. The system may need to display several menus to narrow your choices and figure out precisely what you want. Sometimes the program must also ask you to enter information, but the system should not allow you to give it information or instructions it cannot process properly. This is messy and disregards the rules followed by any

self-respecting database system (especially ours).

### Where Do We Begin?

We must first encode the menus and information requests. Let's begin by looking at some programming techniques that will help us do those things more easily — subroutines, loops and and Computed GOTOS. These routines will be used throughout our system. Don't be put off by their unusual names. Computer languages include many unfamiliar terms, but these terms will be easier to understand as we proceed.

A subroutine is a special set of instructions that does something specific (like converting hours and minutes into seconds). You write these instructions once in a program and return to them any time you want those instructions followed. This shortens your program and lessens the possibility of an error. Because we will use menus in several sections of our program, the subroutine technique will be quite useful. Listing 1 includes a subroutine that displays a menu with one to four choices.

When Listing 1 is run, it clears the screen, displays four lines at the top of the screen and then stops at Line 40. The

entire program is not a subroutine. The program starts at Line 10 and ends at Line 600. On the other hand, the subroutine begins at Line 500 and ends on Line 550. Line 40's GOSUB 500 lets us use (or call) this subroutine. At the end of the subroutine, Line 550's RETURN statement returns us to the statement immediately following the GOSUB. Thus, the program returns to the STOP statement in Line 40, and the program stops.

The subroutine was written to be flexible. With only minor changes, you can display fewer lines or change the text. The actions of the subroutine depend upon conditions you set up before you call it. By changing the setup, you change the subroutine's response. This makes using the subroutine in other parts of the program simpler. In this subroutine, you control the number of lines displayed by placing that value in Variable NL. The text is placed in variables L1\$ through L4\$. The GOSUB statement calls the subroutine, and RETURN restores you to Line 40: Although you must have a RETURN statement at the end of the subroutine, be careful not to use RETURN if you are not writing a subroutine. If you do, your program will stop running at the RETURN

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##### Some of the Printers

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Supply power for the interfaces are Epson, Seikosha, Panasonic, Silver Reed and NEC. If your printer cannot supply power to the interface you can order your interface with the "P" option or you can supply your own AC adapter. We recommend the Radio Shack 273-1431 AC adapter with a 274-328 connector adapter.

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statement because it has nowhere to return.

To demonstrate the flexibility of the subroutine, let's display only three lines this time. To do this, I changed the value in NL before calling the subroutine again and entered CONT, which lets the program resume running after the STOP in Line 40.

### The FOR/NEXT Loop

There are four PRINT and three IF statements in our subroutine. We can eliminate most of them by using FOR/NEXT loops. A FOR/NEXT loop is a set of instructions that repeats itself (or loops back) for a specific number of times. We can use a FOR/NEXT loop to add three to itself five times and display the result after each addition. In Figure 1, this procedure is completed first with a FOR/NEXT loop and then without it.

Both sets of code do the same thing, but the FOR/NEXT loop requires much less program code. In both examples, Line 100 includes Variable I, the index. The FOR instruction in Line 100 does two things. It sets up the loop, and it tells the computer that I is the index, its starting value is 1, and its ending value will be 5. The FOR instruction runs all instructions between itself and the NEXT statement. It also adds one to the index during each pass. Until I is equal to five, the FOR instruction will run the instructions between itself and the NEXT statement. Therefore, this group of FOR/NEXT statements will run five times, and then the loop will be over. When the loop is over, the statement following NEXT I will run, and the program will stop.

### Lists Made Easy: The Array

In addition to GOSUBS and FOR/NEXT loops, we will use arrays in our database. An array is a useful method of holding lists of information — something a computer does well. The lists will have names, and each item in each list will have an item number. We can then refer to each item by using its *array name* and *item number*. In our menu subroutine, we stored the lines we wanted to display in the variables L1\$, L2\$, L3\$ and L4\$. However, we would have problems if we tried to display 10 or more items because array names can include no more than three characters. To remedy this problem, we will use an L\$ array and store the lines in the variables L\$(1), L\$(2), L\$(3) and L\$(4). The item numbers (1 to 4) are subscripts, and an array can have thousands of them. The following example takes our original subroutine and recodes it to use both a loop and an array:

```
100 CLEAR 500
110 DIM L$(10)
200 L$(1) = "1- FIRST CHOICE ON THE MENU
210 L$(2) = "2- SECOND CHOICE ON THE MENU
220 L$(3) = "3- THIRD CHOICE ON THE MENU
240 L$(4) = "4- FOURTH CHOICE OF MENU
250 NL = 4 'NUMBER OF CHOICES
260 GOSUB 500
270 STOP
500 CLS:FOR I = 1 TO NL
510 PRINT L$(I)
515 NEXT I
520 RETURN
```

Compare this routine with our original example. We still must place a value in NL and place the display lines in the L\$ array. The recoded subroutine is three lines shorter and much simpler, however, because the FOR/NEXT loop

does all the checking for us. The index is used to pick out the items to display.

However, the computer isn't all that smart. We must tell it (in a separate statement) that L\$ is an array, and we must identify the maximum size of the list. To do this we use a DIM statement on Line 110. The DIM statement tells the computer that L\$ is an array and that it should be set up so we can use subscripts from zero to 10 when we work with it. Although we are using only four items, our array can hold a maximum of 11 items. You can use as few items as you want — just don't exceed the maximum.

### Our First Real Menu

It is easier to use a menu if we know the menu's purpose and the expected response to the menu. So before we display the choices, we will clear the screen, put a brief explanation on the top line and place instructions on the next display line. That will leave us with a proper menu.

Because we will now use the first two lines to display something other than menu choices, we must display these items lower on the screen. CoCo's BASIC comes to our aid by giving us a PRINT statement ("PRINT @ xx") that allows us to control the placement of our display on the screen. In this statement, xx is the display position on the video screen. The 512 possible display positions are divided into lines of 32 characters each. The first character position of the first line is Display Position 0, the first character position of the second line is 32, etc. To position the information we placed in Array L\$(2) on the left margin of the third line, we would enter "PRINT @96,L\$(2)". We can also use the PRINT @ statement to "blank out" an entire line. To do this, enter PRINT @32," ".

### Time to Type

After it displays the menu lines, our subroutine should let us press a single key to indicate our choice. We can do this by using the INKEY\$ instruction. INKEY\$ allows the computer to identify which key was pressed or to indicate that no key was pressed. When we use INKEY\$, the screen will not display the key that was pressed, nor is it necessary to press ENTER to indicate that your typing is complete. The following routine shows that you pressed a key:

```
100 CLS:PRINT "-- WAS ANYTHING TYPED? --"
110 A$ = INKEY$:IF A$ = "" GOTO 110
120 PRINT @64,"YES, SOMETHING WAS TYPED"
130 GOTO 110
```

#### FOR/NEXT Code

```
100 FOR I= 1 TO 5
200 N = N + 3
250 PRINT N
300 NEXT I
301 STOP
```

#### Normal Code

```
100 I=0
101 I=I+1
102 IF I>5 THEN GOTO 301 ELSE N=N+3
103 PRINT N:GOTO 101
301 STOP
```

Figure 1: Adding 3

#### Computed GOTO Code

```
200 GOSUB 9020
201 ON A GOTO 300,400,500,600
210 STOP
```

#### Normal Code

```
200 GOSUB 9020
201 IF A = 1 GOTO 300
202 IF A = 2 GOTO 400
203 IF A = 3 GOTO 500
204 IF A = 4 GOTO 600
210 STOP
```

Figure 2: GOTOS

This program will stay on Line 110 until you type something. When a key is pressed, the program will print a message on the third display line. Look at Line 110. The two quotation marks with nothing between represent a *null* character. Therefore, the statement `IF AS = "" ...` tells the program that if nothing was typed, then Line 110 must be redone. I've included this technique in Listing 2.

When this program is run, the menu display begins Position 96 (5L) and will display four lines of information (NL). You then type a number to indicate your choice. If your choice is accepted, it is displayed on the screen, and you get to press another key. If you press 4, the program will stop. If your choice is not accepted, you must press another key.

The subroutine starts at Line 9000. While lines 9000 to 9001 display the menu lines, lines 9005 through 9010 place the message "Select from the following" on the second display line and cause it to blink on and off until you press a key. The blink rate is determined by the highest value for I in the FOR statements on lines 9006 and 9008. Try changing these values, and see what you get. As soon as you type a character, the program will go to Line 9012. Lines 9012 and 9013 ensure that the value you have entered is a number between one and four (the value of NL). If these requirements are met, then the RETURN statement in Line 9012 resumes the program at Line 270. When the subroutine returns, the value in Variable A will be the number you entered. This number will be used in Line 270 to determine what will be displayed and in 280 to determine what action will be taken.

If the subroutine didn't check our typing, then the program could stop running, since Line 270 will not work if the value of A is not between one and four. We also used the value of A in Line 280 to determine whether the program will stop or ask for another choice. In a *real* menu, there could be more than four choices, and we would have a lot of checking to do after the subroutine returns.

### The Computed GOTO

BASIC has a nice feature to help us check our subroutine called the *Computed GOTO*. Figure 2 shows how this statement works and what we would need to enter if it didn't exist. (Don't enter this yourself since it is not a complete program.)

The Computed GOTO on Line 201 puts

four instructions on a single line, and that's far from the limit. You can put many more instructions in a Computed GOTO. I haven't figured out what the limit is, but I've never exceeded it. And unless you do some fancy programming, you won't either.

### Multiple Menus for Marbles

Listing 3 shows how we can use the techniques we have described to employ more than one menu in a program. This program doesn't do anything useful, but it does work. The program maintains a database containing information about my marble collection. To save time and space, only some of the choices have been programmed, but I've included enough working code for you to see menu switching at work. Where a choice is not programmed, I will display the choice made and allow another choice. The first menu will give us five options:

1. Add marbles to the database.
2. Change the database.
3. Delete from the database.
4. Report from the database.
5. End the session.

The menus that follow allow other options, but we must return to the first menu to end the session. Enter Listing 3 and see if it works. Try each option on each menu. Then change the program by putting in your own descriptions and experiment with moving the display lower on the screen. But don't change the subroutine. We will use it later. I used `CLS0` to create the dark screen, but you can use `CLS` if you prefer.

### No! No! We Won't GIGO!

As mentioned before, it is important to keep incorrect information out of your database. This is difficult because you have to decide beforehand what is *correct* and what is not. Numbers are fairly easy to check because we usually have a good idea what the highest and lowest acceptable values will be. The following program code will determine whether or not a number is too high:

```
100 PRINT @32, "ENTER A NUMBER FROM 1 TO 2000"
110 INPUT A
120 IF A <= 2000 AND A >= 1 THEN GOTO 150
130 PRINT A; " IS OUT OF RANGE":GOTO 100
150 PRINT A; " IS IN RANGE":GOTO 100
```

But what about money? This program code would not prevent you from entering 1.275 or 1275, when you wanted to enter 12.75. It would also move the display farther and farther

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down the screen if you entered something that wasn't a number, which isn't good if you are trying to format an input screen. To make sure that the entry is a number having two (and only two) decimal places and that it will be entered on the same line, you need a routine something like the following:

```

95 CLS
100 PRINT @32, "ENTER 1.00 TO 99.00"
110 INPUT A$
112 L=LEN(A$)
114 IF L < 3 GOTO 135
116 IF MID$(A$,L-2,1) <> "." GOTO 135
118 A = VAL(A$)
120 IF A <= 99 AND A >= 1 THEN GOTO 150
130 PRINT A;" IS OUT OF RANGE":GOTO 100
135 PRINT A;" IS OUT OF RANGE":GOTO 100
150 PRINT A;" IS IN RANGE":GOTO 100

```

### New BASIC Statements

In our last example, we used the BASIC statements INPUT (Line 110), LEN (Line 112), MID\$ (Line 116) and VAL (Line 118). Let's review their uses:

**INPUT** Lets you enter as many characters as you need, unlike INKEY\$, which only accepts one character. INPUT also shows you what you are typing, lets you backspace and type over and waits for you to press ENTER before continuing.

**LEN** Tells you how many characters there are in a character variable.

**MID\$** Lets you examine and change specific characters.

**VAL** Turns a character variable into a numeric one. If the character variable is not a number, then your result is zero.

Now we need to check character variable entries like names and addresses. These can contain any combination of letters, numbers and punctuation, and they are difficult to check with the same precision as numbers. Our only reasonable test on this data would determine whether or not it is too long for the program to use properly. We can use the LEN instruction for this and combine all these checks into one subroutine. The subroutine will check three types of information: numbers without decimals, decimal numbers with two decimal places and alpha-numeric character strings such as names or addresses. The subroutine will print a message requesting data, enter the response, check to make sure it is within a range of values and allow re-entry if we have made a mistake. Listing 4 shows how we would use such a subroutine.

### Listing 1: SUBDEMO

```

10 CLEAR 500
15 L1$ = "FIRST ITEM ON THE MENU
20 L2$ = "SECOND ITEM ON THE MENU
25 L3$ = "THIRD ITEM ON THE MENU
30 L4$ = "FOURTH ITEM ON THE MENU
35 NL = 4 'NUMBER OF CHOICES
40 GOSUB 500:STOP
50 NL=3:GOSUB 500:GOTO 600
500 CLS:PRINT L1$
510 NL = NL - 1
515 IF NL = 0 GOTO 550
520 PRINT L2$:NL=NL-1:IF NL = 0 GOTO 550
530 PRINT L3$:NL=NL-1:IF NL = 0 GOTO 550
540 PRINT L4$
550 RETURN
600 END

```

### Listing 2: REALMENU

```

100 CLEAR 500
105 DIM L$(10)
110 CLS:PRINT @0, "----- FIRST MENU -----"
200 L$(1) = "1= FIRST CHOICE ON THE MENU
210 L$(2) = "2= SECOND CHOICE ON THE MENU
220 L$(3) = "3= THIRD CHOICE ON THE MENU
240 L$(4) = "4= STOP THE PROGRAM
250 NL = 4:SL=96
260 GOSUB 9000
270 PRINT @352, L$(A), "WAS CHOSEN
280 IF A= 4 THEN STOP ELSE GOTO 250
9000 FOR I= 1 TO NL:PRINT @SL, L$(I)
9001 SL= SL+32:NEXT I
9005 PRINT @32, "* SELECT FROM THE FOLLOWING
9006 FOR I = 1 TO 200
9007 A$ = INKEY$:IF A$ <> "" GOTO 9012 ELSE NEXT I
9008 PRINT @32, " ":FOR I = 1 TO 65
9009 A$ = INKEY$:IF A$ <> "" GOTO 9012 ELSE NEXT I
9010 GOTO 9005
9012 A = VAL(A$):IF A > 0 AND A < NL+1 THEN RETURN
9013 GOTO 9005

```

### Listing 3: MARBLE1

```

100 CLEAR 500
110 DIM LI$(6)
120 CLS:PRINT "-- MARBLE DATABASE OPTIONS --"
130 LI$(1)="1= ADD MARBLES TO THE DATABASE
132 LI$(2)="2= CHANGE WHAT'S IN THE DATABASE
134 LI$(3)="3= DELETE MARBLES FROM DATABASE
136 LI$(4)="4= REPORT FROM THE DATABASE
138 LI$(5)="5= END THIS SESSION
140 SL=96:NL=5:GOSUB 9000

```



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2 10 18 26 34 42 50 58 66 74  
3 11 19 27 35 43 51 59 67 75  
4 12 20 28 36 44 52 60 68 76  
5 13 21 29 37 45 53 61 69  
6 14 22 30 38 46 54 62 70  
7 15 23 31 39 47 55 63 71  
8 16 24 32 40 48 56 64 72

PLEASE CIRCLE  
TAPE OR DISK



Enter Listing 4 and try to fool the subroutine by entering incorrect information. The subroutine is only 15 lines long, but it does everything we need. It displays a line of instructions at the screen position we specify (9020), telling us what we should be typing in next. Then it accepts our data on the next line (9026), checks it to see that it is within the range of values (9038, 9040, 9046) or length (9032) we are looking for, and demands that we type it in again if it is not an acceptable response.

If you look at the program statements before GOSUB 9020, you will see that I placed setup values in the variables P\$, VT\$, LV, HV and SL before calling the subroutine. These values are used by the subroutine to direct its actions. They are used as follows:

- P\$        The line of instructions. It should be 32 characters or less in length.
- SL        The position we want to start the display of the line of instructions. It should be a multiple of 32.
- VT\$      The variable type — N is for a number without decimals; D, for a decimal number with two decimal places; and A, for alpha-numeric information.
- LV        The lowest acceptable value.
- HV        The highest acceptable value, or maximum length for VT\$=A.

We used the LINE INPUT instruction (Line 9026) to get our information from the keyboard. The LINE INPUT instruction lets us enter commas, semicolons or special characters that might cause the INPUT statement trouble.

Try writing your own program using the subroutine to enter something with which you are familiar, such as your telephone number. You can test for a specific number by setting both HV and LV to that number before calling the subroutine. This subroutine will be used in our database's front-end to make sure that no unwanted information is accepted.

That's all for this month. It will take some time to get our database set up, but don't give up. Next time we'll set up a *Money Manager* database and create menus and data inputs to do this.

*(Questions or comments about this tutorial may be directed to the author at 83-34 169 Street, Jamaica, NY 11432. Please include an SASE when requesting a reply.)* □

```

142 ON A GOTO 150,300,144,146,148
144 PRINT @320,"OPTION #3 DELETE WAS CHOSEN":GOTO 130
146 PRINT @320,"OPTION #4 REPORT WAS CHOSEN":GOTO 130
148 END
150 CLS0:PRINT "---- ADDING A MARBLE ----
152 LI$(1)="1= SIZE OF THE MARBLE
153 LI$(2)="2= COLOR OF THE MARBLE
154 LI$(3)="3= DESCRIPTION OF THE MARBLE
155 LI$(4)="4= RETURN TO THE PREVIOUS MENU
160 SL =96:NL=4:GOSUB 9000
162 ON A GOTO 170,170,170,120
170 PRINT @320,A;" CHOSEN":GOTO 152
300 CLS0:PRINT "- CHANGE EXISTING INFORMATION -
302 LI$(1)="1= CHANGE THE SIZE
304 LI$(2)="2= CHANGE THE COLOR
306 LI$(3)="3. CHANGE THE DESCRIPTION
308 LI$(4)="4. RETURN TO PREVIOUS MENU"
310 SL=64:NL=4:GOSUB 9000
314 ON A GOTO 320,320,320,120
320 PRINT @320,A;" CHOSEN":GOTO 302
9000 FOR I= 1 TO NL:PRINT @SL,LI$(I)
9001 SL= SL+32:NEXT I
9005 PRINT @32,"* SELECT FROM THE FOLLOWING"
9006 FOR I = 1 TO 200
9007 A$ = INKEY$:IF A$ <> "" GOTO 9012 ELSE NEXT I
9008 PRINT @32," ":FOR I = 1 TO 65
9009 A$ = INKEY$:IF A$ <> "" GOTO 9012 ELSE NEXT I
9010 GOTO 9005
9012 A = VAL(A$):IF A > 0 AND A < NL+1 THEN RETURN
9113 GOTO 9005

```

#### Listing 4: MARBLE2

```

100 CLEAR 500
105 CLS
110 P$="ENTER A NUMBER FROM 1 TO 99":VT$="N"
120 HV=99:LV=1:SL=64:GOSUB 9020
130 P$="ENTER MARBLE SIZE: 0.25 TO 5.50":VT$="D"
140 HV=5.50:LV=0.25:SL=128:GOSUB 9020
150 P$="MARBLE DESCRIPTION < 32 CHARS":VT$="A"
160 HV=32:SL=192:GOSUB 9020
170 GOTO 105
9020 PRINT @SL,P$ 'PROMPT FOR VARIABLE
9022 PRINT @SL+32," " 'CLEAR THE NEXT LINE
9024 PRINT @SL+32,""; 'REPOSITION CURSOR
9026 LINE INPUT "=> ";VA$ 'INPUT THE VARIABLE
9028 LA= LEN(VA$):IF VT$ = "D" GOTO 9044
9030 IF VT$ = "N" GOTO 9036
9032 IF LA > INT(HV) GOTO 9020
9034 RETURN 'VARIABLE IS IN RANGE
9036 VV= VAL(VA$) 'GET NUMERIC VALUE
9038 IF VV < LV GOTO 9020
9040 IF VV > HV GOTO 9020
9042 GOTO 9034
9044 IF LA > 9 OR LA < 3 GOTO 9020
9046 IF MID$(VA$,LA-2,1) <> "." GOTO 9020
9048 GOTO 9036

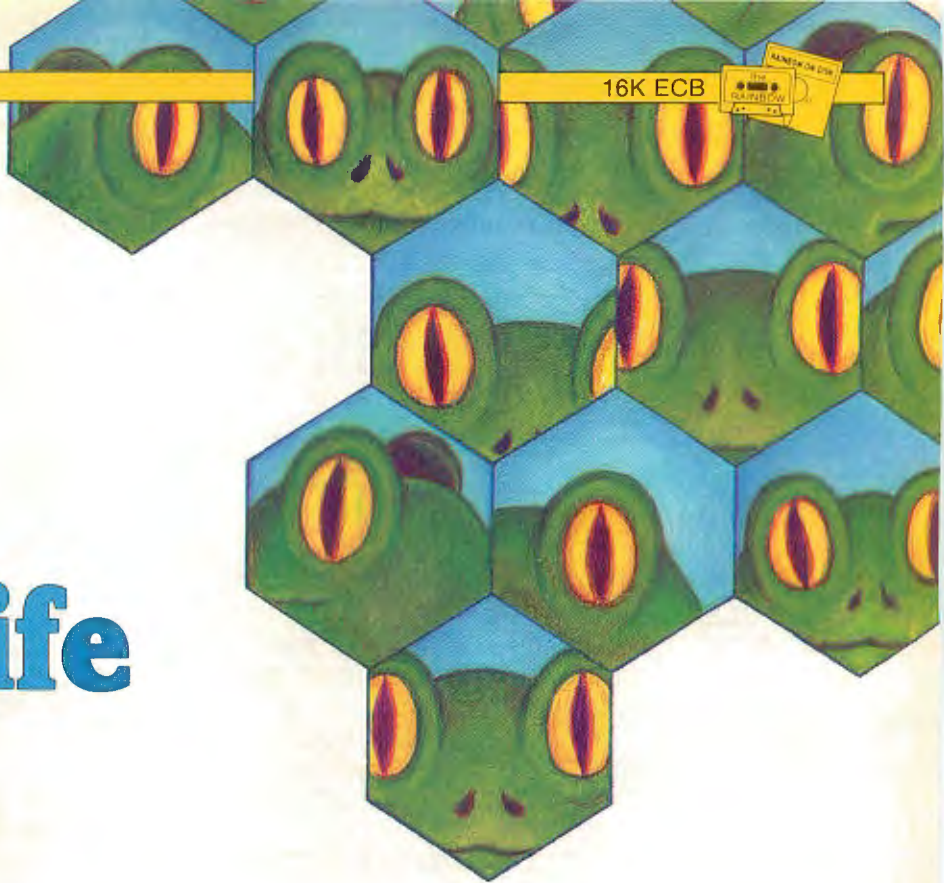
```



*Some days it doesn't pay  
to leave the lily pad*

# It's a Toad's Life

**By Christopher Dunn**



**A**re your fingers cramped from entering page after page of listings, or have you just looked in horror at the length of most entertaining programs? If so, I have a game for you. *Toader* needs your help to return to the lily pads. With the help of a 16K ECB CoCo and one joystick, you can give this poor little toad the guidance it needs.

Use the joystick to guide *Toader* to its home at the top of the screen. You must avoid cars and trucks on the road and get your toad across the water by making him hop on the floating logs and swimming turtles. Once there is a toad on each of the five lily pads at the top of the screen, you'll advance to a more challenging level. Be careful with your little friend. You start with only three toads at the bottom of the screen. You've also got to keep an eye on the timer. *Toader* only has so much time to get home before he croaks.

You may not believe that a short program can do all this. However, using one of BASIC's better tricks (string manipulation), you can create a *short* program that's fun. BASIC is an interpreted language. When a line is executed, the interpreter must translate what it sees before following the instruction — a slow process. Strings offer a way around this repeated interpretation. When the computer locates a string, the entire line is interpreted once. However, an assembly language routine generates a string's characters (which are stored as consecutive bytes in an area of RAM located by a string pointer) in a fraction of the time required to print each character separately in BASIC.

*Toader* uses this idea to draw the rows of cars, logs and turtles. Each row is assigned a 60-character string. As a pointer (P) counts from one to 30, a 30-character portion of each string is printed using the MID\$ function. You can make a row appear to move backwards by using 32-P as the pointer value.

The rows are printed beginning at Line 1049. Notice the inclusion of P\*2 in Line 1120. This instruction makes the pointer move twice as fast, which in turn makes the row move twice as fast as the others. Initially, this row consist only of ASCII code 143 (grass for our toad). However, cars materialize at Level 3. (In fact, several challenges become apparent beyond Level 1. Watch for them.)

A timer at the bottom of the screen serves both to warn you of *Toader's* impending demise and to record the score. The equation for increasing the score is in Line 3005. Line 1350 includes a sound for our toad's jump; however, I have masked that line with a REM statement to increase program speed and joystick responsiveness. Try the program with the sound and make any modifications you want. (I am no Mozart, and I'd be happy to learn that someone has come up with a better tune for the PLAY statements.)

The DATA statements at the end contain the information for the logs, cars and turtles (Logs = 255, Turtles = 42, and Cars = 175, 207 and 223). While only the given character codes are available, you might try experimenting with the width of each obstacle (up to 30) and the space between them. Since the obstacles are placed randomly within the intervals (see Line 2112), the value simply identifies at what section of the row the obstacle will appear.

The EXEC statement, Line 1300, is the JOYIN routine listed in the Color Computer manual (JOYIN=[A00A]). Check this number by peaking addresses &HA00A and &HA00B. You should find the values 169 and 222 [(169\*26)+222=43486]. If the values you find at these addresses are different, multiply the first value by 256 and add that total to the second value. That will be your EXEC address. Be careful with this equation. If you EXEC the wrong address, the computer may freeze. I suggest that you save the program before running it.

*Christopher Dunn is a 19-year-old college freshman who attends the California Institute of Technology.*

You are given an extra toad at 2500 points. Variable XS represents the score at which an extra toad is awarded. After you receive the first toad, XS will become 7500, then 15,000, etc.

When you play, you must move

quickly through the cars. (Remember: They move at twice the speed of the logs and turtles.) However, crossing the water requires more concentration than speed, so move carefully over the water. Enjoy the game, but remember that

Toader's life depends on you.

(Questions or comments about this program may be directed to the author at Lloyd House, I-54 Cal Tech, Pasadena, CA 91126. Include an SASE when requesting a reply.) □

✓	1000	.....236	2290	.....83
	1350	.....85	3006	.....104
	2110	.....55	END	.....6

The Listing: TOADER

```

0 '***TOADER***
1 '**(ALMOST FROGGER)**
2 'BY CHRISTOPHER DUNN
10 CLEAR 1000
400 D$(1)="SPLAT":D$(2)="OOPPS":
D$(3)="CROAK":D$(4)="THANKS":D$(
5)=" BYE ":D$(6)="HELP"
401 D$(7)="WHOMP":D$(8)="SQUASH"
:D$(9)="RIBBIT"
700 '***INITIALIZATION
800 SC=0:'SCORE
810 XS=2500:'EXTRA TOAD AT 2500
820 NT=3:'# OF TOADS
830 ST=32:'START TIMER VALUE
840 LV=1:'GAME LEVEL
899 '***NEW SCREEN
900 GOSUB 2100:GOSUB 2200
950 P=RND(30):'OBSTACLE SHIFT
951 T=1424:'TOAD POS. (POKE)
952 T0=1424:'LAST TOAD POS.
953 L=143:'LAST VAL(UNDER TOAD)
954 NL=5:'# OF LILLY PADS LEFT
955 TM=ST:'TIMER
960 PRINT@480,STRING$(TM-1,191);
970 PRINT@448,STRING$(16,143);:P
RINT@448,"LEVEL";LV;:GOSUB2310
980 GOSUB 2300
995 PLAY"O3T3L8CL16EL4E#L8D#L16F
L8GL4FT2"
999 '***BEGINNING OF MAIN LOOP
1000 P=P+1:IF P>30THEN P=1
1010 TM=TM-.5:IF TM<=0THEN2000
1020 POKE1504+TM,128
1040 POKE T,L
1049 'LOGS, CARS, TURTLES
1050 PRINT@65,MID$(A$(0),P,30);
1060 PRINT@97,MID$(A$(1),32-P,30
);
1070 PRINT@129,MID$(A$(2),P,30);
1080 PRINT@161,MID$(A$(3),32-P,3
0);
1090 PRINT@257,MID$(A$(4),32-P,3
0);
1100 PRINT@289,MID$(A$(5),P,30);
1110 PRINT@321,MID$(A$(6),32-P,3
0);
1120 PRINT@353,MID$(A$(7),P*2,30
);
1130 PRINT@193,MID$(A$(8),P,30);
1199 'TOAD MOVEMENT
1200 L=PEEK(T):T0=T:POKE T,159
1300 EXEC43486:J0=PEEK(346):J1=P
EEK(347):IF J0=0 THEN T=T-1 ELSE
IF J0=63 THEN T=T+1 ELSEIF J1=0
THEN T=T-32ELSEIF J1=63 THEN T=T
+32
1350 IF T0<>T THEN POKE T0,L:L=P
EEK(T):POKE T,159:REM PLAY"L7003
V20CEO4V30FA"
1360 IF L=106 THEN L1=9 ELSE L1=
INT((L-127)/16)
1399 'MOVES TOAD ON LOGS OR RUNS
HIM OVER WITH CAR
1400 ON L1 GOTO 1500,2000,2000,3
000,2000,2000,2090,2050,2060
1500 GOTO 1000
1995 'END OF MAIN LOOP
1999 '***CRUSHED TOAD
2000 PRINT@493,D$(RND(9));:PLAY"
O1V20L8GL20V25FL4V30D":POKE T,L
2020 NT=NT-1:IF NT=0THEN4000
2022 TM=ST:PRINT@480,STRING$(TM-
1,191);
2025 GOSUB 2300
2030 L=143:T=1424
2035 GOSUB 2310
2040 GOTO 1000
2049 '***MOVE TOAD
2050 T=T-1:L=PEEK(T):GOTO1500
2060 T=T+1:L=PEEK(T):GOTO1500
2090 POKE T,L:T=T-32:L=143:GOTO
1500
2099 '***SET UP OBSTACLES
2100 FOR Q=0TO3
2101 A$(Q)=STRING$(30,175):A$(Q+
4)=STRING$(30,128):NEXT Q
2105 A$(8)=STRING$(30,175)
2110 FOR Q=0TO8:READ A,B,C
2111 A$=STRING$(B,A)
2112 FOR QQ=1 TO 30 STEP C:MID$(
A$(Q),QQ+RND(1+C-B)-1,B)=A$
2113 NEXT QQ,Q
2120 IF LV=3 THEN A$(7)=STRING$(
6,175)+STRING$(24,128) ELSEIF LV
<3 THEN A$(7)=STRING$(30,143)
2125 IF LV=1 THEN A$(8)=STRING$(
30,143)
2127 FOR Q=0 TO 8:A$(Q)=A$(Q)+A$
(Q):NEXT Q
2128 A$(7)=A$(7)+A$(7)
2130 RESTORE
2140 RETURN
2199 '***DRAW SCREEN

```

```

2200 FOR Q=1 TO 16:PRINT@480,STR
ING$(32,128);:NEXTQ
2201 CLS 0
2202 PRINT@0,STRING$(64,207);
2203 PRINT@64,STRING$(192,175);
2210 FOR Q=33 TO 61 STEP 7:PRINT
@Q,CHR$(191);CHR$(191);:NEXTQ
2220 PRINT@224,STRING$(32,143);
2230 PRINT@384,STRING$(32,143);
2240 PRINT@416,STRING$(32,239);
2250 FOR Q=2 TO 12:PRINT@Q*32,CH
R$(207);:PRINT@Q*32+31,CHR$(207)
;:NEXTQ
2290 RETURN
2299 '***SHOW # OF TOADS
2300 GOSUB 2305:PRINT@463,STRING
$(14,128);
2301 IF NT<=1 THEN RETURN ELSE F
OR Q= 464 TO 464+(NT-2)*2 STEP 2
:POKE Q+1024,159:NEXT Q:RETURN
2305 IF NT>8 THEN NT=8
2307 RETURN
2309 '***SHOW SCORE/EXTRA TOAD?
2310 SC=INT(SC):PRINT@455,USING"
###,### ";SC;
2311 IF SC>=XS THEN PLAY"V3104L2
0GP10GP10G":XS=XS+2*SQR(XS*1340)
+1340:NT=NT+1:GOSUB 2300
2315 RETURN
2999 '***TOAD IN LILLY PAD!!!
3000 POKE T,159:IF PEEK(T-1)=191

```

```

THEN POKE T-1,159 ELSE POKE T+1
,159
3005 SC=SC + TM*TM*LV + 100*LV
3006 TM=ST:PRINT@480,STRING$(TM-
1,191);
3007 GOSUB 2310
3009 PLAY"T703V25L6FL4EV15L10AV2
0L4GT2"
3010 NL=NL-1:IF NL=0 THEN 3200
3050 T=1424:L=143:GOTO 1500
3199 '***GO TO NEXT LEVEL
3200 ST=ST-1:IF ST<=18 THEN ST=1
8
3205 LV=LV+1
3210 GOTO 900
3999 '***END OF GAME(OF COURSE)
4000 PRINT@225," GAME
OVER ";
4010 FOR Q=1 TO 2000:NEXT Q:GOTO
700
8998 '***OBSTACLE DATA
8999 'ASCII,WIDTH,SEPARATION
9000 DATA 255,6,15
9010 DATA 42,3,10
9020 DATA 255,8,15
9030 DATA 42,3,6
9040 DATA 207,4,10
9050 DATA 175,2,6
9060 DATA 223,3,10
9070 DATA 175,5,10
9080 DATA 255,5,10

```

If you write checks, use credit cards, have a bank account or pay taxes, then....

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## Locating Typos

Dear Bill:

My wife and I typed in the program Big Bad Wolf from the September '88 issue (Page 34), and we can't get it to run. Every time we type RUN, all we see is the small figure of the pig and the wolf being drawn. After that, the screen goes blank and the OK prompt appears. How can we get this to run properly?

Warren & Jean Schulze  
Manitowoc, Wisconsin

I looked at the listing, and I'd like to share a few hints with you. These hints will save you some frustration and time looking for your typos. Even when you think you typed in each line correctly, very small mistakes can creep in. It takes only one typographical error to crash the program with a syntax error.

In this particular case, the author has added an error trap routine in Line 20, which says `ON ERR GOTO 2290`. That's a new feature for the CoCo 3, and while it may have its advantages in the finished product, it will not help you find your typos while you are in the debugging process. As a matter of fact, if your error is caused by a typographical error and you try to run the program with that error in place, the `ON ERR GOTO` routine will simply end the program without telling you *where* the error occurred.

To temporarily remedy this condition, you'll need to by-pass that routine. You can either omit Line 20, replacing it after you have a working copy, or you can edit Line 20 and place an apostrophe (SHIFT-7) in front of the line, rendering it useless. Just remember to remove the apostrophe or replace the line when you are finished de-bugging.

When Line 20 is deactivated, you can run your program. Now, when the program encounters an error, it will halt, and the error will appear along with the line number. In your particular case, you not only omitted the comma between `PSET` and `BF` in Line 1360, but you also had a 2 at the end of Line 2220. That probably resulted from not shifting the 2 key to get your closing quote.

*Bill Bernico, RAINBOW's newest columnist, is the author of more than 300 Color Computer programs. He founded Bill Bernico Software in 1987 and enjoys writing and recording his own music.*



## By Bill Bernico Rainbow Contributing Editor

Now that you can see where the errors have occurred and can correct them, try running the program again. When it works the way the author says it is supposed to, you can replace Line 20 or remove the apostrophe. Then you'll be ready to enjoy the program.

### Out of Range

Dear Bill:

I have a 64K CoCo 2 Model 26-3127 with a cassette system. I have had it for almost four years, but now it won't accept GET/PUT statements. Every time I try to use GET/PUT, I get a BS Error. Why has this happened, and how can I fix it?

Bill Cathey  
Kings Mountain, North Carolina

I don't think your machine is at fault, Bill. If it is, you'll have to take it to Radio Shack for a checkup. If you have a program that will run a check on your system, you could help the technician locate the problem.

If, on the other hand, your problem is in your programming, maybe I can help. To begin with, a BS Error means that you have a *Bad Subscript*, or a subscript *out of range*. In other words, you have to use a subscripted variable to define the areas to be used in the GET and PUT commands. Suppose you are trying to move a part of the graphics screen 15-by-15 pixels in area. That graphics area will be stored in a sub-

scripted array, which we will call Array G\$. In this case, G\$ must be dimensioned early in the program. As you may remember, any subscripted variable larger than nine must be dimensioned. If you didn't allot enough space for Array G\$, you'll get a BS Error.

Type in this short sample program and run it:

```
10 PMODE 4,1:PCLS 1
20 SCREEN 1,1:COLOR 0,1
30 DIM G(10)
40 DRAW 'BM10,10R15NG15D15L15U1
50 GET (10,10)-(25,25),G
60 FOR X1 TO 750:NEXT X
70 PCLS1
80 PUT (100,100)-(115,115),G
90 GOTO 90
```

If this program works, the problem is not in your machine. However, if this sample produces a BS Error, you may have other subscripted variables in your program that have nothing to do with GET and PUT. The program may be crashing in another area altogether.

### Fading Away

Dear Bill:

I'm writing a CoCo 3 program in BASIC using `HSCREEN 2` and `HPRINT` statements to display my instructions on the graphics screen. The way the screen is set up, I have to use the last line for text, so one of my commands looks like this:

```
HPRINT (1,23), "Instructions"
```

I have problems when there are letters with descenders (g, p, q, y) on this line. The descending part of the letter fades into the black border, and it's difficult to read at a glance. Any solutions?

Eddie Lewis  
Lockport, Illinois

There is a simple fix that will let you read that last line easily and clearly. All you have to do is make the surrounding border color the same as the rest of your text screen. For my example, I'll use black letters on a white background. To get this, I use the following:

```
HSCREEN 2:HCLS 4:HCOLOR 8,4
```

Color 8 is black and Color 4 is white. With these values, my white screen

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will have a black border unless I change it by poking a value to make the border the same color as the rest of the screen. For a white border, I will want to poke a value of 63 (the palette color for white) into Location 65434. Your best bet is to include this poke in the same line with your other graphics screen commands, immediately after HCOLOR 8,4.

If your graphics screen color is anything other than white, simply change the poke value to match the color you're using. For example, if your graphics screen is blue and you're using white letters, poke Location 65434 with 9, since 9 is the palette value for that shade of blue. Your other graphics commands would be HSCREEN 2:HCLS 2:HCOLOR 4,2. Now you will have a completely blue screen with white letters.

### The Old Red, White and Blue

Dear Bill:

*I've seen procedures that create the artifact colors red and blue on a PMODE 4 screen by poking 17B with either a 1 for red or a 2 for blue. Is there a way to get these colors without poking these values?*

Jeff Gatzke  
Glendale, California

There is another way to get these colors on the PMODE 4 screen; however, this technique depends on which lines are being drawn on the screen. That is, if you draw lines on an even-numbered coordinate, you'll get one color — provided that your series of lines is spaced two lines apart. The artifacting appears when these two lines are next to each other without touching. When you draw on the odd coordinates, you'll get the other color. The color you get will vary each time because your computer may not default to the right color set when you power up.

When you overlap these lines, you get white if you start on a black screen. When you run the program shown in the listing you will see three colors — red, white and blue. The red is produced by the series of lines drawn on the even coordinates and drawn on every other line. The blue is produced when the lines are drawn at odd coordinates and drawn on every other line. The white in the middle is produced when the lines are drawn *right next* to each other.

This method is limited because you may want to fill odd-shaped areas. While you could draw lines within your area, it would be tedious and a waste of

time. Using the POKE 17B,1 method with your PAINT command would be more efficient and space saving. Just remember that a regular PAINT command looks like this:

```
PAINT (12B,96),1,1
```

With the artifact color method, your PAINT command would look like this:

```
POKE 17B,1:PAINT (12B,96),,0
```

The regular PAINT command shows the two coordinates followed by the paint color, a comma and the border color. The artifact method has two commas followed by a zero instead.

### The Listing:

```
10 PMODE4,1:PCLS:SCREEN1,1
20 FORK=1TO250STEP2
30 LINE(2+X,2)-(2+X,115),PSET
40 LINE(3+X,75)-(3+X,189),PSET
50 NEXT X
60 GOTO60
```

### Creations Font

Dear Bill:

*I enjoyed your English Font program in the May '88 issue ("Ye Olde Font," Page 36). I even ordered your disk with the other dozen or so fonts on it. They are all well done, but I'd like to know how you knew where to DRAW each character to get it to look like it does. How do you visualize what each character will look like before you define it, and how can I convert some of my CoCo Max fonts to BASIC strings?*

Chuck Dobbs  
Fayette, Alabama

It's funny that you mention the *CoCo Max* fonts. My fonts were created in BASIC using those fonts as a basis. That is, I ran *CoCo Max*, loaded in the font that I wanted to convert and viewed it in the *Fat Bits* mode. A picture shown in this mode screen is magnified, and each pixel is then represented as a square on a grid.

It took me a long time to convert each font, or set of characters. My first step was to count the squares in the grid and determine the size of each character. I decided to start each character at the upper left-hand corner of that grid and end at the upper right-hand corner. That way, when a character needed to be displayed on the screen, its position would line up with the next character.

Starting at that upper left-hand corner, I looked over the character, which was now represented by a series

of filled in squares, and determined my shortest route for covering the entire character in as few steps as possible. For example, if the letter A took up an area 8-by-8 squares in dimension, I would enter the following:

```
A$(65)="BRNDBR5D4NL5D4U8BR2"
```

Since there are 90 possible A\$ combinations (32 through 122), each character must be defined in its own subscripted variable. A capital letter A has an ASCII value of 65, so that draw string is stored in A\$(65). A capital letter B would be stored in A\$(66), and so on until you have defined each character with its own variable.

With all the characters defined, you can place them on the graphics screen by drawing the string containing that particular letter. For example, the following command line:

```
DRAW"BM10,10"+A$(65)+A$(66)+A$(67)
```

will result in the appearance of "ABC" on the graphics screen at Location 10 across and 10 down. Knowing that each letter is 8-by-8 squares, you can space your lines 10 pixels apart and be able to display 19 lines of text on a PMODE 4 screen.

### Saving Graphics

Dear Bill:

*I used DRAW statements to create a PMODE 4 picture. How can I save this to disk for later use?*

Vic Roberts  
Lexington, Kentucky

Once your BASIC program is finished with your PMODE 4 masterpiece, save the picture to disk by entering *SAVE"filename",&H0E00,&H25FF,&HA027*. This assumes your picture was created using PMODE 4,1. Save the picture to tape by entering *CSAVE"filename",&H0600,&H1DFF,&HA027*. To view your creation, (C)LOADM it and run the following program:

```
10 PMODE4,1
20 SCREEN 1,1
30 GOTO 30
```

Questions about specific BASIC programming problems can be addressed to *BASICALLY Speaking, THE RAINBOW, P.O. Box 385, Prospect KY 40059*.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. We are unable to answer letters individually.





CoCo makes calculations easier for the disabled

# Just One Touch — Just One Breath

By Eric Ryan Mims

**M**ost people do not think about the physical abilities required to use a computer keyboard, many of which have up to 90 keys. However, those who have either limited or no use of their hands may find such a keyboard difficult or even impossible to use. A person whose physical handicap inhib-

its all the fingers may not be able to operate even a calculator.

*Single Key Calculator* has six functions with memory and can be operated by a person who has lost the use of hands or fingers. In addition to the four basic functions of a calculator — addition, subtraction, multiplication and division — it can handle both square and square root functions. The user can also clear the screen or exit the program at any time.

The program was written on a 64K Extended Color BASIC CoCo 2 with one disk drive; however, the program would work with a 16K CoCo using a cassette player. The primary functions of this program could be adapted to be used with any computer using BASIC, but major changes may be needed to modify the graphics.

The right joystick's fire button is the only input device used for this calculator. Because the joystick is used, other types of buttons or switches can be connected to the computer through the

---

*Eric Mims is a sophomore at BEE County College in Beeville, Texas. His Single Key Calculator project won several awards in the Alamo Regional Science Fair in San Antonio, Texas.*



Calculator simulator during operation.

joystick port. This way, each user can choose the appropriate input device.

### Program Operation

During operation, the program displays a facsimile of a calculator keyboard. A small arrow points to the first row of keys for a few seconds and then moves to the next row. After pointing to each row, the arrow moves back to the top row and the process is repeated.

As the arrow pauses at each row, the computer checks one of its joystick ports to see if the user has closed an on/off switch (connected in place of the fire button) to select the row containing a desired function. If so, the computer's arrow will point to each key in a column, beginning with the left-most key and moving to the right. At each key, the computer will pause for a few seconds to give the user time to choose that key.

The first 14 lines of *Single Key Calculator* contain the program instructions. Line 160 begins the actual program by clearing the screen and changing the background color to blue. Lines 170, 180, 220 and 230 set all the variables for the program. Lines 210 through 270 display the keyboard, while lines 280 and 290 display the memory sign and the selected numbers.

After the program has been started and the display cleared, two zeroes will appear at the bottom of the screen. If memory is being used, an 'M' will appear in inverse video at the upper-right corner. Lines 1210, 140, 1650 and 1900 display the function being used. In this manner, the user is always reminded of the calculation being performed.

Lines 320 through 430 form a routine that scans each row of the simulator's keyboard while waiting for the user to respond by pressing either the joystick's fire button or another switch connected to that port. Line 60 assigns the up-arrow cursor (displayed on the screen in inverse video) to P\$ and a blue square (to cover the cursor) to Q\$. Finally, the PRINT location for the function being used is assigned to E.

The joystick scan is included in each section of the program that scans either rows or keys. While this allows the program to run faster, the program would be short-

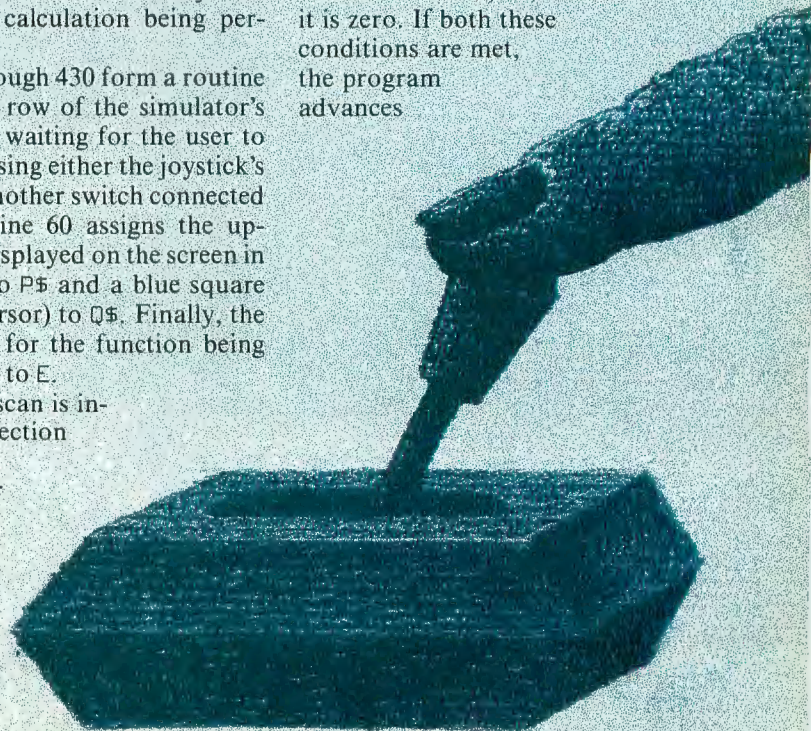
er if all joystick scans were combined in one subroutine at the program's end.

The first row contains keys for the following functions: clear, square, square root and exit. The second row of the calculator contains these memory functions: memory +, memory -, memory recall and memory clear. Rows 3 through 5 include the numbers one to nine and the basic functions of division (/), multiplication (\*) and subtraction (-). Finally, the sixth row contains 0, the decimal (.), the equal sign (=) and the addition function (+).

When one of the four basic functions is selected, the variable S is assigned the number corresponding to that sign. When the equal sign is selected, the program instructs the computer to check the value of S and, depending on the value, perform the selected operation. The functions and their corresponding values are as follows:

Value:	Function:
S = 0	no function assigned
S = 1	division
S = 2	multiplication
S = 3	subtraction
S = 4	addition

To prevent a Division by 0(/0) Error from stopping the operation of the computer, Line 1870 checks Variable S to see if division has been requested. If it has, the computer looks at the second number variable, N2, to see if it is zero. If both these conditions are met, the program advances



to Line 1930 and displays the message, "/0 Error." The program then assigns  $\emptyset$  to S, but does not erase the first number variable, N1. The user may continue by selecting another function.



Puff/sip switch.

### User Response

As mentioned earlier, the joystick port is used as the only input device so that other switches, which might better serve the user, may be connected to the computer. The joystick button was used to develop and test this button. Later, a breath-activated *puff* switch was used. The puff switch allows the user to operate the keys of the simulator by lightly breathing into or sipping from a plastic tube connected to the device.

The puff switch used with this program is a Honeywell Model PSF 100A, purchased from Edmund Scientific. The switch, which has two ports, is closed when the difference in air pressure between the two ports is at least 0.02 pounds per square inch. The switch can be activated in two ways by using the two openings. The opening marked "High" is activated by high pressure (light breathing), while the opening marked "Low" detects low pressure (sipping).

To test the switch, I opened a Radio Shack joystick (Cat. No. 26-3008) and connected alligator clips to the fire

button switch. The two wires from the clips were drawn out of the joystick case through the same hole used for the joystick cable. The puff switch was then connected to the clips and the program was run.

When a straw was used to extend the openings, the puff switch was triggered with little effort if the user's mouth completely covered the end of the straw. For best results, the port extension tube should be long enough to rest on a table, desk or the lap of the user.

### Conclusion

*Single Key Calculator* is a useful tool for the physically disabled. With this program, a person previously unable to use a calculator can now use one with little or no help. In addition, this application is just one demonstration of the CoCo's usefulness for the disabled.

Of course, the program does have some drawbacks. First, long calcula-

tions take a long time. Second, the computer must be set up, the program loaded and the appropriate switch connected to the computer before a disabled person can use the program.

Ideally, a computer designed for the quadriplegic user would not need another person to set up and turn on the computer each time it is to be used. Instead, the computer should be designed to be turned on and off with a puff switch. In addition to my program, such a computer could add to the person's freedom by including other single-key programs. Home computers like the CoCo have the potential to simplify the lives of many disabled persons. *Single Key Calculator* takes one step in that direction.

(Questions or comments about this program may be directed to the author at 433 Twin Oak, Seguin, TX 78155. Please include an SASE when requesting a reply.) □



Puff/sip switch connected to the Color Computer 2 through a joystick.

✓	160	.....80	1280	.....8
	350	.....151	1530	.....129
	580	.....26	1750	.....29
	810	.....71	END	.....244
	1090	.....207		

The Listing: CALCLATR

```

10 CLS
20 PRINT "ONE KEY CALCULATOR"
30 PRINT "FOR SCIENCE FAIR 1985-
86"
40 PRINT "COPYRIGHT 1985 BY ERIC
RYAN MIMS"

```

```

50 FOR X=0 TO 200:NEXT
60 CLS
70 PRINT@6, "ONE KEY CALCULATOR"
80 PRINT:PRINT" THIS SINGLE-KEY
CALCULATOR SIMULATOR WAS CRE
ATED FOR USE BYDISABLED PERSONS
WHO DO NOT HAVETHE ABILITY TO OP
ERATE A CONVENTIONAL CALC
ULATOR.";
90 PRINT" THE SIMULATOR IS A
SIX FUNCTION CALCULATOR WITH
MEMORY WHICH CANBE OPERATED WIT
H A SINGLE SWITCH. THE SWITCH C
AN BE A STANDARD PUSH-BUTTON DEV
ICE OR A BREATH- OPERATED 'PUFF'
SWITCH.press thefirebutton to

```

```

start";
100 IF PEEK(65280)=(127 OR 255)
THEN 100
110 ' ONE KEY CALCULATOR
120 ' FOR SCIENCE FAIR 1985-86
130 ' COPYRIGHT 1985 BY ERIC RYA
N MIMS
140 '
150 ' VERIABLE DEFINITION
160 CLS3
170 CLEAR
180 X=0:A=0:B=0:C=0:D=0:SOUND 1,
1
190 '
200 ' CREATE KEYBOARD
210 X=X+1
220 DATA CLEAR,67,SQR,75,^2,82,E
XIT,87,M+,133,M-,140,RM,146,CM,1
52,7,197,8,204,9,210,/,216,4,261
,5,268,6,274,*,280,1,325,2,332,3
,338,-,344,0,389,..,396,=,402,+,4
08
230 DATA 92,1,156,2,220,3,284,4,
348,5,412,6
240 IF X>24 THEN 280
250 READ A$,B
260 PRINT @B,A$;
270 GOTO 210

```

```

280 IF M<>0 THEN PRINT@62,"m";EL
SE PRINT @62,Q$;
290 PRINT@453,N1;:PRINT@485,N2;
300 '
310 ' ROW SCAN
320 A=A+1
330 IF A>6 THEN RESTORE:GOTO 180
340 READ B,C
350 PRINT@B,CHR$(127);
360 GOSUB 390
370 PRINT@B,CHR$(175);
380 GOTO 320
390 FOR W=0TO 25
400 P=PEEK(65280)
410 IF P<>(255 OR 127) THEN 460
420 NEXT W
430 RETURN
440 '
450 ' VARIABLE DEFINITION OF ARR
OW, BLUE SQUARE, AND LOCATION OF
SIGNS
460 P$=CHR$(126):Q$=CHR$(175):E=
476
470 FOR X=0 TO 150:NEXT
480 RESTORE:ON C GOTO 520,770,10
40,1270,1480,1690
490 '
500 ' FIRST LINE

```

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```

510 ' SCAN OF CLEAR, SQR, ^2, EX
IT
520 A=101:B=108:C=114:D=120
530 PRINT@92,CHR$(175);
540 PRINT@A,P$;:X=1:GOSUB 610:PR
INT@A,Q$;
550 PRINT@B,P$;:X=2:GOSUB 610:PR
INT@B,Q$;
560 PRINT@C,P$;:X=3:GOSUB 610:PR
INT@C,Q$;
570 PRINT@D,P$;:X=4:GOSUB 610:PR
INT@D,Q$;
580 GOTO 180
590 '
600 ' SCAN OF JOYSTICK BUTTON
610 FOR W=0 TO 25
620 P=PEEK(65280)
630 IF P<>(255 OR 127) THEN 670
640 NEXT W
650 FOR Y=0 TO 80:NEXT
660 RETURN
670 ON X GOTO 680,690,710,730
680 N1=0:N2=0:N$="":S=0:CLS3:SOU
ND 200,5:GOTO 180
690 IF S=0 THEN N1=SQR(N1)ELSE N
2=SQR(N2)
700 PRINT @B,Q$;:GOTO 180
710 IF S=0 THEN N1=N1^2ELSE N2=N
2^2
720 PRINT@C,Q$;:GOTO 180
730 END
740 '
750 ' SECOND LINE
760 ' SCAN OF M+, M-, RM, CM
770 A=165:B=172:C=178:D=184
780 PRINT@156,CHR$(175);
790 PRINT@A,P$;:X=1:GOSUB 840:PR
INT@A,Q$;
800 PRINT@B,P$;:X=2:GOSUB 840:PR
INT@B,Q$;
810 PRINT@C,P$;:X=3:GOSUB 840:PR
INT@C,Q$;
820 PRINT@D,P$;:X=4:GOSUB 840:PR
INT@D,Q$;
830 GOTO 180
840 FOR W=0 TO 25
850 P=PEEK(65280)
860 IF P<>(255 OR 127) THEN 900
870 NEXT W
880 FOR Y=0 TO 80:NEXT
890 RETURN
900 IF S=0 THEN 960
910 ON X GOTO 920,930,940,950
920 M=M+N2:PRINT@A,Q$;:GOTO 180
930 M=M-N2:PRINT@B,Q$;:GOTO 180
940 N2=M:PRINT@C,Q$;:GOTO 180
950 GOTO 1000
960 ON X GOTO 970,980,990,1000
970 M=M+N1:PRINT@A,Q$;:GOTO 180

```

```

980 M=M-N1:PRINT@B,Q$;:GOTO 180
990 N1=M:PRINT@C,Q$;:GOTO 180
1000 M=0:PRINT@D,Q$;:GOTO 180
1010 '
1020 ' THIRD LINE
1030 SCAN OF 7,8,9,/
1040 A=229:B=236:C=242:D=248
1050 PRINT@220,CHR$(175);
1060 PRINT@A,P$;:X=1:GOSUB 1110:
PRINT@A,Q$;
1070 PRINT@B,P$;:X=2:GOSUB 1110:
PRINT@B,Q$;
1080 PRINT@C,P$;:X=3:GOSUB 1110:
PRINT@C,Q$;
1090 PRINT@D,P$;:X=4:GOSUB 1110:
PRINT@D,Q$;
1100 GOTO 180
1110 FOR W=0 TO 25
1120 P=PEEK(65280)
1130 IF P<>(255 OR 127) THEN 117
0
1140 NEXT W
1150 FOR Y=0 TO 80:NEXT
1160 RETURN
1170 ON X GOTO 1180,1190,1200,12
10
1180 N$=N$+"7":GOSUB 1220:PRINT@
A,Q$;:GOTO 180
1190 N$=N$+"8":GOSUB 1220:PRINT@
B,Q$;:GOTO 180
1200 N$=N$+"9":GOSUB 1220:PRINT@
C,Q$;:GOTO 180
1210 S=1:SOUND 100,1:PRINT@E,"/"
;:N$="":PRINT@D,Q$;:GOTO 180
1220 IF S=0 THEN N1=VAL(N$) ELSE
N2=VAL(N$):RETURN
1230 RETURN
1240 '
1250 ' FOURTH LINE
1260 ' 4,5,6,*
1270 A=293:B=300:C=306:D=312
1280 PRINT@284,Q$;
1290 PRINT@A,P$;:X=1:GOSUB 1340:
PRINT@A,Q$;
1300 PRINT@B,P$;:X=2:GOSUB 1340:
PRINT@B,Q$;
1310 PRINT@C,P$;:X=3:GOSUB 1340:
PRINT@C,Q$;
1320 PRINT@D,P$;:X=4:GOSUB 1340:
PRINT@D,Q$;
1330 GOTO 180
1340 FOR W=0 TO 25
1350 P=PEEK(65280)
1360 IF P<>(255 OR 127) THEN 140
0
1370 NEXT W
1380 FOR Y=0 TO 80:NEXT
1390 RETURN
1400 ON X GOTO 1410,1420,1430,14

```



```

40
1410 N$=N$+"4":GOSUB 1220:PRINT@
A,Q$;:GOTO 180
1420 N$=N$+"5":GOSUB 1220:PRINT@
B,Q$;:GOTO 180
1430 N$=N$+"6":GOSUB 1220:PRINT@
C,Q$;:GOTO 180
1440 S=2:SOUND 100,1:PRINT@E,"*"
;:N$="":PRINT@D,Q$;:GOTO 180
1450 '
1460 ' FIFTH LINE
1470 ' 1,2,3,-
1480 A=357:B=364:C=370:D=376
1490 PRINT@348,Q$;
1500 PRINT@A,P$;:X=1:GOSUB 1550:
PRINT@A,Q$;
1510 PRINT@B,P$;:X=2:GOSUB 1550:
PRINT@B,Q$;
1520 PRINT@C,P$;:X=3:GOSUB 1550:
PRINT@C,Q$;
1530 PRINT@D,P$;:X=4:GOSUB 1550:
PRINT@D,Q$;
1540 GOTO 180
1550 FOR W=0 TO 25
1560 P=PEEK(65280)
1570 IF P<>(255 OR 127) THEN 161
0
1580 NEXT W
1590 FOR Y=0 TO 80
1600 RETURN
1610 ON X GOTO 1620,1630,1640,16
50
1620 N$=N$+"1":GOSUB 1220:PRINT@
A,Q$;:GOTO 180
1630 N$=N$+"2":GOSUB 1220:PRINT@
B,Q$;:GOTO 180
1640 N$=N$+"3":GOSUB 1220:PRINT@
C,Q$;:GOTO 180
1650 S=3:SOUND 100,1:PRINT@E,"-"
;:N$="":PRINT@D,Q$;:GOTO 180
1660 '
1670 ' SIXTH LINE
1680 ' 0,.,=,+
1690 A=421:B=428:C=434:D=440
1700 PRINT@412,Q$;
1710 PRINT@A,P$;:X=1:GOSUB 1760:
PRINT@A,Q$;
1720 PRINT@B,P$;:X=2:GOSUB 1760:
PRINT@B,Q$;
1730 PRINT@C,P$;:X=3:GOSUB 1760:
PRINT@C,Q$;
1740 PRINT@D,P$;:X=4:GOSUB 1760:
PRINT@D,Q$;
1750 GOTO 180
1760 FOR W=0 TO 25
1770 P=PEEK(65280)
1780 IF P<>(255 OR 127) THEN 182
0
1790 NEXT W

```

```

1800 FOR Y=0 TO 80
1810 RETURN
1820 ON X GOTO 1830,1840,1870,19
00
1830 N$=N$+"0":GOSUB 1220:PRINT@
A,Q$;:GOTO 180
1840 N$=N$+"." :GOSUB 1220:PRINT@
B,Q$;:GOTO 180
1850 '
1860 ' /0 ERROR TRAPPING
1870 IF (S=1 AND N2=0) THEN GOSU
B 1930:GOTO 1890
1880 IF S=0 THEN 1810 ELSE IF S=
1 THEN N1=N1/N2 ELSE IF S=2 THEN
N1=N1*N2 ELSE IF S=3 THEN N1=N1
-N2 ELSE IF S=4 THEN N1=N1+N2
1890 S=0:SOUND 100,1:PRINT@E,Q$;
:N$="":N2=0:PRINT@C,Q$;:GOTO 180
1900 S=4:SOUND 100,1:PRINT@E,"+"
;:N$="":PRINT@D,Q$;:GOTO 180
1910 '
1920 ' ERROR SUBROUTINE
1930 PRINT@503,"/0 ERROR";:PLAY"
V2001T7DDDD":FOR F=0 TO 250:NEXT:
PRINT @503,"";:FOR F=0 TO 7:PRINT
Q$;:NEXT:RETURN

```

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*A system to aid physically handicapped people  
in controlling automated functions*

# Hands-Free Computing

*By Dennis H. Weide*



**C**OEPP is an acronym for Computer Operated Equipment for Paralyzed Persons. In short, it provides a means for quadriplegics and other people who have limited physical movement to control automated functions around their homes or offices. Simple things, like turning lights and appliances on and off, are often impossible for disabled persons. Computerized systems cost more than those requiring them can afford to spend. So, I developed COEPP. It's nothing spectacular — it performs only simple tasks and functions — but it can give a new outlook on life for those who use it.

One COEPP system is now in use, and I'm currently working on two more. Each system is designed to meet the specific needs of the individual user. The system described here consists of a central processing unit, a

*Dennis Weide is a communications technician for AT&T in Albuquerque, New Mexico, where he programs AT&T and IBM PCs. He enjoys making toys and teaching computer programming.*



#	Function
1	Toggle Outlet #1
2	Toggle Outlet #2
3	Toggle Outlet #3
4	Toggle Outlet #4
5	Toggle Outlet #5
6	Toggle Outlet #6
7	Place a phone call
8	Answer/Disconnect call
9	Reset system

Figure 1: COEPP Functions

COEPP interface controller (CIC) and an outlet interface circuit (OIC) that provide the user with the ability to automatically dial one of ten preprogrammed telephone numbers and communicate via a speaker-phone. The system also lets the user answer an incoming call and hang up when the call is completed. Other functions include turning lights and appliances on and off and automatically restarting the system.

The user of the first system is a young girl with muscular dystrophy who is confined to a wheelchair. Access to the

computer is provided via a radio transmitter, located on the wheelchair, and a receiver in the CIC. By operating a joystick connected to the transmitter, the user can select and execute any of the nine functions shown in Figure 1. For a quadriplegic, the joystick can be replaced with "sip switches."

### How the System Works

The COEPP system is easy to use once you understand how it works. Figure 2 is a simplified block diagram of the system. The CIC provides the means by which the CPU communicates with the OIC and LED display unit. Interconnecting cables are shown as lines in Figure 2 and are labeled according to their function. Addresses are shown in hexadecimal (i.e., FF40), and bit positions are shown in parentheses. Therefore, the line labeled FF40 (0-7) represents eight wires that connect address \$FF40 bits 0 through 7 to the outlet interface. All signals between the OIC and the CPU must pass through the CIC.

The OIC contains the outlet relay

drivers, the telephone relay driver, the radio receiver, the low voltage power supply and the AC outlets and bus.

The display unit provides a visual display for the CPU, while the speaker-phone provides a hands-free audible link to the telephone.

Let's discuss the operation of the system. The radio transmitter (not shown in Figure 2), which is fastened to the wheelchair, is connected to an Atari-style joystick that has been modified to allow only forward and backward movement. The current function number is displayed on the LED display unit. Pushing the joystick forward advances the function number, while pulling it back executes the function. As an example, assume you have a desk lamp plugged into Outlet Number 5 and the lamp is currently off. Select Function 5 by pushing the joystick forward until the number 5 is displayed on the display unit. Execute the function by pulling the joystick back. The number 5 will flash on the display unit, indicating the function has been executed; the desk lamp will light. When the display

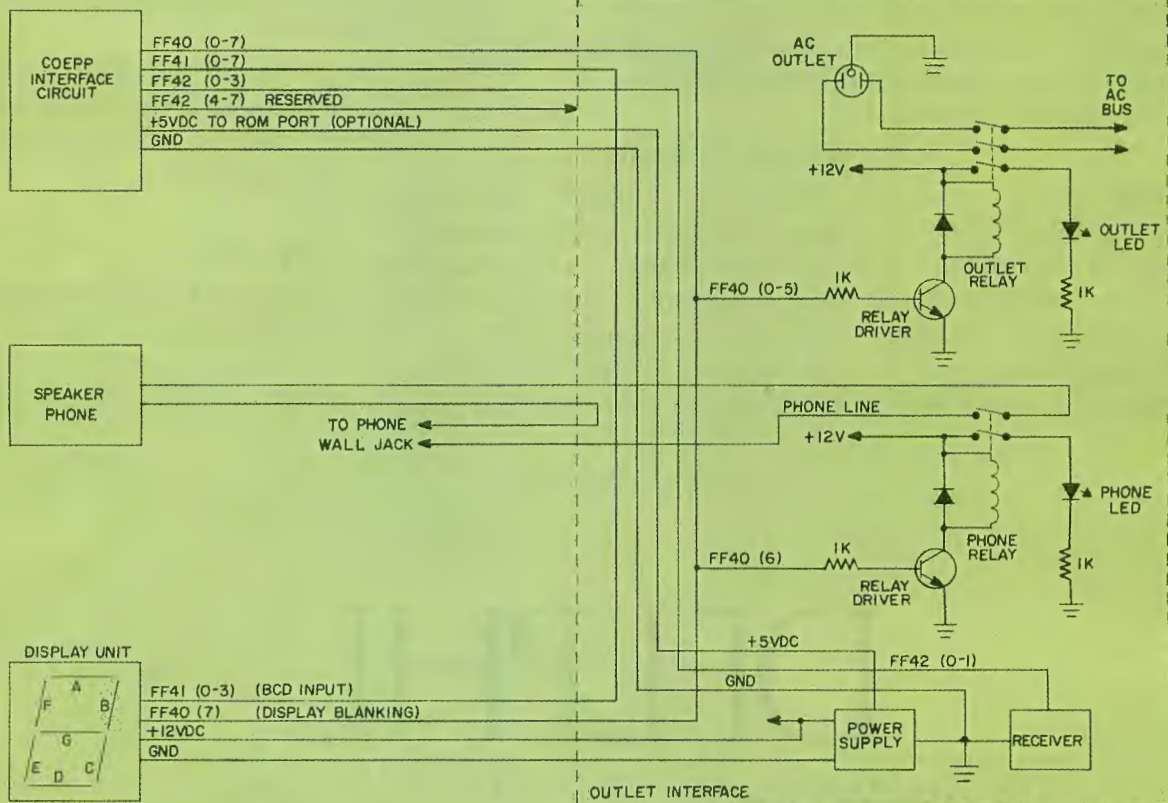


Figure 2: COEPP System Simplified Block Diagram

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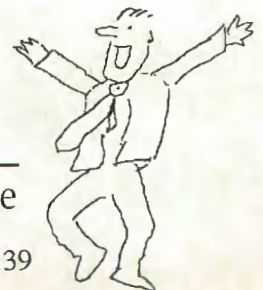
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unit stops flashing, you can select another function or execute Function 5 again. If the lamp is on, executing Function 5 again will turn it off.

Functions 1 through 6 and Function 8 all work the same way. Function 9 is a safety and convenience feature that turns everything off.

### Placing a Phone Call

Function 7 is a special function for placing phone calls using a speaker-phone. You can program up to 10 telephone numbers into the computer, which can then be dialed using Function 7. If a TV or monitor is connected to the computer, the telephone numbers assigned to memory slots 0 through 9 will be displayed, as shown in Figure 3.

Here's how to place a call. First, select Function 7 by pushing the joystick forward until 7 is displayed, then execute it by pulling the joystick back. When the function has been executed, a zero will be displayed. This is the first of 10 preprogrammed telephone numbers (slots 0 through 9). Select the number you want to dial by pushing the joystick forward again until the slot number you want is displayed. For example, the telephone number for the

### Telephone Book

#0	5551212
#1	2431371
#2	18002223000
#3	2471611
#4	911
#5	13122556400
#6	12123389900
#7	8656210
#8	8429900
#9	0

Note: Your numbers will be different from these.

Figure 3: Visual Phone Number Display

local time and temperature in Albuquerque is 247-1611. In Figure 3, this phone number is assigned to Memory Slot 3. Push the joystick forward until 3 is displayed, then pull the joystick back. The computer will seize the phone line, and you'll hear a dial tone. The computer will then dial the number. As each number is dialed, it will be shown on the display unit. When dialing is completed, the display unit will flash Function 8. You are now ready to hang up the phone when the call is finished. Function 8 is also used to answer in-

coming calls. Functions can be selected and executed in any order. That is, you can place a phone call, then turn any outlet on or off while talking on the phone.

### A CoCo

By now, you've probably guessed that the CPU used for the COEPP is actually a CoCo 1, 2 or 3. While the CoCo 3 has replaced the CoCo 1 and 2, the older versions are a long way from being extinct. In fact, for the first COEPP system, I purchased a 64K CoCo 2 from a pawn shop for \$50. It was in fine working condition and is now being used to make someone's life a little easier.

Why use a CoCo? Because it's a powerful 8-bit microcomputer that's easy to program and interface to the outside world. All necessary signals are available on the ROM port, which can be addressed directly via machine language or BASIC routines.

### The System

It's important to understand that the system described here should be used as an example. The schematics shown are the final drawings for the first system.

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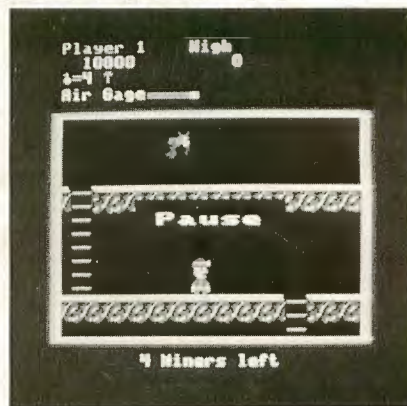
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I haven't included a parts list, since each system is specially designed. This information is provided to show the different methods used so you can design your own peripheral equipment.

First, let's look at the power supply used to power the peripheral interface equipment. Figure 4 shows a simple, easy-to-construct power supply. The most important thing to remember is to use adequate supply and ground leads. Use a ground bus system and lots of filtering to ensure clean power for the project. Bypass each IC power lead with a 0.1MFD. capacitor to ground. The +5VDC output is not necessary if you power the CIC from the computer. But the cost of the additional regulator (7805) is low enough to justify powering the CIC from this supply.

Figure 5 is the schematic drawing for the light emitting diode (LED) display unit. It works the same as a standard seven-segment display and can be replaced with one if a smaller display is acceptable to you. I chose an LED display over a CRT (television or monitor) because of the lower cost and the fact that the LED display is small (the numbers are 4 inches high) and yet can

still be seen from anywhere in the room. The LEDs are mounted in 1/4-inch holes drilled in a piece of 1/8-inch clear plexiglass and covered with a piece of red plexiglass to provide a professional appearance.

The display segment layout is shown at the bottom of Figure 5. Each segment (A through G) has its own current-limiting resistor. Segments A, D and G each have five LEDs and use a 220-ohm resistor. The other four segments each have four LEDs and use a 330-ohm resistor. This arrangement produces a uniform brightness for all display segments.

The 7447 integrated circuit (IC) is a BCD-to-7 segment decoder IC. It takes a binary-coded-decimal (BCD) input (IN1-IN4) and lights the proper output segments (A through G) to display a single-digit number.

The 7805 voltage regulator chip uses the +12 VDC input from the power supply in the outlet interface to provide the +5 VDC output required by the 7447 IC. This arrangement eliminates the need to run two separate voltages to the display unit and allows you to use a smaller diameter cable.

Pin 4 of the 7447 is the blanking lead and is used to flash the display. When this lead goes low, the display will be blanked out.

### The Radio Link

The radio link uses a radio-controlled (R/C) car transmitter and receiver to link the user with the computer. I'll show you here a general idea of how you might use R/C equipment for a radio link. It is very unlikely that you'll be able to find the same model transmitter and receiver that I used. But using a little common sense and electrical knowledge, you should be able to modify your radio. The only modification to the transmitter is to replace the unit controls with a standard Atari-style joystick. This allows the user to send one of two signals (joystick forward and joystick backward) to the receiver located in the outlet interface.

The receiver is a little more difficult to modify (see Figure 6). The blue and grey wires connected to the drive motors are used to reverse the 5VDC polarity to the drive motors. This allows the motors to be operated in the forward and reverse direction. I used optocouplers to convert the voltage polarity reversal into two digital logic signals. Operating the transmitter joystick in the forward direction causes one optocoupler LED to conduct, while operating the joystick in the reverse direction reverses the voltage polarity and causes the other optocoupler LED to conduct. The output of the two logic signals are of the wrong state, so a 74LS04 IC (IC3B shown in Figure 7) is used on the CIC board to invert the signals.

The receiver requires +9 VDC to operate and 5 VDC to power the motors. The +9 VDC is supplied by dropping the +12 VDC across four diodes. Each diode drops about .7 volts, providing an output of approximately 9.2 VDC. A 7805 voltage regulator IC provides the +5 VDC from the +12 VDC input.

### The Interface Circuit

Figure 7 shows the CIC used to interface the peripheral equipment to the computer. The heart of this circuit is IC2, the 8255 Programmable Peripheral Interface (PPI) chip. This chip provides three programmable 8-bit parallel ports. For this project, ports A and B are programmed as output ports and port C as an input port by loading the PPI internal register (\$FF43) with decimal 129.

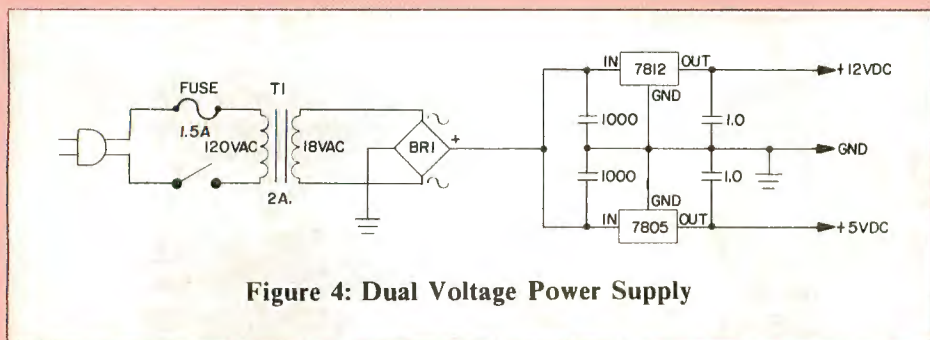


Figure 4: Dual Voltage Power Supply

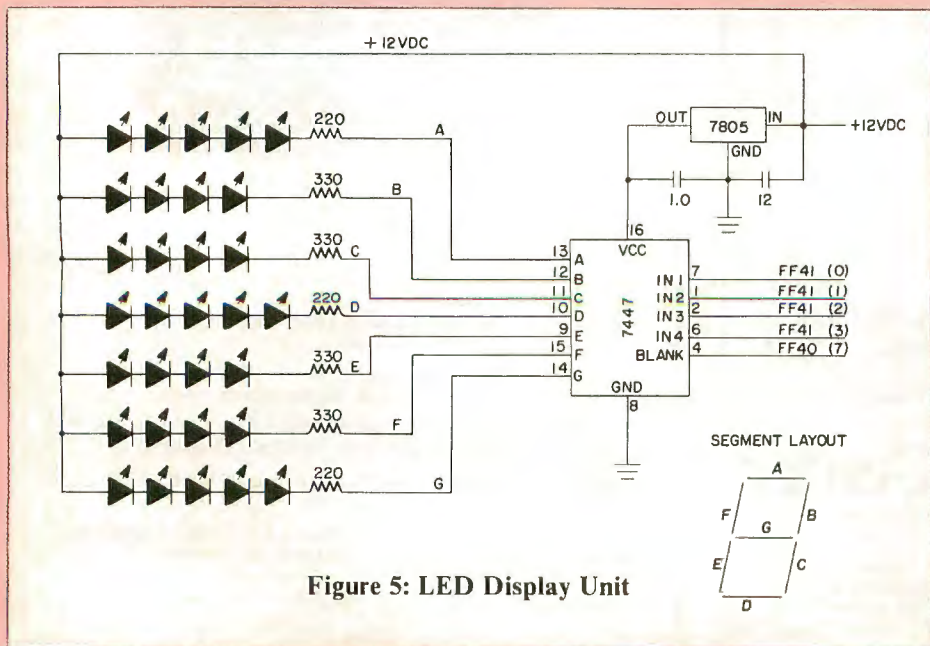


Figure 5: LED Display Unit

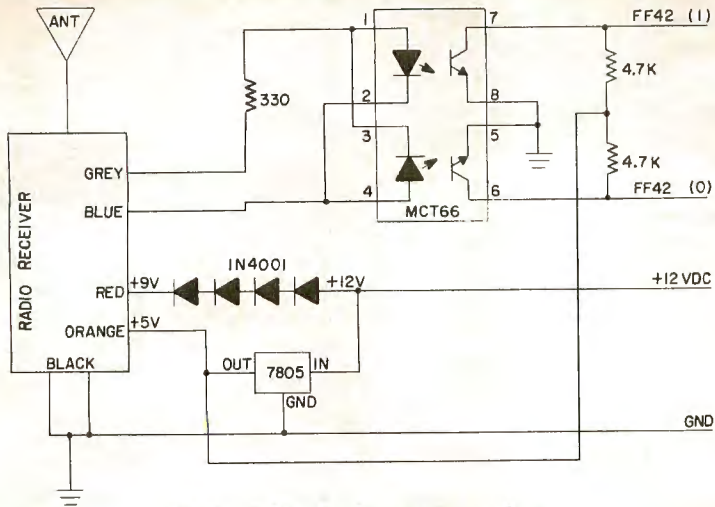


Figure 6: Radio Control Receiver

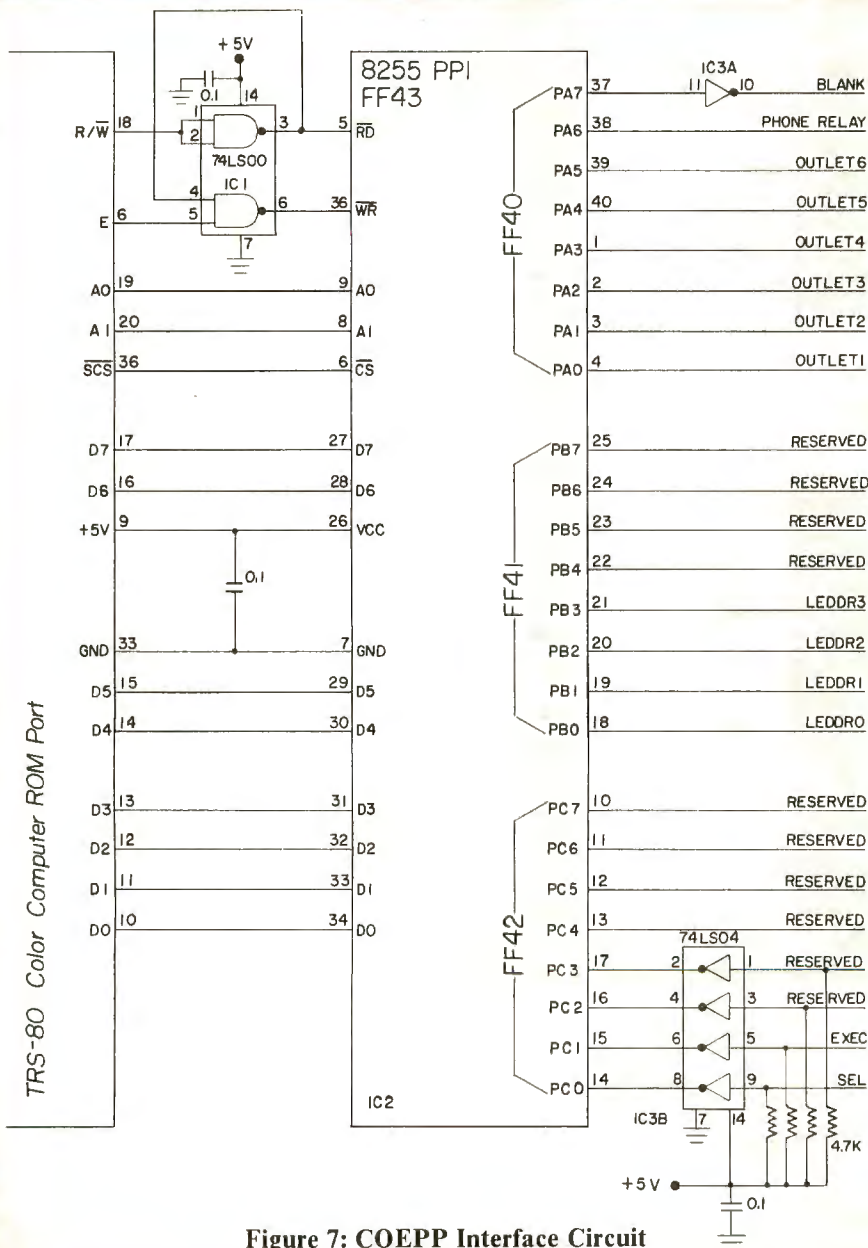


Figure 7: COEPP Interface Circuit

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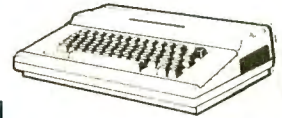
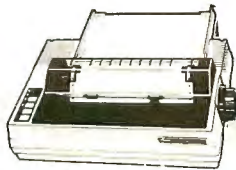
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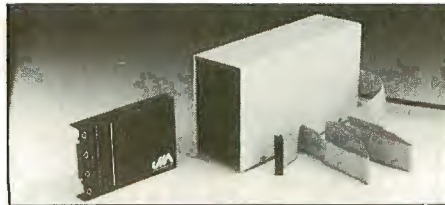


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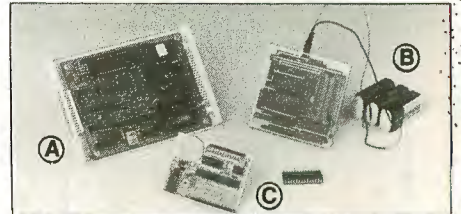
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nects the speaker-phone to the telephone line to answer an incoming call or to get a dial tone when a call is placed. Pulsing the relay simulates rotary dialing. Rotary dialing will work on both rotary and Touch-Tone (TM) telephone lines and eliminates the need to interface a Touch-Tone chip to the phone line. To simulate rotary dialing, it is necessary to open the telephone line at a rate of 10 pulses per second with 50 percent break. That means that for each pulse, the relay contacts must be closed 50 percent of the time and open the other 50 percent.

Bit 7 of Port A (PA7, \$FF40) is used to blank the display unit when a function has been executed. Setting the bit high will blank the display. The 74LS04 inverts the signal to the 7447 to provide the low required for display blanking.

Bits 0 through 3 of Port B (PB0-PB3, \$FF41) provide the BCD output to drive the display unit. Bits 4 through 7 (PB4-PB7, \$FF41) are reserved for future expansion.

Bits 0 and 1 of Port C (PC0-PC1, \$FF42) are used as inputs. Bits 2 through 7 are reserved. Although only two of the inputs are used to select and execute joystick functions, four are

inverted by the 74LS04. Since the four inputs to the 74LS04 are tied high through the 4.7K resistors, the outputs to the PPI (PC0-PC3) are all held low for a no-signal condition. When the joystick is operated in either direction, the appropriate bit to the PPI (EXEC or SEL) will go high.

### The Program

Let's look at the program and give you some ideas on how to write your own. The program shown in Listing 1 is the Pascal source code for the COEPP program. As you'll see shortly, Pascal was chosen to allow the program to automatically execute when power is applied to the computer. For BASIC, reading the radio receiver output is accomplished with peeks, while operating the peripheral equipment is accomplished with pokes. Understanding the Pascal source code will help you write a BASIC version.

Refer to Listing 1 for a brief explanation. Five constants are declared at the beginning of the program. The first one, Phonenummer, is the start address of the telephone number memory slots. Each slot is twelve bytes long, one byte for each digit. Unused bytes are poked

with values greater than 10. The program uses the Phonenummer constant plus the slot number (0 through 9) to find the start address of the number you select. PORTA, PORTB and PORTC are assigned the addresses of the 8255 ports, while PPI is assigned the address of the 8255 internal register (IREG, \$FF43).

Next all variables are declared. LASTPORTA is an eight-element Boolean array used to keep track of the last state of the eight bits of Port A (\$FF40). If the selected bit is high, the array element will be true. If the bit is low, the array element will be false.

CURRENTPORTA, LASTPORTB, LASTPORTC and LASTDISPLAY keep track of the state of the three PPI port values and the current function number. JOYSTK stores the results of reading the radio receiver output.

The program actually begins at the BEGIN statement. First, the program initializes program variables. Then the PPI IREG is loaded with Decimal 129 to set up the input and output ports of the 8255 PPI. PORTA is loaded with zero to turn everything off, and PORTB is loaded with 1 to display the first function number.

The next section of the program reads

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the telephone number memory slots and displays the phone numbers on the optional TV screen. Next comes the main program loop. The program will loop through this section until the computer is reset or power is turned off. The comments explain what the program is doing, so it isn't necessary to go into great detail here. There are a couple of things I'd like to explain, though.

First, the software compensates for the inequities of the radio and relay drivers by reading the receiver output 75 consecutive times to ensure that the signal is valid. After a valid read is completed, the program loops for 15,000 instruction cycles to allow the receiver ample time to settle down.

The second explanation is about dialing. A zero on the telephone dial or button is actually equal to 10 and is stored as such in the computer memory. The program dials 10 pulses but displays a zero. Two program loops are used to complete dialing. The first loop is executed once for each pulse required. The number six requires six pulses, so the loop is executed six times. The second loop is a time-delay loop, which is executed for the remainder of the ten pulses. In the above example, the second loop is executed four times (i.e.,  $10 - 6 = 4$ ). This allows all digits dialed to be shown on the display unit an equal length of time.

The telephone numbers are stored in memory at the end of the compiled program by poking telephone number digits into consecutive memory addresses in RAM. For the EPROM version shown, the program starts at Address \$C000 and the telephone numbers at \$D800. For an all-RAM version, you can load the program at \$3000 and the telephone numbers at \$4800. Make sure you change the Phonenum constant in the program source code.

If the program is burned into ROM, you must poke the telephone numbers into memory before burning the ROM chip. Each phone number is allowed 12 bytes of memory. Unused bytes will contain values greater than 10. Zeroes are always stored as 10s and displayed as zeros.

Two versions of the compiled program are provided for RAINBOW ON TAPE and RAINBOW ON DISK. Figure 10 lists the program addresses for each version.

#### Auto Execute

Because the system was designed for disabled persons, it wouldn't make

Program Name	Version	Start Address	End Address	Execute Address	Start Address of Tel. #
COEPPRAM/BIN	RAM	\$3000	\$4878	\$3000	\$4800
COEPPROM/BIN	ROM	\$C000	\$D878	\$C000	\$D800

Figure 10: Program Memory Requirements

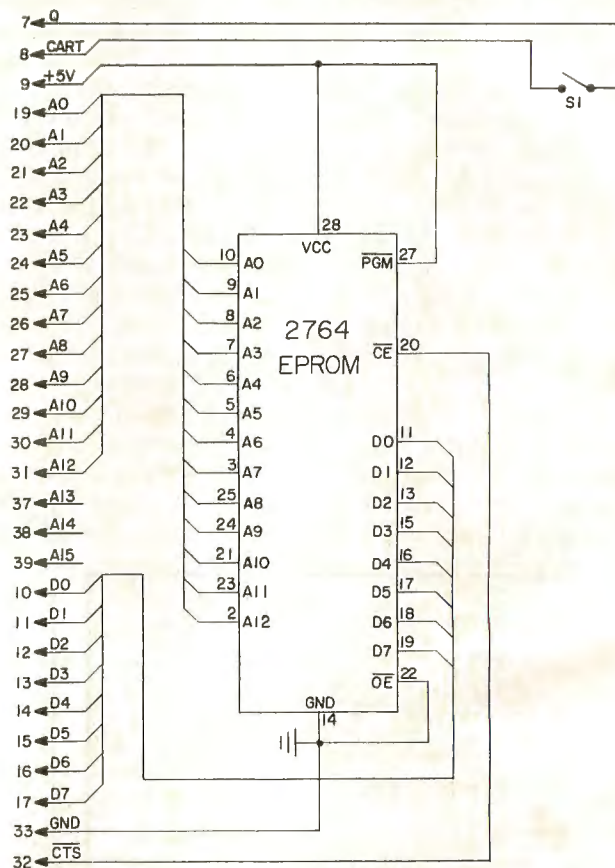


Figure 11: EPROM Circuit

sense for the user to have to load system software from tape or disk. So the logical choice is to program an EPROM chip in machine language and have the computer execute the program every time the reset button is pressed or the power is turned on. That's why *Pascal* was chosen. The program can be loaded anywhere into memory, so it's ideal for an EPROM.

Figure 11 shows the EPROM circuit for a CoCo. IC1 is a 2764, 8K-by-8-bit EPROM that is connected to the CoCo ROM port. Pins 7 and 8 of the ROM port are tied together through Switch S1. When S1 is closed, the program will automatically execute on reset or power up. When S1 is open, the computer functions in the normal fashion and the

program can be executed by typing EXEC 49152 and pressing ENTER. For those who wish to use all ROM memory available, refer to the schematic of the Static RAM Interface circuit on Page 152 of the May '88 issue of *THE RAINBOW*. This circuit is directly compatible with 2764 EPROMs, and you can replace the SRAMs of the SRI circuit with 2764 EPROMs. If you want to program an EPROM but don't have an EPROM programmer, ask your local CoCo club for assistance.

*(Questions or comments regarding this project may be directed to the author at 14201 Marquette N.E., Albuquerque, NM 87123. Please enclose an SASE when requesting a reply.)* □

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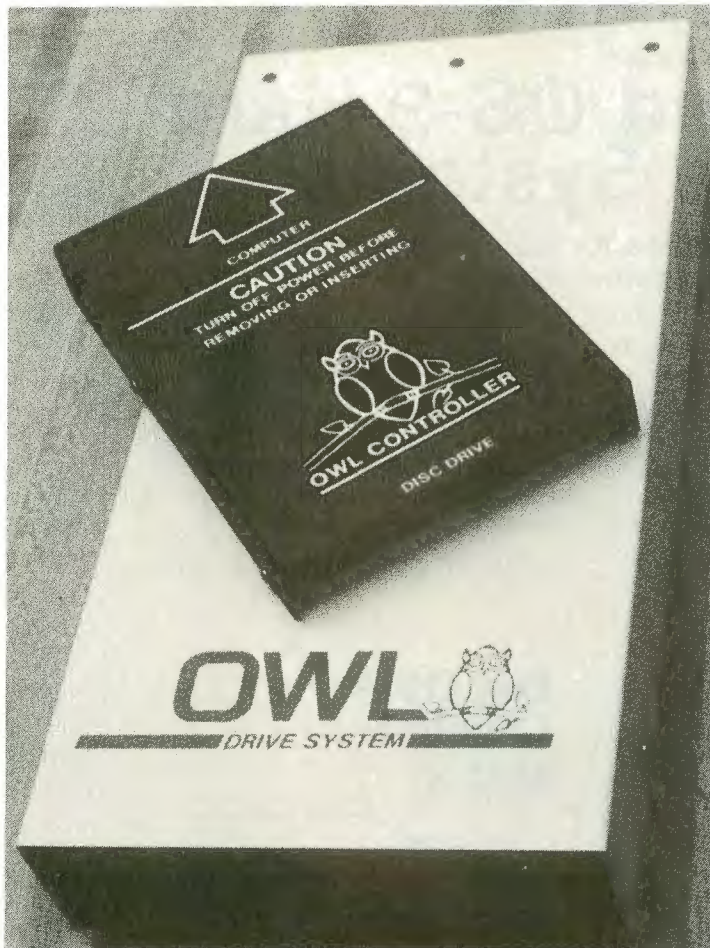
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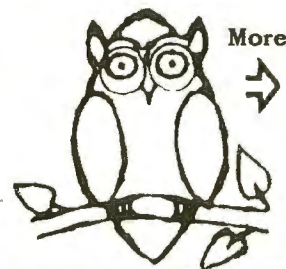
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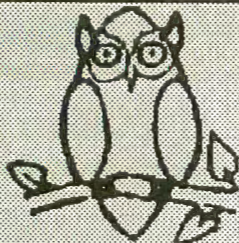
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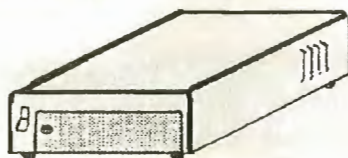
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## Submitting Material To Rainbow

*Contributions to THE RAINBOW* are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

**WHAT TO WRITE:** We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

**FORMAT:** Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

**COMPENSATION:** We do pay for submissions, based on a number of criteria. Those wishing remuneration should so state when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

### Listing 1: COEPPRAM

```
PROGRAM COEPP(INPUT,OUTPUT);

(* COEPP VERSION 1.0 NOV. 6,1987 *)
(* WRITTEN BY DENNIS H. WEIDE *)
(* COPYRIGHT 1987 *)
(* THIS VERSION IS FOR *)
(* 16K STATIC RAM *)

CONST PHONENUMBER=$E000;
PORTA=$FF40;
PORTB=$FF41;
PORTC=$FF42;
PPI=$FF43;

VAR LASTPORTA:ARRAY[1..8] OF BOOLEAN;
CURRENTPORTA,
LASTPORTB,
LASTPORTC,
LASTDISPLAY,
NUMBER,SCRAP,JOYSTK,A,B,C,D,E,F,G,H:INTEGER;
DUMMY,ANSWER:STRING(12);

BEGIN
PAGE;
FOR A:=1 TO 8 DO LASTPORTA[A]:=FALSE;
CURRENTPORTA:=0;
LASTDISPLAY:=1;
BYTE[PPI]:=129;
BYTE[PORTA]:=0;
BYTE[PORTB]:=LASTDISPLAY;
Writeln('TELEPHONE BOOK');
Writeln('-----');
FOR A:=0 TO 9 DO BEGIN
SCRAP:=PHONENUMBER+(12*A);
WRITE('#',A:1,' ');
FOR B:=1 TO 12 DO BEGIN
C:=BYTE[SCRAP];
IF C=10 THEN C:=0;
IF C<11 THEN WRITE(C:1);
SCRAP:=SUCC(SCRAP);
END; (*FOR*)
Writeln;
END; (*FOR*)
CURSOR(448);
WRITE('ADD PHONE NUMBERS (Y/N)?');
READLN(ANSWER);
WHILE ANSWER='Y' DO BEGIN
CURSOR(448);
Writeln;
CURSOR(448);
WRITE('ENTER PAGE NUMBER (0-9)>');
READLN(NUMBER);
CURSOR(448);
Writeln;
CURSOR(448);
WRITE('ENTER PHONE NUMBER >');
READLN(ANSWER);
```

```

ANSWER:=ANSWER+'*****';
SCRAP:=PHONENUMBER+(12*NUMBER);
BUFFER*)
FOR B:=1 TO 12 DO BEGIN
  STRINGCOPY(ANSWER,B,1,DUMMY);
  C:=ENCODE(DUMMY);
  IF DUMMY='*' THEN C:=255;
  IF C=0 THEN C:=10;
  BYTE[SCRAP]:=C;
  SCRAP:=SUCC(SCRAP);
END; (*FOR*)
SCRAP:=PHONENUMBER+(12*NUMBER);
CURSOR((NUMBER*32)+68);
REPEAT
  A:=BYTE[SCRAP];
  IF A=10 THEN A:=0;
  IF A<11 THEN WRITE(A:1);
  SCRAP:=SUCC(SCRAP);
UNTIL A>10;
WRITE('          ');
CURSOR(448);
WRITELN;
CURSOR(448);
WRITE('ENTER ANOTHER NUMBER (Y/N)?');
READLN(ANSWER);
END; (*WHILE*)

```

(\*FIND START ADDR OF PHONE

(\* MAIN PROGRAM LOOP \*)



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```

CURSOR(448);
WRITELN;
WHILE TRUE DO BEGIN
  JOYSTK:=BYTE[PORTC];          (* READ JOYSTK FOR *)
  A:=JOYSTK AND 3;             (* INPUT REQUEST *)
  C:=1;                        (* IGNORE ALL BITS *)
  FOR SCRAP:=1 TO 75 DO BEGIN  (* EXCEPT 0 AND 1. *)
    JOYSTK:=BYTE[PORTC];      (* READ JOYSTK 75 *)
    B:=JOYSTK AND 3;          (* TIMES TO ENSURE *)
    IF B=A THEN C:=SUCC(C);   (* THAT THIS IS A *)
  END; (*FOR*)                 (* VALID REQUEST. *)
  IF C<>SCRAP THEN A:=0;
  CASE A OF
    1:BEGIN                    (* IF INPUT=1, THEN *)
      LASTDISPLAY:=SUCC(LASTDISPLAY); (* INCREMENT DISPLAY *)
      IF LASTDISPLAY>9 THEN LASTDISPLAY:=1;
      BYTE[PORTB]:=LASTDISPLAY;
      FOR SCRAP:=1 TO 15000 DO ; (* DELAY PROGRAM SO *)
    END; (*BEGIN*)             (* IT WON'T RUN AWAY *)
    2:BEGIN
      CASE LASTDISPLAY OF
        1:SCRAP:=1;           (* SET BITS TO REQUIRED VALUES
*)
        2:SCRAP:=2;           (* TO TOGGLE OUTLETS OR RELAYS
*)
        3:SCRAP:=4;
        4:SCRAP:=8;
        5:SCRAP:=16;
        6:SCRAP:=32;
        7:BEGIN                (* GIVE OFF-HK AND DIAL OUT *)
          NUMBER:=0;
          BYTE[PORTB]:=NUMBER; (* SET DISPLAY TO ZERO *)
          FOR SCRAP:=1 TO 15000 DO ;
            D:=0;
            WHILE D<2 DO BEGIN (* READ JOYSTK TO DETERMINE *)
              JOYSTK:=BYTE[PORTC]; (* IF DIALLING OR SELECTING *)
              D:=JOYSTK AND 3; (* NUMBER. *)
              F:=1;
              FOR SCRAP:=1 TO 75 DO BEGIN (* READ 75 CONSECUTIVE TIMES *)
                JOYSTK:=BYTE[PORTC]; (* TO DETERMINE IF REQUEST *)
                E:=JOYSTK AND 3; (* IS VALID. *)
                IF E=D THEN F:=SUCC(F);
              END; (*FOR*)
              IF F<>SCRAP THEN D:=0;
              CASE D OF
                1:BEGIN (* ADVANCE DISPLAY NUMBER *)
                  NUMBER:=SUCC(NUMBER);
                  IF NUMBER>9 THEN NUMBER:=0;
                  BYTE[PORTB]:=NUMBER;
                  FOR SCRAP:=1 TO 15000 DO ;
                END; (*BEGIN*)
                2:BEGIN (* DIAL NUMBER *)
                  BYTE[PORTA]:=CURRENTPORTA+192; (* GIVE OFF-HK *)
                  FOR SCRAP:=1 TO 30000 DO ; (* WAIT FOR DIAL TONE *)
                    SCRAP:=PHONENUMBER+(12*NUMBER); (* FIND START *)
                    FOR G:=1 TO 12 DO BEGIN (* READ 12 NUMBERS AND *)
                      E:=BYTE[SCRAP];

```

```

IF E<11 THEN BEGIN (* DIAL ONLY IF NUMBER *)
  IF E=10 THEN BYTE[PORTB]:=0 (* EQUALS 1 TO 10. IF *)
  ELSE BYTE[PORTB]:=E; (* NUMBER=10, DISPLAY *)
  FOR F:=1 TO E DO BEGIN (* A ZERO *)
    BYTE[PORTA]:=CURRENTPORTA; (* ON HOOK *)
    FOR H:=1 TO 1000 DO ;
    BYTE[PORTA]:=CURRENTPORTA+64; (* OFF HOOK *)
    FOR H:=1 TO 1000 DO ;
  END; (*FOR*)
  FOR F:=1 TO 10-E DO FOR H:=1 TO 1000 DO ;
  BYTE[PORTA]:=CURRENTPORTA+192;
  FOR H:=1 TO 10000 DO ;
  END; (*IF*)
  SCRAP:=SUCC(SCRAP);
END; (*FOR*)
CURRENTPORTA:=CURRENTPORTA+64; (* UPDATE PORTA FOR OFF-HK
*)
BYTE[PORTA]:=CURRENTPORTA+128; (* DELETE THIS LINE IF TBL
*)
LASTDISPLAY:=8; (* SET DISPLAY TO 8 FOR
*)
BYTE[PORTB]:=LASTDISPLAY; (* DISCONNECT (ON-HK)
*)
FOR SCRAP:=1 TO 15000 DO ;
END (*WHILE*)
END; (*CASE*)
END; (*WHILE*)

```

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```

    SCRAP:=0;
END; (*BEGIN*)
8:SCRAP:=64; (* OFF-HK OR ON-HK *)
9:BEGIN
    CURRENTPORTA:=0;
    BYTE[PORTA]:=CURRENTPORTA;
    FOR SCRAP:=1 TO 8 DO LASTPORTA[SCRAP]:=FALSE;
END (*BEGIN*)
END; (*CASE*)
IF (LASTDISPLAY<7) AND (LASTDISPLAY<9) THEN BEGIN
    IF LASTPORTA[LASTDISPLAY]=FALSE THEN BEGIN
        CURRENTPORTA:=CURRENTPORTA+SCRAP; (* CALCULATE NEW PORT *)
        BYTE[PORTA]:=CURRENTPORTA; (* VALUE *)
        LASTPORTA[LASTDISPLAY]:=TRUE; (* SET FLAG *)
    END (*IF*)
    ELSE BEGIN
        CURRENTPORTA:=CURRENTPORTA-SCRAP; (* CALCULATE NEW PORT *)
        BYTE[PORTA]:=CURRENTPORTA; (* VALUE *)
        LASTPORTA[LASTDISPLAY]:=FALSE; (* RESET FLAG *)
    END; (*ELSE*)
END; (*IF*)
FOR SCRAP:=1 TO 3 DO BEGIN (* BLINK THE DISPLAY *)
    BYTE[PORTA]:=CURRENTPORTA+128; (* AFTER EXECUTING *)
    FOR C:=1 TO 8000 DO ; (* COMMAND *)
        BYTE[PORTA]:=CURRENTPORTA;
        FOR C:=1 TO 8000 DO ;
    END; (*FOR*)
    FOR SCRAP:=1 TO 15000 DO ;
END (*BEGIN*)
END; (*CASE*)
END (*WHILE*)
END. (*BEGIN*)

```

## Listing 2: COEPPROM

```

PROGRAM COEPP(INPUT,OUTPUT);

(* COEPP VERSION 2.0 NOV. 21,1987 *)
(* WRITTEN BY DENNIS H. WEIDE *)
(* COPYRIGHT 1987 *)
(* THIS VERSION IS FOR 8K ROM *)

CONST PHONENUMBER=$D800;
    PORTA=$FF40;
    PORTB=$FF41;
    PORTC=$FF42;
    PPI=$FF43;

VAR LASTPORTA:ARRAY[1..8] OF BOOLEAN;
    CURRENTPORTA,
    LASTPORTB,
    LASTPORTC,
    LASTDISPLAY,
    NUMBER,SCRAP,JOYSTK,A,B,C,D,E,F,G,H:INTEGER;
    DUMMY,ANSWER:STRING(12);

```

## Corrections

**"News Flash! News Flash!" (December 1988, Page 92):** To make the program run more efficiently the following corrections to NEWS-REEL were submitted by the author. Add a semicolon to the end of Line 50. Delete Line 70. Also, change the word *increase* in the last sentence of the text to *decrease*.

**"Received & Certified" (November 1988, Page 139):** The program *The Answer* was incorrectly described as working only on the CoCo 3. *The Answer* works on all versions of the Color Computer.

**"Bingo the CoCo Way" (August 1988, Page 38):** In order to allow BINGOTLK to work properly on a tape-only system, readers should change each occurrence of the

(continued on Page 77)

```

BEGIN
PAGE;
FOR A:=1 TO 8 DO LASTPORTA[A]:=FALSE;
CURRENTPORTA:=0;
LASTDISPLAY:=1;
BYTE[PPI]:=129;
BYTE[PORTA]:=0;
BYTE[PORTB]:=LASTDISPLAY;
WRITELN('TELEPHONE BOOK');
WRITELN('-----');
FOR A:=0 TO 9 DO BEGIN
  SCRAP:=PHONENUMBER+(12*A);
  WRITE('#',A:1,' ');
  FOR B:=1 TO 12 DO BEGIN
    C:=BYTE[SCRAP];
    IF C=10 THEN C:=0;
    IF C<11 THEN WRITE(C:1);
    SCRAP:=SUCC(SCRAP);
  END; (*FOR*)
  WRITELN;
END; (*FOR*)
CURSOR(448);

```

(\* MAIN PROGRAM LOOP \*)

```

WRITELN;
WHILE TRUE DO BEGIN
  JOYSTK:=BYTE[PORTC];
  A:=JOYSTK AND 3;
  C:=1;
  FOR SCRAP:=1 TO 75 DO BEGIN
    JOYSTK:=BYTE[PORTC];
    B:=JOYSTK AND 3;
    IF B=A THEN C:=SUCC(C);
  END; (*FOR*)
  IF C<>SCRAP THEN A:=0;
  CASE A OF
    1:BEGIN
      LASTDISPLAY:=SUCC(LASTDISPLAY);
      IF LASTDISPLAY>9 THEN LASTDISPLAY:=1;
      BYTE[PORTB]:=LASTDISPLAY;
      FOR SCRAP:=1 TO 15000 DO ;
    END; (*BEGIN*)
    2:BEGIN
      CASE LASTDISPLAY OF
        1:SCRAP:=1;
        2:SCRAP:=2;
        3:SCRAP:=4;
        4:SCRAP:=8;
        5:SCRAP:=16;
        6:SCRAP:=32;
        7:BEGIN
          NUMBER:=0;
          BYTE[PORTB]:=NUMBER;
          FOR SCRAP:=1 TO 15000 DO ;

```

\*)

\*)

number 3584 to the phrase PEEK(188)\*256 in lines 5, 100 and 105.

**"CoCo's Current Companion" (July 1988, Page 34):** Marc Campbell, author of BUDDY, has supplied the following corrections: First in Line 51, GOTO106 should be changed to GOTO105. In Line 73, the formula  $EE=LL((Q-S)/249)-1$  should be changed to  $EE=LL((Q-S)/250)-1$ . The tape merge routine at the end of the article should read OPEN"1",#-1 instead of just OPEN#-1. Finally, if you have experienced lock-up when an error is encountered, add LOCATE0,0:PRINT: to the beginning of Line 48.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type DATA at the CoCo SIG> prompt and INFO at the TOPIC> prompt.

```

(* READ JOYSTK FOR *)
(* INPUT REQUEST *)
(* IGNORE ALL BITS *)
(* EXCEPT 0 AND 1. *)
(* READ JOYSTK 75 *)
(* TIMES TO ENSURE *)
(* THAT THIS IS A *)
(* VALID REQUEST. *)

```

```

(* IF INPUT=1, THEN *)
(* INCREMENT DISPLAY *)

(* DELAY PROGRAM SO *)
(* IT WON'T RUN AWAY *)

```

```

(* SET BITS TO REQUIRED VALUES

(* TO TOGGLE OUTLETS OR RELAYS

```

```

(* GIVE OFF-HK AND DIAL OUT *)

(* SET DISPLAY TO ZERO *)

```

```

D:=0;
WHILE D<2 DO BEGIN                                (* READ JOYSTK TO DETERMINE *)
  JOYSTK:=BYTE[PORTC];                            (* IF DIALLING OR SELECTING *)
  D:=JOYSTK AND 3;                                (* NUMBER. *)
  F:=1;
  FOR SCRAP:=1 TO 75 DO BEGIN                      (* READ 75 CONSECUTIVE TIMES *)
    JOYSTK:=BYTE[PORTC];                          (* TO DETERMINE IF REQUEST *)
    E:=JOYSTK AND 3;                              (* IS VALID. *)
    IF E=D THEN F:=SUCC(F);
  END; (*FOR*)
  IF F<> SCRAP THEN D:=0;
  CASE D OF
    1:BEGIN                                        (* ADVANCE DISPLAY NUMBER *)
      NUMBER:=SUCC(NUMBER);
      IF NUMBER>9 THEN NUMBER:=0;
      BYTE[PORTB]:=NUMBER;
      FOR SCRAP:=1 TO 15000 DO ;
    END; (*BEGIN*)
    2:BEGIN                                        (* DIAL NUMBER *)
      BYTE[PORTA]:=CURRENTPORTA+192;              (* GIVE OFF-HK *)
      FOR SCRAP:=1 TO 30000 DO ;                  (* WAIT FOR DIAL TONE *)
      SCRAP:=PHONENUMBER+(12*NUMBER);            (* FIND START *)
      FOR G:=1 TO 12 DO BEGIN                    (* READ 12 NUMBERS AND *)
        E:=BYTE[SCRAP];
        IF E<11 THEN BEGIN                      (* DIAL ONLY IF NUMBER *)
          IF E=10 THEN BYTE[PORTB]:=0            (* EQUALS 1 TO 10. IF *)
          ELSE BYTE[PORTB]:=E;                  (* NUMBER=10, DISPLAY *)
          FOR F:=1 TO E DO BEGIN                (* A ZERO *)
            BYTE[PORTA]:=CURRENTPORTA;          (* ON HOOK *)
            FOR H:=1 TO 1000 DO ;
            BYTE[PORTA]:=CURRENTPORTA+64;      (* OFF HOOK *)
            FOR H:=1 TO 1000 DO ;
          END; (*FOR*)
          FOR F:=1 TO 10-E DO FOR H:=1 TO 1000 DO ;
          BYTE[PORTA]:=CURRENTPORTA+192;
          FOR H:=1 TO 10000 DO ;
        END; (*IF*)
        SCRAP:=SUCC(SCRAP);
      END; (*FOR*)
      CURRENTPORTA:=CURRENTPORTA+64;            (* UPDATE PORTA FOR OFF-HK *)
      BYTE[PORTA]:=CURRENTPORTA+128;           (* DELETE THIS LINE IF TBL *)
      LASTDISPLAY:=8;                          (* SET DISPLAY TO 8 FOR *)
      BYTE[PORTB]:=LASTDISPLAY;                (* DISCONNECT (ON-HK) *)
      FOR SCRAP:=1 TO 15000 DO ;
    END (*WHILE*)
  END; (*CASE*)
END; (*WHILE*)
SCRAP:=0;
END; (*BEGIN*)
8:SCRAP:=64;                                    (* OFF-HK OR ON-HK *)
9:BEGIN
  CURRENTPORTA:=0;
  BYTE[PORTA]:=CURRENTPORTA;

```



```

FOR SCRAP:=1 TO 8 DO LASTPORTA[SCRAP]:=FALSE;
END (*BEGIN*)
END; (*CASE*)
IF (LASTDISPLAY<>7) AND (LASTDISPLAY<9) THEN BEGIN
  IF LASTPORTA[LASTDISPLAY]=FALSE THEN BEGIN
    CURRENTPORTA:=CURRENTPORTA+SCRAP;      (* CALCULATE NEW PORT *)
    BYTE[PORTA]:=CURRENTPORTA;             (* VALUE *)
    LASTPORTA[LASTDISPLAY]:=TRUE;          (* SET FLAG *)
  END (*IF*)
  ELSE BEGIN
    CURRENTPORTA:=CURRENTPORTA-SCRAP;      (* CALCULATE NEW PORT *)
    BYTE[PORTA]:=CURRENTPORTA;             (* VALUE *)
    LASTPORTA[LASTDISPLAY]:=FALSE;         (* RESET FLAG *)
  END; (*ELSE*)
END; (*IF*)
FOR SCRAP:=1 TO 3 DO BEGIN                 (* BLINK THE DISPLAY *)
  BYTE[PORTA]:=CURRENTPORTA+128;          (* AFTER EXECUTING *)
  FOR C:=1 TO 8000 DO ;                    (* COMMAND *)
    BYTE[PORTA]:=CURRENTPORTA;
    FOR C:=1 TO 8000 DO ;
  END; (*FOR*)
  FOR SCRAP:=1 TO 15000 DO ;
END (*BEGIN*)
END; (*CASE*)
END (*WHILE*)
END. (*BEGIN*)

```



**ARK ROYAL GAMES** is drastically cutting prices and reducing our inventory on most of our CoCo products. Prices have been slashed on even our new programs. Send a SASE for complete price listing or \$1.00 for catalog (refunded with first order).

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## VIP Terminal

RATED BEST IN JANUARY  
 1984 "RAINBOW"

For your important communications needs you've got to go beyond software that only lets you chat. You need a smart terminal so that you can send and receive programs and messages and print them! The VIP Terminal features 32, 51, 64 or 85 characters by 21 or 24 lines on the screen and has a 43K byte buffer to store information. **DISK \$29.95**

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RAVED ABOUT IN THE  
 APRIL 1983 "RAINBOW"

Now you can retrieve lost data on any disk. VIP Disk-Zap is the ultimate repair utility for repair of most disk errors. VIP Disk-Zap verifies diskettes, reads and writes any sector and lets you retrieve all types of bashed text files, BASIC and ML programs. VIP Disk-Zap includes an informative 50 page tutorial manual. New features of version 1.1 are FASTER and more RELIABLE disk access and printing at up to 9600 BAUD. **DISK \$24.95**

VIP Disk-Zap owners: upgrade to VIP Disk-Zap 1.1 for \$10 + \$3 S/H. Send only ORIGINAL disk and \$13 Total.





*Do your assembly language programming on the wide screen*

# A Patch for a Patch

By Randall Reid

**A**re you tired of writing assembly language programs using the little 32-by-16 window while your 80-column screen sleeps in the background? Well, help has arrived. Roger Schrag freed us from our cassette players with *Super Patch* in September 1983 ("Superpatch for *EDTASM+*," Page 66). Now using my program, *EDPatch*, we can move to the big screen and actually *see* our listings without listing each line.

My patch performs about the same as the patch for Disk *EDTASM+* found in Doctor ASCII's January '88 column (Page 154), with the same limitations. The main differences are a larger buffer in *Super Patch* *EDTASM+* and the additions Roger built in (i.e., key repeat and the ability to call a directory without exiting the program). One word of caution: My program will crash if you exceed the buffer. It will also crash if a disk error occurs. (In this case, however, the program can be restarted without losing your data.)

The buffer is between &H38FF and &H7FFF — a little over 16K. There is no end-of-buffer signal, so if you exceed the buffer while loading or editing, you

will crash and lose your data permanently. The buffer will hold about 1000 lines of lightly commented code. That is equivalent to three times the code Roger used to write *Super Patch* (without his comments) and should be ample for most routines, but that monster arcade game won't fit. You can still write the code in 80-column format and save it in blocks to load in your original *Super Patch* *EDTASM*. My program automatically appends files, so you load them in the order you want them and renumber to reconstruct your monster.

I do not recommend in-memory assembly unless you want to alter your operating system or are very careful about where you assemble it. Assembling to disk works as usual and is a better idea. No matter what assembler you use, it's a good idea to use the W command frequently to make sure you have your file in case of crash.

If you do crash during disk I/O, type EXEC&H2D88 and press ENTER *twice*. This takes you to *ZBUG* with all files closed and your original buffers intact.

To patch *Super Patch* *EDTASM+*, initialize a disk. Once you have your disk ready, copy *Super Patch* *EDTASM+* to the disk and rename it ED+*BIN*. Once you have done this, copy *EDPATCH* and *EDLADDER* to the disk. Now cold start your CoCo 3 and enter RUN *EDPATCH*. When *EDPATCH* returns an OK prompt, cold start your computer again. Now enter LOADM"SUPERED",&H1000. When *SUPERED* has loaded, enter the following:

```
SAVEM"SUPERED1",&H1E00,&H47FF,&H1E00
```

You are now ready to run *EDLOADER* and explore assembly language programming on an 80-column screen. Please note: *EDLOADER* offset loads *SuperED1* to &HE00, which may make my final two instructions seem a little ridiculous. However, CoCo 3 will not let the program load directly to &HE00. The stack or buffers overwrite some code. *SuperED1* can be loaded and executed at &H1E00, but you will lose 1K from the buffer. Those final instructions must be entered directly from the keyboard and cannot be included in a program line.

You can rename *SUPERED1* to something easier to type. (I call mine *ED*.) However, you must also edit *EDLOADER* to accept the new filename.

So what are you waiting for? Wake up your 80-column screen and start programming.

Editors Note: For your convenience the assembled *Super Patch* routine from the September 1983 issue is included on this month's *RAINBOW ON DISK*. You will need to refer to the September '83 issue for instructions on running *Super Patch*.

(Questions and comments about these programs may be directed to the author at R.R. 4, Wiarton, ON, Canada N0H 2T0. Please include an *SASE* when requesting a reply.) □

---

*Randall Reid is a self-employed commercial artist and an electronics technician. He has several CoCos including a CoCo 2 that runs his heating system and records weather information.*

### Listing 1: EDPATCH

```

0 WIDTH32:PCLEAR8:GOTO10
5 SAVE"EDPATCH3":END
10 PRINT"LOADING":LOADM"ED+"
20 CLS:PRINT"PATCHING"
30 FORX=&HE00 TO &H37FF
40 PRINT@25,HEX$(X)
50 IF PEEK(X)<>&H7F THEN 110
60 IF PEEK(X+1)<>&HFF THEN 110
70 IF PEEK(X+2)=&HDF OR PEEK(X+2)
)=&HDE THEN 90 ELSE 110
80 GOTO 110

```

```

90 PRINTEX$(X)
100 FORY=0TO2:POKEX+Y,&H12:NEXTY
110 NEXTX
120 SAVEM"SUPERED",&HE00,&H37FF,
&HE00
130 PRINT:PRINT"YOU MUST NOW COL
DSTART AND TYPE LOADM";CHR$(34);
"SUPERED";CHR$(34);",&H1000"
140 PRINT:PRINT"WHEN SUPERED HAS
LOADED TYPE SAVEM";CHR$(34);"SU
PERED1";CHR$(34);",&H1E00,&H47FF
,&H1E00"
150 END

```

### Listing 2: EDLOADER

```

0 PCLEAR8:WIDTH32:GOTO10
1 '*****COPYRIGHT 1988 RANDALL R
EID
5 SAVE"EDLOADER":END
10 FORA=0TO5:READ A$:POKE VAL("&
H"+A$),&HC0:NEXT
20 POKE&HF66B,&HC7:POKE&HF688,&H
CF:POKE&HF866,&HC7:POKE&HF875,&H
CE
30 POKE&HE0C0,6:POKE&HE0C8,6:POK

```

```

E&HE0C6,&H3E
40 WIDTH80:CLS5:PRINT"LOADING SU
PERPATCHED EDTASM+ PROGRAM"
50 PRINT:PRINT"IF YOU CRASH OUT
OF THE PROGRAM DURING DISK I/O T
RY TYPING EXEC&H2D88 AND YOU M
AY GET THE PROGRAM BACK WITH BUF
FERS INTACT":PRINT
60 LOADM"SUPERED1",&HE00-&H1E00+
65536:EXEC
70 DATA F68D,F6A3,F6D5,F7BC,F857
,F90D

```

### FILE TRANSFER UTILITIES

XXX: Reviews - December Rainbow Dale Puckett - November Rainbow. XXX

The GCS File Transfer Utilities provide a simple and quick method to transfer text and binary files from and to a variety of floppy disk formats.

Need to transfer files to and from FC (MSDOS), RSDOS, FLEX and MINI-FLEX disks on your OS-9 system? Have text files on a PC (MSDOS) system at work and want to work on them at home? Have source programs (BASIC, C, Pascal, etc.) which you wish to port to another system?

With GCS File Transfer Utilities, just place the PC (MSDOS), RSDOS, FLEX or MINI-FLEX disk into you disk drive - enter a simple command and the file is copied into a OS-9 file. File transfer: back is just as simple. With Multi-Vue version, just select command from one of three menus.

PCDIR	directory of PC disk	RSDIR	directory of RSDOS disk
PCDUMP	display PC disk sector	RSDUMP	display RSDOS disk sector
PCREAD	read file from PC disk	RSREAD	read file from RSDOS disk
PCWRITE	write file to PC disk	RSWRITE	write file to RSDOS disk

PCRENAME	rename PC file	FLEXDIR	directory of FLEX disk
PCDELETE	delete PC file	FLEXDUMP	display FLEX disk sector
PCFORMAT	format PC disk	FLEXREAD	read FLEX file
		FLEXWRITE	write file to FLEX disk

**Extensive options** Single, double sided disks. Single, double density disks. 35, 40 or 80 track floppy drives. 8 or 9 sectors (PC). First level sub-directories (PC). Binary files. Use pipes for direct and multiple transfers.

**Requires** OS-9. 2 drives (one can be hard or ramdisk). Multi-Vue for Multi-Vue version. SDISK (SDISK3 for COCO III).

GCS File Transfer Utilities for CoCo - Multi-Vue version \$54.95  
- Standard version \$44.95

SDISK or SDISK 3 \$29.95

Standard diskettes are OS-9 format (5.25" - add \$2.50 for 3.5". Orders must be prepaid or COD. VISA/MC accepted. Add \$1.75 S&H, COD is additional.

### GRANITE COMPUTER SYSTEMS

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## VIP Calc 1.1

"MORE USEABLE FEATURES"  
FEBRUARY 1985 "RAINBOW"

VIP Calc has all the features of VIP Calc III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Calc is the most complete calc for the CoCo 1 & 2! Version 1.1 has FASTER and more RELIABLE disk access and vastly improved display speed. **DISK \$59.95**

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## VIP Speller 1.1

INCLUDES 50,000 WORD DICTIONARY

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VIP Speller owners: upgrade to VIP Speller 1.1 for \$10 + \$3 S/H. Send only ORIGINAL disk and \$13 Total.



If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

*A program designed to teach fundamental math skills to new students*

# Count on CoCo

By Fred B. Scerbo  
Rainbow Contributing Editor

Several months ago, I ventured into the world of early childhood education with a series of programs — *Opposites Concepts 1* (August '88, Page 92), *Opposite Concepts 2* (October '88, Page 90) and *Match Game of Opposites* (September '88, Page 92). Judging from my mail and the comments from those who have used them, my programs seem to be meeting a need in an area where there is little software.

Because of this need, I have written another educational program, *Count on Me*, designed for use by young and special-needs students. It allows hands-on counting experience and tests these skills in a manner even the youngest Color Computer user can handle.

## Why Counting?

There is little educational software dealing with even the most basic childhood skills. Our school has an early-childhood program, which deals with special-needs students as young as two years old. We have difficulty finding any software for these young children.

Parental pressure has resulted in a computer being placed in this classroom (not a Color Computer — that *other* kind), and there's almost no software for the darn thing. What can a two-year-old do on a computer without appropriate software? To be honest, almost

nothing of value. Still, some parents think that the computer is the only solution, so the thing sits there, collecting dust.

Since some of you have been kind enough to donate your old CoCo 1s and 2s to our school system, I will be adding one of these CoCos to our preschool class. For it to be useful though, I need some software to use with this CoCo. That's how *Count on Me* came about.

*Count on Me* uses only the spacebar and the ENTER key for student response. Most small children can use these keys without too much trouble. Although this may be too much for some of our youngest children, the program can be quite useful when dealing with older special-needs students.

Another nice feature of the program is that young students can use their fingers to count the large objects on the screen. This physical contact in the counting process helps to reinforce the number being taught. Naturally, this is not a program in which you would leave a young child alone at the computer. The program does require an adult to guide the child throughout the process.

## Using the Program

When you run *Count on Me*, you will see a standard title card. Press ENTER

and the following menu will appear:

- A) REVIEW NUMBERS
- B) QUIZ GRAPHICS
- C) QUIZ NUMBERS

<<<SELECT YOUR CHOICE>>>

The program operates exactly like the *Opposites* series. Press A to review the numbers. The number is shown as an Arabic numeral and in its written form next to the item or items corresponding to that number. Pressing ENTER advances the program to the next item.

To test the child on the numbers, press B. An inverted screen will show the number written in white on black. The child may advance the flashing cursor to the picture matching the number by pressing the spacebar. The child presses ENTER when the cursor is on the right choice. The ENTER key is then used to advance to the next screen.

You may press @ at any time to check the score and then press C to continue the program from the scorecard. If you press C at the main menu, you will be tested on matching Arabic numbers with the number in written form. Again, this quiz works like my other programs. Press the letter (A,B or C) corresponding to the correct choice, press @ to check your progress and ENTER to proceed to the next question.

Since there are only ten numbers introduced, the quiz is rather short. However, this fits the attention span of young and many special-needs students. In addition, the program is useful as an introduction to computers for any child. You be the judge, and let me know how useful you think it is.

## Conclusion

I don't need to say much about *Count on Me*. Like any program meant to help teach fundamental skills to students with limited abilities, the instructions are simple. I would appreciate any suggestions you can give for other program ideas that could fit into this same genre.

Also, let me again thank all those kind folks who have sent in used Color Computer 1s and 2s for our special-needs students. Every one has found a home in a classroom, which has made our Resource Rooms the envy of other schools.

See you next month.

*Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.*

45	.....205	505	.....138
95	.....38	560	.....222
170	.....15	595	.....26
260	.....109	630	.....125
340	.....159	760	.....250
405	.....229	END	.....15
460	.....54		

The listing: COUNTME

```

1 REM*****
2 REM*      COUNT ON ME      *
3 REM*      COPYRIGHT (C) 1988  *
4 REM*      BY FRED B. SCERBO  *
5 REM*      60 HARDING AVENUE  *
6 REM*      NORTH ADAMS, MA 01247 *
7 REM*****
10 CLEAR3000
15 CLS:PRINTSTRING$(32,188);STRING$(32,156);:FORI=1TO160:READA:PRINTCHR$(A+128);:NEXT
20 PRINTSTRING$(32,195);STRING$(32,179);
25 PRINT@358," AN INTRODUCTION TO ";:PRINT@390," COUNTING NUMBERS ";
30 PRINT@422," BY FRED B.SCERBO ";:PRINT@454," COPYRIGHT (C) 1988 ";
35 DATA126,124,125,117,124,124,1

```

```

22,122,,117,117,114,,122,126,125
,124,122,94,92,93,85,82,,90,30,2
9,28,26,30,28,28
40 DATA122,,116,117,,122,122,,1
17,117,125,114,122,120,117,,120,
90,,85,85,93,82,90,26,21,,26,26,
16,
45 DATA122,,117,,122,122,,117,
117,,125,122,,117,,90,,85,85,,9
3,90,26,21,,26,30,28,
50 DATA122,,117,117,,122,122,,1
17,117,,122,117,,90,,85,85,,
90,26,,26,26,16,
55 DATA124,124,124,116,124,124,1
20,124,124,124,116,,120,,124,12
0,,92,92,92,84,,88,24,,24,28,2
8,28
60 X$=INKEY$:IFX$<>CHR$(13)THEN6
0
65 DIM P$(10,3),A$(6),B$(20),C$(
20),A(20),N(20),B(4),C(4),D(4),E
(4),F(4),AO(20)
70 FORI=1TO3:READ C(I),D(I),E(I)
,F(I):NEXT:FORI=1TO6:READA$(I):N
EXT:FORI=1TO10:READP$(I,1),B$(I)
,P$(I,2),P$(I,3),C$(I):NEXT
75 COLOR1,0
80 CLS:PRINTSTRING$(32,"=");:PRI
NT@74,"COUNT ON ME ":PRINT@134,"

```

## Alpha Software Technologies

### OS9 Level II BBS Release 3.0

The best BBS system has just gotten better! System comes complete and ready to run in less than 5 minutes! Use the built in menus or create your own, you can even run your own programs or games on-line! Complete message system allows easy message posting and retrieving. Complete file transfer system supports Xmodem and Ymodem as well as keyword searching single line and paragraph file descriptions. System runs completely in the background, allowing you full use of your computer! Also comes with it's own Terminal program "Quikterm" Free! 512k OS9 Level II and RS-232 Pak Required.....\$29.95



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## VIP Database 1.1

"ONE OF THE BEST" JUL '84 "RAINBOW"

VIP Database has all the features of VIP Database III described elsewhere in this magazine except the screen widths are 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Database is the most complete database for the CoCo 1 & 2! Version 1.1 has FASTER and more RELIABLE disk access and single spaced reports. DISK \$49.95

VIP Database owners: upgrade to VIP Database 1.1 for \$10 + \$3 S/H. Send original disk and \$13 total.

VIP DATABASE

## VIP Writer 1.1

RATED "BEST" IN SEPT '88 "RAINBOW"

VIP Writer has all the features of VIP Writer III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green & white, double clock speed is not supported, Spooler and menus are unavailable because of memory limitations. Even so, VIP Writer is the BEST word processor for the CoCo 1 & 2! Version 1.1 includes the configuration/ printer installation program and RGB Hard Disk support. Available thru Radio Shack Express Order #90-141. Includes VIP Speller 1.1 DISK \$69.95

VIP Writer owners: upgrade to VIP Writer 1.1 for \$20 + \$3 S/H. Send only ORIGINAL disk and \$23 total.

VIP WRITER



```

A) REVIEW NUMBERS":PRINT@198,"B)
  QUIZ GRAPHICS":PRINT@262,"C) QU
  IZ NUMBERS"
85 PRINT@324,"<<<SELECT YOUR CHO
  ICE>>>"
90 PRINT:PRINTSTRING$(32,"=");:P
  RINT@420,"DEDICATED TO THE STUDE
  NTS":PRINTTAB(6)"OF CONTE MIDDLE
  SCHOOL"
95 X$=INKEY$:X=RND(-TIMER):IFX$=
  "A"THEN350ELSEIFX$="B"THEN100ELS
  EIFX$="C"THEN630ELSE95
100 CLS0:PMODE0,1:PCLS1
105 LINE(0,0)-(254,170),PRESET,B
110 LINE(6,4)-(122,82),PRESET,BF
115 LINE(128,4)-(248,82),PRESET,
  B
120 LINE(6,86)-(122,164),PRESET,
  B
125 LINE(128,86)-(248,164),PRESE
  T,B
130 DRAW"BM26,188C0NU10R10NU10BR
  6R10U6L10U4R10BR6NR10D4NR10D6R10
  BR12BU6NE4D2F4BR6R10U6L10U4R10BR
  6ND10R10D4NL10BR6NR10D6U10R10D10
  BR6NR10U10R10BR6NR10D4NR10D6R10B
  R10U10NL4R10D4NL10D6NL14BR6U10R1
  0D4NL10D6BR6U10R10D4L10R4F6BR6E4
  U2H4"
135 DATA130,6,246,80,6,86,120,16
  2,130,86,246,162
140 PAINT(2,2),0,0:PCOPY1TO3
145 PMODE0,4:PCLS1
150 LINE(0,0)-(254,170),PRESET,B
  F
155 LINE(8,6)-(120,80),PSET,BF
160 PCOPY4TO2:PMODE0,1:SCREEN1,1
165 DATA"BM2,8C1","BM130,8C0","B
  M2,90C0","BM130,90C0","BM2,48C0"
  ,"BM130,48C0"
170 FORI=1TO10
175 A(I)=RND(10):IFN(A(I))=1THEN
  175
180 N(A(I))=1:NEXTI:FORY=1TO20:C
  OLOR1,0
185 FORI=2TO4
190 B(I)=RND(3)+1:IFN(B(I))=0THE
  N190
195 N(B(I))=0:NEXTI:FORY=1TO4:N(
  I)=1:NEXT
200 B=RND(10):IFB=A(Y)THEN200
205 C=RND(10):IFC=B OR C=A(Y)T
  HEN205
210 DRAW A$(1):DRAWP$(A(Y),1)
215 DRAW A$(B(2)):DRAWP$(B,2):DR
  AWP$(B,3)
220 DRAW A$(B(3)):DRAWP$(C,2):DR
  AWP$(C,3)
225 DRAW A$(B(4)):DRAWP$(A(Y),2)
  :DRAWP$(A(Y),3)
230 COLOR1,0

```

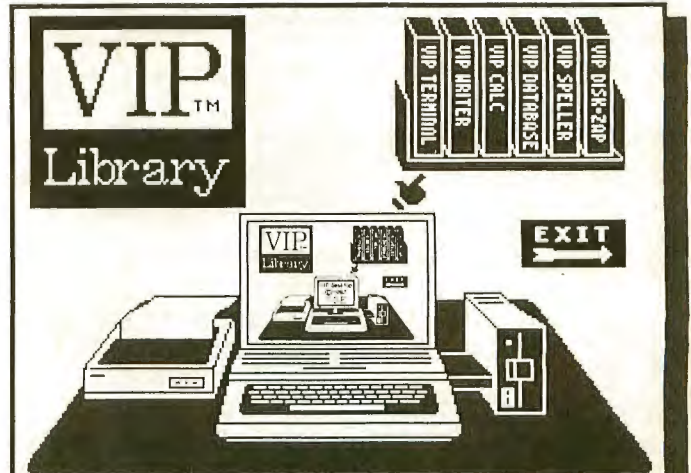
```

235 Z=0
240 PMODE0,4
245 DRAW A$(1)+"C0":DRAWP$(A(Y),
  1)
250 DRAW A$(B(2))+ "C1":DRAWP$(B,
  2):DRAWP$(B,3)
255 DRAW A$(B(3))+ "C1":DRAWP$(C,
  2):DRAWP$(C,3)
260 DRAW A$(B(4))+ "C1":DRAWP$(A(
  Y),2):DRAWP$(A(Y),3)
265 PMODE0,1:SCREEN1,1
270 LINE(8,6)-(120,80),PSET,B
275 X$=INKEY$:IFX$=" "THEN285ELS
  EIFX$="@ "THEN800
280 COLOR1,0:LINE(8,6)-(120,80),
  PRESET,B:GOTO270
285 Z=Z+1:IFZ=4THENZ=1
290 COLOR1,0:LINE(C(Z),D(Z))-(E(
  Z),F(Z)),PSET,B
295 X$=INKEY$:IFX$=" "THEN285ELS
  EIFX$=CHR$(13)THEN305ELSEIFX$="@
  "THEN800
300 COLOR1,0:LINE(C(Z),D(Z))-(E(
  Z),F(Z)),PRESET,B:GOTO290
305 IFZ+1=B(4)THEN315
310 NW=NW+1:FORK=1TO5:PMODE0,4:S
  CREEN1,1:SOUND10,3:PMODE0,1:SCRE
  EN1,1:SOUND1,3:NEXTK:GOTO290
315 NC=NC+1:PMODE0,4:PCLS1:LINE(
  0,40)-(256,126),PRESET,B:LINE(6,
  44)-(124,122),PRESET,B:LINE(130,
  44)-(248,122),PRESET,B:PAINT(2,4
  2),0,0
320 DRAW A$(5):DRAWP$(A(Y),1)
325 DRAW A$(6):DRAWP$(A(Y),2):DR
  AWP$(A(Y),3)
330 SCREEN1,1
335 X$=INKEY$:IFX$<>CHR$(13)THEN
  335
340 PMODE0,1
345 PCOPY3TO1:SCREEN1,1:PCOPY2TO
  4:NEXTY:GOTO800
350 PMODE0,2:PCLS1:SCREEN1,1:LIN
  E(0,40)-(256,126),PRESET,B:LINE(
  6,44)-(124,122),PRESET,B:LINE(13
  0,44)-(248,122),PRESET,B:PAINT(2
  ,42),0,0
355 FORI=1TO10:DRAW A$(5):DRAWP$(
  I,1)
360 DRAW A$(6):DRAWP$(I,2):DRAWP
  $(I,3)
365 X$=INKEY$:IFX$<>CHR$(13)THEN
  365
370 COLOR1,0:LINE(8,46)-(122,120)
  ,PSET,BF:LINE(132,46)-(246,120)
  ,PSET,BF:NEXTI
375 RUN
380 DATA"BR56BD44R16U6L4U26L8G8D
  2R6D16L4D6BD10BL10D10R10U10NL10B
  R6ND10F10NU10BR6NR6U6NR6U4R6"
385 DATA ONE

```

390 DATA"BR58BD48R8E4U12R4U6L4U6  
H4L16G4D6L4D6R4D12F4R8BU8NE4NH4B  
U8NLNR2BU6BL4NR2BR6R2"  
395 DATA BR  
400 DATA 1  
405 DATA"BR48BD44R28U12L6D4L14U4  
E4R10E4U8H4L18G4D4R6E2R8F2D2L10G  
8D12BD12BL6NL6NR6D10BR12NU10R6NU  
10R6U10BR6R10D10L10U10"  
410 DATA TWO  
415 DATA"BR36BD48R8E4U12R4U6L4U6  
H4L16G4D6L4D6R4D12F4R8BU8NE4NH4B  
U8NLNR2BU6BL4NR2BR6R2BR38BD22R8E  
4U12R4U6L4U6H4L16G4D6L4D6R4D12F4  
R8BU8NE4NH4BU8NLNR2BU6BL4NR2BR6R  
2"  
420 DATA BR  
425 DATA 2  
430 DATA"BR70BD28E4U8H4L18G4D4R6  
E2R8F2D4L10G4F4R10D4G2L8H2L6D4F4  
R18E4U8H2BL48BD24R6ND10R6BR6D10U  
6R10U4D10BR6U10R10D4L10R4F6BR6NR  
10U6NR10U4R10BR6NR10D4NR10D6R10"  
435 DATA THREE  
440 DATA"BR24BD48R6E4U12R4U6L4U6  
H4L12G4D6L4D6R4D12F4R6BU8NE4NH4B  
U8NLNR2BU6BL4NR2BR6R2BR32BD22R6E  
4U12R4U6L4U6H4L12G4D6L4D6R4D12F4  
R6BU8NE4NH4BU8NLNR2BU6BL4NR2BR6R  
2BR32BD22R6E4U12R4U6L4U6H4L12G4D  
6L4D6R4D12F4R6BU8NE4NH4BU8NLNR2B  
U6BL4NR2BR6R2"  
445 DATA BR  
450 DATA 3  
455 DATA"BR74BD28NR8U14L8D14L10U  
14L8D22R18D8R8U8R8U8BD24BL48NR10  
D4NR10D6BR16U10R10D10NL10BR6NU10  
R10NU10BR6U10R10D4L10R4F6"  
460 DATA FOUR  
465 DATA"BR48BD34BU4NG2U2H2L2G2D  
2NF2L14NG2U2H2L2G2D2NF2L10U20R28  
D6R6D6R8D8L4BR50BD4BU4NG2U2H2L2G  
2D2NF2L14NG2U2H2L2G2D2NF2L10U20R  
28D6R6D6R8D8L4BD32BL54NG2U2H2L2G  
2D2NF2L14NG2U2H2L2G2D2NF2L10U20R  
28D6R6D6R8D8L4"  
470 DATA"BR50BD4BU4NG2U2H2L2G2D2  
NF2L14NG2U2H2L2G2D2NF2L10U20R28D  
6R6D6R8D8L4"  
475 DATA 4  
480 DATA"BR46BD14R30D8L22D6R18F4  
D8G4L24H2U4R20U4L20U18BD36BL12NR  
10D4NR10D6BR16NU10BR12H4U6BR8D6G  
4BR12NR10U6NR10U4R10"  
485 DATA FIVE  
490 DATA"BR32BD28U6L10E6L4E6L4E8  
F8L4F6L4F6L10D6L2BR46U6L10E6L4E6  
L4E8F8L4F6L4F6L10D6L2BL26BD20U6L  
10E6L4E6L4E8F8L4F6L4F6L10D6L2BD2  
0BL26U6L10E6L4E6L4E8F8L4F6L4F6L1  
0D6L2BR46U6L10E6L4E6L4E8F8L4F6L4

F6L10D6L2"  
495 DATA BR  
500 DATA 5  
505 DATA"BR46BD14R30D8L22D6R18F4  
D8G4L24H2NU26BE4BR4R14U4L14D4BD1  
4BL12NR10D4R10D6NL10BR8NU10BR8E6  
NH4NE4F6"  
510 DATA SIX  
515 DATA"BR10BD26R10L18E10M-8,+  
4L6U4H2L2G4R4D4F4L26E10M-8,+4L6U  
4H2L2G4R4D4F4BD26BL20R10L18E10M-8,+  
4L6U4H2L2G4R4D4F4L26E10M-8,+4L6U  
4H2L2G4R4D4F4L26E10M-8,+4L6U4H2L  
2G4R4D4F4"  
520 DATA BR  
525 DATA 6  
530 DATA"BR46BD14R30D8M-12,+22L1  
2M+12,-22L20U8BD38BL8L10D4R10D6N  
L10BR6NR10U6NR10U4R10BR6D6F4E4U6  
BR6NR10D4NR10D6R10BR6U10F10U10"  
535 DATA SEVEN  
540 DATA"BR34BD10D10R12U6L4D6R12  
U10NF2H10G12E2NR20BR30D10R12U6L4  
D6R12U10NF2H10G12E2NR20BL46BD24D  
10R12U6L4D6R12U10NF2H10G12E2NR20  
BR30D10R12U6L4D6R12U10NF2H10G12E  
2NR20BR30D10R12U6L4D6R12U10NF2H1  
0G12E2NR20"



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```

545 DATA "BL46BD24D1ØR12U6L4D6R1
2U1ØNF2H1ØG12E2NR2ØBR3ØD1ØR12U6L
4D6R12U1ØNF2H1ØG12E2NR2Ø"
55Ø DATA 7
555 DATA"BR5ØBD14R26F4D6G4F4D8G4
L26H4U8E4H4U6E4BD4BR4R18D6L18U6B
D14R18D6L18U6BD2ØBL24NR1ØD4NR1ØD
6R1ØBR6U1ØBR6NR1ØD1ØR1ØU6NL6BR6N
U4ND6R1ØD6U1ØBR6R6ND1ØR6"
56Ø DATA EIGHT
565 DATA"BR12BD1ØD6G2D6R6U4F4R1Ø
H2U2H2L4H2U6L6BR24D6G2D6R6U4F4R1
ØH2U2H2L4H2U6L6BR24D6G2D6R6U4F4R
1ØH2U2H2L4H2U6L6BR24D6G2D6R6U4F4
R1ØH2U2H2L4H2U6L6BL9ØBD2Ø"
57Ø DATA"BR12BD1ØD6G2D6R6U4F4R1Ø
H2U2H2L4H2U6L6BR24D6G2D6R6U4F4R1
ØH2U2H2L4H2U6L6BR24D6G2D6R6U4F4R
1ØH2U2H2L4H2U6L6BR24D6G2D6R6U4F4
R1ØH2U2H2L4H2U6L6"
575 DATA 8
58Ø DATA"BR5ØBD14R26F4D22G4L26H4
U2R26U8L22H4U8E2BD4BR6R18D4L18U4
BD32BL14ND1ØF1ØU1ØBR6D1ØBR6U1ØF1
ØU1ØBR6NR1ØD4NR1ØD6R1Ø"
585 DATA NINE
59Ø DATA"BR8BD1ØD4R4D4L4D12R16U1
2L4U4R4NL16U4NL16BR6D4R4D4L4D12R
16U12L4U4R4NL16U4NL16BR6D4R4D4L4
D12R16U12L4U4R4NL16U4NL16BR6D4R4
D4L4D12R16U12L4U4R4NL16U4NL16BR6
D4R4D4L4D12R16U12L4U4R4NL16U4NL1
6"
595 DATA"BL94BD26D4R4D4L4D12R16U
12L4U4R4NL16U4NL16BR6D4R4D4L4D12
R16U12L4U4R4NL16U4NL16BR6D4R4D4L
4D12R16U12L4U4R4NL16U4NL16BR6D4R
4D4L4D12R16U12L4U4R4NL16U4NL16"
60Ø DATA 9
605 DATA"BR36BD44R16U6L4U26L8G8D
2R6D16L4D6BR3ØH4U24E4R2ØF4D24G4L
2ØBU6BR4R12U2ØL12D2ØBD14BL3ØR6ND
1ØR6BR6NR1ØD4NR1ØD6R1ØBR6U1ØF1ØU
1Ø"
61Ø DATA TEN
615 DATA"BR38BD16H4L4U2NR4D2L4NU
ND4L4U2L4D2R4NH6L2G4BR54H4L4U2NR
4D2L4NUND4L4U2L4D2R4NH6L2G4BR54H
4L4U2NR4D2L4NUND4L4U2L4D2R4NH6L2
G4BL42BD16H4L4U2NR4D2L4NUND4L4U2
L4D2R4NH6L2G4BR54H4L4U2NR4D2L4NU
ND4L4U2L4D2R4NH6L2G4BR54"
62Ø DATA"H4L4U2NR4D2L4NUND4L4U2L
4D2R4NH6L2G4BL42BD16H4L4U2NR4D2L
4NUND4L4U2L4D2R4NH6L2G4BR54H4L4U
2NR4D2L4NUND4L4U2L4D2R4NH6L2G4BR
54H4L4U2NR4D2L4NUND4L4U2L4D2R4NH
6L2G4BL1ØBD16H4L4U2NR4D2L4NUND4L
4U2L4D2R4NH6L2G4"
625 DATA 1Ø
63Ø CLS:V=1

```

```

635 FORI=1TO1Ø
64Ø AO(I)=RND(1Ø)
645 IF N(AO(I))=1 THEN 64Ø
65Ø N(AO(I))=1:NEXTI
655 FOR P=1TO1Ø
66Ø CLS
665 PRINT@68,"WHICH WRITTEN NUMB
ER IS"
67Ø PRINT@132,C$(AO(P))+ " ?"
675 FOR Q=1TO2
68Ø C(Q)=RND(1Ø):IF C(Q)=AO(P) T
HEN68Ø
685 FOR K=Q-1 TO ØSTEP-1:IF C(K)
=C(Q) THEN68Ø
69Ø NEXTK
695 NEXTQ:C(3)=AO(P)
70Ø FOR E=1TO3
705 F(E)=RND(3)
71Ø FOR K=E-1 TO Ø STEP-1:IF F(K)
)=F(E) THEN705
715 NEXTK:NEXTE
72Ø PRINT
725 PRINTTAB(8)"A-"+B$(C(F(1))):
PRINT
73Ø PRINTTAB(8)"B-"+B$(C(F(2))):
PRINT
735 PRINTTAB(8)"C-"+B$(C(F(3))):
PRINT
74Ø G$=INKEY$:IFG$="@ "THEN80Ø
745 IF G$=""THEN74Ø
75Ø G=ASC(G$)-64
755 IF G<1 THEN 74Ø
76Ø IF G>5 THEN 74Ø
765 IF C(F(G))<>AO(P) THEN78Ø
77Ø PRINT:PRINT" RIGHT! THE ANS
WER IS: "+B$(AO(P))
775 NC=NC+1:GOTO79Ø
78Ø PRINT:PRINT" SORRY! THE AN
SWER IS: "+B$(AO(P))
785 NW=NW+1
79Ø X$=INKEY$:IFX$<>CHR$(13)THEN
79Ø
795 NEXT P
80Ø CLS:PRINT@1Ø1,"YOU TRIED"NC+
NW"TIMES &":PRINT@165,"ANSWERED"
NC"CORRECTLY"
805 PRINT@229,"WHILE DOING"NW"WR
ONG."
81Ø NQ=NC+NW:IF NQ=ØTHEN NQ=1
815 MS=INT(NC/NQ*1ØØ)
82Ø PRINT@293,"YOUR SCORE IS"MS"
%."
825 PRINT@357,"ANOTHER TRY (Y/N/
C) ?";
83Ø X$=INKEY$:IFX$="Y"THEN RUN
835 IFX$="N"THENCLS:END
84Ø IFX$="C"THEN85Ø
845 GOTO83Ø
85Ø IFV=1THEN66Ø
855 IFV=ØTHEN265

```



# NOVICES NICHE



THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

## Home Help

### Keeping Your Balance

By Jerry Yates

CoCo 3

At a recent club meeting, a new member asked me if I knew of a program to help him see if he had made a mistake in balancing his checkbook. I remembered a program I had written several years ago that could be of help, *Checkbook Checker*.

*Checkbook Checker* is very simple to use, and it even has instructions printed on the title screen. On booting the program and pressing a key to clear the intro, you are prompted for a beginning balance. Then you are asked for the check number and the amount in the format of *Check #, Amount* (the two are separated by a comma — e.g., 1001,250 would indicate that Check No. 1001 was written for the amount of \$250). Enter deposits or checks paid to you as "negative payments:" 2000,-500 would indicate that you received \$500. Along with the last 12 transaction records, the screen displays the current balance.

#### The Listing: CHECKBOOK

```
Ø POKE65497,Ø:RGB
1Ø CLSØ:GOSUB 18Ø:PRINT@69,CHR$(
142);STRING$(2Ø,14Ø);CHR$(141);
2Ø PRINT@1Ø1,CHR$(138);" CHECKBO
OK CHECKER ";CHR$(133);
3Ø PRINT@133,CHR$(138);" BY JE
RRY YATES ";CHR$(133);
4Ø PRINT@165,CHR$(138);" AUGUST
2Ø, 1988 ";CHR$(133);
5Ø PRINT@197,CHR$(138)+STRING$(2
Ø,134)+CHR$(133);
6Ø PRINT@229,CHR$(138)" TO ENTER
A DEPOSIT ";CHR$(133);
```

```
7Ø PRINT@261,CHR$(138);"USE NEGA
TIVE (-) NO.";CHR$(133);
8Ø PRINT@293,CHR$(138);" -5ØØ.ØØ
ENTER CK.# ";CHR$(133);
85 PRINT@325,CHR$(138);" 99999
9 TO EXIT ";CHR$(133);
9Ø PRINT@357,CHR$(139);STRING$(2
Ø,131);CHR$(135);
95 FOR T=1TO5:GOSUB18Ø:NEXT
96 PALETTE 12,63:PALETTE 13,Ø
1ØØ FOR C=1TO3:SOUNDRND(2ØØ),2:N
EXT:PRINT@421,"";:INPUT"BEGINNIN
G BALLANCE";BAL:CLS
11Ø PRINT@Ø,USING" CURRENT BALLA
NCE =$$$####.##";BAL
12Ø PRINTSTRING$(32,131);
13Ø PRINT@448,STRING$(32,14Ø);
14Ø INPUT" CHECK #, AMOUNT";CN,C
K
15Ø IF CN=999999 THEN GOTO 23Ø E
LSE BAL=BAL-CK
16Ø PRINT@416,USING"##### $$$###
.## =$$$####.##";CN;CK;BAL
17Ø GOTO 11Ø
18Ø FOR X=1TO62:SET(X,Y,RND(9-1)
):NEXT
19Ø FOR Y=1TO3Ø:SET(X,Y,RND(9-1)
):NEXT
2ØØ FOR X=63TO1STEP-1:SET(X,Y,RN
D(9-1)):NEXT
2Ø5 FOR Y=3ØTO1STEP-1:SET(X,Y,RN
D(9-1)):NEXT
21Ø RETURN
23Ø CLSØ:PRINT"I HOPE CHECKBOOK
CHECKER HAS BEEN HELPFUL.":E
ND
```

# Applying Labels

By Ana M. Rodriguez

4K

If you don't have the time to type up multiple address labels on the typewriter, and if you have a DMP-105 printer, this short program is for you. Just type it in and run, supplying the appropriate information when prompted (name, address, city, state and ZIP code). The program next will ask how many labels you want printed; make sure your printer is online with labels at the ready. If address labels aren't the kind of labels you need, you can modify the program in lines 50, 60 and 70.

The Listing: ADLABELS

```

10 REM **          LABELS          **
20 REM **          BY              **
30 REM ** ANA M. RODRIGUEZ        **
40 CLS:PRINTTAB(13);"LABELS"

```

```

50 PRINT"ENTER NAME":INPUT N$
60 PRINT"ENTER NUMBER & STREET":
INPUT S$
70 PRINT"ENTER CITY, STATE & ZIP
CODE":INPUT C$
80 CLS:PRINT "REMEMBER: TURN ON
YOUR PRINTER"
90 INPUT "HOW MANY LABELS";L
100 REM PRINT LABELS
110 FOR A=1TOL
115 PRINT#-2,CHR$(27);CHR$(19)
120 PRINT#-2,TAB(3);N$:PRINT#-2,
TAB(3);S$:PRINT#-2,TAB(3);C$
130 PRINT#-2:PRINT#-2
140 NEXT A
150 CLS:INPUT"DO YOU WANT TO PRI
NT NEW LABELS (Y-N)";A$
160 IF A$="Y" THEN 40
170 END

```

# Custom Cassette Labels

By Travis Halbrook

CoCo 3

If you love music as I do, then you probably make your own "party mix" tapes. Putting your favorite songs on one tape allows you to listen to the music you want without having to constantly switch cassettes. Unfortunately, the labels you stick on homemade tapes have to be made by hand, which gives them a very sloppy appearance. Let *Cassette Labeler* make neat, professional-looking cassette jackets for you.

After typing in and saving the program, type RUN and press ENTER. A model of a cassette label should appear onscreen, with a flashing, auto-repeating cursor in the middle. Just move the cursor wherever you want and type in the pertinent information. To print, press the SHIFT and down arrow keys at the same time.

The rectangle at the top of the screen represents the front of the label. This is where I put the names of the songs. The rectangle at the bottom represents the "spine" of the cassette label; I put the title of my tape in this part. Of course, it goes without saying that this program is not restricted just to creating jackets for music tapes. Run it for some of your custom "party mix" CoCo program tapes!

The Listing: CASSLBLR

```

10 "CASSETTE LABELER" BY TRAVIS
HALBROOK          COPYRIGHT
1988
20 ON BRK GOTO 360
30 POKE 65497,0:WIDTH 40:PALETTE
0,0:PALETTE 8,63:CLS1
40 PRINT STRING$(40,"-");
50 FOR A=1 TO 17
60 PRINT "          ";
          ";
70 NEXT A
80 PRINT STRING$(40,"-");
90 LOCATE 0,15
100 PRINT STRING$(39,"-");

```

```

110 LPOKE 443646,ASC("-")
120 LOCATE 8,21:PRINT"SHIFT/DOWN
ARROW TO PRINT"
130 X=20:Y=12
140 LOCATE X,Y
150 IF PEEK(341)=247 THEN Y=Y-1
ELSE IF PEEK(342)=247 THEN Y=Y+1
ELSE IF PEEK(343)=247 THEN X=X-
1 ELSE IF PEEK(344)=247 THEN X=X
+1
160 A$=INKEY$:IF A$<>" " AND A$<>
"^" AND A$<>CHR$(9) AND A$<>CHR$(
10) AND A$<>CHR$(8) AND A$<>"["
THEN LPOKE 442368+X*2+Y*80,ASC(
A$):X=X+1
170 IF A$="[" THEN 210
180 IF X>39 THEN X=0:Y=Y+1 ELSE
IF X<0 THEN X=39:Y=Y-1
190 IF Y<0 THEN Y=0 ELSE IF Y>18
THEN Y=18
200 GOTO 140
210 A$=""
220 LOCATE 7,20:PRINT"          PR
INTING          "
230 POKE 150,176:'DOUBLE BAUD RA
TE FOR HIGH SPEED
240 FOR Y=0 TO 18
250 FOR X=0 TO 39
260 A=LPEEK(442368+X*2+Y*80)
270 A$=A$+CHR$(A)
280 NEXT X
290 PRINT #,-2,A$
300 A$=""
310 NEXT Y
320 FOR A=1 TO 3
330 PRINT #,-2,"          ";
          ";
340 NEXT A
350 PRINT#-2,STRING$(40,"-")
360 POKE 65496,0
370 POKE 150,88 'RETURN BAUD RAT
E TO NORMAL SPEED

```

# Knee-High to a Growth Chart

By Gay Crawford

16K  
ECB

*Growth Chart* is a handy program for those who are parents of young children. With a Gemini 10X printer and this program, you can print out an accurate height chart that will allow you to track your child's ascent into maturity.

If you don't have a Gemini, change the baud rate in Line 20 to that of your printer. The value is currently set as 150, 18 for 2400 baud. Poke these values in Line 20 for the following baud rates: 150,87 for 600 baud, 150,41 for 1200 baud, 150,7 for 4800 baud, and 150,1 for 9600 baud. You'll most likely need 600 baud because that is how fast CoCo is set to "talk" on power-up. Also, if your printer is not a Gemini, refer to your printer manual to replace the code in Line 30 with the proper code to change linefeeds to 1/4 inch (but check the accuracy with a ruler or a yardstick).

Use tractor-feed paper, and consider reinforcing the page breaks with tape, or perhaps cover the entire chart with clear contact paper. Hang the chart on a wall so that the 2-foot mark is exactly 24 inches above the floor, have the youngster stand straight against the wall (no tippytoeing), make a mark at the youngster's head level, and write the day's date out to

the side. There is plenty of room on the chart for comments, and you may want to let your child decorate it.

The Listing: GROCHART

```

10 'HEIGHT CHART PRINTER FOR GEM
INI 10X
20 POKE 150,18
30 PRINT#-2,CHR$(27);CHR$(65);CHR
R$(18);' 1/4 INCH LINEFEEDS
40 CLS
50 LINEINPUT"ENTER NAME OF CHILD
: ";CN$
60 PRINT#-2,"Height Growth Chart
for ";CN$
70 PRINT#-2:PRINT#-2
80 F=5:I=0
90 PRINT#-2,F" Feet "I "inches"
;TAB(22);"-----"
100 PRINT#-2,TAB(22);"--"
110 PRINT#-2,TAB(22);"--"
120 PRINT#-2,TAB(22);"--"
130 I=I-1:IFI<0 THENI=11:F=F-1
140 IFF>1 THEN 90
150 END

```

## Brain Games

### CoCo Says . . .

By Warren Massie

16K  
ECB

CoCo says . . . select the blue box in the lower-left corner. CoCo says . . . pick the red box in the lower-right corner. CoCo says . . . test your short-term memory with *CoCo Simon*.

*CoCo Simon* divides the screen up into four sections, each displaying a different color and sound. The top-left corner corresponds to the Q key, top-right to the W, bottom-left to A and bottom-right to S. The computer will flash one of the sections. Your job is to press the appropriate key. If your response is correct, it will add another sequence to the previous one, laying down a pattern for you to duplicate.

When run, the game begins immediately, so pay attention. After it finishes its display, there is a "dead" time in which it waits for your response. If you press the correct keys, the program adds another bit to the sequence. See how far you can go — most people run into a snag at about 10 items.

The Listing: SIMON

```

10 CLS 8:PRINT"COCO SIMON"
20 PRINT"          BY W.MASSIE"
30 FORX=1TO20:SOUND 100,1:SOUND9
0,1:NEXTX
40 PMODE 3,1:SCREEN 1,0:PCLS
50 '*****
60 P=1:' FOR SOUND DELAY
70 DIM M$(99):C=0:CH=0
80 R=RND(4):A$="QWAS":C=C+1

```

```

90 M$(C)=MID$(A$,R,1)
100 C1=0:C2=0
110 '*****
120 C1=C1+1:PCLS
130 IF M$(C1)="Q" THEN 190
140 IF M$(C1)="W" THEN 220
150 IF M$(C1)="A" THEN 250
160 IF M$(C1)="S" THEN 280
170 IF C1=C THEN 320
180 GOTO 120
190 COLOR 3,5
200 LINE(0,0)-(100,75),PSET,B
210 SOUND 100,P:GOTO 170
220 COLOR 2,5
230 LINE(100,0)-(200,75),PSET,BF
240 SOUND 125,P:GOTO 170
250 COLOR 3,5
260 LINE(0,75)-(100,150),PSET,BF
270 SOUND 150,P:GOTO 170
280 COLOR 4,5
290 LINE(100,75)-(200,150),PSET,
BF
300 SOUND 200,P:GOTO 170
310 '*****
320 C2=C2+1:PCLS
330 K$=INKEY$
340 IF CH<C2 THEN CH=C2
350 IF C2=C+1 THEN PCLS 2:FORX=1
TO20:NEXTX:GOTO80
360 IF K$="Q" OR K$="W" OR K$="A
" OR K$="S" THEN 370 ELSE 330

```

```

37Ø IF K$<>M$(C2) THEN CLS:GOTO4
3Ø
38Ø IF K$="Q"THEN COLOR 3,5:LINE
(Ø,Ø)-(1ØØ,75),PSET,B:SOUND1ØØ,P
39Ø IF K$="W"THEN COLOR 2,5:LINE
(1ØØ,Ø)-(2ØØ,75),PSET,BF:SOUND12
5,P
4ØØ IF K$="A"THEN COLOR 3,5:LINE
(Ø,75)-(1ØØ,15Ø),PSET,BF:SOUND15
Ø,P
41Ø IF K$="S"THEN COLOR 4,5:LINE
(1ØØ,75)-(2ØØ,15Ø),PSET,BF:SOUND
2ØØ,P

```

```

42Ø PCLS:GOTO 32Ø
43Ø PRINT"WRONG, IT WAS THE ";M$(
(C2);"-KEY.":SOUND 1,15
44Ø PRINT:PRINT"HIGHEST NUMBER O
F SEQUENCE(S)"
45Ø PRINT"REMEMBERED IS: ";CH-1
46Ø PRINT:PRINT"DO YOU WANT TO P
LAY AGAIN (Y/N)?"
47Ø R$=INKEY$:IF R$="Y" THEN C=Ø
:CH=Ø:PMODE 3,1:SCREEN 1,Ø:PCLS:
GOTO8Ø
48Ø IF R$="N" THEN END ELSE 47Ø

```

## Towers of Hanoi

By Dan O'Brien

16K  
ECB

*Towers of Hanoi* is a graphic brain-teaser that will surely get your mental gears to grinding. There are three "pegs"; on the peg on the left is a "pyramid" of discs, each disc being smaller than the one it rests on. The object is to move all the discs from the left peg to the right peg.

Three conditions: 1) only one disc can be moved at a time, 2) only the top disc of a stack can be moved, and 3) a disc cannot be stacked onto any disc that is smaller than itself. To play, use the 1, 2 and 3 keys (which represent pegs 1, 2 and 3).

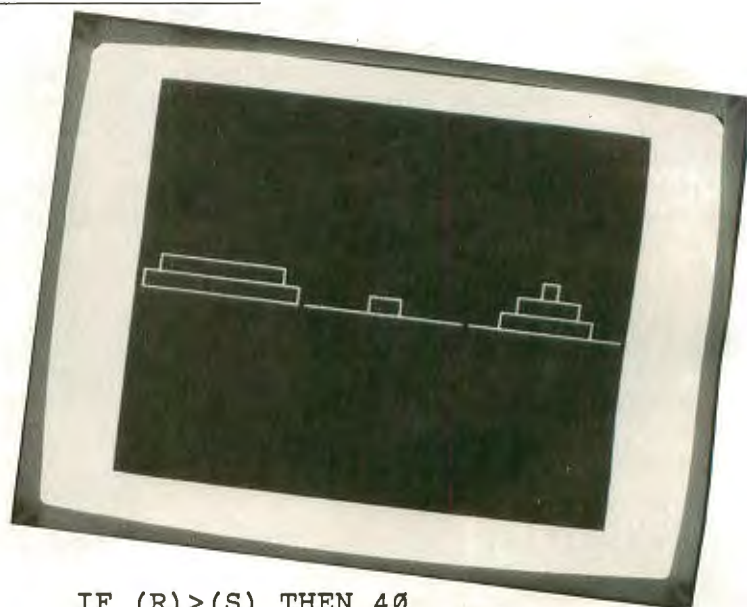
Just press the number of the peg you want to move the disc from, then press the number of the peg you want to move the disc to. If a wrong number is pressed, or if you get the feeling the computer is locked up, press the zero (0) key and try again; the previous move will be ignored. The only advice I can give you is to be patient.

### The Listing: HANOI

```

5 REM DEVELOPED BY DAN O'BRIEN
1Ø PMODE4,1:PCLS:SCREEN1,Ø
2Ø LINE(4,1ØØ)-(84,92),PSET,B:LI
NE(12,92)-(76,84),PSET,B:LINE(2Ø
,84)-(68,76),PSET,B:LINE(28,76)-
(6Ø,68),PSET,B:LINE(36,68)-(52,6
Ø),PSET,B:LINE(4Ø,6Ø)-(48,52),PS
ET,B:LINE(88,1ØØ)-(168,1ØØ),PSET
:LINE(172,1ØØ)-(252,1ØØ),PSET
3Ø L(1)=6:LD(2)=Ø:L(3)=Ø:LEV(1,1
)=6:LEV(1,2)=5:LEV(1,3)=4:LEV(1,
4)=3:LEV(1,5)=2:LEV(1,6)=1:H=Ø:A
=Ø:B=Ø:R=Ø:S=Ø:MOV=Ø
4Ø I$=INKEY$:IFI$=""THEN4Ø
5Ø IFI$<>"1" AND I$<>"2" AND I$<
>"3" OR I$=""THEN4Ø
6Ø A=VAL(I$)
7Ø I$=INKEY$:IFI$=""THEN7Ø
8Ø IFI$<>"1" AND I$<>"2" AND I$<
>"3" OR I$=""THEN 4Ø
9Ø B=VAL(I$)
1ØØ IF (A)=(B) THEN4Ø
11Ø IF L(A)=ØTHEN4Ø
12Ø R=LEV(A,L(A))
13Ø IF L(B)<>ØTHENS=LEV(B,L(B)):

```



```

IF (R)>(S) THEN 4Ø
14Ø MOV=MOV+1
15Ø IF R=1 THEN D=4 ELSE D=(R-1)
*8
16Ø IFA=1THEN P=44
17Ø IFA=2THEN P=128
18Ø IFA=3THEN P=212
19Ø H=1ØØ-(8*(L(A)-1))
2ØØ LINE(P-D,H-1)-(P-D,H-8),PRES
ET:LINE-(P+D,H-8),PRESET:LINE-(P
+D,H-1),PRESET
21Ø L(B)=L(B)+1
22Ø IF B=1THENP=44
23Ø IF B=2 THEN P=128
24Ø IF B=3 THEN P=212
25Ø H=1ØØ-(8*(L(B)-1))
26Ø LINE(P-D,H)-(P+D,H-8),PSET,B
27Ø LEV(B,L(B))=R
28Ø LEV(A,L(A))=Ø
29Ø L(A)=L(A)-1
3ØØ IF L(3) <>6 THEN4Ø
31Ø CLS:PRINT"YOU HAVE DONE IT I
N: ";MOV;" MOVES!
315 PRINT"ONLY: ";MOV-63;" MOVES
TILL PERFECT"
32Ø PRINT"PRESS ANY KEY TO PLAY
AGAIN"
33Ø I$=INKEY$:IFI$=""THEN33Ø
34Ø RUN

```

# Boggling Your Mind

By Russell Riley, Jr.

4K

In *Heads Up*, players compete against time and each other to come up with as many words as possible from a grid of random letters appearing onscreen. The letters can be used only once and *must touch!* Each player should use a notepad and a pencil to jot down his or her words. When time runs out, a tone sounds and players compare their lists of words. Words that appear on other players' lists are cancelled out.

## The Listing: HEADSUP

```
Ø REM RUSSELL RILEY JR COPYRIGHT
  1988
1 CLS
3 DIM A$(100)
5 FOR X=1 TO 16
6 RESTORE
7 Y=Ø
10 Z=RND(70)
15 READ A$(X):Y=Y+1
16 IF Z=Y THEN NEXT X ELSE 15
20 FOR P=Ø TO 169:NEXT P
50 PRINT @ 170,A$(1);" ";A$(2);"
```

```
";A$(3);" ";A$(4)
51 FOR P=177 TO 201:PRINT @ P,CHR$(TR)
52 NEXT P
55 PRINT @ 202,A$(5);" ";A$(6);"
  ";A$(7);" ";A$(8)
56 FOR P=209 TO 233:PRINT @ P,CHR$(TR):NEXT P
57 PRINT @ 234,A$(9);" ";A$(10);
  ";A$(11);" ";A$(12)
58 FOR P=241 TO 265:PRINT @ P,CHR$(TR):NEXT P
59 PRINT @ 266,A$(13);" ";A$(14);
  ";A$(15);" ";A$(16)
60 FOR P=273 TO M:PRINT @ P,CHR$(TR)
61 NEXT P
65 T=T+1
70 IF T=18000 THEN SOUND 1,10
75 GOTO 65
100 DATA A,A,A,A,A,B,B,C,C,D,D
  ,E,E,E,E,E,E,E,E,F,F,G,G,G,H,H,I
  ,I,I,I,J,J,K,K,L,L,M,M,N,N,O,O,O
  ,O,O,P,P,P,Q,R,R,R,R,S,S,S,T,T,T
  ,U,U,U,U,V,V,W,W,X,Y,Z
```

## Graphics

# The Building Blocks of Graphics

By Keiran Kenny

16K

*Color Blocks* is a nice, *short* program suitable to introduce beginners to Lo-Res graphics. It uses Color BASIC's block graphics characters. After you load and run, you see an up-arrow cursor centered at the bottom of the screen. Press the appropriate arrow key and auto-repeating action will take you in whatever direction you want to go.

When you come to a good place to drop off a block, press a number key from 1 to 8, and CoCo will draw a block there in the color of the number you chose (1 is green, 2 is red, 3 is blue, etc.). The cursor will then reappear at the bottom of the screen, ready to travel to another position and place a block there. If you place the cursor over an existing color block, the block will be deleted.

Don't be dismayed if the cursor shoots off the top of the screen — it wraps around. Press the arrow key and it reappears at bottom center. With a little patience you can create attractive patterns. I drew a really impressive Christmas tree.

## The Listing: CLRBLOKS

```
Ø 'COLRBLKS' by Keiran Kenny,
  Sydney, 1988.
10 CLSØ
20 P=152Ø
30 POKEP,3Ø
```

```
40 IFPEEK(341)=247THENP=P-32:POKE
  E(P),3Ø:POKEP+32,128:GOTO100
50 IFPEEK(342)=247THENP=P+32:POKE
  EP,3Ø:POKEP-32,128:GOTO100
60 IFPEEK(343)=247THENP=P-1:POKE
  P,3Ø:POKEP+1,128:GOTO100
70 IFPEEK(344)=247THENP=P+1:POKE
  P,3Ø:POKEP-1,128:GOTO100
80 K$=INKEY$:IFK$=<"Ø"ORK$>"8"TH
  EN110
90 POKEP,127+16*VAL(K$):GOTO20
100 IFP<1024ORP>1535THENP=152Ø
110 FORD=1TO5Ø:NEXT:GOTO40
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

### Out of Sync

*I would like to hook a 12-inch Samsung TTL (IBM type) monochrome monitor to my CoCo 3. This is a monitor with a 9-pin DB connector on the back, with provisions for intensity, video, H sync and V sync on pins 6, 7, 8 and 9 respectively. Pin 1 is ground.*

*Donald Bullock  
Camden, Alabama*

That monitor is rather hard to use with a CoCo 3 for two reasons. First, the monitor requires a digital TTL signal-level input (0 to 5 volts), while the CoCo uses an analog signal ranging from 0 to .9 volts. Second, that monitor is set up to work properly only when it receives a sync frequency of about 19 KHz. The CoCo sends out its video at a sync frequency of 15.75 KHz. It would require some special circuitry to get a decent image on that monitor. Even then, you'd only get three intensity levels at best (black, dim and bright). In addition, your picture would probably be small — occupying only the center portion of the screen — because of the discrepancy in the H sync frequencies. Someone with a good knowledge of analog and digital video and a moderate amount of time to tinker might be able to make such a converter circuit, but none is currently offered on the CoCo market. For all practical purposes, you cannot use that monitor with the CoCo at this time.

### All or Nothing

*I have a Disto 512K CoCo-upgrade board with no chips in it. Is it possible to temporarily populate it with 256K of memory?*

*Roger Wilkins  
Sexsmith, Alberta*

There is no intermediate amount of memory that can work on the CoCo 3. You must have either 128K or the full 512K. While in theory it might be

*Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.*



**By Marty Goodman  
Rainbow Contributing Editor**

possible to make a board that can be partially populated (probably using 4464-type chips), no one has bothered to do so. Such a board would be very expensive because it would need a number of chips in addition to the memory chips.

### Solder Solution

*I have found and solved the same nasty problem in two of my Tandon TM 100 series full-height drives. The problem involved intermittent failure of the drives. The drive motor-spindle would spin too fast, occasionally resulting in a crashed disk. When the drives failed, a sharp rap on the case would temporarily fix the problem. In both drives, the problem was caused by cold-solder joints between the motor-speed potentiometer (a rectangular blue component on the small motor-speed PC circuit board in the rear of the drive) and its circuit board. Remelting the solder joints for the potentiometer cured the problem. I suspect that other Tandon series 100 (TM 100-1, 100-2 and 100-4) drives might suffer from the same problem and be just as easy to fix.*

*Steve Goldberg  
(W21MF)  
Bethpage, New York*

Thanks for the solution. The Tandon TM 100 series drives (apart from that problem) are among the more reliable

of the older technology full-height floppy drives. I used two of them for many years. While I never encountered that problem, perhaps others have.

### Read Before You Write

*How do I use the memory-management unit (MMU) of the CoCo 3 in writing assembly language programs?*

*H. Peters  
Lantzville, British Columbia*

First, you need a good reference on the GIME chip. Spectral Associates' *Super Extended BASIC Unraveled* (available from Microcom) is a good reference on the GIME chip. The book includes full specs on the chip and disassembly of the CoCo 3's ROM, including numerous examples of chip programming. The Tandy service manual for the CoCo 3, another good reference, can be purchased from either Microcom or your local Radio Shack store. (Radio Shack will have to order the book from National Parts in Texas.)

With these references in front of you, note that the memory manager is programmed by 6-bit data values written to registers \$FFA0 through \$FFAF. These sixteen registers set up two tasks, or masks, for mapping memory. The task being used (if any) is controlled by the task-select bit (Bit 0 of FF91) and the MMU-enable bit (Bit 6 of SFF90). If the MMU is disabled, then a third canned task is implemented, and the 6809's memory is mapped to the top 64K of the machine's physical memory (as if segments \$38 through \$3F were programmed into a select set of eight task registers).

### A Moving Experience

*Can I use an FD 501 and an FD 502 drive in the same cabinet as drives 0 and 1?*

*Oscar Dias  
Aibonito, Puerto Rico*

You can use the drives in the way you describe, but there are several difficulties in doing so. First, the FD 502 drive's power supply connector is physically different from that of the FD 501 drive. To use both in the same case, you would have to adapt or change the power supply connector on one or the other. Both use the same (+5 and +12) voltages at about the same amount of current, but the physical connector is different.

Second, if both the FD 501 and the FD 502 drive were originally Drive 0, you must remove a terminator resistor pack from one or the other. All drive systems have only *one* terminator resistor. (These resistor packs vary in their appearance. They may look like an integrated circuit in a socket, or a blob of epoxy with a single row of pins, also socketted.) In addition you need to alter the position of the drive-select jumpers on one or the other drive if both were originally Drive 0. Look for jumpers labeled DS0, DS1, etc. Change a jumper from DS0 to DS1 on one of the drives. On some brands of drives, the change will be from DS1 to DS2. While on some brands these jumpers can be moved by hand, on others you need to cut and resolder wires.

### Back to Disk BASIC

*I cannot get CoCo Max III to work with my CoCo 3 and Disto Super Disk Controller whether I use my Disk BASIC ROM or CDOS-3.*

*Art St. Amant  
Elliot Lake, Ontario*

CoCo Max III needs an almost totally standard disk ROM, so I am not surprised that it did not work with CDOS-3. I know of only one modified DOS that is compatible with CoCo Max III — the current release of ADOS-3. (To use that version, you must use the optional Disable feature.) I see no reason why it should not work properly if you are using a vanilla, unmodified Radio Shack Disk BASIC ROM.

However, since you say you are using a Disto Super Controller, I assume your Disk BASIC ROM is a 28-pin EPROM, which means that anyone could have altered it subtly. You need to try what you *know* is a completely unaltered version of Disk BASIC in the controller. If that doesn't work, call Colorware, which sells the product. It's worth the trouble. CoCo Max III is a fine product.

### Analog vs. Digital

*I just purchased a Tandy 1000 HX computer and discovered that my CM-8 RGB monitor would not work with it. Is there any way to fix this? Also, can I use a couple of old gray full-height drives with my Tandy FD 501 two-drive system?*

*W.J. Martin  
Key Largo, Florida*

The CM-8 accepts only an analog signal. The PC-compatible you bought

puts out a CGA (a four-bit digital RGB) signal. The two signal protocols are not really compatible because they work at different voltage levels and select colors in different ways. This is one of the reasons I have suggested to readers that they consider getting a Magnavox or Sony monitor instead of the CM-8. Those monitors offer compatibility with both types of signal protocol.

I have heard from one user who hooked his Tandy 1000's R, G and B lines and H and V sync lines to the corresponding input lines on his CM-8 and got a usable picture. Remember: Because the CM-8 cannot handle the intensity line from the Tandy 1000, you can only get six colors and black and white this way. In addition, when using the CM-8 in this fashion, you are driving inputs designed for signal levels of 0 to .9 volts with signals that go as high as 4 volts. Prolonged use might damage the input chip on the CM-8. The user who reported this experiment said things had been fine for a few months. To make this modification, you need to be comfortable cutting on the CM-8 cable and arranging for your own connectors. In effect, you need to be a hardware tinkerer of at least modest ability.

As for using the old gray drives, I recommend you just forget about them. Those particular drives are notoriously unreliable machines. It is possible to do as you suggest. However, the old Tandy full-height drives were selected via missing teeth in the connector, while the new half-height drives are selected via jumpers on the drive's circuit board. This makes it necessary to do some tinkering to put together the system you describe. And, of course, you'd have to yank the terminator resistor from your gray Drive 0.

### CoCo 3 Inputs

*A note to hardware hackers looking for inputs to the CoCo 3: Unlike on the CoCo 1 and 2, there are four unused pins on the CoCo 3's IC4 (the 68B21 PIA) that can be used as inputs if the bits are set as such. These lines were used to drive the VDG chip on the older CoCos, but that function is now done inside the GIME chip. You can't use those lines as outputs. If you do that, you will be writing to registers inside the GIME chip that mimic the functions of the old VDG chip. However, if used as inputs, these lines constitute four valid TTL inputs. The lines in question are PB 4 through PB 7. Note that PB 3, wired to a pull-up system and Pin 10 of*

*the RGB port, is not used by any hardware or software made by Tandy or anyone else. Hackers may want to free that line to get a fifth PIA line. (This line could be used as either an input or an output.) Use Pin 10 of the RGB port to supply +5 volts to sync converters or to output composite sync generated with your own circuit.*

*Hackers should also beware: There have been reports of several devices that worked on the CoCo 1 and 2 but don't work properly on the CoCo 3. This may include some releases of the FD 501 and FD 502 shortie controller from Tandy. Problems have been traced to an apparent difference in the timing of the SCS (Spare Cartridge Select) line on the CoCo 2 and CoCo 3. The problems appear to be cured if one gates the SCS line with the high part of the E clock line. One NOR and two inverter gates could be used to accomplish this.*

*Steve Bjork  
(6809ER)*

*SRB Software  
Palmdale, California*

Thanks for those tips, Steve. I have been using Pin 10 of the RGB port for composite sync (which I generate using a 74LS02 chip I piggy-backed on the 74LS04 in the CoCo) for about a year now. I encountered the same problem you describe when a device I was prototyping worked fine on a CoCo 1 and 2 but not on a CoCo 3. The problem was cured when I gated the SCS line with the E clock, as you suggest. So my experience indicates there are real timing differences between the SCS line on the CoCo 1 and 2 and the CoCo 3. Does anyone out there have a nice high-frequency scope and want to report more conclusive details?

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG > prompt, pick Rainbow Magazine Services, then, at the RAINBOW > prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS > prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

## CBASIC III EDITOR/COMPILER

### The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). We even added advanced commands not available in Basic to give you a level of control only available to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, File and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/PUT, H/PLAY and H/DRAW, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximately 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk \$149.00

## DATA PACK III PLUS V1.1

### SUPER SMART TERMINAL PROGRAM AUTOPILOT & AUTO-LOG PROCESSORS X-MODEM DIRECT DISK FILE TRANSFER VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the COCO-3 Serial I/O port.
- 8 Display Formats, 32/40/64/80 columns at 192 or 225 Res.
- 50K Text Buffer when using the Hi-Res Text Display & Disk.
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file (Data Logging).
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys, position, insert/delete, PF & Alt. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates.
- Complete Full and Half Duplex operation, with no garbled data.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 baud.
- Send Files directly from the Buffer, Macro Keys or Disk.
- Display on Screen or Print the contents of the Buffer.
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- Built in Command Menu (Help) Display.
- Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, \$59.95

## EDT/ASM III

### 128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Supports Local and Global string search and/or replace.
- Full Screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted file formats.
- Block Move & Copy, Insert, Delete, Overtyping.
- Create and Edit files larger than memory.

The Assembler portion of EDT/ASM III features include:

- Supports the full 6809 instruction set & cross assembles 6800 code.
- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file (include) up to 9 levels deep.
- Supports standard Motorola assembler directives.
- Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
- Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk \$59.95

## TEXTPRO IV

### The ADVANCED COCO-3 Word Processing System

- 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- On Screen Display of Bold, Italic, Underline & Double Width print.
- Up to 8 Proportional Character Sets Supported with Justification.
- Up to 80 Programmable Function Keys & Loadable Function key sets.
- Fully Buffered keyboard accepts data even during disk access.
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- 8 Pre-Defined Printer function commands & 10 Programmable ones.
- Supports Library files for unlimited printing & configurations.
- Disk file record access for Mail Merge & Boiler Plate printing.
- Completely Automatic Justification, Centering, Flush left & right.
- Change indents, margins, line length, etc. anytime in the text.
- Create and Edit files larger than memory, up to a full disk.
- Easily imbed any number of printer format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexibility and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is what you're looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text you're working on. There are no time consuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk \$89.95

## HI-RES III Screen Commander

### The DISPLAY you wanted but didn't get on your CoCo-3

- 54 Different Character Sizes available from 14 to 212 cpl.
- Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- Double Width, Double Height and Quad width characters.
- Scroll Protect form 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN 3 mode.
- PRINT @ is available in all character sizes & styles.
- Programmable Automatic Key repeat for fast editing.
- Full Control Code Keyboard supported.
- Selectable Character & Background color.
- Uses only 4K of Extended (2nd 64K) or Basic RAM.
- Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. HI-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk \$34.95

## 512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in your CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk \$19.95

## "The SOURCE III"

### DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

- Automatic label generation and allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk, unlike other disassemblers.
- Automatically locates Begin, End and Execution address.
- Output Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler source files directly to disk or printer.
- Built in Hex/Ascii dump/display to locate FCB, FCC & FDB areas.
- 8 Selectable Display formats 32/40/64/80 columns in 192 or 225 Res.
- Selectable Foreground & Background colors & Printer Baud rates.
- Built in Disk Directory and Kill file commands.
- Menu display with single key commands for smooth, Easy operation.
- Written in Ultra Fast Machine Language.

Requires 128K & Disk \$49.95

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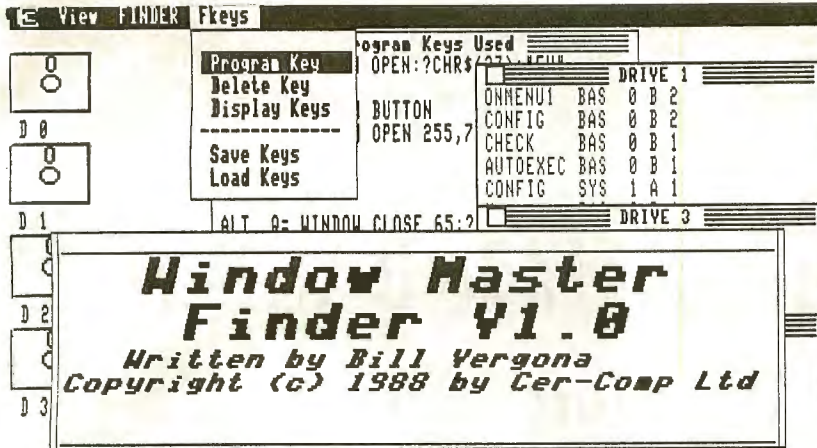
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# "Window Master"



## Screen Display Fonts

Window Master supports up to 54 different character sizes on the screen with 5 different character styles. You can have Bold, Italic, Underlined, Super-Script, Sub-script or Plain character styles or any combination of them in any character size. You can also change the text color and background at any time to get really colorful displays.

## Fully Basic Compatible

Window Master is fully compatible with Enhanced Color Disk basic with over 50 Commands & functions added to fully support the Point & Click Window System. Window Master does not take any memory away from Basic, so you still have all the Basic Program memory available.

## Hi-Resolution Displays

Window Master uses the full potential of the Color Computer 3 display by using the 225 vertical resolution display modes instead of the 192 or 200 resolution modes like most other programs. It uses either the 320/16 color mode or the 640/4 color display to give you the best display resolution possible, and can be switched to either mode at any time.

## Mixed Text & Graphics

Window Master fully supports both Text & Graphics displays and even has a Graphics Pen that can be used with HLINE, HCIRCLE, HSET and more. You can change the Pen width & depth and turn it on or off with simple commands. We also added Enhanced Graphics Attributes that allow graphics statements to use And, Or, Xor and Copy modes to display graphic information. With the Graphics enhancements added by Window Master, you could write a "COCOMAX" type program in Basic! In fact we provide a small graphics demo program written in Basic.

## Event Processing

Window Master adds a powerful new programming feature to Basic that enables you to do "Real Time" Programming in Basic. It's called Event Trapping, and it allows a program to detect and respond to certain "events" as they occur. You can trap Dialog activity, Time passage, Menu Selections, Keyboard activity and Mouse Activity with simple On Gosub statements, and when the specified event occurs, program control is automatically routed to the event handling routine, just like a Basic Gosub. After servicing the event, the sub-routine executes a Return statement and the program resumes execution at the statement where the event occurred.

## Enhanced Editing Features

Window Master adds an enhanced editor to Basic that allows you to see what you edit. It allows you to insert & delete by character or word, move left or right a word or character at a time, move to begin or end of line, toggle automatic insert on/off or just type over to replace characters. The editor can also recall the last line entered or edited with a single key stroke. You can even change the line number in line to copy it to a new location in the program.

## Window Master Features

### Multiple Windows

Window Master supports multiple window displays with up to a maximum of 31 windows on the screen. Overlapping windows are supported, and any window can be made active or brought to the top of the screen. Windows can be picked up and moved anywhere on the screen with the mouse. There are 6 different Window styles to choose from and the window text, border and background color is selectable.

### Pull Down Menus

Menus are completely programmable with up to 16 menus available. They can be added or deleted at any time in a program. Menu items can be enabled, disabled, checked or cleared easily under program control. Menu selection is automatically handled by Window Master & all you have to do is read a function variable to find out which menu was selected.

### Buttons, Icons & Edit Fields

Each Window can have up to 128 buttons, Icons or Edit fields active, if you can fit that many. Buttons, Icons and Edit field selection is handled automatically by Window Master when the mouse is clicked on one. All you have to do is read a Dialog function to find out which Button, Icon, or Edit field was selected, its very simple.

### Mouse & Keyboard Functions

Window Master automatically handles the Mouse pointer movement, display and button clicks. It will tell you the current screen coordinate, the local window coordinate, window number the mouse is in, the number of times the button was pressed, which window number it was clicked in and more. The Keyboard is completely buffered, and supports up to 80 programmable Function keys that can contain any kind of information or command sequences you can imagine. You can load and save function key sets at any time. So, you can have special sets of function keys for different tasks. The "Ctrl" key is supported so that you have a full control code keyboard available.

### Window Master Applications

Window Master pushes the Color Computer 3 far beyond its normal capabilities, into the world of a "User Friendly" operating environment. We are already planning several new programs for use with Window Master. So you don't have to worry about having to write all your own programs. And don't forget that many existing Basic and M.L. programs will run under Window Master with little or no changes. The Possibilities for Application programs are endless: Spread Sheets, Word Processing, Communications, Education, Games, Graphic Design, Desk Top Publishing and on and on.

### Hardware Requirements

Window Master requires 512K of memory, at least 1 Disk Drive, a Hi-Res Joystick Interface and a Mouse or Joystick.

### Technical Assistance

If you run into difficulty trying to use some of Window Master's features, we will be happy to assist you in any way possible. You can write to us at the address below or call us between 10am and 2pm Pacific Standard Time for a more timely response. Sorry, no collect calls will be accepted.

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*The eighth in a series of tutorials for the beginner to intermediate machine language programmer*

# Machine Language Made BASIC:

## Part VIII: And More Math

By William P. Nee

**B**ecause the computer uses the Base 2 system, math problems involving multiplying or dividing by two are very easy. Shifts are a quick way to multiply or divide registers A, B, or D by two. The LSR (logical shift right) command will shift each bit in registers A or B to the right, effectively dividing either by two; however, any remainder is lost. As the following example illustrates, the right bit (Bit 0) of the register goes to the *carry bit* of the CC register, and the left bit (Bit 7) becomes a zero:

```
Register A = 10101010 = 170
LSRA      = 01010101 = 85
Carry Bit = 0
```

Notice that the carry bit of the CC register is now a zero. When signed numbers are used, the ASR (arithmetic shift right) works the same way as LSR except that Bit 7 (the sign bit) stays the same, so the sign of the number will remain unchanged.

An LSL (logical shift left) will multiply register A or B by two. This time, Bit 0 will become a zero and Bit 7 will be stored in the carry bit of the CC register. An ASL (arithmetic shift left) does exactly the same function as an LSL; neither will retain the sign bit.

*Bill Nee bucked the "snowbird" trend by retiring to Wisconsin from a banking career in Florida. He spends the long, cold winters writing programs for his CoCo.*

Instead, it is stored in the carry bit, as shown by the following:

```
Register B = 01010101 = 85
LSLB      = 10101010 = 170
Carry Bit = 0
```

The following two branch commands are useful if you want to check the carry bit:

BCC — branch if the carry bit is clear (=0)  
 BCS — branch if the carry bit is set (=1)

There is no specific command to shift Register D. Therefore, if your number uses both registers A and B, to shift Register D you must use both shift and rotate functions. Rotating (ROR, ROL) either register A or B will shift all of the bits one space. The empty bit will be filled by the value in the carry bit, and the bit that is lost will go to the carry bit. To perform a right shift on Register D, you must complete the following functions:

(For Unsigned Numbers)	(For Signed Numbers)
LSRA	ASRA
RORB	RORB

Let's try an example. If we load Register D with #938, our computer will follow these instructions:

	Register	Carry Bit:	Register
	00000011		10101010
LSRA	00000001	1	10101010
RORB	00000001		11010101

The one in Bit 0 of Register A went to the carry bit after the LSRA operation and then to Bit 7 of Register B after the RORB function. These two operations have divided the number in Register D by two. Repeating will continue to divide the number by two. To multiply Register D by two, perform a logical shift left on Register B (LSLB), and then rotate Register A to the left (ROLA).

These two routines perform the function opposite that of the routines in the division example. Continued operations will continue doubling the number. Of course, in either multiplication or division, if you keep repeating the same routine, you will get an incorrect result. Not only can registers A, B and D be shifted and rotated, but memory locations can be shifted or rotated to the right or left as well.

You may also use the floating point format (FP1) to multiply or divide. Location \$4F is the exponent of the number in FP1, and changing this will change the number. Adding one to \$4F is the same as multiplying that number by two to the first power; adding an eight would multiply the number by two to the eighth power, or 256. Subtracting two from \$4F would divide the number by four. You can do these operations by performing the following operations:

LDA \$4F	exponent of the number in FP1
ADDA #8	multiply by 256
STA \$4F	new number is in FP1

## ☞ So, what is the Calligrapher anyhow? ☜

The Calligrapher is a program that allows you to print signs, labels and other things, using ornate, decorative and fancy type-styles (fonts) on a dot-matrix printer. The Calligrapher comes with 3 fonts but many more are available. The Calligrapher runs on either RSDOS (simple and easy) or OS9 (powerful and complex). The OS9 Font Massager lets you create your own fonts or modify existing fonts. See below for more info.

### CALLIGRAPHER

**CoCo Calligrapher** - Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, labels and more. Includes 3 fonts: *Gay Nineties*, *Old English* and *Cartoon*. The letters are ½ inch high and variably spaced. Works with many printers such as Epson, Gemini and Radio Shack. Additional fonts are available (see below). Tape/Disk; \$24.95.

**OS9 Calligrapher** - Prints all the same fonts as the CoCo Calligrapher. It reads a standard text file which contains text and formatting codes. You may specify the font to use, change fonts at any time, centering, left, right or full justify, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX systems. Includes the same 3 fonts and additional fonts are available (see below). Disk only; OS9 Level I or II; \$24.95.

**Calligrapher Fonts** - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; \$14.95 each. **Set #1** (9 fonts) Reduced and reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** (8 fonts) Old Style and Broadway; **Set #3** (8 fonts) Antique and Business; **Set #4** (8 fonts) Wild West and Checkers; **Set #5** (10 fonts) Stars, Hebrew and Victorian; **Set #6** (8 fonts) Block and Computer; **Set #7** (5 small fonts) Roman, Italics, Cubes, Digital and Old World. ☞ **NEW: Set #10** (8 fonts) several Roman styles; **Set #11** (10 fonts) Gothic and Script; **Set #12** (10 fonts) more Roman and Italic.

**Economy Font Packages** on disk; specify RSDOS or OS9; \$29.95 each or \$59.95 for all three: **Font Package #1** - Above font sets 1, 2 and 3 (25 fonts). **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts). **Font Package #4** (also known as the *Hershey* fonts) - Above font sets 10, 11 and 12 (28 fonts).

**Calligrapher Combo Package** - Includes the Calligrapher and Economy Font Packages #1 and #2, 54 fonts in all \$69.95, or \$84.90 to also include Package #4 (82 fonts).

## Sample Calligrapher Hershey Fonts

*The CoCo Calligrapher!*

### NEW! OS9 Font Massager -

This OS9 utility program allows you to do all sorts of things to Calligrapher font files. You may create new fonts, modify existing fonts, invert fonts, compress fonts, double the height and/or width, halve the height and/or width and convert between OS9 and RSDOS formats. \$19.95 (or only \$14.95 if ordered with any other *Calligrapher* item). A listing of the C source code for the Font Massager is available for an additional \$14.95.

### INFORMATION MGT.

**TIMS (The Information Management System)** - Tape or disk, fast and simple general data base program. Create *files of records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; \$19.95.

**TIMS Mail** - Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; \$19.95.

**TIMS Utility** - Utility companion for TIMS and TIMS Mail for multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; \$14.95.

**TIMS Combo Package** - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - \$34.95.

### EDUCATIONAL

**Trig Attack** - Ages 9 and up. An educational arcade game where players learn important math concepts as they play. Sound effects, colorful graphics. Excellent manual includes an introduction to trigonometry. Tape/Disk; \$19.95.

**The Educational Combo** - The Combo includes these educational (and entertaining) games: **Silly Syntax** (ages 5 and up) story creation game with 2 stories

**Galactic Hangman** (ages 7 and up) animated graphics, with a 700 word vocabulary

**The Presidents of the USA** (ages 10 and up) a presidential trivia game

**The Great USA** (ages 9 and up) a trivia game of the states

**Trig Attack** (ages 9 and up) Zap those *Trigs*

All five programs on one disk; \$49.95 (save \$50!).

### SPECIAL INTEREST

**Rental Property Income and Expense Management Package** - Maintain rental property income and expense records and print reports. 28 expense categories. *This program may be tax deductible.* Disk only; \$29.95.

**CoCo Knitter** - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights of yarn; 8 sizes from baby to man. Tape/Disk; \$19.95.

All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add \$1.50 per tape or disk for shipping and handling. Florida residents add 6% sales tax. COD orders add \$5. Dealer inquiries invited. Orders generally shipped in 24-48 hours. No refunds or exchanges without prior authorization.



## SUGAR SOFTWARE

P.O. Box 7446  
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There is no division command in either BASIC or machine language that does not use FPI. The program at the end of this article will divide a one-byte unsigned number by another unsigned one-byte number. The result will be a two-byte number in Register D. Register A will hold the whole number, and

Register B will hold the decimal. Remember, they both are Hex numbers. A .8 in Hex is 8/16 (or .5 in Base 10). A .C is 12/16 in Hex (or .75 in Base 10).

We will use the second half of this program in a future article to compute the slope of a line. Load Register A (the dividend) and Register B (the divisor)

with different numbers to make sure you understand the results.

*(Questions and comments concerning this tutorial may be directed to the author at Route 2, Box 216 C, Mason, WI 54846-9302. Please include a self-addressed, stamped-envelope when requesting a reply.)* □

### The Listing: SHIFTS

```

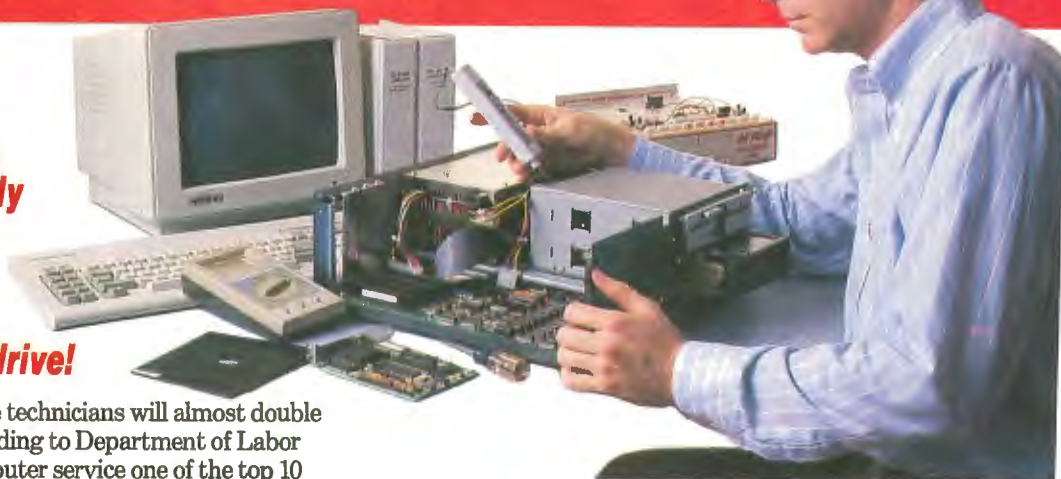
3000          00100      ORG      $3000
3000 7F      3053      00110  START  CLR      WHOLE
3003 86      FF       00120      LDA      #255    DIVIDEND EXAMPLE
3005 C6      7F       00130      LDB      #127    DIVISOR EXAMPLE
3007 F7      3054      00140      STB      DIVSR   SAVE THE DIVISOR
300A B1      3054      00150      CMPA     DIVSR
300D 25      23       00160      BLO     DIVID2  IT'S A FRACTION
300F 27      3D       00170      BEQ     SAME    IT'S = 1
3011 C6      08       00180  DIVID1  LDB      #8      DO IT 8 TIMES
3013 F7      3052      00190      STB      COUNT
3016 1F      89       00200      TFR     A,B     PUT DIVIDEND IN REGISTER B
3018 4F              00210      CLRA
3019 58              00220  LOOP1  ASLB           SHIFT REGISTER B TO THE LEFT
301A 49              00230      ROLA    SHIFT REGISTER A TO THE LEFT
301B B1      3054      00240      CMPA     DIVSR
301E 25      04       00250      BLO     CONT1
3020 B0      3054      00260      SUBA    DIVSR
3023 5C              00270      INCB           INCREASE THE QUOTIENT
3024 7A      3052      00280  CONT1  DEC      COUNT  FILLED THE BYTE YET?
3027 26      F0       00290      BNE     LOOP1
3029 F7      3053      00300      STB      WHOLE  SAVE THE WHOLE NUMBER
302C 4D              00310      TSTA           ANY REMAINDER?
302D 26      03       00320      BNE     DIVID2  IF SO, COUNTINUE DIVIDING
302F 1E      89       00330      EXG     A,B     REGISTER D HAS THE RESULTS
3031 3F              00340      SWI
3032 C6      08       00350  DIVID2  LDB      #8      DO IT 8 MORE TIMES
3034 F7      3052      00360      STB      COUNT
3037 5F              00370      CLRB           LEAVE ROOM FOR THE QUOTIENT
3038 58              00380  LOOP2  ASLB           MOVE QUOTIENT OVER
3039 49              00390      ROLA    SHIFT REGISTER A TO THE LEFT
303A 25      05       00400      BCS     LOOP3  BRANCH IF THERE'S A CARRY
303C B1      3054      00410      CMPA     DIVSR
303F 25      04       00420      BLO     LOOP4
3041 B0      3054      00430  LOOP3  SUBA    DIVSR
3044 5C              00440      INCB           INCREASE THE QUOTIENT
3045 7A      3052      00450  LOOP4  DEC      COUNT  FINISHED DIVIDING YET?
3048 26      EE       00460      BNE     LOOP2
304A B6      3053      00470      LDA      WHOLE  GET THE WHOLE NUMBER
304D 3F              00480      SWI           REGISTER D HAS THE RESULTS
304E CC      0100      00490  SAME   LDD      #$0100
3051 3F              00500      SWI
3052              00510  COUNT  RMB      1
3053              00520  WHOLE  RMB      1
3054              00530  DIVSR  RMB      1
          3000      00540      END      START

```

000000 TOTAL ERRORS

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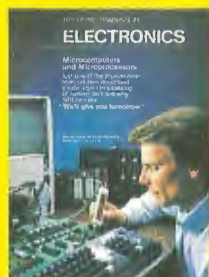
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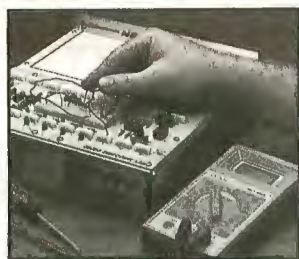
205-029

Accredited by the Accrediting Commission of the National Home Study Council

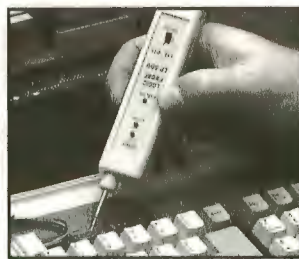
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After you build this digital logic probe, you explore the operation of the Packard Bell detached "intelligent" keyboard and its dedicated microprocessor.

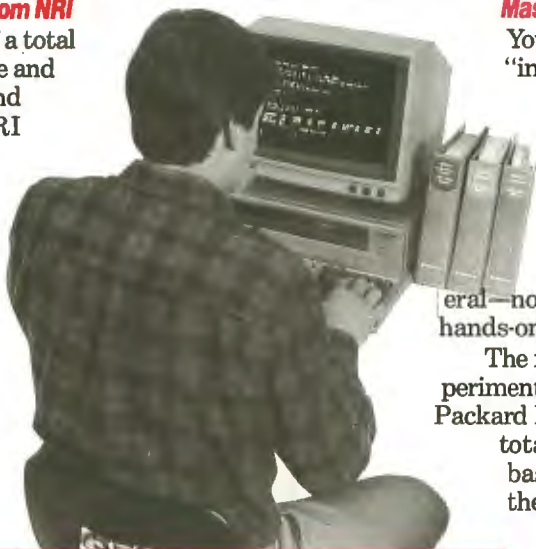


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## Moving Files

I recently purchased a Tandy 1000 SX, and would like to transfer many of my CoCo files to it. How can I do this?

Milton Simpson  
Big Flats, New York

**R** A really versatile transfer program, *Xenocopy-PC*, can be used to copy floppy disk files to your 1000 from Color Computers, TRS-80 Model IIIs and 4s, Kaypros, etc. It is priced at \$79.95 plus \$3 S/H from Microcom Software, 2900 Monroe Ave, Rochester, NY 14618 (716) 383-8830. Microcom also sells *CoCo Util II*, a less expensive program limited to CoCo disks (\$39.95 plus \$3 S/H).

## A ProComm Workalike

Is there a program like ProComm available for the CoCo 3, now that it has 80 columns with color?

Jonathon Graff  
Bronx, New York

**R** *Telstar 3.2* is virtually *ProComm* for the CoCo 3 under OS-9 Level II. Like *ProComm*, it has an auto-dialer, help menus, direct download to disk with both Xmodem and Ymodem, chat mode, etc. It does not have a programming language for unattended operation, or VT-100 emulation, but unlike *ProComm*, you have the CoCo's magic CLEAR key to switch windows while online. One of the best features of this program is that you can download it from Delphi or get it from the author for \$10 plus return postage. Please include a formatted disk. Requests may be directed to Merle Kemmerly III at 2213 Shed Road #250, Bossier City, LA 71111.

## A Radio Shack Cure

Is there any way to get OS-9's Profile (Cat. No. 26-3247) to run under OS-9 Level II?

David Bacus  
Detroit, Michigan

Richard Esposito is the principal engineer for BDM Corporation. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.



By Richard E. Esposito  
Rainbow Contributing Editor  
with Richard W. Libra

**R** The following fix is prescribed by Radio Shack Computer Customer Service in Ft. Worth, Texas (817-390-3861): First boot OS-9 Level II, then format a blank disk in /d1. Type LOAD BACKUP and then use that command to back up your original copy of OS-9 Profile. Bring up BASIC09 and at the B: prompt, type the following: e fixprofile and press ENTER. Then using the built-in editor, enter the following program:

```
DIM path,newval:INTEGER
DIM profilecrc(3),mgtrc(3):
  BYTE
newval:=$2041
DATA $8A,$E5,$C0,$6B,$75,$A9
FOR count:=1 TO 3
  READ profilecrc(count)
  READ mgtrc(count)
NEXT count
OPEN #path,"/d0/cmds/profile":
  UPDATE
SEEK #path,$11EA
PUT #path,newval
SEEK #path,$64E4
PUT #path,profilecrc
CLOSE #path
OPEN #path,"/d0/cmds/mgt":
  UPDATE
SEEK #path,$0506
PUT #path,newval
SEEK #path,$1D55
PUT #path,mgtrc
CLOSE #path
```

With the previously backed-up copy of OS-9 Profile in Drive 0, run the program to make the required patches.

## Automation Routine

Is there any way to automatically have my programs PCLEAR0 with Disk BASIC?

Mary Willingham  
Omaha, Nebraska

**R** Place the following routine at the beginning of your program. It will cause the program to relocate itself to Location &H0E01.

```
10 GOTO 5000
20 DATA BD.B3.ED.1F.02.7E.96.A7
30 RESTORE:FOR X=0 TO 7:READE$:NEXT
40 *****
50 ' PLACE YOUR PROGRAM HERE
60 *****
5000 CLEAR200:FOR I=0 TO 7*:READ E$
5010 POKE&HE01=I,VAL("&H"+E$):NEXT
5020 DEFUSR0=&H01:X=USR0(&HE09)
5030 GOTO 30
```

This is equivalent to POKE 25,14:POKE &HE00,0:NEW, which increases the RAM directly available to BASIC from Locations 22824 to 28968. The CoCo 2 graphic modes are not available after these pokes; however, on a CoCo 3, the new graphic modes are still available.

## Parent/Child Conflict

I am having a problem using the system call os9fork. I experience the problem only when I do not follow it with a wait statement. What is the problem?

Herve R. Bernier  
Aulnaies, Quebec

**R** With both parent and child processes running in parallel, be sure that they don't both try to access the same I/O paths.

## Gaining Access

How can I access the second side of a double-sided disk drive under OS-9 Level II? I have a CoCo 3 with an FD 501 drive. Drive 1 is my double-sided drive. ADOS 3 under Disk BASIC accesses the drive, but under OS-9 there doesn't seem to be any instructions for

adding the proper device descriptor to boot the drive. I have seen references to such a descriptor from time to time in manuals and in RAINBOW, but I'm stumped. I would like to change the drive step rates as well, but again I cannot find the necessary information.

William Charles Sarn  
Barrington, Rhode Island

**R**X There are more elegant ways to do this, but here's one way to access Side 2 of your double-sided drive: Boot up by typing DOS while your 35-track system disk is in Drive 0 and a freshly formatted disk is in Drive 1. After entering the date, type the following:

```
MODPATCH -S
L D1
C 18 23 50
C 19 1 2
V
```

Press CTRL, then BREAK, and then type the following:

```
CHD /D0
COBBLER /D1
DSAVE /D0 /D1 !SHELL
```

You now have a 35-track bootable system disk in Drive 1 that will access Drive 1 as a 40-track double-sided disk drive. With the new system disk, you can read 35- or 40-track single- or double-sided disks with your 40-track double-sided drive. By adding an additional line to this Modpatch procedure, you could also change the step rate of your drive from 30ms to 20ms, 12ms or 6ms. Just change the value at Offset 14 from 0 to 1, 2 or 3 respectively.

#### Keyboard Alterations

**R**X Can my CoCo 2's HJL keyboard be installed directly into a CoCo 3? I have used my HJL for years and love the feel of a "regulation" keyboard. I plan to buy a CoCo 3 soon and would like to know if the keyboards are interchangeable.

Larry Donovan  
Stonington, Connecticut

**R**X I am currently using my old HJL keyboard with my CoCo 3 for much the same reason. You can break the plastic latch from under the F2 key so it doesn't lock. I swapped the keycaps so F1 and F2 are on the right. This is where HJL electrically puts the CoCo 3's F1 and F2. The two function keys on

the left are the CoCo 3's ALT and CTRL keys, which I repainted.

#### A Modified Boot

**R**X Is there a way to get OS-9 Level II to boot up in 80 columns in RGB mode?

Ralph Ramhoff  
Columbia, Maryland

**R**X Patches are needed for Term (80 columns, blue on white) and CC310 (RGB on boot). The Modpatch scripts are as follows:

```
L Term
C 2C 2B 50
C 30 01 02
C 33 02 01
C 34 03 08
C 35 03 08
V
L CC310
C 90 86 CC
C 92 A7 78
C 93 88 ED
C 94 3D 88
C 95 86 3D
C 96 78 12
C 97 A7 B7
C 98 88 10
C 99 3E 09
V
```

Use Cobbler to save the modified OS9boot to disk. As an alternative, load PMPTS from your Multi-Vue disk. This file contains the SAVE command. After running a Modpatch script, SAVE lets you save the modified code to disk.

#### Gain Control

**R**X I have a CoCo 3, and none of the control keys seem to work. Is there anything I can do?

Marty Mitchell  
Covina, California

**R**X The keys ALT, CTRL, F1 and F2 occupy addresses 341, 342, 343 and 344 of the keyboard roll-over table. When any one of these keys is depressed, the value at its corresponding address in the keyboard roll-over table changes from 255 to 191. You can use this fact in writing your own programs by using the PEEK function to detect when one of these keys is pressed.

#### Are They Compatible?

**R**X I have recently purchased a new Color Computer 3. I hooked up my RS-232 pack to it, expecting them to be compatible. However, when I typed in EXEC&HC000, the computer refused

to operate the interface. When testing the connection and the dip switches, I noticed that the pack worked only during the computer's first cold start.

I thought that all of Radio Shack hardware is compatible with the CoCo 3. Is there any way I can fix the Radio Shack Deluxe RS-232 Pak so that it won't lock up on me after the first cold start?

Daryl Fortney  
Lancaster, Philadelphia

**R**X That program pack will run with the command statement EXEC&HE010 instead of &HC000. The best way to utilize your RS-232 Pak with the CoCo 3 is with a Multi-Pak Interface (upgraded for CoCo 3 use) and a real terminal program with 80 column support and Xmodem upload/download protocol. There are many of these available, and they will bring much more satisfaction.

#### Harmless Bug

**R**X I keep getting a Retry prompt while formatting or verifying all disks on OS-9 Level II. This prompt occurs only on doubled-sided 80-track operations on tracks 70 and 71 (HEX). I've tried three different disk controllers and removed the Multi-Pak. The Retry prompt occurs on both /d0 and /d1, and it does not occur under single-sided operation on Levels I or II or with 80 TRK patches under Disk BASIC. The prompt doesn't seem to hurt anything, only occurs once, and the process always continues past the error. Is this a bug in OS-9 Level II software?

**R**X It's not really a Retry. A Retry is when an I/O error occurs and the disk is reread or rewritten. In this case, OS-9 is temporarily going back to Track 0 to allocate another sector for the sector allocation table. Technically you could call this a bug, because the Format command does not anticipate the need for the extra space with 80-track double-sided disks. But it's a harmless one.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.



# RAINBOW

## FEST

PRINCETON Oct. 21-23

## R.E.P.O.R.T.E.R

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### RAINBOWfest 16 Marks Year of the Hard Drive

Where were you the weekend of Friday, October 21? If you were in Princeton, New Jersey, you were in the right place for the 16th edition of RAINBOWfest, a biannual bash of CoCo community — and the biggest collection of CoConuts under one roof.

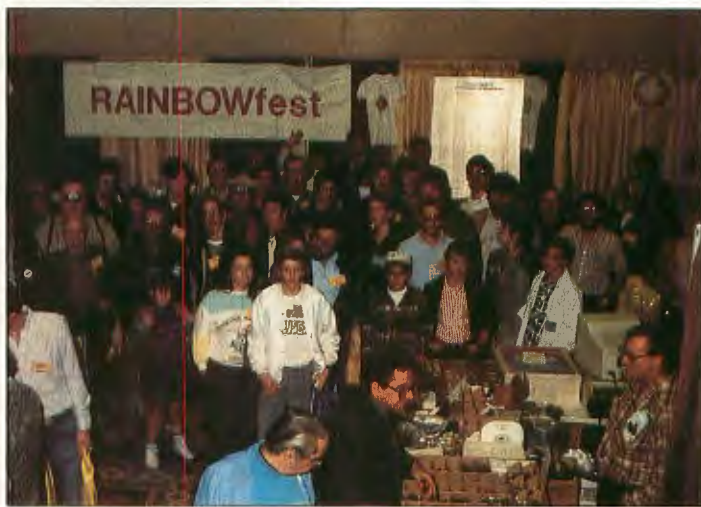
From 7 p.m. Friday until 3 p.m. Sunday, the show hall buzzed with constant activity as CoCoists and Color Computer software programmers, hardware designers, RAINBOW personalities and vendors came together in celebration of our favorite computer.

People who came looking for bargains weren't disappointed, and neither were those who came in search of enlightenment. Fourteen Color Computer notables — including Dr. Martin H. Goodman, M.D., Dale Puckett, Steve Bjork and Rick Adams — gave seminars on topics ranging from program-

ming and marketing commercial software to windowing under the *Multi-View* environment. Anyone with a CoCo question was sure to find an answer from the think tank assembled there.

People who came looking for sustenance in addition to 6809-oriented fellowship found it at the traditional CoCo Community Breakfast. Keynote speaker Richard White talked on the evolution of the CoCo, calling on his acquaintance of the machine from its 4K fledgling stage to the full-blown power user's tool it is today.

People who came looking for excitement experienced sensory overload — there were at least 27 CoCos up and running the latest in CoCo software. From desktop publishers to hot new ML games to MIDI to the newest rage, hard drives, it was all on display at RAINBOWfest Princeton.



Thousands turned out for RAINBOWfest Princeton.

### Digging In at the CoCo Community Breakfast

If you were asked to write down a list of all the biggest names in the world of the Color Computer today, you would probably have found most of those people seated at a breakfast table in Princeton, New Jersey, October 22, 8:15 a.m., partaking of bacon, eggs, donuts and coffee.

Dignitaries at that head table included Barry Thompson, Srinivasan and Mark Siegel of Tandy, Marty Goodman, Dale Puckett,

Richard White, Rick Adams and Lawrence C. Falk, a.k.a. "Lonnie." As coffee was making its second round through the room, Dick White stood up to speak on the CoCo's coming of age.

White was up-front with the objectives of his speech: "I want to talk long enough so that Lonnie won't feel the need to lead a sing-along." (White was successful in this.) Putting the jokes aside, White — his glasses perched at that impossible angle on his forehead,

as usual — dove into the subject at hand: where the Color Computer has been and where it is going.

He reminisced about the good old days back in 1981 when upgrading to 16K from 4K cost \$124, when there was no problem with piracy "because there was nothing to pirate." Concluding with praise for the possibilities OS-9 Level II has opened, Dick White proclaimed 1988 the year of the hard drive.



# Premiere Performances

What was new at the show? Quite a lot, thank you. Nearly every booth featured a new utility or game.

Manohar Santwani of Microcom Software sold out of his new *Color Schematic Designer*. A newcomer to the 'fest, Game Point Software drew in crowds with two new games, *Rupert Rhythm* and *Space Intruders*.

Rulaford Research's Ceell Houk, his CoCo and six of his scintillating synths were on hand to entertain 'fest goers. He sold his new program for the FB-01 sound generator, *FB01Calc*, in addition to *Lyra* and *Lyra Lybrary*.

Art Flexser of SpectroSystems demoed *ExtendedADOS3*, which gives users point-and-click program selection, two RAM disks and access to six physical drives.

New items at the Frank Hogg Laboratories booth included the Eliminator all-in-one card (hard and floppy drive interfaces, a clock, two serial ports and one parallel) and a prototype of a

68000, OS-9-capable system.

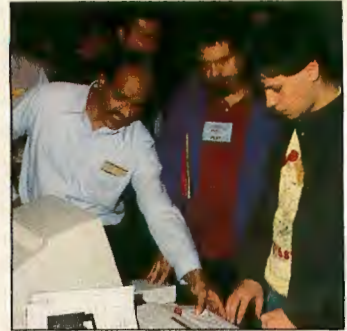
Tom Roginski and Owl-Ware introduced three new products: a version of BASIC for hard drives, a word processor (*Window Writer*) and a programmable interface that connects an IBM keyboard to a CoCo. Also for sale was *DaVinci3*, Owl-Ware's entry into the CoCo 3 graphics market.

Jon Gilbert of Delphi and programmer Rick Adams demonstrated two new programs that will soon be available in the CoCo SIG on Delphi: *Flip-It* (an online "Othello") and *DelphiTerm*, an enhanced version of *RickeyTerm* featuring graphics, one-key logon and a larger buffer.

Chris Rochon and Tony DiStefano were on hand to premiere C.R.C./Disto's new three-in-one board, which holds parallel and serial ports and a battery-backed, real-time clock. Also at the C.R.C. booth were the four-in-one (adds a hard disk adapter) and the inexpensive "mini controller."



At left, David Esleck of Kenneth-Leigh Enterprises: This man means business! Microcom's Manohar Santwani, at right, demos *Color Schematic Designer* to Martin Spiller and his son, Jeremy, who is a frequent RAINBOW contributor.



Ross Litton of Howard Medical introduced PC-ROM, a chip he says "replaces CoCo 3's BASIC ROM, allowing boot-ups with pictures of yourself, which we digitize."

Chris and Trisha Burke of Burke & Burke have come up with a multi-user word game for OS-9 called *PertASCII*. The big seller at the booth, however, was *R.S.B.*, which simulates Disk BASIC in OS-9.

The new "CoCo Crazy" CoCo Cat T-shirt, sold at the Mercer County CoCo Club booth, proved to be popular. Thanks again, Mercer County!

The Public Domain Software Copying Company offered a new six-disk set of public domain programs from Australia.

At the RAINBOW booth there was brisk trade in *The Fourth Rainbow Book of Adventures*.



A quick hug before the show.

## Gossip, Gossip, Gossip

You heard right! There was free food and refreshments for Delphi members at Delphi Saturday Night, a little bash Delphi put together so that online friends could meet each other offline ("in real time <grin>").

Steve Bjork took time off from his honeymoon to come to RAINBOWfest and lead a much-appreciated seminar. Thanks, Mr. and Mrs. B., and congratulations!

Unfortunately, not everybody made it to the 'fest; three Falsoft personnel were struck down by vicious viruses—including RAINBOW's managing editor, Jutta Kapfhammer — and a fourth broke a finger.

Jim Wald and Robert Warner of Micro Master said they had luck selling "generic" stuff, like external modems. The most distinguishing feature of their booth, however, was an MS-DOS machine displaying VGA graphics. "We're the heretics," Jim said, laughing.

Speaking of radical, was that a (gasp!) MS-DOS computer at the Owl-Ware booth displaying digitized *Star Trek* pictures? Say it ain't so.

If you happened to mosey past the Public Domain booth, pal, you could have met Don Johnson, live and in person. *Really*.

Howard C. Rouse wins the "Most Prolific Artist" award for entering 18 pictures in CoCo Gallery Live. He also wins second and third places for entries "Seaside City" and "Red Sails." First prize went to Lori Dles for "Evil Unleashed." First prize in the CoCo 1 and 2 category went to Randy Adams for "Pyramids." Honorable mentions were awarded to Logan Ward for "The King" and to Tracy Lammardo for her

entry, "Bit Bucket."

If you're ever at a 'fest and see Marty Goodman's wooden CoCo at the Delphi booth, don't ask Paul Hodosh, because he doesn't know a thing about it.

Manohar Santwani said of the current version of Microcom's word processor, "*WordPower 3.2* is selling like hotcakes." With more sequels than the *Rocky* flicks, *WordPower* is yet again in the process of revision. But, hey, we're not complaining!

Frank Hogg deserves the "Euphemism With Tongue in Cheek" award for his sign describing the wonderful, spectacular, "optical-to-digital transfer method for setting the computer's time" — LCD stick-on clocks!

Joe Huber, assistant to Bill Vergona of Cer-Comp, lost his voice — presumably from answering questions about the company's new programming environment, *Window Master*. If you attended the 'fest and were left with questions about this program unanswered due to "technical difficulties," turn to the reviews section of this issue.

## OS-9 Out in Force

At the OS-9 User's Group booth, Bill Brady and Mark Griffith were on hand to sell memberships and Brady's shareware program *The Wiz Professional* — a much-praised telecommunications program. Brady tends to be wittily modest about his work: "Somebody called me a third-rate programmer — I'm a fifth-rate programmer."

Granite Computer Systems sold *GCS File Transfer*, a program that converts files among Disk BASIC, FLEX, OS-9 and MS-DOS formats.

Paul Ward and David Esleck of Kenneth-Leigh Enterprises cracked up the show with their "No more excuses! Start OS-9" T-shirts. They also were selling copies of their user-

friendly new book, *Start OS-9: An Enjoyable Hands-On Guide to OS-9 on the Color Computer 3*. Ward claims that the book sports the world's longest subtitle.



In his BASIC09 seminar, Dale Puckett "performs an event."



Offline conferencing with Jon Gilbert, Rick Adams, Marty Goodman and Paul Hodosh.

# CoCo 101 Through 599

Class was in session at RAINBOWfest as 14 CoCo specialists convened to hold seminars on topics of interest to beginning, intermediate and advanced CoCoists. Many of the discussions were standing-room-only.

Rick Adams, author of *Rickeyterm* and *Shanghai*, talked to beginning assembly language programmers about the CoCo 3's hardware, focusing on the GIME chip. Steve Bjork, programmer of *Pitfall III* and *Warp Fighter 3-D*, gave advice to a full house on writing game software. For would-be assembly programmers he offered this advice: "Learn on the Z80, 6809 or 6502." Nancy Ewart conducted a session for those interested in learning to program in C.

It was a packed house at the impromptu "Talking to Tandy" seminar, which was led by Mark Segel, senior engineer, Barry Thompson, buyer for the Color Computer, and Srinl Vasan, buyer for software.

Dale Puckett gave two seminars — "Overview of OS-9" and "Overview of BASIC09" — using parts of his *KISSDraw* code as examples. Marty Goodman and his famous T-shirt provided CoConuts with another double-header — two presentations of his "CoCo Consultations Live" seminar, complete with surprise guests (Steve Bjork and Rick Adams). Besides answering technical questions, Marty posed one of his own: "Does anyone know the plural of 'Olympus'?" RAINBOW's Cray Augsburg led two sessions of "OS-9 for Absolute Beginners," focusing on OS-9's directory structure.

Paul Hodosh, Delphi's marketing manager, talked on the development of Delphi and of online services in general. Ceell Houk of Rulaford Research took a break from entertaining to give a seminar on music, MIDI and the CoCo.

Ed Samuels, a professor at New York Law School, talked on ramifica-

tions of the new copyright law on commercial and public domain programs. Under the new law, you don't have to put copyright notices on a program, because anything distributed has an assumed copyright. "In essence, this blanks out the public domain," he said.

Chris Burke of Burke & Burke led a popular, informative, two-hour-long seminar on hard drives. In addition to describing how to add a hard drive to a CoCo setup, Burke discussed optical storage devices and high-density floppy drives. Logan Ward, who writes and illustrates RAINBOW's CoCo Cat and Maxwell Mouse comic strips, demonstrated creative uses for *CoCo Max* — making calendars, cards, certificates, comic strips and brochures. Also, he served as "curator" of CoCo Gallery Live. Thanks, Logan!

Bruce Bell, a two-time winner of the RAINBOW Adventure Contest, conducted a seminar on writing both graphics and text-only Adventure games for CoCos 1, 2 and 3.

Ben Burnette and Wayne Smith of CY-BURNET-ICS, both elementary school principals, discussed computers as pertaining to educators, touching on networking, word processing and office management.



Ceell Houk of Rulaford Research: Master of the Synths.



At left, Robert Warner and Jim Wald, the "heretics" of Micro Master. At right, brother and sister have a little family argument over who gets to carry the new CoCo 3 home.



To be a good space pilot, you need a lot of advance training. This youngster logs in some light years with *Silpheed*, a space fighter simulation from Tandy.

## Fun and Games

At Gimmesoft, Tom DiMarco and son had a demo of *MaxSound* running creepy dialogue from the movie *The War of the Worlds*. Gimmesoft played host to Glen Dahlgren of Sundog Systems, providing a setup for Sundog's hot new game, *Warrior King*.

Diecom was on hand with its new phaser game, *Medieval Madness*. At

Game Point, *Mine Rescue*, *Warp Fighter 3-D* and *Bash* were selling well. *MichTron* had a few of the older (pre CoCo 3) games for sale, including *Speed Racer* and *Outhouse*.

Steve Blyn and Computer Island filled a niche with their educational programs and the booth's best seller, *CoCo 3 Wheel of Fortune*.

## Desktop Publishing

Second City Software attended the 'fest with exclusive rights to *The Newspaper Plus*, which was sold for \$39.95.

John Monin and Colorware were doing a brisk business with *Max-10*, a WYSIWYG word processor that, when combined with *CoCo Max III*, gives CoCoists desktop publishing powers. Colorware sold a package of 30 new *Max-10* fonts (in sizes from 6 to 24 points) for \$29.95 — "That's 75 cents a font," added Monin.

Zebra Software's booth had a packed house with *Graphics Designer Plus*, a printer-oriented WYSIWYG program that prints banners and signs. It includes an onscreen preview.



Srinl Vasan, left, software buyer for Tandy, talks to Ed Hathaway of Second City Software.



George Beggs of Tallyn Communications congratulates the lucky winner of a 2400-baud modem raffle.



At left, six years of Color Computer history on sale at the RAINBOW booth. At right, discriminating art connoisseurs check out the CoCo Gallery Live exhibition.

## The Hard Drive Phenomenon

For the first few hours of the 'fest, there were hard drives everywhere you looked. Then you blinked, and they were gone. Investigation into this matter revealed an inverse relationship in the price of hard drives to the number of hard drives purchased (1/\$=HD). Falling prices have truly made 1988 — and 1989 — the years of the hard drive.

Howard Medical offered a 20-Meg Seagate hard drive package for \$495 — this included a Western Digital controller and a Burke & Burke interface. "All you have to do is plug it in and it's ready to drive," said Ross Litton.

Frank Hogg did well selling the "Cadillac of hard drives," as he called it. "We sold out in two hours." Kevin Francloft of Hard Drive Specialist sold out of 30-Meg hard drive kits Friday night.

Arizona Small Computers' James Blandon reported selling 14 hard drive kits. Blandon offers hard drives starting at \$120 for 5-Meg kits — you supply the case and the interface. He offers a "club special" of \$350 for complete 20-Meg systems.

Hard drive interfaces were popular, as well. Trisha Burke of Burke & Burke said that she and husband Chris had sold out of almost all their interfaces. C.R.C./Disto was also a popular source for interfaces.



Frank Hogg holds a little hard drive seminar of his own.



Lonnie Falk and Gordon Monnler of MichTron.

## Saying Hello to Good Buys

If RAINBOWfest could be considered a thermometer of the CoCo climate, we would see that the Community has developed a fever for three things: hard drives, 2400-baud modems and desktop publishing software. Vendors carrying these types of items soon found themselves swamped.

There was a little friendly competition for the microphone — announcing a drawing at one's booth became the thing to do. Items given away included modems and T-shirts. But 'fest goes didn't have to wait for a raffle to take advantage of some good deals.

Microworld and Microworld II soon sold out of *Shanghai* at its \$5.99



Barry Thompson, buyer for Tandy, caught in clinch with CoCo Cat (it's true love).

price; CoCo 3s went for \$115. Also selling CoCo 3s for \$115 was Fran Purcell of Computer Plus, who sold 80. At that booth, Tandy educational software went for \$5. Frank Hogg sold *Sculptor* at a 'fest price of \$120.

Don Johnson and Robert Vervoordt of Public Domain Software Copying Company were selling 600 public domain programs on 42 disks for the CoCo 2 and 3. If you bought the whole library, they threw in a plastic bucket (red, yellow or orange): "You can store about 100 disks in it," Vervoordt said. In a brilliant stroke of marketing, they advertised the buckets as \$19.95 each — or free with a \$10 purchase. Funny fellows.

2400-baud modems were hot commodities at the show, and they could be purchased for as low as \$169 (Microm price). By Saturday night, Frank Hogg had sold out of his \$150, speed-upgradable 1200-baud modems, on which he offers a five-year warranty. For a limited time, the people at the Delphi booth were selling *DELPHI: The Official Guide* and one hour of connect time for \$14.95.

Richard and Sharlie Gros of Performance Peripherals were selling the

dual-mode No-Halt DMC controller — "which reads a diskette in one revolution as opposed to three" — for \$99.

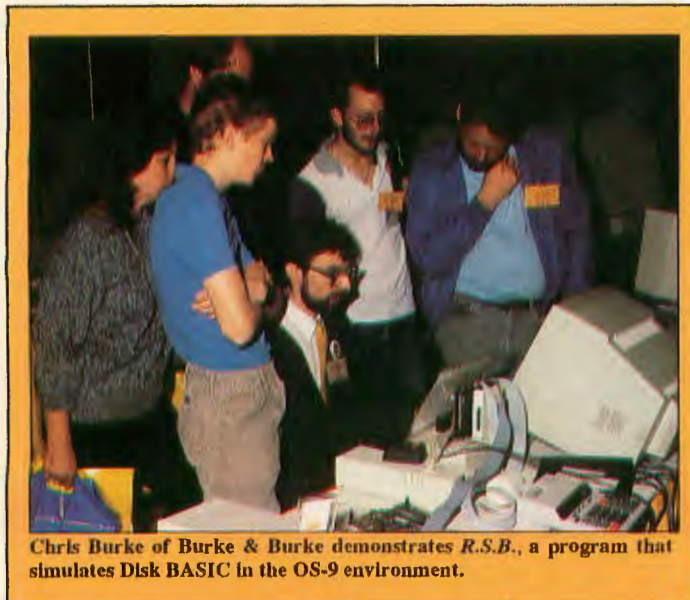
Ross Litton of Howard Medical did a brisk trade in monitors and disk drives. A double-sided Drive 0 package with controller went for \$178.45. Litton said his best seller was a Magnavox 8CM515 monitor.

Zebra Software drew ceaseless crowds with Wico trackballs, 300-baud modems for \$29.95 and copies of *The Graphics Designer Plus* at a RAINBOWfest special price of \$24.95.

For those with T-shirts, printers — or crayons — and imaginations, FotoWear offered "Print 'n Wear" iron-on T-shirt transfers.

Bill Vergona of Cer-Comp had a 512K CoCo 3 set up with *Window Master*, an environment that lets CoCo programmers take advantage of windows without OS-9. Also featured at the Cer-Comp booth was *TextPro IV*, a WYSIWYG word processor.

Lonnie, himself, has been known, on occasion, to commandeer the microphone and announce immediate "five-minute specials" on certain RAINBOW Bookshelf items. But don't tell anybody!



Chris Burke of Burke & Burke demonstrates *R.S.B.*, a program that simulates Disk BASIC in the OS-9 environment.

## What's Next?

Vendors talked excitedly about new projects in the works, dropping tantalizing hints, but most would retreat to hasty "no comments" when pressed for more information. "If I didn't have any competitors..." was the stock response.

Most were like Gimmesoft's Tom DiMarco, Sr., who said he had two — maybe four — projects in development, but would not reveal any more than that. (DiMarco did, however, say that they would be ready by the Chicago 'fest in April.)

Considering all the hints, "no comments" and off-the-record appetizers, the next 'fest looks to be a feast.

See you in Chicago!



A tachistoscope is an apparatus that exposes visual stimuli (words, symbols, pictures, etc.) for a brief period of time. This device regulates the exposure time by an interruption of light, dropping a screen, closing a camera shutter, and so on. The tachistoscope was first used by experimental psychologists for experiments involving visual perception. A number of more famous experiments involved the effect of visual suggestions transmitted by the tachistoscope on the persons being tested.

Later, the tachistoscope was used in the study of learning, attention and perception. We have found this device especially helpful for teaching students spelling words. This month's program, *Tachistoscope*, creates a computer version of this device.

Our program gives students an opportunity to study their weekly spelling lists independently and in a new way. Users will first be asked to enter their spelling words and conclude the list by entering END. This final statement signals the computer that the word list is complete. Students may enter any number of words up to 50 for this exercise. Sometimes review tests and midterm exams contain more than 50 words. If you need to increase this total, change the DIM statement in Line 30.

Once students have entered their word lists, the program asks them to select the appropriate speed. The number requested represents the ap-

*Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.*

## Increase students' memorization abilities

# The Blink of an Eye

By Steve Blyn  
Rainbow Contributing Editor

proximate time in seconds that each word should be displayed. One second is a good place to begin, but some fraction of a second is more realistic for middle-school students. Fractions of a second should be entered as decimals. For example, one-half second would be identified as .5. (One-half second is a good speed for middle-school students who are completing last-minute reviews the day before an examination.)

At first younger or slower children should practice at much slower speeds (two, three or even four seconds) to guarantee positive results and to avoid frustration. We would not want to have any student give up without giving the program a chance. Students' speeds can be built up gradually before any testing takes place.

For students who want or need additional challenge, we have included the option of displaying only the first part

of each word. Line 110 of the program asks whether students want to see all or part of the words. If A is pressed, the program will begin, and an entire word will be selected at random and displayed for the chosen amount of time. If P is selected, the program then asks for the number of letters to be displayed for each word. Once the user has identified this total, the program continues in the same manner as described earlier.

The Part option is useful for students who memorize words easily and need only brief exposure to them. This option encourages students to master the complete spelling of all the words and can be used as a game to see how few letters need to be shown to guess the word and spell it correctly. Line 160 lets the student choose between two and five letters for this option. We felt this would be practical in most situations, but it should be altered if your students will be spelling longer words.

After the word has been displayed, the student is asked to spell it. The program then identifies whether or not the answer is correct. If the spelling is incorrect, the program displays the correct spelling next to the student's response for comparison. To proceed to the next word, the student must press ENTER. To end the session, the student may press E.

This program is not limited to spelling. You may use or alter the program for history exams, multiplication tables — anything that requires memorization. We at Computer Island would be delighted to hear from anyone who comes up with applications for this program other than spelling. Enjoy the program, and we'll see you next month. □

### The Listing: TACHISTO

```
10 REM" TACHISTOSCOPE"
20 REM" STEVE BLYN, COMPUTER ISLAN
D, STATEN ISLAND, NY, 1989"
30 DIM A$(50)
40 CLS: N=1: C$=STRING$(28, " ")
50 PRINT@0, " ": PRINT@0, "ENTER WOR
D #"; N; : INPUT A$(N)
60 SOUND 200, 2: IF A$(N)="END" TH
EN PRINT@0, " ": PLAY"L2A": GOTO 90
70 N=N+1
80 GOTO 50
90 PRINT@0, " ": PRINT@0, "ENTER SP
EED IN SECONDS"; : INPUT S
100 SOUND150, 2: IF S<0 OR S>10 TH
EN 90
110 PRINT@0, "DO YOU WANT TO SEE
ALL OR PART OF THE WORDS ";
```

```
120 LINEINPUT Q$
130 IF Q$="A" THEN 170 ELSE IF Q
$="P" THEN 140 ELSE 110
140 PRINT@0, "HOW MANY LETTERS OF
EACH WORD WOULD YOU LIKE TO S
HOW ";
150 INPUT Q
160 IF Q<2 OR Q>5 THEN SOUND 10,
4: GOTO 140
170 PRINT@0, "***** TACHISTOS
COPE *****"
180 FOR T=1152 TO 1183: POKE T, 12
8: NEXT T: FOR T=1312 TO 1343: POKE
T, 128: NEXT T
190 POKE1184, 128: POKE1185, 128: PO
KE1216, 128: POKE1217, 128: POKE1248
, 128: POKE1249, 128: POKE1280, 128: P
OKE1281, 128
200 POKE1215, 128: POKE1214, 128: PO
KE1247, 128: POKE1246, 128: POKE1279
```

```
, 128: POKE1278, 128: POKE1311, 128: P
OKE1310, 128
210 R=RND(N-1): TIMER=0: PRINT@194
, C$; : PRINT@226, C$;
220 IF Q$="A" THEN Q=LEN(A$(R))
230 PRINT@204, LEFT$(A$(R), Q);
240 IF TIMER>60*S THEN 250 ELSE
230
250 SOUND240, 1: PRINT@194, C$; : PRI
NT@202, "? ";
260 LINEINPUT B$
270 POKE 1247, 128: POKE 1246, 128
280 IF B$=A$(R) THEN PRINT@236, "
CORRECT"; : PLAY"L200CDECEDEGGG"
290 IF B$<>A$(R) THEN PLAY"D-": P
RINT@232, "SORRY, "A$(R);
300 EN$=INKEY$
310 IF EN$=CHR$(13) THEN 210 ELS
E IF EN$="E" THEN 320 ELSE 300
320 CLS: END
```



*If you never seem to have enough time, use this program to organize your schedule*

Life is complicated. We are bombarded by a multitude of commitments, and every day we are asked to fit just "one more thing" into our busy schedules. Requests come from friends, relatives and coworkers. While at work we are expected to remember meetings, deadlines and appointments, at home we must keep track of everything from bills to birthdays. In our spare moments, we promise to get together with friends and "do lunch." How can we keep track of all these plans? More important, how can we ease the stress that such schedules can produce?

Organizing our plans can relieve part of the burden. If we have a list of the day's events, we are less likely to forget plans and commitments. We are also less likely to overburden ourselves if we can refer to an itinerary before making additional plans. The ability to see a layout of the day can help us set more realistic goals for ourselves.

*Daily Planner* helps us organize our scheduled lesson plans for our classes in a less stressful — more productive — manner. You can use the program to better plan your own schedule as well. The program will accept a list of 10 items for each day of the week. You can organize this list in a number of ways. If you have many appointments and commitments, you may want to list the day's events chronologically — including the time and place for each meeting or commitment. If, however, your time is flexible but the number of responsibilities is great, you can list the day's duties by order of importance.

Several variables are used in the program. The following table will help you better understand the options

# I'm Late! I'm Late!

By Mary and James Lamonica

available and help you modify the program as necessary.

following lines are substituted for those in the listing:

Variable	Description
D\$	A two-dimensional array for the day of the week and the items for that day.
H\$	A one-dimensional array for the printed headlines.
I\$	Used for all INKEY\$ statements.
KL\$	Used for the filename in the KILL FILE function.
F\$	Used for the filename in the SAVE and LOAD functions.
R\$	Used for the days of the week stored in the DATA line.
DW\$	Same as R\$.
L\$	The LEFT\$ of D\$.
M\$	The MID\$ of D\$.
DM\$	The MID\$ of D\$, used to find a blank space.
Z	Used to count the length of D\$.
LE	Same as Z.
X, Y, P and H	Used as general counters.

```

34 CLS:PRINT"":PRINTTAB(10) "CSAVE
DATA"
35 OPEN"O",#-1, "PLANDATA"
38 PRINT#-1,D$(X,Y)
41 CLOSE#-1
44 CLS:PRINT"":PRINTTAB(10) "CLOAD
DATA"
45 OPEN"I",#-1, "PLANDATA"
48 INPUT#-1,D$(X,Y)
51 CLOSE#-1
    
```

At the opening screen, *Daily Planner* offers you eight options, each chosen by selecting its corresponding number. The first option takes you to a Data Entry menu. From that menu, choose the appropriate day of the week and enter up to 10 items — appointments, plans or reminders — for that day. The LINE-INPUT command is used, so you can include appropriate punctuation. Each item can be up to 140 characters long. If you exceed the character limit, the program will ask you to re-enter the line. When you finish an item, press Q to return to the Data menu. If you have made a mistake, press the up arrow and ENTER. This will return you to the last item you entered.

Options 2 and 3 let you save and load schedules from disk, respectively. The Save option lets you choose the filename for each schedule. The program attaches the extension /DAT to your

*The Lamonicas live in El Paso, Texas, where Mary teaches algebra and consumer math at Irvin High and James teaches social studies at Henderson Middle School.*

Table 1: Program Variables

As written, *Daily Planner* requires a Color Computer with 32K ECB and a disk drive. However, the program will run on a cassette-based system if the

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### ACCOUNTS PAYABLE

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package.

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filename, so you don't need to include an extension when saving a file to or loading a file from disk. In addition, you don't need to remember filenames when retrieving a data file. The Load function lists the disk directory for you.

The fourth option, the Print function, is the heart of the program. When you indicate that you are ready to print a file, the computer will ask for a four-line heading. Once you have entered that information, the computer will begin printing. Line 56 includes special printer codes for a DMP-110 printer. The code (27) and (17) tells the DMP-110 to print with proportional elite type. You must change this code to fit your printer or delete the code. In addition, Line 68 includes the printer code (12). This code is almost universal for advancing the paper. However, you should check your printer manual and delete the code if necessary.

The Print function includes a word-wrap routine. Variable Z is the maximum line length. Variable LE is the item length. If LE is greater than Z, the program begins a routine that will end the line as close to 70 characters as possible without breaking a word.

The program will print all items saved for each day. If it determines that nothing has been saved in an item string, the program will advance three lines and then move to the next day of the week. When the program completes the items for Friday, the program ends. Use the eighth function to advance the paper to remove your week's schedule.

Finally, two options are offered for clearing data. The sixth function clears a file from your disk. On the other hand, the seventh function clears the screen and then erases the program from memory. Make sure you're ready to quit before you choose Option 7.

If you are like us, no day's schedule is carved in stone. We edit our lists several times before the week begins, and we generally edit them more during the week. We try to keep a copy of our week's schedules with us at home and at work. We refer to the copy when making or changing any plans, and we add these changes to the week's file in the evening. We like to start the day with a clean copy of our schedules. After all, an organized list is a good step toward an organized week.

Our lives are complicated, but that does not mean that they should be disorganized and stressful. We hope that *Daily Planner* can help you plan your busy schedule in a positive way.

*(Questions and comments may be directed to the authors at 10456 Orpheus Drive, El Paso, TX 79924. Please include an SASE when requesting a reply.)* □

✓	17 ..... 33
	34 ..... 15
	58 ..... 136
	END ..... 231

#### The Listing: DAYPLAN

```

1 DIMD$(5,10):CLEAR7000
2 DIMH$(5)
3 CLS:PRINT"":PRINTTAB(10)"(1) ENTER DATA"
4 PRINTTAB(10)"(2) SAVE DATA":PRINTTAB(10)"(3) LOAD DATA":PRINTTAB(10)"(4) PRINT DATA":PRINTTAB(10)"(5) KILL FILE":PRINTTAB(10)"(6) CLEAR MEMORY":PRINTTAB(10)"(7) QUIT":PRINTTAB(10)"(8) ADVANCE PAPER"
5 I$=INKEY$:IFVAL(I$)<1ORVAL(I$)>8THEN5
6 IFVAL(I$)=7THENCLS:NEW
7 ONVAL(I$)GOSUB15,33,43,53,9,75,,78
8 GOTO3
9 CLS:PRINTTAB(10)"KILL FILE":DIR:PRINTTAB(10)"ENTER FILE NAME":PRINTTAB(10)"";:INPUTKL$
10 PRINT"":PRINT"":PRINTTAB(5)"ARE YOU SURE (Y/N)"
11 I$=INKEY$
12 IF I$="N" THEN RETURN
13 IF I$="Y" THEN KILLKL$+"/DAT":RETURN
14 GOTO11
15 REM ENTER DATA
16 CLS:PRINT"FILE=";F$:PRINT"":PRINT""
17 PRINT"":PRINTTAB(10)"(1) MONDAY":PRINTTAB(10)"(2) TUESDAY":PRINTTAB(10)"(3) WEDNESDAY":PRINTTAB(10)"(4) THURSDAY":PRINTTAB(10)"(5) FRIDAY":PRINTTAB(10)"(6) RETURN"
18 I$=INKEY$:IFVAL(I$)<1ORVAL(I$)>6THEN18
19 IFVAL(I$)=6THENRETURN
20 X=VAL(I$)
21 CLS:PRINT"FILE=";F$:PRINT"":PRINT""
22 PRINTTAB(10)"PRESS Q TO QUIT":PRINTTAB(10)"ENTER DATA FOR"
23 FORR=1TOX:READR$:NEXTR
24 PRINTTAB(13)R$
25 FORY=1TO10
26 IFLEN(D$(X,Y))>1THENPRINTY;"-";D$(X,Y):GOTO31
27 PRINTY;"-";:LINEINPUTD$(X,Y)
28 IFLEN(D$(X,Y))>140THENPRINT"ENTRY EXCEEDS LIMIT":GOTO27
29 IFD$(X,Y)="Q"THEN32
30 IFD$(X,Y)="^"THENY=Y-1:GOTO27
31 NEXTY
32 RESTORE:GOTO15
33 REM SAVE DATA
34 CLS:PRINT"":PRINTTAB(10)"SAVE DATA":PRINTTAB(10)"ENTER FILE NAME BELOW":PRINTTAB(10)"";:INPUTF$
35 OPEN"O",#1,F$+"/DAT"
36 FORX=1TO5

```



```

37 FORY=1TO1Ø
38 WRITE#1,D$(X,Y)
39 NEXTY
4Ø NEXTX
41 CLOSE#1
42 RETURN
43 REM LOAD DATA
44 CLS:PRINT"":PRINTTAB(1Ø)"LOAD
  DATA":DIR:PRINTTAB(1Ø)"ENTER FI
  LE NAME BELOW":PRINTTAB(1Ø);:INP
  UTF$
45 OPEN"I",#1,F$+"/DAT"
46 FORX=1TO5
47 FORY=1TO1Ø
48 INPUT#1,D$(X,Y)
49 NEXTY
5Ø NEXTX
51 CLOSE#1
52 RETURN
53 REM PRINT DATA
54 CLS:PRINT@64,"ENTER 4 LINE HE
  ADING BELOW"
55 PRINT"":FORH=1TO4:PRINTH;"-";
  :INPUTH$(H):NEXTH
56 PRINT"":PRINT"":PRINT"WORKING
  TO PRINT OUT YOUR DATA!":PRINT#
  -2,CHR$(27)CHR$(17)
57 PRINT#-2,"":FORH=1TO4:PRINT#-
  2,"";H$(H):NEXTH
58 PRINT#-2,"":PRINT#-2,""
59 FORX=1TO5
6Ø READDW$:PRINT#-2,"";DW$
61 FORY=1TO1Ø
62 IFLEN(D$(X,Y))>7ØTHENGOSUB69
63 IFLEN(D$(X,Y))<2THENGOTO67
64 IFLEN(D$(X,Y))>7ØTHENPRINT#-2
  ,"";Y:L$:PRINT#-2,"
  ";M$:GOTO66
65 PRINT#-2,"";Y:D$(X
  ,Y)
66 NEXTY
67 FORP=1TO3:PRINT#-2,"":NEXTP
68 NEXTX:PRINT#-2,CHR$(12):CLOSE
  1:RESTORE:RETURN
69 Z=7Ø:LE=LEN(D$(X,Y)):Z=7Ø
7Ø DM$=MID$(D$(X,Y),Z,1)
71 IFDM$=""THENGOTO72ELSEZ=Z-1:
  GOTO7Ø
72 L$=LEFT$(D$(X,Y),Z):Z=Z+1:M$=
  MID$(D$(X,Y),Z,LE)
73 RETURN
74 DATAMONDAY,TUESDAY,WEDNESDAY,
  THURSDAY,FRIDAY
75 PRINTTAB(1Ø)"CLEARING MEMORY"
76 FORX=1TO5:H$(X)=""":FORY=1TO1Ø
  :D$(X,Y)=""":NEXTY:NEXTX
77 F$=""":RETURN
78 PRINT#-2,CHR$(12):RETURN

```

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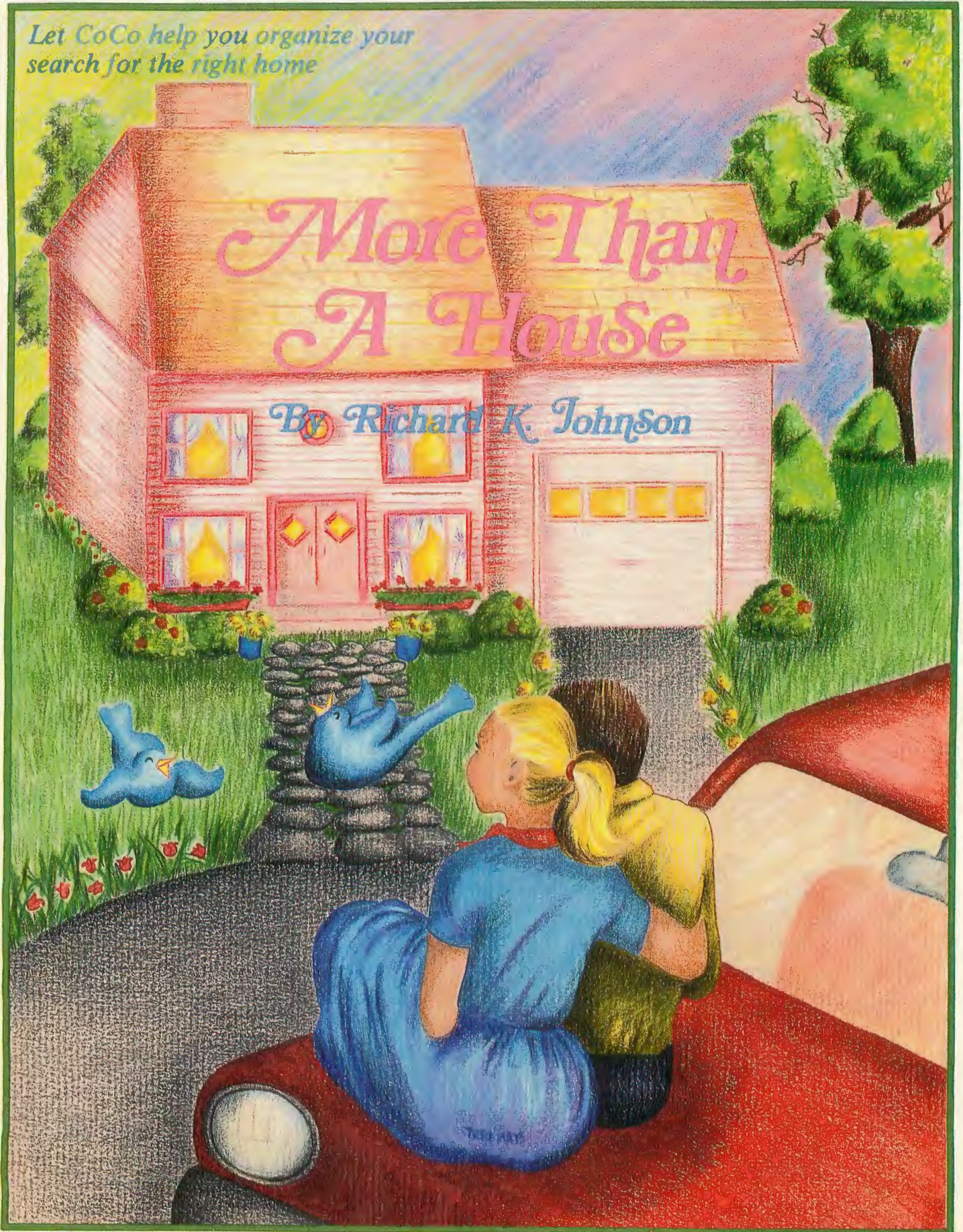
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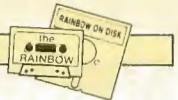
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*Let CoCo help you organize your search for the right home*

# More Than A House

By Richard K. Johnson





Anyone who has ever purchased a house knows the excitement and the fear of house hunting. The decision to buy a house is an important step, but it's just the beginning. This purchase is probably the biggest investment you will make; you can't go into the purchase blind. There are a multitude of questions to be answered and decisions to be made. Is this a good neighborhood? How far is the house from work and school? Is the house in good repair? How much are its taxes? The list goes on and on. If this isn't enough to unsettle you, consider the number of houses that the average buyer must look at before this decision can be made.

True, house hunting is a formidable task, but don't despair. My programs, *Drive By* and *House*, can make your search easier (or at least a little more organized). The programs act as both a checklist of the many questions that must be asked and as a method of organizing and comparing the information about each house you consider. The programs require 16K ECB and can be used with either tape or disk systems.

The first step in buying a house is looking for one. You can look in the newspaper or in multiple listings (generally called *Homes* books), which are published by the Board of Realtors. These publications list all houses for sale in your area and give you basic information about the house.

Before contacting a realtor, most people like to ride by a house, making initial decisions about location and general conditions before hearing the sales pitch. My first program, *Drive By*, can help you make these preliminary observations. This program lists questions you can answer from your first inspection. The form does ask for some information not available at one glance. However, if you like the outside of the house and its location, you can use this

form to guide your questions when talking to the realtor.

When you run *Drive By*, you are shown an opening graphics screen. After a few seconds, the program will prompt you to turn on your printer and prepare the paper. When you have done this, press ENTER. You will then be prompted for the number of copies you want (one to 10).

The second program, *House*, asks for information about the inside of the house like carpet color, size of water heater, appliances and their condition, and a basic description of each room. *House's* form uses letters to denote

certain qualities. The following is a list of these letters and their meanings:

Letter	Definition
E	Electric
G	Gas
O	Oil
S	Solar
WB	Wood-burning

I also included blank columns, so you can add features of importance to you (i.e., number of electrical outlets, fire-place, etc.).

Once you have found the perfect house, you must make one final deci-

DRIVE BY

ASKING PRICE \$64,500      APPRAISED VAL. Not appraised yet

OWNER Richard & Susan Johnson      REALTOR Home Sweet Home Realty

ADDRESS 1234 Primrose Lane      AGENT Jane Doe

TEL 000-0000      TEL 000-0000

SQUARE FOOTAGE 2100      LOT SIZE 80x170      AGE 27 yrs      TAXES \$842

DIST. FROM EMPLOYMENT 10 miles      SHOPPING 1/2 mile      PUBLIC TRANS. 1 Block East

SCHOOLS AND CHURCHES IN AREA Elm 1mi Middle + High 1/2 mi / St. Mary's 2mi

NEIGHBORHOOD \* PLUSES Lead End Street / Close to Police + Fire Protection

NEIGHBORHOOD \* MINUSES Drainage ditch 2 blocks down / railroad nearby / no street lights

EXTERIOR OBSERVATIONS

STYLE:  BRANCH     BI-LEVEL     TRI-LEVEL     COLONIAL     OTHER

EXTERIOR WALLS:  BRICK     WOOD     VINYL SIDING     ALUM SIDING     OTHER

COLOR OF EXTERIOR WALLS red      TRIM white      ROOF white

GARAGE ATT.  DET    SIZE 2 CAR     CARPORT SIZE    CAR    WASHED SIZE 5x7

DRIVEWAY SIZE 2car     CONCRETE     ASPHALT     GRAVEL    CONDITION Good - crack

ROOF CONDITION  NEW     GOOD     FAIR     NEEDS REPLACING    AGE OF ROOF 2 mo.

CONDITIONS OF GUTTERS AND DOWNSPOUTS  NEW     GOOD     FAIR     NEEDS REPLACING

TYPE OF FOUNDATION  SLAB     CRAWLSPACE     BASEMENT    SUMP PUMP  YES     NO

SIDEWALK ON PROPERTY     PUBLIC SIDEWALKS     STEPPING STONES

WINDOW TYPE  ALUM     WOOD     PICTURE WINDOW     BAY WINDOW     OTHER

STORM WINDOWS & DOORS  YES     NO    COMMENTS dent in back storm door / missing screen

STOOPS     PORCH     PATIO     DECK SIZE 12x16     RAILING TYPE wood

FENCE  YES     NO    TYPE  CHAIN LINK     WOOD     PRIVACY NO. OF GATES 2 each 1 double

LANDSCAPE CONDITION very well maintained / flowers around house + fence

SHRUBBERY TYPE spred yews    SHADE TREES oak (back)    FRUIT TREES apple (back)

COMMENTS Rose garden in center of back yard / lot level / shutters on front windows / hip roof / turbine roof ventilator / good place for garden spot / Garage door opener / shelves + workbench in garage.

Richard Johnson is a machine operator at Corhart Refractories. He is married and has two children, Julie and Ricky. Richard has been writing programs for his CoCo 2 since 1985.

# HOUSE HUNTING INTERIOR INSPECTION

ROOMS	SIZE	1/2/B #	# OF	TEL.	WALL	WALL	FLOOR	FLOOR	CEILING	FAN	Remarks
		LEVEL	WIND.	CLOS.	OUT.	COLOR	DESC.	TYPE	COLOR		
KITCHEN	12x18	1	2			Antique Painted	W/W Carpet	Crown			Brice
LIVING	10x12	1	1			Antique W.	Painted	W/W Carpet	Crown		Brice
DINING	10x12	1	1			Blue Blue Wall	W/W Carpet	Blue			Brice
1 BED	12x12	1	2	Walkin		Ant Yellow Painted	Hardwood	Oak			Brice
2 BED	10x12	1	2			St. Pink	Painted	rug 9'12"	Pink		Brice
3 BED	10x12	1	2			Antique W.	Painted	Vinyl	St. Brown		Brice
4 BED	10x12	1	2			Beige	Concrete	Concrete	Beige		Brice
CL.	13x14	1	2			Beige	Concrete	Concrete	Beige		Brice
UTILITY	7x10	B	1			Pecan	Panel	Vinyl	Green		Brice
MUD	12x16	B	1			Beige	Concrete	Concrete	Green		Brice
FAMILY	12x16	B	4	3		Antique W.	Painted	W/W Carpet	Brown		Brice
BASEMT	36x28	B	1			Yellow W. Wall	Ceramic	W + B			Brice
Hall	3x23	1	1			Beige	Concrete	Concrete	Beige		Brice

	FULL	HALF	TUB	SHOWER	COLOR	SINK	SIZE	MED.	VENT	SIZE
1 BATH	Full				White	White	30x18		30x25	In-down Light Bar
2 BATH	Half				White	White	30x18		20x20	
3 BATH										
4 BATH										

KITCHEN APPLIANCES INCLUDED: ( ) REFRIGERATOR ( ) RANGE E/G ( ) MICROWAVE ( ) HOOD FAN ( ) WATER SOFTENER ( ) DISHWASHER ( )

COMMENTS: Oven/ Cooktop/ Hood/ Dishwasher Built-in (5yr old)

CABINETS: # OF DOORS 12, # OF DRAWERS 7, COUNTER SPACE 14 FT., COND. refinished good

( ) PANTRY ( ) BAR ( ) WORK ISLAND # SINK SIZE 32x22 TYPE Double Basin COLOR stainless

( ) WASHER/DRYER CONNECTIONS ( ) LOCATIONS Utility \* ( ) WASHER ( ) DRYER E/G

WATER HEATER E/G'S SIZE 40 GALS. AGE 2 YRS. \* ( ) SEWER ( ) AIR CLEANER SYSTEM

HEAT: E/G S/O/WB TYPE forced air SIZE 100,000 BTU AGE 5 YRS. ( ) WINDOW SIZE 2 1/2 ton AGE 5 YRS.

( ) HEAT PUMP AIR CONDITIONING: TYPE CENTRAL ( ) IN. COMMENTS Poor type SEWER 10'25

INSULATION: CEILING 6 IN. WALLS 0 IN. FLOOR 0 IN.

AVG. UTILITY BILLS ELEC. \$60 GAS \$65 WATER \$17 LOCATION Utility Room

ELECTRIC PANEL: ( ) FUSE ( ) BREAKER SIZE 200 AMP.

## How Much?

By Kenneth Johnson

You've found the perfect house. You want it; you're going to buy it. But how are you going to pay for it? You'll get a loan, of course, but what kind of loan? How much will the interest be, and how long will you make payments? Finally, how much will this cost? *Loan Data* (shown in Listing 3) can help you calculate the monthly payments for any loan amount, at any interest rate and for any time period. It also displays the amount of interest you will pay during the life of the loan and lets you alter the variables to find the best loan for you. [Please note: Taxes and insurance premiums vary from state to state and are usually included in the monthly payment on mortgages. Be sure to take these expenses into consideration when figuring the amount you can afford to spend on purchasing a home.]

*Loan Data* requires 4K of memory and can be loaded from either cassette or disk. My program will consider delayed-payment loans and identify the interest you are charged while your payments are deferred. If you have such a loan, enter the number of days from the day you signed the loan to day of your first payment. The program will consider this data and give you an accurate amortization schedule. If this condition does not apply to you, press ENTER at the prompt. The program will calculate interest rates for balloon payment loans and for short term loans and provide an accurate payment schedule.

The program determines your monthly payments and totals your interest for the life of the loan. Once you get over the shock of seeing how much interest you are paying for your home, you can change the interest rate variable in the program. In this way, you can see what a difference a few percentage points can make in the total of a 30-year loan but how little difference it makes in your monthly payments. Please note: There is a slight delay when calculating the total interest for long-term (25- to 40-year) loans.

Once you have found the best choice for your own loan-payment plan, you will be able to talk to the bank more intelligently about your expectations about the loan. You will also be able to determine if this is the best time for you to buy a house.

sion: Can you afford it? For most of us, this decision will include looking at the necessary down payment, considering interest rates and applying for (and getting) a loan. *Loan Data* has been included to help you with this decision. (For more information, see the sidebar "How Much?" by Kenneth Johnson.)

When I began writing these programs, I tried to include everything. However, I soon realized this was neither practical nor possible. Both programs are straightforward; customize them to fit your own specifications.

The programs were written for the DMP-105 printer and use the following printer codes:

Printer Codes	Description
CHR\$(27)	Escape
CHR\$(27);CHR\$(14)	Start Elongation
CHR\$(27);CHR\$(15)	End Elongation
CHR\$(27);CHR\$(19)	Standard Print
CHR\$(15)	Start Underline
CHR\$(14)	End Underline

If you have a disk system, you can merge the programs by completing the following steps: Delete lines 1030 and 1040 of *Drive By* and save the program in ASCII format. Delete lines 10 through 260 of the second program. Enter RENUM 1030 and then save the second program in ASCII. Now load the first program again and enter MERGE "HOUSE". Save the merged program as HOUSHUNT. The merged program will print out the forms for both *Drive By* and *House*. Each form will use one sheet of paper.

Buying a house is more than just a financial investment. For most of us, the houses we purchase will be our homes. I hope my programs can make such an important step a little easier.

(Questions or comments about these programs may be directed to the author at 826 Elmwood Ave., New Albany, IN 47150. Please include an SASE when requesting a reply.)

*Ken Johnson is a retired air force pilot who purchased a CoCo six years ago to keep up with his grandchildren's computer skills. He hasn't been able to stop using it since.*

# Color Computer I, II, III

## Free Software for Drive 0 Systems

CoCo Checker...Test roms, rams, disk drives and & controller printer, keyboard cassette & more.  
Tape/Disk Utility...Transfers disk to tape and tape to disk.



**159<sup>95</sup>** Drive 0

- Full Ht Drive
- Single Case
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & manuals

**179<sup>95</sup>** Drive 0

- Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

**269<sup>95</sup>** Drive 0 & 1

- 2 Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

## Other Drive Specials

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10 Diskettes with free library case .....	<b>9<sup>95</sup></b>

## Quality Add-On's for Tandy 1000, SX, TX, SL, TL, 3000, 4000



### HARD CARDS

10 meg .....	<b>259.95</b>	40 meg .....	<b>399.95</b>
20 meg .....	<b>299.95</b>	49 meg .....	<b>499.95</b>
30 meg .....	<b>349.95</b>	64 meg .....	<b>599.95</b>

### HARD DRIVE KITS

10 meg kit .....	<b>249.95</b>	40 meg kit .....	<b>399.95</b>
20 meg kit .....	<b>299.95</b>	60 meg kit .....	<b>539.95</b>
30 meg kit .....	<b>339.95</b>		

1000, 1000A,  
**Memory Cards**  
Zucker Memory  
• DMA & 512K **CALL**  
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• Serial  
• Real Time Clock  
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**TANDY 1000**  
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Will run 1 or 2  
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210	.....4	630	.....214
340	.....214	700	.....159
440	.....225	760	.....107
540	.....186	END	.....186

Listing 1: DRIVEBY

```

1Ø REM $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
2Ø REM $ DRIVE BY $
3Ø REM $ BY $
4Ø REM $ RICHARD K. JOHNSON $
5Ø REM $ 826 ELMWOOD AVE. $
6Ø REM $ NEW ALBANY, IN. $
7Ø REM $ 4715Ø $
8Ø REM $ COPYRIGHT (C) JULY 88 $
9Ø REM $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
1ØØ PMODE4,1
11Ø PCLS
12Ø SCREEN1,1
13Ø REM ROAD
14Ø DRAW"BM4,16;D16ØR28U68R188D6
8R28U16ØL28D68L188U68L28"
15Ø REM SIGN
16Ø DRAW"BM6Ø,8Ø;U6ØR16D6ØL16":D
RAW"BM196,8Ø;L16U6ØR16D6Ø":DRAW"
BM76,32;R1Ø4":DRAW"BM18Ø,68;L1Ø4
"
17Ø REM HOUSE
18Ø LINE(116,116)-(76,132),PSET
19Ø LINE(116,116)-(156,132),PSET
2ØØ LINE(152,132)-(152,144),PSET
21Ø LINE(152,144)-(192,152),PSET
22Ø LINE(8Ø,132)-(8Ø,144),PSET
23Ø LINE(8Ø,144)-(64,148),PSET
24Ø DRAW"BM68,148;D24R12ØU2Ø"
25Ø DRAW"BM96,152;L2ØD12R2ØU12":
DRAW"BM1Ø4,152;D2ØR16U2ØL16":DRA
W"BM132,152;R12D12L12U12":DRAW"B
M152,172;U2ØR32D2Ø":DRAW"BM112,1
28;R12D12L12U12"
26Ø DRAW"BM148,128;U8R12D26"
27Ø CIRCLE(195,13Ø),1Ø
28Ø DRAW"BM195,12Ø;U1ØBD2ØBR1ØR1
ØBL2ØBD1ØD1ØBU2ØBL1ØL1ØBR2ØBH1ØH
5BF15BE1ØE5BG15BF1ØF5BH15BG1ØG5"
29Ø REM RAINBOW DR.
3ØØ DRAW"BM16,36;U7R6F1D2G1L6R4F
3"
31Ø DRAW"BM16,5Ø;U6E2R3F2D3L7R7D
3"
32Ø DRAW"BM16,66;R4U7L4R8BD7L4"
33Ø DRAW"BM16,82;U7F7U7"
34Ø DRAW"BM16,98;U7R6F1D1G1L6R6F
1D2G1L6"
35Ø DRAW"BM18,114;H2U3E2R4F2D3G2
L4"
36Ø DRAW"BM16,13Ø;BU7D7E4F4U7"
37Ø DRAW"BM16,152;U7R5F2D3G2L5"
38Ø DRAW"BM16,168;U7R5F1D2G1L5R3

```

```

F3"
39Ø REM COCO LANE
4ØØ DRAW"BM238,36;G1L4H2U4E2R4F1
"
41Ø DRAW"BM233,51;H2U4E2R4F2D4G2
L4"
42Ø DRAW"BM238,66;G1L4H2U4E2R4F1
"
43Ø DRAW"BM233,82;H2U4E2R4F2D4G2
L4"
44Ø DRAW"BM232,114;U7D7R7"
45Ø DRAW"BM232,13Ø;U5E2R3F2D2L5R
5D3"
46Ø DRAW"BM232,146;U7F7U7"
47Ø DRAW"BM232,161;U7R7BD4BL2L5D
4R7"
48Ø REM HOUSE HUNTING
49Ø DRAW"BM1ØØ,44;U7D3R7U3D7BR8H
2U3E2R3F2D3G2L3BR1ØBU7D5F2R2E3D3
U7BR6BD5F2R3E1U2H1L3H1U1E1R3F1BR
6BD6U7R6BD3BL2L4D4R6"
5ØØ DRAW"BM9Ø,6Ø;U7D3R7U3D7BR4BU
7D5F2R2E3D3U7BR4BD7U7F7U7BR4R8L4
D7BR8R6L3U7L3R6BR4BD7U7F7U7BR12B
D1H1L4G2D3F2R4E2U2L3"
51Ø REM RICHARD
52Ø DRAW"BM4Ø,1ØØ;U7R5F1D2G1L4R3
F3BR6BU7R6L3D7L3R6BR1ØBU1G1L4H2U
3E2R4F1BR4BU1D7U4R7U3D7BR6U6E1R5
F1D3L5R5D3BR6U7R5F1D2G1L5R3F3BR6
U7R4F2D3G2L4"
53Ø REM JOHNSON
54Ø DRAW"BM135,98;DF1R3E1U6L4R8B
R6R3F2D3G2L3H2U3E2BR1ØD7U4R7D4U7
BR5BD7U7F7U7BR5BD5F2R3E1U2H1L3H1
U1E1R3F1BR7BD6H2U3E2R3F2D3G2L3BR
9U7F7U7"
55Ø DRAW"BM112,82;U11R26D11L26":
DRAW"BM116,8Ø;U7R5F1D1G1L5R5F1D2
G1L5BR14U3H4F4E4"
56Ø FORP=1TO45ØØ:NEXTP
57Ø PCLS1
58Ø CLS:PRINT"SET PAPER TO TOP O
F PRINTER HEAD"
59Ø PRINT" WHEN PRINTER IS ON L
INE PRESS <<<ENTER>>>"
6ØØ EXEC44539
61Ø IF INKEY$=CHR$(13)THEN 62ØEL
SE58Ø
62Ø CLS:INPUT"HOW MANY COPIES (1
-1Ø)";C
63Ø IFC<1 OR C>1Ø THEN62Ø ELSE64
Ø
64Ø PR=1
65Ø POKE15Ø,87'POKE FOR 6ØØ BAUD
RATE FOR RADIO SHACK DMP 1Ø5 PR
INTER
66Ø FORPR=1 TO C
67Ø CLS:PRINT@234,"NOW PRINTING"
68Ø A$="DRIVE BY"
69Ø PRINT#-2,CHR$(27);CHR$(14);T

```

```

AB( (45-LEN(A$))/2);A$:PRINT#-2:P
RINT#-2
700 PRINT#-2,CHR$(27);CHR$(15);C
HR$(27);CHR$(19);"ASKING PRICE";
CHR$(15);+" ";CHR$
(14);:PRINT#-2,TAB(57);"APPRAISE
D VAL.";CHR$(15);+"
";CHR$(14)
710 PRINT#-2:PRINT#-2,CHR$(27);C
HR$(15);CHR$(27);CHR$(19);"OWNER
";CHR$(15);+"
";CHR$(14);+"REALTO
R";CHR$(15);+"
";CHR$(14)
720 PRINT#-2:PRINT#-2,"ADDRESS";
CHR$(15);+"
";CHR$(14);+"AGENT";CHR
$(15);+"
";CHR$(14)
730 PRINT#-2:PRINT#-2,"TEL";CHR$
(15);+"
";CHR$(14);+"TEL";CHR$(
15);+"
";CHR$(14)
740 PRINT#-2:PRINT#-2,"SQUARE FO
OTAGE";CHR$(15);+" ";CHR
$(14);+" LOT SIZE";CHR$(15);+"
";CHR$(14);+" AGE";C
HR$(15);+" ";CHR$(14);+"

```

```

TAXES";CHR$(15);+"
";CHR$(14)
750 PRINT#-2:PRINT#-2,"DIST. FRO
M EMPLOYMENT";CHR$(15);+"
";CHR$(14);+" SHOPPING";CHR
$(15);+" ";CHR$(14);+"
PUBLIC TRANS.";CHR$(15);+"
";CHR$(14)
760 PRINT#-2:PRINT#-2,CHR$(14);"
SCHOOLS AND CHURCHES IN AREA";CH
R$(15);+"
";C
HR$(14)
770 PRINT#-2:PRINT#-2,"NEIGHBORH
OOD * PLUSES *";CHR$(15);+"
";CHR$(14)
780 PRINT#-2:PRINT#-2,"NEIGHBORH
OOD * MINUSES *";CHR$(15);+"
";CHR$(14)
790 PRINT#-2
800 B$="EXTERIOR OBSERVATIONS"
810 PRINT#-2:PRINT#-2,CHR$(14)CH
R$(27);CHR$(14);TAB((45-LEN(B$)
)/2);B$:PRINT#-2
820 PRINT#-2:PRINT#-2,CHR$(27);C
HR$(15);CHR$(27);CHR$(19);"STYLE
: ()RANCH ()BI-LEVEL ()TRI-LEV

```



## The COCO hardware store



### Super Controller I \$99.95

A Superb Controller. Along with the included G-DOS, plug-in three more software selectable DOSes or 2764 or 27128 EPROMs burned to your liking. The Internal M.E.B. lets you add Disto incredible Super Add-ons.

### Fantastic Super Controller II \$130.

- Under OS-9:
- Buffered Read/Write sector achieved without halting the CPU.
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- System's clock no longer loses time during Read & Write.
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- Drivers written by KEVIN DARLING
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### 3 in 1 Multi-Board Adapter \$59.95

This Multi-Board is an adapter that plugs in any Disto Super Controller, Ramdisk or MEB Adapter. It includes a new and improved Printer Port (Centronics compatible), a faster Real Time Clock (works at 2MHz.) and a true RS-232 Serial Port (external 12 volt AC adapter required). DB25 cable included. It fits neatly inside the metal case and is still within Tandy's power limits. It also works with or without a Multi-Pak.

### SUPER ADD-ONS

- Real Time Clock & Printer Interface \$34.95
- Mini EPROM Programmer \$54.95
- Hard Disk Interface \$49.95
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- Super RAM 3 ZeroK Board \$24.95
- MEB Adapter \$24.95

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- Radio Shack/Tandy controller compatible
- Works on all COCOs with or without Multi-Pak
- 2 DOS switcher
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- A Stand-Alone (Multi-Pak required) adapter that gives the user a true RS-232 Serial Port.
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```

EL  () COLONIAL  () OTHER  ";CHR$(1
5);+"          ";CHR$(1
4)
83Ø PRINT#-2:PRINT#-2,"EXTERIOR
WALLS:() BRICK  () WOOD  () VINYL S
IDING  () ALUM SIDING  () OTHER";C
HR$(15);+"          ";CHR$(14)
84Ø PRINT#-2:PRINT#-2,"COLOR OF
EXTERIOR WALLS";CHR$(15);+"
          ";CHR$(14);+" TRIM";C
HR$(15);+"          ";CHR$(
14);+" ROOF";CHR$(15);+"
          ";CHR$(14)
85Ø PRINT#-2:PRINT#-2,"() GARAGE
ATT/DET SIZE";CHR$(15);+"
CAR";CHR$(14);+"  () CARPORT SI
ZE";CHR$(15);+" CAR";CHR$(1
4);+"  () SHED SIZE";CHR$(15);+"
          ";CHR$(14)
86Ø PRINT#-2:PRINT#-2,"() DRIVEWA
Y SIZE";CHR$(15);+"          ";CHR$(
14);;"  () CONCRETE  () ASPHALT
() GRAVEL  CONDITION";CHR$(15);+"
          ";CHR$(14)
87Ø PRINT#-2:PRINT#-2,"ROOF COND
ITION  () NEW  () GOOD  () FAIR  ()
NEEDS REPLACING  AGE OF ROOF";
CHR$(15);+"          ";CHR$(14)
88Ø PRINT#-2:PRINT#-2,"CONDITION
S OF GUTTERS AND DOWNSPOUTS  () NE
W  () GOOD  () FAIR  () NEEDS REPLA
CING"
89Ø PRINT#-2:PRINT#-2,"TYPE OF F
OUNDATION  () SLAB  () CRAWLSPACE
() BASEMENT  SUMP PUMP  () YES  (
) NO"
90Ø PRINT#-2:PRINT#-2,"() SIDEWAL
K ON PROPERTY  () PUBLIC SIDEWA
LKS  () STEPPING STONES"
91Ø PRINT#-2:PRINT#-2,"WINDOW TY
PE  () ALUM  () WOOD  () PICTURE WIN
DOW  () BAY WINDOW  () OTHER";CHR$(
15);+"          ";CHR$(14)
92Ø PRINT#-2:PRINT#-2,"STORM WIN
DOWS & DOORS  () YES  () NO  COMMEN

```

```

TS";CHR$(15);+"
          ";CHR$(14)
93Ø PRINT#-2:PRINT#-2,"() STOOPS
() PORCH  () PATIO  () DECK  SIZE"
;CHR$(15);+"          ";CHR$(14)
;+"  () RAILING  TYPE";CHR$(15);+
"          ";CHR$(14)
94Ø PRINT#-2:PRINT#-2,"FENCE  () Y
ES  () NO  TYPE  () CHAIN LINK  () W
OOD  () PRIVACY  NO. OF GATES";CH
R$(15);+"          ";CHR$(14)
95Ø PRINT#-2:PRINT#-2,"LANDSCAPE
CONDITION";CHR$(15);+"
          ";CHR$(14)
96Ø PRINT#-2:PRINT#-2,"SHRUBBERY
TYPE";CHR$(15);+"          "
;CHR$(14);+" SHADE TREES";CHR$(1
5);+"          ";CHR$(14);+
"FRUIT TREES";CHR$(15);+"
          ";CHR$(14)
97Ø PRINT#-2:PRINT#-2,CHR$(15);"
COMMENTS
"
98Ø PRINT#-2:PRINT#-2,"
"
99Ø PRINT#-2:PRINT#-2,"
"
100Ø PRINT#-2:PRINT#-2,"
"
101Ø PRINT#-2:PRINT#-2,"
";CHR$(14)
102Ø PRINT#-2:PRINT#-2
103Ø NEXTPR
104Ø CLS:PRINT@231,"GOOD HOUSE H
UNTING"

```

250	.....	244	840	.....	187
420	.....	19	900	.....	36
540	.....	167	970	.....	129
700	.....	18	END	.....	191
750	.....	171			

Listing 2: HOUSE

```

1Ø CLS
2Ø REM $$$$$$$$$$$$$$$$$$$$$$$$$$$$$
3Ø REM $ HOUSE HUNTING $
4Ø REM $ BY $

```

```

5Ø REM $ RICHARD K. JOHNSON $
6Ø REM $ 826 ELMWOOD AVE. $
7Ø REM $ NEW ALBANY, IN. $
8Ø REM $ 4715Ø $
9Ø REM $ COPYRIGHT (C) JULY 88 $
10Ø REM $$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$
11Ø PRINT@166,"$$$$$$$$$$$$$$$$$$$$
$$$$"
12Ø PRINT@198,"$ HOUSE HUNTING
$"
13Ø PRINT@23Ø,"$ BY
$"

```



```

14Ø PRINT@262,"$ RICHARD JOHNSO
N $"
15Ø PRINT@294,"$$$$$$$$$$$$$$$$
$$$$$"
16Ø FORP=1TO3ØØØ:NEXTP
17Ø CLS:PRINT"SET PAPER TO TOP O
F PRINTER HEAD"
18Ø PRINT" WHEN PRINTER IS ON L
INE PRESS <<<ENTER>>>"
19Ø EXEC44539
20Ø IF INKEY$=CHR$(13)THEN 21ØEL
SE17Ø
21Ø CLS:INPUT"HOW MANY COPIES (1
-1Ø)";C
22Ø IFC<1 OR C>1Ø THEN21Ø ELSE23
Ø
23Ø PR=1
24Ø POKE15Ø,87'POKE FOR 6ØØ BAUD
RATE FOR RADIO SHACK DMP 1Ø5 PR
INTER
25Ø FORPR=1 TO C
26Ø CLS:PRINT@234,"NOW PRINTING"
27Ø C$="HOUSE HUNTING"
28Ø PRINT#-2,CHR$(27);CHR$(14);T
AB((45-LEN(C$))/2);C$:PRINT#-2
29Ø D$="INTERIOR INSPECTION"
30Ø PRINT#-2,TAB((42-LEN(D$))/2)
;D$
31Ø PRINT#-2,CHR$(15);"
"
;CHR$(14)
32Ø PRINT#-2,CHR$(27);CHR$(15);C
HR$(27);CHR$(19);"
1/2/B # OF # OF TEL. WALL WA
LL FLOOR FLOOR CEILING""
33Ø PRINT#-2,CHR$(27);CHR$(15);C
HR$(27);CHR$(19);CHR$(15);"ROOMS
SIZE LEVEL WND. CLOS. OUT.
COLOR DESC. TYPE COLOR FAN
"
34Ø PRINT#-2,"FOYER / / /
/ / / / / /
/ / / / / / / / /
35Ø PRINT#-2,"LIVING / / / /
/ / / / / / / / /

```

```

/ / / / /
36Ø PRINT#-2,"DINING / / / /
/ / / / / / / / /
/ / / / / / / / /
37Ø PRINT#-2,"
"
38Ø PRINT#-2,"1 BED / / / /
/ / / / / / / / /
39Ø PRINT#-2,"2 BED / / / /
/ / / / / / / / /
40Ø PRINT#-2,"3 BED / / / /
/ / / / / / / / /
41Ø PRINT#-2,"4 BED / / / /
/ / / / / / / / /
42Ø PRINT#-2,"
"
43Ø PRINT#-2,"KIT. / / / /
/ / / / / / / / /
44Ø PRINT#-2,"
"
45Ø PRINT#-2,"UTILITY/ / / /
/ / / / / / / / /
46Ø PRINT#-2,"MUD / / / /
/ / / / / / / / /
47Ø PRINT#-2,"FAMILY / / / /
/ / / / / / / / /
48Ø PRINT#-2,"BASEMT / / / /
/ / / / / / / / /
49Ø PRINT#-2,"
/ / / / / / / / /
50Ø PRINT#-2,"
/ / / / / / / / /

```

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```

510 PRINT#-2," / / /"
520 PRINT#-2,"1 BATH / / /"
530 PRINT#-2,"2 BATH / / /"
540 PRINT#-2,"3 BATH / / /"
550 PRINT#-2,"4 BATH / / /"
560 PRINT#-2," / / /"
CHR$(14)
570 PRINT#-2," FULL
TILE SINK SIZE MED. V
ENT SIZE "
580 PRINT#-2,CHR$(15);"
HALF TUB SHOWER COLOR COLOR VANI
TY CAB FAN MIRROR
"
590 PRINT#-2,"1 BATH / / /"
600 PRINT#-2,"2 BATH / / /"
610 PRINT#-2,"3 BATH / / /"
620 PRINT#-2,"4 BATH / / /"
630 PRINT#-2," / / /"
CHR$(14)
640 PRINT#-2,"KITCHEN APPLIANCES
INCLUDED: COMMENTS";CHR$(15);+
"
";CHR$(14)
650 PRINT#-2,"()REFRIGERATOR ()
RANGE E/G ()OVEN E/G ()COOKTOP
E/G ()DISPOSAL ()COMPACTOR"
660 PRINT#-2,CHR$(15)"()FREEZER
()MICROWAVE ()HOOD FAN ()WATE
R SOFTNER ()DISHWASHER ()
"
670 PRINT#-2,CHR$(15)"
"
";CHR$(14)
680 PRINT#-2,"CABINETS: #OF DOOR
S";CHR$(15);+" ";CHR$(14);+"
#OF DRAWERS";CHR$(15);+" ";C

```

```

HR$(14);+"COUNTER SPACE";CHR$(15
);+" FT.";CHR$(14);+" COND."
;CHR$(15);+" ";CHR$(
14)
690 PRINT#-2,"()PANTRY ()BAR (
)WORK ISLAND *SINK SIZE";CHR$(15
);+" ";CHR$(14);+"TYPE"
;CHR$(15);+" ";CHR$(14)
;+"COLOR";CHR$(15);+" "
;CHR$(14)
700 PRINT#-2,"()WASHER/DRYER CON
NECTIONS E/G LOCATIONS";CHR$(1
5);+" ";CHR$(14);+" *(
)WASHER ()DRYER E/G"
710 PRINT#-2,"WATER HEATER E/G/
S SIZE";CHR$(15);+" GALS.";C
HR$(14);+" AGE";CHR$(15);+"
YRS.";CHR$(14);+" *()SEWER (
)SEPTIC TANK"
720 PRINT#-2,"HEAT: E/G/S/O/WB T
YPE";CHR$(15);+" ";CHR$(
14);+" SIZE";CHR$(15);+"
BTU";CHR$(14);+" AGE";CHR$(15);
+" ";CHR$(14);+" ()AIR CL
EANER SYSTEM"
730 PRINT#-2,"()HEAT PUMP AIR C
ONDITIONING: TYPE ()CENTRAL ()W
INDOW SIZE";CHR$(15);+"
";CHR$(14);+" AGE";CHR$(15);+"
";CHR$(14)
740 PRINT#-2,"INSULATION: CEILIN
G";CHR$(15);+" IN.";CHR$(14)
;+" WALLS";CHR$(15);+" IN.";
CHR$(14);+" FLOOR";CHR$(15);+"
IN.";CHR$(14);+" COMMENTS";CH
R$(15);+" ";CHR$(
14)
750 PRINT#-2,"AVG. UTILITY BILLS
ELEC.";CHR$(15);+" ";C
HR$(14);+" GAS";CHR$(15);+"
";CHR$(14);+" WATER";CHR$(1
5);+" ";CHR$(14);+" SEW
ER";CHR$(15);+" ";CHR$(
14)
760 PRINT#-2,"ELECTRIC PANEL: ()
FUSE ()BREAKER SIZE";CHR$(15);
+" AMP.";CHR$(14);+" LOCATI
ON";CHR$(15);+"
";CHR$(14)
770 PRINT#-2:PRINT#-2,CHR$(15);"
COMMENTS
"
780 PRINT#-2:PRINT#-2,"
"
790 PRINT#-2:PRINT#-2,"
"

```

```
800 PRINT#-2:PRINT#-2,"
```

```
"
```

```
810 PRINT#-2:PRINT#-2,"
```

```
"
```

```
820 PRINT#-2:PRINT#-2,"
```

```
"
```

```
830 PRINT#-2:PRINT#-2,"
```

```
";CHR$(14)
```

```
840 PRINT#-2:PRINT#-2:PRINT#-2
```

```
850 NEXTPR
```

```
860 CLS:PRINT@231,"GOOD HOUSE HU  
NTING"
```

<input checked="" type="checkbox"/>	260 .....	64	750 .....	98
	420 .....	235	890 .....	3
	630 .....	151	END .....	5

Listing 3: LOAN DATA

```
10 CLS4:C=2:X=3
20 IF C>3 THEN C=2:IF X<2 THEN X
=3
30 FOR H=0 TO 63 STEP 4:FOR V=0
TO 1
40 SET (H,V,C):SET(H+1,V,C)
50 SET (H+2,V,X):SET(H+3,V,X)
60 NEXT V,H
70 FOR H= 62 TO 63:FOR V= 2 TO 2
9 STEP 4
80 SET (H,V,C):SET(H,V+1,C)
90 SET (H,V+2,X):SET(H,V+3,X)
100 NEXT V,H
110 FOR H=63 TO 0 STEP -4:FOR V=
30 TO 31
120 SET(H,V,C):SET(H-1,V,C)
130 SET(H-2,V,X):SET(H-3,V,X)
140 NEXT V,H
150 FOR H=0 TO 1:FOR V=29 TO 2 S
TEP -4
160 SET (H,V,C):SET(H,V-1,C)
170 SET (H,V-2,X):SET(H,V-3,X)
180 NEXT V,H
190 PRINT@ (138)," LOAN DATA ";
200 PRINT@ (237)," BY: ";
```

```
210 PRINT@(329)," KEN JOHNSON ";
220 PRINT@(364)," 1985 ";
230 FOR DLAY=1 TO 1500:NEXT DLAY
240 US="#####.##":V$=" "
250 CLS:PRINT@(72),"<<<LOAN DATA
>>>":PRINT
260 PRINT@(140),"-MENU-":PRINT:P
RINT
270 PRINT" (C)ALCULATE PAYM
ENT":PRINT
280 PRINT" (S)CHEDULE PRINT
OUT":PRINT:PRINT
290 PRINT" MAKE SELECTION:
C/S"
300 IS=INKEY$:IF IS="C" THEN 310
ELSE IF IS="S" THEN 600 ELSE 30
0
310 CLS:PRINT:PRINT:PRINT"
DATA ENTRIES":PRINT
320 L=0:IT=0:P=0:W=0
330 INPUT" LOAN BALANCE";A
340 INPUT" INTEREST RATE";B
350 INPUT" TERM IN MONTHS";C
360 PRINT:PRINT:PRINT" CH
ECK ENTRIES...."
370 PRINT:PRINT" PRESS (C)ONTI
NUE OR (R)EDO"
380 CE$=INKEY$:IF CE$="C"THEN 39
0 ELSE IF CE$="R" THEN 310 ELSE
380
390 IF B<1 THEN B=B*100
400 I=(B/100)/12
410 M=I/((1+I)^(C)-1)+I:D=M*A
420 CLS:PRINT:PRINT:PRINT" LOAN:
$";:PRINT USINGU$;A
```

```

430 PRINT" RATE:";B;"%"
440 PRINT" TERM:";C;"MONTHS"
450 PRINT" PYMT: $";:PRINT USING
U$;D
460 PRINT:PRINT" CALCULATING TOT
AL INTEREST...."
470 K=A
480 FORY=1 TO C
490 R=B/100:DD=D
500 I=(K*R)/12
510 W=W+I
520 IT=W
530 P=DD-I:NB=K-P
540 K=NB
550 NEXT Y
560 PRINT:PRINT" TOTAL INTEREST
: $";:PRINT USINGU$;IT
570 PRINT:PRINT:PRINT" (T)RY ANO
THER (M)AKE PRINTOUT"
580 PRINT" (E)ND PROGRAM (R)ETUR
N TO MENU"
590 I$=INKEY$:IF I$="T"THEN 310
ELSE IF I$="M" THEN 710 ELSE IF
I$="R" THEN 250 ELSE IF I$="E" T
HEN CLS:END ELSE 590
600 CLS:PRINT:PRINT:PRINT" A
MORTIZATION SCHEDULE":PRINT
610 PRINT
620 INPUT" ENTER LOAN BALANCE ";
A
630 INPUT" ENTER INTEREST RATE "
;B
640 INPUT" ENTER TERM IN MONTHS
";C
650 INPUT" ENTER AMOUNT OF PYMT.
";D
660 PRINT" DAYS FIRST PYMT DELAY
ED."
670 INPUT" IF N/A PRESS <ENTER>"
;E
680 PRINT:PRINT:PRINT" CH
ECK ENTRIES...."
690 PRINT:PRINT" PRESS (C)ONTI
NUE OR (REDO)"
700 CP$=INKEY$:IF CP$="C"THEN 71
0 ELSE IF CP$="R" THEN 600 ELSE
700
710 CLS:PRINT@ (102),"MAKE PRINT
ER READY !":PRINT:PRINT
720 PRINT"PRESS: (P)RINT (R)E-E
NTER DATA"
730 PRINT" (A)BORT (E)ND
PROGRAM"
740 I$=INKEY$:IFI$="P"THEN 750EL
SE IF I$="R"THENCLS:GOTO600ELSE
IFI$="A"THEN GOTO250 ELSE IF I$=
"E"THEN END ELSE 740
750 QQ=PEEK(65314):IF QQ><4 THEN
CLS:PRINT@ (102),"PRINTER NOT R
EADY !"
760 PRINT#-2:PRINT#-2:L=2:PN=1
770 CLS:PRINT#-2,"
<<< AMORTIZATION SCHE
DULE >>>":PRINT#-2:PRINT#-2:PRIN
T#-2:L=L+4:Y=0
780 CLS:PRINT@ (103), "PRINTING
SCHEDULE"
790 PRINT#-2," LOAN: ";:PRINT#-
2,USINGU$;A;:PRINT#-2," INT.R
ATE:"B;:PRINT#-2,"%";:PRINT#-2,"
TERM:"C;:PRINT#-2,"MONTHS";
:PRINT#-2," PAYMENT:";:PRINT
#-2,USINGU$;D;:PRINT#-2:PRINT#-2
:L=L+3:GOSUB 970
800 K=A:IF B<1 THEN B=B*100
810 FOR Y= 1 TO C
820 R=B/100:DD=D
830 IF Y=1 AND E<>0 THEN I=((R*A
)/365)*E ELSE I=(K*R)/12
840 P=DD-I:NB=K-(DD-I)
850 IF Y=C THEN DD=K+I:P=K:NB=0:
GOTO880
860 K=NB
870 IF Y=C THEN DD=NB+I:P=NB:NB=
0
880 PRINT#-2,USING"###. ";Y;:PRI
NT #-2," <.....> ";:PRIN
T#-2,USINGU$;DD;:PRINT#-2,V$;:PR
INT#-2,USINGU$;I;:PRINT#-2,V$;:P
RINT#-2,USINGU$;P;:PRINT#-2,V$;:
PRINT#-2,USINGU$;NB:L=L+1
890 IF C<25 THEN PRINT#-2:L=L+1
900 IF L=62 AND Y<C THEN GOSUB 1
010
910 NEXT Y
920 PRINT#-2:PRINT#-2:PRINT#-2,T
AB(34)"<LAST PAGE>"
930 CLS:PRINT:PRINT:PRINT:PRINT:
PRINT"PRESS: (A)NOTHER COPY"
940 PRINT" (R)E-RUN PROGRA
M"
950 PRINT" (Q)UIT; CLEAR M
EMORY"
960 I$=INKEY$:IF I$="A" THEN CLS
:GOTO 720 ELSE IF I$="R" THEN RU
N ELSE IF I$="Q" THEN POKE 113,0
:EXEC 40999 ELSE 960
970 IF Y=0 THEN 980 ELSE IF Y>1
THEN PRINT#-2:PRINT#-2:PRINT#-2:
L=L+3
980 PRINT#-2,STRING$(80,45):L=L+
1
990 PRINT#-2," PYMT.# PYMT.DA
TE AMOUNT INT.
PRINCIPLE BALANCE":L=L
+1
1000 PRINT#-2,STRING$(80,45):PRI
NT #-2:L=L+2:RETURN
1010 PRINT#-2:PRINT#-2:PRINT#-2,
TAB(36)"PAGE"PN:PN=PN+1:PRINT#-2
:PRINT#-2:PRINT#-2:L=2:GOSUB 970
:RETURN

```

# Tandy Users Unite!

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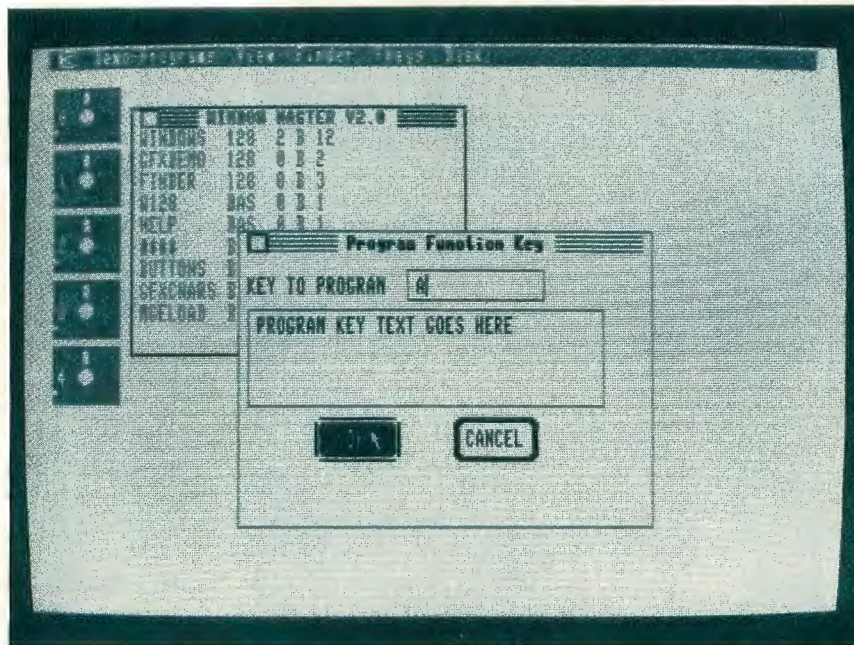
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## Software

CoCo 3

# Window Master— Advanced Features — Without OS-9

Have you ever seen a product advertisement you couldn't believe? You know the kind — "... it slices, it dices... all for \$19.95." We've all seen unbelievable ones. When I saw the advertisement for *Window Master*, I believed about half of what I read. However, seeing is believing, and once I saw this program in action, I became a believer.

*Window Master* is a point-and-click graphics operating environment that uses either a 320-by-225 screen with 16 colors or a 640-by-225 screen with four colors. The program requires a Color Computer 3; **512K is recommended**. (There is a 128K version, which works well, but it has a limited range of features. In this review I

will discuss only the 512K version.) The program also requires a disk drive, a Hi-Res joystick adapter, a color or monochrome monitor, and a mouse or joystick.

The program provides the user with a wide range of new features through *Window BASIC*, an extension of Disk Extended BASIC that uses normal BASIC commands to control windows, pull-down menus, buttons, icons, edit fields, etc. This version of BASIC is automatically installed in your system when the program is loaded into the CoCo 3. In addition, the program is fully compatible with Disk Extended BASIC and takes none of CoCo's BASIC memory.

*Window Master* is easy to load — just

type RUN"W" and the BASIC program will load and execute *Window Master's* installation code. In a 512K system, the program installs two RAM disks.

Using this program, you can create BASIC applications that use multiple windows. *Window Master* supports a maximum of 31 windows onscreen at once. Overlapping windows are also supported. You have a choice of six different window styles and any window size or screen position. You use your mouse to move the windows anywhere on the screen. Didn't they say only OS-9 could do all that? Move over, *Multi-View*.

*Window Master* features true event-trapping — a capability that allows a program to detect and respond to certain *events* and branch to the appropriate routine. Events that can be trapped include time passage, selection of a menu item or a keyboard key, etc. The program also includes a set of menu statements and functions that give you all the tools needed to



create custom menu-bar options and sub-topics under these new headings.

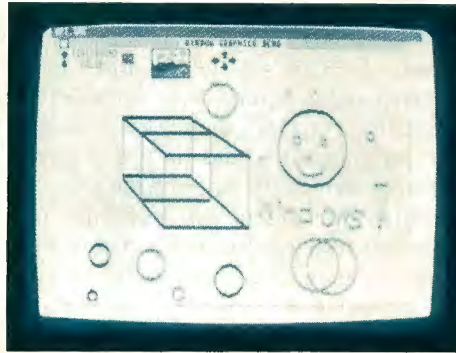
The Mouse statements let you incorporate the mouse into any program. These statements can identify the location of a mouse on the screen — including the window number — and whether or not the mouse has been clicked. In addition, the Mouse statements let you enable or disable the mouse and set the type of mouse pointer displayed.

Other *Window Master* statements include Edit Field statements (useful for those of us who must create forms), the Pen Size statement, a Protect statement and WEdit. The Protect statement is used to protect a specified number of lines in the current window, which can keep the top of the window from scrolling off the screen. The WEdit statement allows the use of a built-in screen editor for editing BASIC program lines. Although you can still use the regular Edit command, I found WEdit much easier to use.

The program features a fully buffered keyboard that allows you to type ahead of the display — even when inserting text. You can also enter commands or answers to prompts when the system is busy loading or saving files to disk or printing to the printer. The buffer will hold up to 48 characters, including ENTER. (Remember, this is Disk BASIC.)

The program's large number of pro-

grammable function keys can be used for anything from complex command sequences to a single word or phrase, all at the touch of a key. *Window Master* automatically loads a set of function keys when it starts up, all of which can be changed, deleted, loaded or saved. So you can save your own customized function key set.



You can display up to 212 characters per line, in eight different character-enhancement modes — bold, italic, underline, double width and height, quad width, super and subscript, and regular characters. Any of these features can be selected at any time, and more than one feature can be enabled at the same time. In addition, the program has a built-in graphics character font for printing special symbols. The system includes several printer drivers and allows the user to print either the current window or the entire screen.

## Cer-Comp, Certainly

Surprisingly enough, Cer-Comp was formed before the Color Computer was ever produced. Bill Vergona, owner of Cer-Comp, began programming software for other 6800 and 6809 computers. When the Color Computer was introduced, Vergona immediately saw this new computer's power and directed Cer-Comp toward this remarkable new machine. Cer-Comp began producing new software for the Color Computer — introducing *Hi-Res II*, *Textpro III*, *Data Pack II* and *CBASIC*, all powerful machine language programs.

These Cer-Comp programs supplied the CoCo user with many needed features that Tandy had not included. *Hi-Res II Screen Utility* gave the CoCo user a high-resolution screen capable of displaying up to 255 characters per line, true lowercase, mixed text and graphics, auto key repeat and an ON ERROR GOTO function.

When Tandy announced another new computer, the CoCo 3, Vergona directed Cer-Comp toward this new, more powerful, Color Computer. Some of the new software

reflected earlier work by Cer-Comp. The old favorites were modified and enhanced to fully use the power of the CoCo 3. However, Cer-Comp does more than updating established software. It produces *Window Master*, a powerful new software package for the CoCo 3 that pushes the machine's hardware far beyond its normal capabilities.

Cer-Comp takes great pride in the technically oriented software it offers its customers. Vergona loves to make the CoCo 3 do more than the expected. Programs like *CBASIC III* and *Window Master* do just that. Both systems were expensive projects for Cer-Comp — each requiring more than a year to produce. But Vergona feels it's all worthwhile. Indeed, he says that "*Window Master* is the greatest thing since sliced bread."

The people at Cer-Comp pledge to continue on a technically oriented path; they enjoy stretching the Color Computer 3's hardware capability, and making the impossible possible. □

*Window Master* comes with over 30 pages of understandable documentation. With the information provided, I was able to produce a program utilizing eight windows on my screen. In fact, I was so fascinated that I wrote several programs. The system is a delight to use!

## The Power Within *Window Master*

*Window Master* has an extensive set of commands, which are an extension of the original Extended Disk BASIC commands. I was impressed with some of these powerful statements, and I would like to give you a preview of some of the functions offered by this system.

The Window Open statement creates an output window of a specified type and size on the screen. It will automatically become the current active window. You have the option of creating either a centered or uncentered title. In contrast, the Window Close statement removes a specified window from the screen. However, all the information contained in the window is saved and can be re-displayed later.

The Window Active statement makes a specified window currently active. If this window is hidden beneath another, *Window Master* will rearrange the window layers to bring your specified window to the screen.

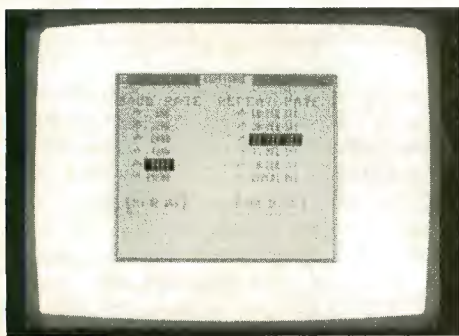
You use the Window Button statement to display one of the various types of buttons on the active window along with text next to the button. (The buttons allow the user to define various screen areas.) The Window Button Close statement removes a specified button from the display.

While Window Icon statements let you display an icon image in your current window, Window Attr statements are used to choose how graphic data will be placed in the window. Disk BASIC allows the use of a copy function, which automatically replaces any existing data on the screen. This window statement lets you select three alternative ways to put the data on the screen.

Using the Window Color statement, you can change colors after a window has been opened. Buttons, icons and text are displayed in the current text color. Edit field boxes are displayed in the current border color.

These are just a few of the commands available for manipulating the windows in the programs you develop, just a brief glimpse of the options available. *Window Master* also has an extensive command list for manipulating the mouse, keyboard, menus and much more. It is up to you and your imagination to test the limitations of this system. □

*Window Master* comes on a somewhat copy-protected disk. You can make backup copies with the `BACKUP` command, but the backup isn't bootable. You must boot up with the original disk and then replace the original with your backup. If the original disk is damaged within a year of the purchase date, it will be replaced free of charge. The program disk comes with many demonstration programs, like a calendar program, an MGE graphics viewer and a graphics editor. Cer-Comp promises more in the future. The company is also producing an advanced programming guide designed for *Window Master* users, and the company would like to hear from those of you using this product. If you produce some great software with *Window Master*, Cer-Comp might want to make you an offer.



The program has made Disk Extended BASIC very powerful. *Window Master* is reasonably priced and (dare I say it?) offers so many features that it is probably underpriced. I recommend this software to all CoCo 3 owners.

(Cer-Comp, Ltd., 5566 Ricochet Ave., Las Vegas, NV 89110, 702-452-0632; \$69.95 plus \$3 S/H)

— Brian R. Smith

## Software

CoCo 3

### *MacPlay*— Can You Hear It?

*MacPlay* is a machine language, disk-based utility that allows the CoCo 3 to play digitized *MacSound* files, which are found on most Macintosh BBSs as well as CompuServe and Delphi. *MacPlay* requires a 128K or 512K CoCo 3 and one disk drive. You will need a 512K CoCo 3 to take advantage of some of the larger digitized sound files. Although a modem with related communications software is required to download *MacSound* files, you don't need a modem to listen to the files. The sounds are played through the monitor

speaker via the CoCo 3's output jack.

*MacPlay* comes on two disks. The first disk contains the program and several sample *MacSound* files; the second contains additional sample files. *MacPlay* runs under Disk BASIC, and the manufacturer says it will run on any of the Disk BASIC-compatible operating systems. *MacPlay* is not copy-protected, so you should make copies of the original disks and work from the backup copies.

When you boot the program, you'll see a single menu that presents a list of options, which are selected by pressing the corresponding number key. In the default drive, the Directory option lets you view the program files, and the Load option allows you to load a file and then view it. Another option lets you load files into memory sequentially and then play them in the order they were loaded. The speed at which sounds are played is controlled via a set of values (one to 32), which are selected using the left and right arrow keys. A final Quit option lets you quit the program and return to Disk BASIC.

The sample files included with *MacPlay* are actual digitized sound files created originally for the Macintosh computer. If you download additional files from a BBS, no file conversion is necessary. However, each file should be given the extension `.MAS`, or the program will not recognize it. In addition, *MacPlay* cannot play archived or compressed files.

While the duration of a digitized sound varies according to file size and playing speed, each of the sample files included lasts between one and five seconds. Having never heard the CoCo produce digitized sound, I was surprised by the high quality of the sound files. To CoCo users who have heard only the buzzes and squeaks available from BASIC, *MacPlay* will make the files sound like records played on a phonograph. The sample files include the Roadrunner's famous "meep-meep," the final bars of the theme song from *The Three Stooges*, the opening trumpet call of *F-Troop* as well as assorted spoken words and sentences. Each file was realistic. (I even expected to see the Roadrunner race up behind me.)

The program makes no provisions for recording your own sound files, nor can *MacSound* files be played or manipulated by any other CoCo sound digitizer.

Overall, I was impressed by the program's convenience. The menu is straightforward and works logically. I liked the ability to make menu selections with a single keystroke. However, the Load and Directory commands are somewhat limited: You cannot load a *MacSound* file while viewing the file directory. In order

to load a file, you must return to the main menu — losing the directory. Therefore, you must either memorize or write down the names of the files you want to load. In addition, you can access only one disk drive while using the program.

These are minor faults for a program that gives the CoCo Community a whole new world of digitized sound. One of the biggest difficulties faced by computer users today is communication between different systems; *MacPlay* is helping to unite our community. If you would like to hear what Macintosh users have been hearing, *MacPlay* is for you.

(CoCoTech, 208 Cathy Ann Drive, Reading, PA 19606, 215-779-7768; \$19.95: First product review for this company appearing in THE RAINBOW.)

— Walter Myers

## Book

### *Pokes, Peeks 'n Execs*— A Series of Helpful Hints and Tips

Do you remember looking through the programs and articles in THE RAINBOW and wondering where all those intriguing peeks, pokes and execs came from? Do you jot down interesting CoCo tidbits for later use but want some way to organize that information? Have you always wanted to really stretch the power of your CoCo?

If the answer to any one of these questions is yes, you should look at the *Pokes, Peeks 'n Execs* series sold by Microcom Software. This series consists of three 8 1/2-by-5 1/2-inch soft-cover booklets, containing more than 1,000 peeks, pokes and execs.

Each of the books is organized into general sections, dealing with disks, printers, cassettes, 64K-mode operation, etc. After each command is presented, comments are given about its use and result. The format is clear, easy-to-follow and concise enough not to slow down the more experienced user.

These books can improve your programming skills by giving you access to many functions normally unavailable. The information can be used straight from the books to increase the power and flexibility of your computer. In addition, this wealth of information is available in one organized source, which will be appreciated by both novice and expert.

The first book in the series, *500 Pokes, Peeks 'n Execs* for the TRS-80 Color Computer, contains a wide range of commands, including those for disabling keys or commands, determining either computer memory size or the type of BASIC used, etc. The book also contains utilities, like key-beep, reset protection and recovering a BASIC program after the command NEW.

The second book, *Supplement to 500 Pokes, Peeks 'n Execs* for the TRS-80 Color Computer, offers 500 more useful commands and utilities, including some for text and graphics dumps, and has fixes for a few bugs. The book includes some modifications for a few well-known programs and shows you how to get extra lives in some of your favorite games. In addition, it includes a section describing changes to make some of the commands in the book work on the CoCo 3.

The final book in the series, *300 Pokes, Peeks 'n Execs* for the CoCo 3, has some excellent information for the CoCo 3 that I have already put to use. The book includes information on changing border colors, memory management registers, true lowercase, fixes for CoCo 3 bugs, etc.

I was impressed with the accuracy of all three books and found very few errors

in the command lines. I did notice that a few peeks and pokes found their way into more than one book, but that was a rarity.

The information found in these books is valuable. I have seen programs based solely on one or two of these peeks and pokes. Imagine what you could do with the entire series at your fingertips.

(Microcom Software, 2900 Monroe Ave., Rochester, NY 14618, 800-654-5244; \$19.95 for first book; \$16.95 for second; \$9.95 for third; \$39.95 for set, \$3 S/H)

—Michael G. Toepke

## Software

CoCo 1, 2 & 3

# MAESTRO— The Complete Disk Manager

MAESTRO is advertised as "the complete disk manager for the Tandy Color Computer System." The utility will work on any 32K CoCo with at least one disk drive and Disk BASIC. The program is written in BASIC, so there are no problems

with making backup copies for your own protection. The BASIC listing also makes it easy to study the author's work and make changes or modifications as you want. MAESTRO is easy to use, even for non-programmers. With it, I was able to modify a number of disk programs and even fix some that crash on me.

MAESTRO is easy to load. The directory contains both the main program and two loaders: one for the CoCos 1 and 2, and another for the CoCo 3. To bring up the Hi-Res screen, just type RUN "COCO 3" and press ENTER. From that point, the actual editor screen can be invoked by pressing any key.

The disk index is shown in the upper third of the editor screen. This section of the screen displays the contents of the disk being edited. In the middle of the disk index area, three numbers representing the disk drive, track and sector are displayed. A block to the right of these numbers contains the decimal and Hex values of the byte at the cursor location. The bottom half of the screen, the command window, is used to display various messages for the 32 commands available with MAESTRO. The following commands are performed by pressing the appropriate key in conjunction with the CLEAR key:

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**up arrow** Reads the current sector of the following track into the editor.

**down arrow** Reads the current sector of the preceding track into the editor.

**right arrow** Reads the following sector of the current track into the editor.

**left arrow** Reads the preceding sector of the current track into the editor.

**@ (Position Cursor)** Relocates the cursor to any byte in the sector.

**0 (No. of Tracks)** Changes the number of tracks to 35, 40 or 80.

**A (Change Drive Default)** Changes the number of the disk drive accessed for input and output functions (0 to 3).

**B (Toggle Background Color)** Switches between green and buff.

**C (Copy Sector)** Writes the contents of the editor to the specified track and sector.

**D (Decimal Mode)** Allows you to enter a three-digit number. One- or two-digit numbers must be preceded by a 0 or followed by spaces.

**E (Exit)** Returns to BASIC.

**F (Read File)** Reads the first sector of a specified file into the editor.

**G (Clear Buffer)** Erases the decimal or hexadecimal number in memory.

**H (Hexadecimal Mode)** Allows you to enter a two-digit Hex number. One-digit

numbers must be preceded by a 0 or followed by a space.

**I (Disk Directory)** Displays the disk directory.

**J (Toggle Inverse Display)** Reverses the current foreground and background colors.

**K (Kill File)** Kills a file on disk.

**L (Encode MSB/LSB)** Translates a number into most significant byte/least significant byte code.

**M (Fill Sector)** Fills the sector with any character you specify.

**N (Normal Mode)** Allows direct input from the keyboard.

**O (Decode MSB/LSB)** Translates a most significant byte/least significant byte code into a decimal number.

**P (Search Disk)** Searches each half-sector on the disk for a given target string.

**Q (Current Granule)** Displays the current granule.

**R (Rename File)** Renames a file on disk.

**S (Read Sector)** Reads the sector of the track you designate into the editor.

**T (Trace File)** Traces a file on the disk after reading it into the editor. You will see the current granule, track and sector of the file.

**U (Undo Sector Mods)** Restores the original sector by erasing any changes you made.

**V (Verify Disk)** Makes sure the disk is free of I/O errors.

**W (Write Sector)** Writes the contents of the editor to the current track and sector.

**X (Reinitialize)** Restarts the program.

**Y (Fill Before Cursor)** Fills every byte before and after the cursor with any character you select.

**Z (Fill After Cursor)** Fills the byte under and after the cursor with any character you select.

I used **MAESTRO** to fix a disk that kept giving me I/O errors. All I had to do was scan the sector containing the I/O Error

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and look for the byte that was out of place. The program's 15-page instruction manual devotes an entire section to this process. Instructions are also provided for *patching*, rather than fixing, a bad sector if you don't understand the sector's contents. In addition, *MAESTRO* can fix FS errors. The program disk contains a utility called *Crash Buster*, which makes an extra copy of the disk directory on an unused track. This utility is simple to use and menu-driven.

*MAESTRO* is a fine disk repair utility, and its ease of use rates as one of the best I've seen. The program is straightforward; the author treats this usually complicated subject matter with a good deal of practicality. Although not intended for the novice, *MAESTRO* provides the serious CoCo hacker with an excellent tool for programming and debugging. The program supports a printer, so you can make printouts for later reference and filing.

(Marc Campbell Innovations, 266 River-view Drive, Ephrata, PA 17522, 717-733-2998; \$16.95 plus \$2 S/H: First product review for this company appearing in *THE RAINBOW*.)

— Robert Gray

## Software

CoCo 1, 2 & 3

## Buried Buxx— Digging for Dollars

*Buried Buxx* is an action, shoot-em-up, machine language game that requires a CoCo with 32K ECB, one disk drive and a joystick. The game runs fine on the CoCo 3, but you will get a black-and-white game screen if you use an RGB monitor. On the CoCo 3, the screens look best on a composite color monitor.



The game is simple to load; just type LOADM "BUXX", press ENTER and then enter EXEC. You will be greeted with the title screen, which includes a color test. Press the reset button on the back of the

CoCo until the test blocks are the correct color.

To play the game, use a joystick to maneuver a small helicopter over buried dollar signs (\$). You must shoot holes into the ground and descend into the holes to retrieve the dollar signs. At the same time, you must avoid the bombs dropped by the ever-present airplane above you. The bombs will also fill the holes you have blasted. To make matters worse, there are missiles hidden beneath the ground, and if you uncover them while shooting, you must move quickly to avoid destruction.

Once you have successfully captured a dollar sign, you must fly to the landing pad on the left side of the screen and land. A tone indicating that you have off-loaded the dollar sign will sound, and you can continue your search for the buried dollar signs. Don't get greedy and try to carry

more than one dollar sign at a time — your helicopter will explode.

Once you have retrieved all the buried dollar signs, you will advance to the next screen. At each new level, an additional dollar sign is added. (By the way, the number of dollar signs is equal to the number of hidden missiles.)

Each dollar sign you deliver to the landing pad is worth \$2,000. Your score is shown at the bottom left of the screen, and the number of remaining helicopters is displayed at the bottom center of the screen. For every 20,000 points you earn, you get an extra helicopter. Helicopters get 25 rounds of ammunition, and extra ammunition is available at the landing pad. However, you lose 10 points every time you fire, so it's wise to conserve that ammo. Your ammunition count is displayed at the bottom right of the screen.

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*Buried Buxx* is a lot of fun to play. It has a simple theme but challenges your skills. The disk has a one-year warranty and can be replaced for \$5. In addition, the disk is not copy-protected, so you can make backup copies. I would like to see a version available for the CoCo 3 and an RGB monitor, so those users can enjoy the colors and graphics. The game is suitable for all ages, and its tame theme does not promote violence.

(JR & JR Softstuff, P.O. Box 118, Lompoc, CA 93438, 805-735-3889; \$19.95: First product review for this company appearing in **THE RAINBOW**.)

—Jerry Semones

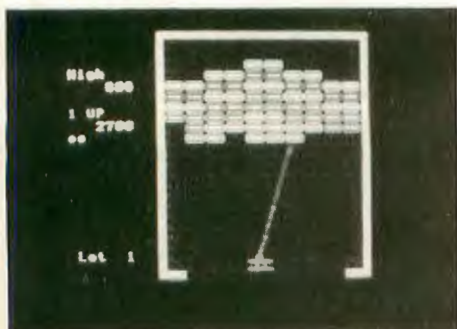
## Software

CoCo 3

### *Bash*— Breaking Away

*Bash* is an action game in which players attempt to clear vacant lots (screens) of debris for the construction of new buildings. To do this, you must move a girder back and forth across the lot in order to bounce a wrecking ball off the debris. If you fail to hit the ball with the girder, the ball is lost and a new one is put into play. When the screen is cleared of debris, the player advances to a more difficult lot. The game is over when a player either successfully clears all 20 lots or exhausts the limited supply of wrecking balls.

My first impression of *Bash* was that it would be another one of those *Breakout*-type games. But I think the author, Steve Bjork, has made it different and more challenging. As in most *Breakout* games, the speed of the ball continues to increase. But in this version, when certain pieces of the debris are hit, treasures are revealed and “fall to the ground.”



These treasures must be caught by the girder in order to be collected. Some of the treasures cause the ball to slow down or make the girder wider. Other treasures produce more balls—it can become quite

a challenge trying to keep all those extra balls in play. You must learn to catch the treasures with the girder while not losing the wrecking ball.

*Bash* makes very good use of the colors available on the CoCo 3 and is especially nice on an RGB monitor. This is important because it allows for extended playing time without the video eye-aches. Another feature is one that allows you to choose to start anywhere from Lot 1 to 15. The game's pause feature comes in handy when you're right in the middle of a game and the phone rings!

*Bash* is essentially bug-free, and all of the action elements are close to real-life movements; e.g., the ball's behavior is realistic as demonstrated by the way it bounces off the objects on the screen. The game was very enjoyable and worthwhile to play.

(Game Point Software, P.O. Box 6907, Burbank, CA 91510, 818-566-3571; \$24.95 plus \$3 S/H; \$4.95 for demo disk)

—Christopher Dollberg

## Software

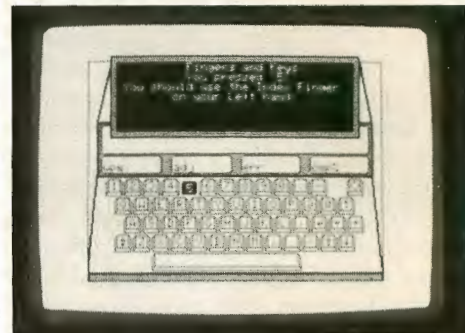
CoCo 1, 2 & 3

### *TypeMate*— Teach Your Fingers More Than Walking

Speed is a major concern of many computer users. We spend hundreds of dollars on utilities like RAM disk programs to speed up our computing. We listen with interest as software publishers brag about the lightning speed of their programs. Even with RAM disks, hard disks and faster microprocessors, our computing is still often slowed down by the slowest and often forgotten component—the operator. Using a word processor with a RAM disk and print spooler is great, but it leaves something to be desired if the person sitting in front of the computer is still typing manuscripts by the hunt-and-peck method.

A recent search through **THE RAINBOW** showed only one typing tutor program for sale. It seems that keyboarding skills have been neglected by CoCo programmers. Tandy, however, is attempting to rectify this situation by releasing a new program pack intended to teach typing skills—*TypeMate*, which will work with any CoCo 1, 2 or 3 that has at least 32K of memory. No other equipment is necessary; a printer and cassette recorder, however, are optional.

It doesn't take long to learn how to use *TypeMate*. Simple menus guide users through the program. Selections are made by pressing the up and down arrow keys followed by the ENTER key. The BREAK key is always used to escape from one level of the program back to the previous one. The opening menu is called “What shall we do?” and contains five selections: Fingers and Keys, Exercises, Lessons, Graphs, and Controls.



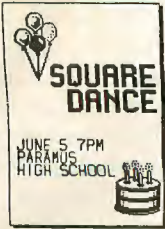
The first thing people must learn about keyboarding is how to place their fingers on the keyboard and which finger to use for each key. *TypeMate* is not a conventional, full-fledged typing tutorial: It does not contain lessons that begin with the home-row keys (A through L) and then continue on to the more exotic keys. It *does* have a chart in the back of its simple but adequate 28-page manual that shows you where to place your fingers. From there you must learn how each key works by selecting the Fingers and Keys option on the menu.

Fingers and Keys prompts you to press any key. When you do, the computer tells you which key you have pressed and which finger or combination of fingers should be used to make that key press. The accompanying manual provides a suggested plan for going through each key press in order to learn them.

The Exercises and Lessons options are useful and similar to each other. Here is where you begin to practice typing. When you choose the Exercises option, the computer produces random lessons made up of nonsense words and times you as you type them. You can choose short, medium or long exercises for your left hand, right hand, both hands or problem fingers. Of course, you cannot choose problem fingers until you have completed at least one exercise—which allows the computer to determine which fingers are causing you trouble.

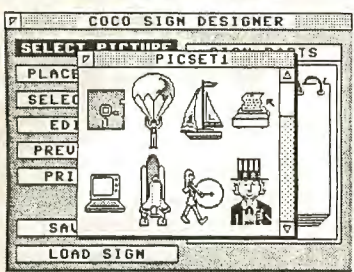
As you type, your words per minute (wpm), number of errors, adjusted wpm and the percentage of the exercise completed are shown onscreen. It is tempting to look at these displays as you type, but this only slows you down. Whenever you

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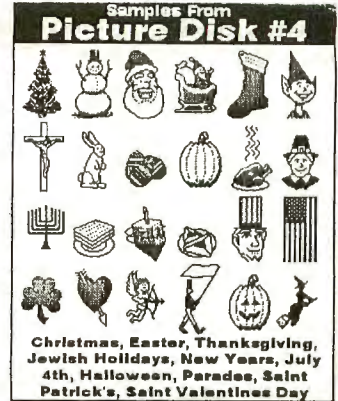
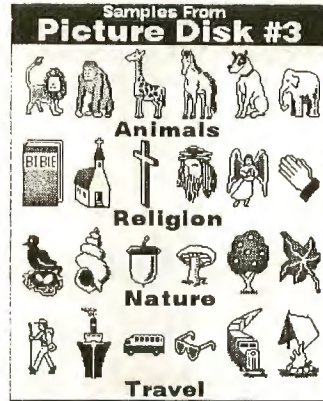
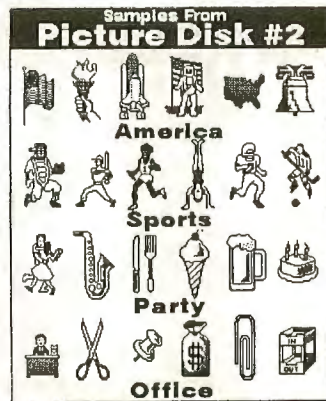
The CoCo Graphics Designer Plus (CGDP) is CoCo 2 and 3 Compatible. It allows pictures, and text in up to 4 sizes and 16 fonts, per page or banner. The cards & signs feature hi-resolution borders and complete on-screen previews. The CGDP comes with 16 borders, 5 fonts, and 32 pictures. It's 100% machine language for fast execution.

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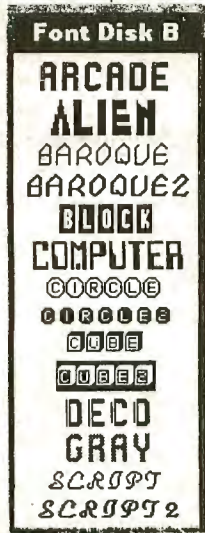
**Requirements:** 64K CoCo II or III, disk drive with RSDOS, mouse or joystick.

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make a mistake, the computer beeps. If you find this annoying, as I did, simply turn down the volume on your monitor.

The Lessons option allows you to create and edit your own typing exercises, execute them and save them on tape for future use. This option is helpful because it enables you to create typing exercises that are more like the actual manuscripts that you type in real life. After all, how many of us find ourselves typing such phrases as "zzyk lper syncu." You will find that your typing speed will be much better when typing actual English words.

There are some limitations when using a cassette recorder. First, all lessons that you create are saved under the same filename, *TYPEMATE*. You cannot give them filenames of your own. Second, I was hoping I would be able to load in manuscripts that I had prepared previously on a word processor. Although I tried many times, I couldn't do it. *TypeMate* seems to save files in its own unique way, which is incompatible with word processing and straight ASCII files. If Tandy upgrades this program, I would recommend they add the capability of reading in existing ASCII files so that users won't have to spend time creating files.

*TypeMate* also allows you to print out lessons that you can type in, as you might ordinarily. This option, like the cassette option, is excellent; however, it too has limitations. *TypeMate* sends data to the printer at the normal default rate of 600 baud, a fact not documented in the manual. I have my printer set at 4800 baud and had to reset the DIP switches before printing my lesson. Also, *TypeMate* does not allow you to format your lesson before your print it out. Spaces and margins will have to be put into your document as you type it.

It is possible to transfer the program from pack to tape so that you can change the baud rate before executing the program. This, however, is probably not worth the effort. If you should do it, you may have problems getting *TypeMate* to run from tape.

It is essential to have feedback when learning typing skills. This is where *TypeMate* really shines. Not only does it keep track of your speed and errors, it also illustrates those errors with bar charts. The Graphics option will illustrate your errors by hand and finger, and by keyboard character. Once you know what fingers and keys are giving you trouble, you can give them special attention.

The final option on the main menu is called Controls, and it allows you to change the color of your screen from black on white (with artifact red and blue) to dark green on light green. You can also change

from typewriter to word processor mode, which simply means you won't have to use carriage returns at the end of lines, and you can use the backspace key to make corrections while working on a lesson. Finally, you can remove the labels from the keys that appear on the screen.

Although I would recommend this program to anyone, I think it is best suited for someone who already has a little experience with the keyboard. A person who has no keyboarding skills might need a step-by-step tutorial that works on one key at a time. However, for anyone who knows some of the keyboard but is slow and makes a lot of errors, *TypeMate* is an excellent tool. It is also an excellent tool for a good typist who simply wants to increase speed. I enjoyed using *TypeMate*, and it was comforting to find out that my typing skills have not diminished since I took a personal typing course back in 1973.

(Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; \$24.95; Available in Radio Shack stores nationwide.)

—Dan Weaver

## Software

CoCo 3

### Warrior King— Reclaiming a Kingdom

Rastann is alone. His armies have deserted him. Only his sword, his bravery and his wits can save his life and his kingdom.



The kingdom, Aqualone, is properly named because there is a lot of water in *Warrior King*, Sundog Systems' latest cardiac-arrest game for the CoCo 3. At times I felt as if I were back on the golf course, what with all the water hazards facing me as Rastann's controller. Fortunately for golfers, there aren't any pits filled with molten lava on the greens as

there are in this game.

You need a good joystick, 128 or 512K and a disk drive — plus a strong heart and maybe a goodly supply of deodorant — to play. There were times when I wondered about both (plus the wisdom of using a week's supply of adrenalin in five minutes) after battling lizard-men, skeletons and various other unfriendly inhabitants of Faerendor on my way to retrieve Rastann's crown and thus save his kingdom.

The double-sided disk can be backed up. However, you cannot play from the backup copy; it's only to restore the regular disk in case you goof it up. One side is the game and the other side the graphics, which, by the way, are excellent.

You load up the game disk, at which time the screen will ask if you have an RGB monitor. You're then told to *flip the disk* to the graphics side.

My disk drive made little squeaks every once in a while when the graphics disk was loading, but it was nothing to worry about. Leave the graphics disk in the drive.

At the beginning you see an elaborately carved gate with a sword over it (is there a face at the base of the blade or do I need new glasses?). You begin the game by pressing the joystick firebutton; as the gates slide back, you hear the sinister "sniick" of a sword being drawn from its scabbard.

You then see a side view of Rastann as he proceeds on his perilous quest. Using the joystick and its firebutton, you slash at the enemy (while the computer produces realistic metal-on-metal noises), climb ropes, jump hazards and pick up helpful items. This is not easy, because you are also facing a time limit for each level you have to pass through. Thus, you can't be mucking about slicing up foes instead of getting on with it. The screen advises you of how much time you have left, any objects you might have picked up, and how much life energy you still have.

When you die — and you will — everything goes black. Well, the screen goes black, anyway. You then return to the starting point for that level. Three lives gone and you end up back at the gate, unless you've picked up one or two bonus lives. Those you collect at every other level. The trick is surviving long enough.

Rastann must have some body armor because he can survive melee-type close combat, but at a cumulative cost to his life energy. Unfortunately, this same armor gives him the swimming ability of a depth charge, so stay out of the water and the lava. The best thing is to slash the opponent, kneeling if you have to in order to get under his sword — and get moving.

Like a lot of good advice, it wasn't that



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easy to follow. After drowning often, I called Glen Dahlgren, the wizard who programmed *Warrior King*. He gave me some good advice, which was easy to follow. Swing the sword before jumping, because sometimes you will push the joystick through another command area on the way to the upper-right corner to produce a jump. This hint saved me from the previous embarrassment of watching my hero look like an armored hopscotch player, having just made a 6-inch jump straight into the water.

Another hint was to ease up to the edge of where you want to jump from by tapping the joystick. "Ease" and "tap" are the right words; more than once Rastann had eased his way right into the water thanks to my trying to gently move the joystick instead of tapping it.

Another thing to remember is that you can't move forward or backward when swinging the sword. This is important because if you're flailing away at an enemy while standing on his toes, you're not getting away from him and you're not going to kill him, either. In the meantime, he'll be turning you into self-propelled hash.

The instructions for this electronic mayhem are clear, concise, easy-to-follow and well-made. Sundog Systems has already produced a modified version of the instructions, which are much classier than the original. In addition, Glen Dahlgren said that he'd eliminated a gremlin that appeared about once in every 1,000 games.

Don't laugh. If you were to keep track, 1,000 games would happen sooner than you think. There is an obsessive tendency to try just one more time before going to bed, to work or to dinner.

My only suggestion might be to make things just a little easier at the beginning so you can get used to the way things work. You may spend a lot of time dying while learning the basics. On the other hand, if you apply the above hints, you'll have an easier time than I did before calling for help.

So, if you want something other than mindless blasting of alien spacecraft from the galaxy, and thrive on feeling your heart pound in your chest while your forehead gets damp, have a go at *Warrior King*. What with winter settled in, you can get your exercise swinging a sword/joystick rather than a golf club or bat. You might get to the fabled Crown of Aqualone by spring.

(Sundog Systems, 21 Edinburg Drive, Pitsburgh, PA 15235, 412-372-5674; \$29.95 plus \$2.50 S/H)

—John M. Hebert

## Software

CoCo 3

### Rad Warrior— Life in the Rad Years

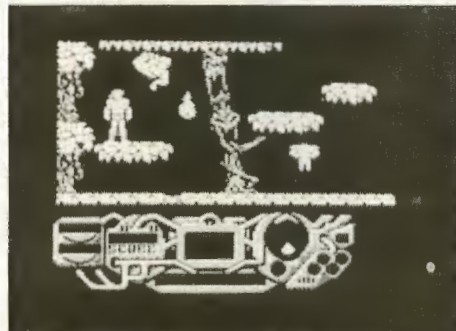
It wasn't always like this. The elders talk of a time before the space invaders attacked, a time of blue skies and green forests. All that is gone now — lost in an alien attack. The remnants of humanity are slaves, mining ore deep in the earth. It is the worst of times.

But there is hope. The elders know of weapons that — if found — would destroy the aliens. You have been trained from birth to find these weapons and destroy the aliens. You are earth's last hope.

First, insert the *Rad Warrior* ROM pack into your CoCo 3. Select your tools (either an RGB monitor or color television, and either your joystick or keyboard), and face the opening screen. The graphics and animation in this arcade game are excellent.

Begin your quest by searching for the energy suit, which is vital in protecting you from the radiation. The suit also has a control panel, so you can keep tabs on the radiation level, weapon status and other information necessary for your survival.

It's not easy. The enemies appear endless — mutant flies, jugoids and sustains bar your way. Although these creatures are easy to destroy, killing them saps your strength. Acid rain drips from the ceiling of the mines. Lethal and indestructible sloths wait to ambush you in the forest, and hidden hydraulic spikes add to the danger.



Your weapons and equipment are scattered throughout an underground forest, the ruined city and the volcanic rubble. The weapons you must find include the energy suit, gravity displacers, pulsar weapons (used to shoot the enemy), implosion mines and a particle negator (used to protect you from the intense radiation). Of course, as a last resort, you can also use your fists and throw rocks.

Once you have gotten your weapons, you must fight your way through the alien defenses. You will learn that you can't fight the bomber droids, but you can de-

stroy their bombs. You can do nothing against the calibrated gunners and their plasma bolts, so fight around them. Just when you think it can't get worse, it does. Flame dragons attack with fire. Will these aliens stop at nothing?

You must remember your goal: Find the aliens' generator rooms and destroy the central generator. You must not fail. Failure means the eternal enslavement of the human race.

Some day, people will sing songs about your bravery. They will shudder with horror as they tell tales of the Rad time.

(Tandy Corporation, Fort Worth, TX; \$29.95; Available in Radio Shack stores nationwide.)

—Thomas M. Taulli

## Software

CoCo 3

### Warp Fighter 3-D— Spacing Out Into the Third Dimension

There she stood, complete with the Federation's newest warp drive and the latest technological advances known to mankind — the *Warp Fighter*. Like an old monument, I stood fixed and motionless, gazing in awe at the splendor of her design and workmanship. Suddenly, my concentration was shattered by the realization that the Akaires were out there, waiting to test the years spent sweating, studying and training at the Academy.

Stepping onto the anti-gravitational boarding platform, I couldn't help but feel insignificant compared to the size and complexity of this technological work of art. I slid into the cockpit and lowered myself down into the custom-fit combat pilot's seat, which was manufactured to fit my body like my own skin. I secured myself so as not to be tossed around like a satellite in a meteor shower. The instrument panel looked cold and uninviting. The monitor was lifeless. Eagerly I donned the advanced 3-D visor and reached for the power switch. As power surged through the electrical veins of the ship, the monitor flickered to life. The sound of the drives was soothing, almost hypnotizing.

I activated the long-range scanner. There they were! The Akaires ships. I selected Sector 5.2, which indicated one enemy vessel. I engaged the warp drive and, with a blinding flash of light, almost instantly was transported into the heat of battle. I maneuvered into firing position. The tracking computer locked on. I fired! A direct

hit! One sector cleared. Consulting the long-range scanner, I drew a deep breath and prepared for another warp.

*Warp Fighter 3-D*, programmed by Steve Bjork (distributed by Game Point Software), is a three-dimensional graphics space fighter simulation complete with 3-D glasses. It requires a CoCo 3 with at least 128K, a joystick, a disk drive and a monitor. Although a color TV or a composite monitor can be used, an RGB color monitor is preferred for best results.

Operation of *Warp Fighter 3-D* is simple, controlled almost entirely by the joystick. The video display is simple and easy to read, unhampered by confusing, cluttered graphics. The main display, also the largest, is where all the action is. Above it is one line of strategic information and below are three lines of the same. When requested, a sector display will appear to show enemy-held sectors, starbases and your relative position.

The simulation reacted to input as fast as I could act. In order to lock onto an enemy vessel, you must center the cross hairs on the enemy ship. When this is accomplished, the "on-board tracking computer" will stay locked on unless one of several things happens: 1) The enemy ship maneuvers too fast (I found this hap-

pening frequently at the higher difficulty levels), 2) The enemy vessel leaves the screen, or 3) The enemy ship is destroyed.

One characteristic that cannot only be annoying but also fatal is the tracking computer's inability to distinguish between asteroids and ships. In the fury of battle, I don't like wasting time shooting asteroids in order to get a shot at the enemy. The tracking computer can't unlock from a target unless the target is destroyed or moves off the screen.



In the middle of play, I heard a beeping/buzzing sound. Once I figured out what it was, it was too late. That sound was a warning that my shields were depleting to a dangerous level. Shield level is compromised by taking hits from enemy fire and

running into asteroids. If you notice the condition in time, warping to a sector with a starbase and then docking with it will recharge the shield. However, be warned: Recharging the shields costs expensive points. Also take notice that if the shield level drops to the nonexistent, the simulation is over. This was an aspect of the game that I liked. As long as the shield holds up, the game will continue (unlike some other games that depend on fuel level).

The longer I played, the more I noticed that the increase in difficulty in the highest level is derived not only from an increase in speed but primarily from an increase in enemy ships per sector. There are three difficulty levels: Ensign (easiest), Captain (medium) and Admiral (hardest). I found the Admiral level fairly easy and accomplished it on my second or third try (I don't remember which). Had I the determination and the stamina, I could have played as long as the computer held up. After you reach the level of Admiral, 40 enemy ships (total combined sectors) are all you'll have to fight. The object after mastering the Admiral level is to clear all sectors without having to recharge the shield. In theory, this means that it is possible to achieve a maximum score and not be able to do any better. I'll let you discover the maximum



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**The RAINBOW, July 1987**

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score, if it exists, for yourself.

*Warp Fighter 3-D* has a pause feature (for when Mom calls you to dinner) that changes the screen color every few seconds to help prevent screen burn-in. I like this feature and wish all software had it.

A veteran of several different space fighter simulations, I feel this one has some limitations. But I have enjoyed playing it. *Warp Fighter 3-D* is easy to play, which allows younger children to participate and does not require memorizing a lot of keyboard commands or controls. Likewise, the manual is simple and to the point. It outlines basic game play and directions and provides warranty information. It even tells you how to get another pair of 3-D glasses to replace the ones you'll probably wear out. And if you purchase *Warp Fighter 3-D*, you will very likely have to purchase another pair.

This is the first 3-D Simulation I tried; the 3-D aspect is a new twist on an old theme. The monitor actually shows a three-dimensional picture using the blue and red color scheme; the cross hairs and enemy ships are the primary objects that really stand out (the manual recommends adjusting the brightness to help bring out the 3-D aspect). However, I discovered that once I got deeply involved with the game, I wasn't really aware (consciously, at least) of the 3-D graphics. It is difficult for me to describe to you. It's one of those things that you have to see for yourself. I played *Warp Fighter 3-D* both with and without the 3-D glasses and the 3-D option, and enjoyed game play either way. I think you will, too.

(Game Point Software, P.O. Box 6907, Burbank, CA 91510, 818-566-3571; \$24.95 plus \$3 S/H)

—Greg Snow

## Software

CoCo 3

### *Deluxe Icon Editor— A Must for Multi-Vue*

As the "new" CoCo 3 continues to mature, we are beginning to see new and exciting programs enter the market. With the introduction of *Multi-Vue* for OS-9 Level II, we gained a graphic interface for our CoCo. Now we have a utility that helps us use this new interface without having to be programmers.

*Deluxe Icon Editor* from Puritas Springs Software is for the CoCo 3 with 512K of memory, one or more disk or hard drives, and a TV or monitor. Use of a mouse and an RGB monitor is optional but recom-

mended. It runs under OS-9 Level II with *Multi-Vue*.

I, for one, am really glad to see a program that makes some use of all this hardware and software I have invested in, especially *Multi-Vue*. *Deluxe Icon Editor* allows you to easily create original icons for your programs and to run them with a touch of the mouse. This allows you to set up an icon for any OS-9 program that can easily be run by anyone. No longer will the novices in the house refuse to look at BASIC09 or *DynaCalc* because it is difficult to learn the OS-9 menu system. Now they won't have to.

*Deluxe Icon Editor* is a machine language utility that comes on a disk. The instructions are included in a file on the disk. This may not be as nice as having a manual, but I'm sure it helps hold down the cost. The manual prints out to slightly more than seven pages and clearly describes the operation of the program. I was able to create and run an icon for *DynaCalc* in a short time. There is also an icon for BASIC09 supplied on the disk that worked well with my copy of BASIC09.

The main screen or window used by *Deluxe Icon Editor* is divided into five parts. First, there is the menu bar, which functions much the same as the *Multi-Vue* bar. It consists of a Files menu, which allows you to create new files, open existing files, save files, abandon files, delete files, or quit the program. Second, there is a Disk menu, which allows you to change working or data directories or to see the current directories. Third, there is a Colors menu, which allows you to choose your current color. Fourth, there is the AIF section, which allows you to specify the name for the application along with the parameters for the window it is to use.

Last is the Color Bar, Icon Window and Icon Work Area part that allows you to create the icon. Color Bar works in a similar fashion to Color Menu and allows color selection. Icon Work Area is a 24-by-24 grid that allows the icon to be drawn dot by dot. The icon is displayed in Icon Window as it is being drawn to show the actual size of your work.

If you have the right setup, *Deluxe Icon Editor* is one good utility to add to your collection. At the price Puritas Springs Software is asking for this program, it is quite a bargain.

(Puritas Springs Software, Ameritrust Building, 17140 Lorain Ave., Cleveland, OH 44111, 216-251-8085; \$10.95: First product review for this company appearing in THE RAINBOW.)

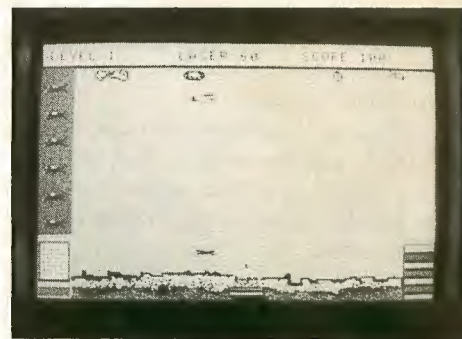
—Barry Pottinger

## Software

CoCo 3

### *Frogday Afternoon— Adventures of an Underwater Courier*

*Frogday Afternoon* from K-Soft is an arcade-style game of action on the ocean floor. The scenario involves protecting a solitary frogman as he swims to and fro carrying crystals to the generator of an underwater city. All is well and good except for the obligatory bad guys, who really don't want the frogman to succeed in delivering his parcel.



*Frogday Afternoon* begins with some very flashy title screens and then prompts for either an RGB monitor or a color TV (this adds a lot to the program, because many CoCo 3 owners don't yet own an RGB monitor). The game screen appears and you are set to defend your frogman from subs, squid and torpedoes. The object is to give the frogman enough time and protection to get to the other side of the screen. As enemy subs cruise by overhead, taking potshots at your hero, you take potshots at them.

The program is written in machine language and uses some really good sound effects and graphics, compliments of the CoCo 3. However, I would not say that the game offers a good challenge to anyone above 12 years of age. I was able to get to Level 6 out of 8 the day I received the program to review. I admit that after Level 4 things do get more difficult, but with a few days' practice, *Frogday Afternoon* can easily be mastered. I did not notice any errors in the program, which is a plus in its favor.

The most challenging aspect of the program is its joystick operation. You don't just point and shoot. Rather, you must adjust for how far away the enemy is. Your "gun" seems almost like a whip: You control how far the "rope" travels, and only the "tip" does any damage. So, in order to destroy squid and enemy subs,

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For Naughty  
Boys and Girls  
See Page 41.

you take your aim and then estimate how far away the target is.

The documentation is rather short, but it does give most of the necessary information needed to play the game. The program will run only on a CoCo 3 and requires a joystick. A TV may be used. However, I would highly recommend an RGB monitor, because *Frogday Afternoon* gives great detail to the graphics and sound portion of the Color Computer 3.

(K-Soft, 300 13th N.E., E. Wenatchee, WA 98802, 509-884-0338; \$24.95)

—Corrie Bender

## Hardware

### Arizona's Hard Drives— Inexpensive Hard Drives for OS-9

The advertisement reads "Hard Drives for the Price of Floppies." Well, I can tell you that this is no ploy and, in fact, is true. Arizona Small Computer Peripherals has OS-9-capable hard drives for your CoCo for as little as \$120 for a 5-megabyte version or \$160 for the 10-megabyte version. These prices include the drive, controller, power supply and cables. You must provide a cabinet of your choice and a hard drive interface to the CoCo.



This Arizona hard drive is shown in a case with a Disto controller attached.

The unit furnished for this review consisted of a 20-Meg CMI 6426 hard drive with a Western Digital WD-1002-SHD controller. The drive, controller and power supply were all installed in an attractive case. Also included in the review package was the Disto/CRC Hard Drive Interface attached to the end of a 32-inch flat ribbon cable, which terminated inside the hard drive case. The drives are full-height, so they are bulkier than the newer half-height

variety. However, the lower cost makes up for this small inconvenience. This neat 20-Meg package sells for \$350 and is an excellent buy if you are serious about adding a hard drive to your CoCo OS-9 system.

*"If you have not experienced the sheer joy of owning a hard disk, I can recommend this Arizona unit without reservation."*

I was impressed with the quality of the hardware package except for one thing: The drive has no ON/OFF switch. Perhaps this is of little consequence to users with plug-in power strips and main power switches, but I object to the lack of such a switch because I don't want the hard drive running when I'm using Disk BASIC and floppies. It seems to me that needless wear and tear on the drive's bearings could be avoided with the addition of an inexpensive switch. However, Arizona Small Computer Peripherals boasts extensive quality checks on their hard drives and warrants them for 180 days.

The completed unit is heavy, weighing in at a mighty 11 pounds, which includes case, power supply and the Disto interface. It measured 7 inches wide by 4 3/4 inches high by 11 1/2 inches deep, making it just a little smaller than a shoe box. A little red LED (light emitting diode) on the front panel flickers when the drive is reading or writing.

Booting the system is easy. Instructions are provided to help you through the process of making a boot disk. The unit supplied for the review already had the boot disk, so it was an easy matter to insert it in Drive 0 and just type DOS. This boot disk can be configured for any slot in your Multi-Pak Interface, or it can go directly into the CoCo's expansion slot.

If you wanted to start from scratch, the following procedure will build a new boot disk for incorporating the hard disk into your system. Level I OS-9 users need only change their startup file to load `ascp.harddisk` from the Disto disk and

link `h0` and `cchdisk` as shown here:

```
load /d1/ascp.harddisk
link h0 cchdisk
```

Level II users have to build a new boot disk to include `h0` and `cchdisk` in this manner (assuming two floppy drives):

```
merge/d0/os9boot
/d1/ascp.harddisk
/d0/newboot
attr newboot e pe
copy /d1/cmds/dmode
/d0/cmds/dmode
```

Remove the Disto disk from Drive 1 and replace it with a newly formatted disk. Type this:

```
os9gen /d1
/d0/newboot
```

Check the modules in the newly created `os9boot` file in Drive 1:

```
ident /d1/os9boot
```

Check that all module `cro`'s are good, then copy all files from your system disk in Drive 0 to the new boot disk in Drive 1:

```
dsave -s48 /d0 /d1 ! shell
```

After doing all this, you can now do a reboot of OS-9 from a cold start using the new boot disk. It will take about 30 seconds for the hard drive to get up to speed. If you watch the hard drive's LED, you will see it flicker at about the same time the OS-9 sign-on message appears. Further instructions are provided to format the hard disk. The unit supplied for this review was already formatted and even contained a number of OS-9 public domain programs. Arizona Small Computer Peripherals gives its customers these programs with an offer to make the boot disk from a customer-supplied OS-9 disk with the `cmds`, `grfdrv` and `shell` modules.

If you have not experienced the sheer joy of owning a hard disk, I can recommend this Arizona unit without reservation. If you are into OS-9, you will find your investment well justified. The access speed and mass storage capability make this hard disk drive a natural.

(Arizona Small Computer Peripherals, 930 W. 23rd St., Suite 26, Tempe, AZ 85282, 602-829-8028; \$120 for 5-Meg kit, \$140 for 8-Meg, \$160 for 10-Meg, \$350 for complete 20-Meg system: First product review for this company appearing in THE RAINBOW.)

—David Miller

## Diskman II— Preventive Maintenance for Floppies

In May 1987's RAINBOW (Page 134), I wrote a favorable review of the original version of *Diskman*. This program was designed to protect the computer user from garbled directories by backing up the directories on either the original disk or a second disk. Since the directory track is the most used portion of a disk, it is the most likely source of trouble. In addition to the ability to back up directories, the program also allowed examination and change in any sector on a disk — interchanging or alphabetizing directory files, scanning and printing out directories.

Now Tothian Software has revised the program and renamed it *Diskman II*. The program requires a 32K CoCo, at least one disk drive and a printer if printouts are desired. The changes include the addition of a multiple-disk drive mode and the support of CoCo speed-up pokes. *Diskman II* uses machine language where appropri-

ate to prevent crashes and includes three new options.

When you boot the program, you will see a menu of options. Option 0, the disk drive mode, allows the user to choose between one- and two-drive operation. Option 1 reads disk directories and makes a backup on the same or a different disk. Option 2 restores a lost directory from the backup copy. Option 3 examines and/or changes any sector on a disk. (Note: This option requires detailed knowledge of computer language and can cause serious damage to a program. A warning sounds when Option 3 is chosen.)

Option 4 reorganizes a directory, and Option 5 alphabetizes it. Option 6 displays stored directories on the screen if the directories are stored on a separate disk. Option 7 displays the directory currently in use. Option 8 prints out a directory catalog showing the number of free granules on each disk, filenames and extensions, types of files, etc. Option 9 searches for a particular file if you have a separate disk for your directories.

Option U removes a backup directory from a disk. Finally, Option C checks the readability of a disk, granule by granule. Bad granules can be blocked out, and this option lets you identify the current use of

each granule. Note: Like Option 3, this option is for the experienced programmer.

In addition to these options, *Diskman II* comes with a companion program, *File-Copy*, which aids in reviving files that are unreadable because of I/O errors.

*“Diskman II provides the ability to scan a disk and either block out or change any sector.”*

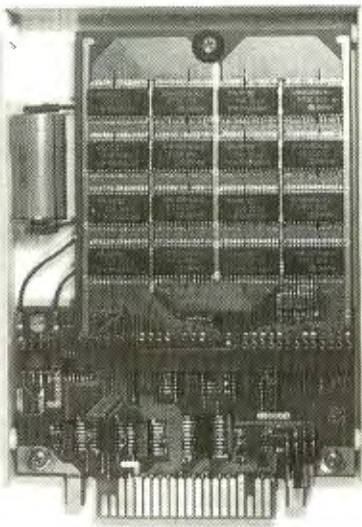
*Diskman II* offers several useful additions to the original version. For the experienced programmer, it provides the ability to scan a disk and either block out or change any sector. The program is user-friendly and comes with five pages of clear instructions. *Diskman II* and its companion program are useful utilities and well worth their price.

(Tothian Software, Box 663, Rimersburg, PA 16248; \$24.95)

—Mel Siegel

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The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, your assurance that we have seen the product and have ascertained that it is what it purports to be.

**Ghost Hunters**, a one- or two-player game in which it is up to you to destroy four plasma disrupter wave generators in order to send 50 troublesome ghosts back to their own plane. *Ghost Hunters* is a scenario created under SPORTSware's *Wargame Designer* and can be modified by those who own *Wargame Designer*. Requires a CoCo 3 and a disk drive. SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; \$15.

**Graphics Designer Plus**, an upgrade to *CoCo Graphics Designer* that's rewritten in assembly language to incorporate a point-and-click graphical interface with windows, scroll bars, buttons, dialog boxes and WYSIWYG on-screen previews. "Produces signs, banners and greeting cards on most popular dot-matrix printers." New features include higher resolution borders and support for more fonts and pictures on each creation. Includes border, font and picture collections. Requires 64K and a CoCo 2 or 3, disk drive, a joystick or mouse and a compatible printer. *Zebra Systems, Inc.*, 78-06 Jamaica Ave., Woodhaven, NY 11421, (718) 296-2385; \$29.95 plus \$3 S/H, upgrade available for \$20 and original *Graphics Designer* disk.

◆ **Hard Drive Utilities Program**, a disk of utilities designed to run under the Burke & Burke *Hyper-I/O* operating system. The program allows users to copy and kill selected files, back up the hard drive to floppies, restore a hard drive from floppies, search for files and more. Requires a CoCo 3, OS-9 Level II and Burke & Burke's *Hyper-I/O KB Enterprises*, 435 *Brightwaters Drive*, CoCoa Beach, FL 32931, (407) 799-3253; \$21.95 plus \$1.50 S/H.

◆ **Kcal**, a calendar-generation program written partly in machine language that bases all its calculations on January 1, 1988 (it will create calendars only from this date forward). DMP-compatible printers can be used to print a calendar 7 inches high by 8 inches wide. Requires a 32K Extended Color BASIC computer, a disk drive or cassette and a DMP-compatible printer. *King Cottage Industries*, 1814 *Valley St. NE*, Poulsbo, WA 98370, (206) 697-5576; \$6.

**Keyboard Extension Cable**, a 5-foot extender cable that lets users back off from their setup. It requires opening up the CoCo. The cable is available in custom lengths, as well. *HAWKSoft*, P.O. Box 7112, Elgin, IL 60121, (312) 742-3084; \$25.

**Math Tutor**, an educational math program that's part "private drill coach" and part arcade game. The display appears as a shooting gallery. Three lesson types are available: arithmetic, fractions and algebra. Comes on a ROM pack for any Color Computer that has at least 16K. *Tandy Corporation*, 1700 *One Tandy Center*, Fort Worth, TX 76102; \$24.95: Available in Radio Shack stores nationwide.

**Orc Ambush**, a game in which you and your elven friends must retrieve a wizards's treasure chest of magic herbs from the devious Orcs. *Orc Ambush* is a stand-alone scenario created with *Wargame Designer* for the Color Computer 3. SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; \$15.

◆ **Rustler**, a Hangman-type game in which you are the only hope of saving an innocent cowpoke from swinging at the town scaffold. Requires a 32K ECB Color Computer and a cassette player or disk drive. *King Cottage Industries*, 1814 *Valley St. NE*, Poulsbo, WA 98370, (206) 697-5576; \$5.

**Space Intruders**, a *Space Invaders*, arcade-type game that features 16-color graphics and sound on the Color Computer 3. The goal is to destroy the intruders with a "particle beam laser cannon" before they reach the ground. Requires a CoCo 3. *Game Point Software*, P.O. Box 6907, Burbank, CA 91510, (818) 566-3571; \$24.95 plus \$3 S/H.

**SPORTSware's Catalog on Disk**, a floppy disk with graphics files that illustrate some of SPORTSware's products. Runs on the CoCo 3 only, although it covers some CoCo 2 software. SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; \$3, but refundable on the purchase of a SPORTSware product.

**Tetris**, a game of spatial skill from Russia that requires users to rotate and place shapes composed of four blocks. When a row is completely filled up, it disappears. As more lines disappear, the skill level increases and the shapes drop at a faster rate. Requires a CoCo with a minimum of 32K, or a CoCo 2 with 64K, or a CoCo 3. *Tandy Corporation*, 1700 *One Tandy Center*, Ft. Worth, TX 76102; \$29.95: Available in Radio Shack stores nationwide.

**TextPro IV**, a text editing/word processing program written in machine language for the CoCo 3. Features include search-and-replace, automatic line numbering and justification, variable fonts, footers, onscreen display of character special effects, supports for laser printers with proportional fonts and more. Requires a 128K or 512K CoCo 3 and disk drive. On 512K systems, *TextPro IV* automatically installs two RAM disks as drives 2 and 3. *Cer-Comp*, 5566 *Ricochet Ave.*, Las Vegas, NV 89110, (702) 452-0632; \$89.95.

◆ **UPDOS**, an EPROMable Disk Extended Color BASIC enhancement for the Color Computer 3 that includes command line recall and editing routines, commands that manipulate graphics compatible with *Color Max 3/ Deluxe*, and that invoke the DOS command on power-up to boot OS-9 automatically. Requires a CoCo 3. *ESP*, P.O. Box 63065, Wichita, KS 67203, (316) 946-0440; \$24.95.

**Wargame Designer Icon Disk #1**, a *Wargame Designer* system accessory that contains eight sets of 66 icons, including humans, elves, standard military symbols, ghosts, robots, desert armies, British and Zulu soldiers, cowboys and Indians, and more. Icons can be viewed at five times their actual size. Requires a CoCo 3 and *Wargame Designer*. SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; \$10.

◆ **First product received from this company**

The Seal of Certification is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a Seal, the magazine certifies the program does exist — that we have examined it and have a sample copy — but this does not constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

—Lauren Willoughby



*If OS-9 seems a little backward, this utility can help*

# What Day Is It?

By Richard Ries

When I was in school, I was taught to write the date in the following order: month-date-year. I've grown accustomed to that order, and I use it in all situations — except one. When I use OS-9, I am prompted to enter the date in this order: year-month-day. I never get that right. I always have to back up and re-enter the date. (This can be rather disheartening at the beginning of a programming session.) Maybe I should adjust, but I don't want to change my habits.

Finally, I decided that the computer and I would both be happier if I wrote a small program that let OS-9 accept the date in the format I preferred. The result of this decision is *Set Date*, a utility that you can add to your StartUp file.

To use *Set Date*, type it in and save it. Next enter pack, and BASIC09 will compile the program into a machine-usable program in the CMDS directory. After the program is written and packed, edit your StartUp file by replacing the following line:

```
setime < /term
```

with this line:

```
setdate < /term
```

*Richard Ries is an electronics technician who integrates hardware and software at work. In his spare time, Richard enjoys programming on his CoCo.*

The next time you boot up OS-9, you will be prompted to enter the date (in month-date-year format) and then the hour, minute and second. *Set Date* then switches the date's order to the format OS-9 uses and runs *Setime* to set OS-9's clock/calendar. One note of caution: *Set Date* should be the last line in your StartUp file. For some reason (which probably has to do with "forking shells") any lines after the SETDATE command are lost.

I hope this program will be as useful to you as it is to me. If you have any questions about BASIC09, I suggest you read Dale Puckett's book, *The Official BASIC09 Tour Guide*. It explains things in a clearer manner than the manual that comes with BASIC09.

*(Questions or comments about this utility may be directed to the author at 361 Deauville Blvd., Copiague, NY 11726. Please include an SASE when requesting a reply.)* □

## The Listing: SetDate

```
PROCEDURE setdate
  0000      (* Copyright 1988 *)
  0014      (* Richard J. Ries *)
  0028      DIM date,time:STRING[8]
  0038      DIM olddate:STRING
  003F      DIM ipath:INTEGER
  0046      ipath:=0
  004D
  004E      PRINT "Please enter the date: "
  0069      PRINT " (mm/dd/yy) ";
  007A      INPUT #ipath,date
  0084
  0085      PRINT "Please enter the time: "
  00A0      PRINT " (hh:mm:ss) ";
  00B1      INPUT #ipath,time
  00BB      (* pack out missing seconds. *)
  00DA      IF LEN(time)<8 THEN
  00E7          FOR n=LEN(time)+1 TO 8
  00FE              time=time+"0"
  010A          NEXT n
  0115      ENDIF
  0117
  0118      olddate=" setime "+RIGHT$(date,2)+" "+LEFT$(date,LEN(date)-3
  0146          )+" "+time
  0146      (* set the clock *)
  0159      SHELL olddate
```

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This fascinating CoCo 3 game continues to be one of our best sellers. **Pyramix** is 100% machine language written exclusively to take advantage of all the power in your 128K CoCo 3. The Colors are brilliant, the graphics sharp, the action fast. Written by Jordon Tsvetkoff and a product of **ColorVenture**.



computer could read their minds? **Mental Freedom** uses the techniques of Biofeedback to control video game action on the screen. Telekinesis? Yes, you control the action with your thoughts and emotions. And, oh yes, it talks in a perfectly natural voice without using a speech synthesizer! Requires Radio Shack's low cost Biofeedback monitor, Cat. #63-675.

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This is not a synthesizer. Sounds are digitized directly into computer memory so that voices or sound effects sound very natural. One "off-the-shelf" application for Vocal Freedom is an automatic message minder. Record a message for your family into memory. Set Vocal Freedom on automatic. When Vocal Freedom "hears" any noise in the room, it plays the pre-recorded message! Disk operations are supported. VF also tests memory to take advantage of from 64K up to a full 512K. Requires low cost amplifier (RS cat. #277-1008) and any microphone.

## Mental Freedom

Would your friends be impressed if your

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## Lightning Series

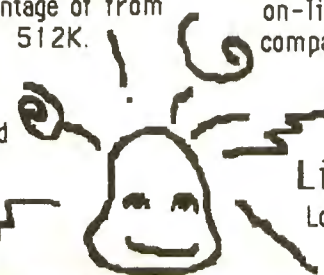
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# Barden's Buffer

*The worm that ate Fort Worth and other CoCo stories*

## Food for Worms

By William Barden, Jr.  
Rainbow Contributing Editor

**W**ith all the talk about neural networks these days, I thought it might be nice to emulate life on a CoCo. Why not try a lower form of life? Perhaps a programmer or life insurance salesman? No, I decided these life forms were too complex. (I still don't understand annuities.) Maybe an orangutan or a chimp? Nope. Much too complicated. A dog? Since I can't understand why my dog barks at *me* when I enter a room, I thought I'd never be able to emulate *his* mind.

Eventually, after passing through lower mammals, birds and reptiles, I settled on a worm. After all, worms seem to lead leisurely lives, munching their way through a seemingly endless supply of food. They also leave trails when moving through earth, wood or paper — easy to simulate on the screen of the CoCo.

### A First Attempt

Suppose our CoCo screen contains a *phosphor* worm. This worm lives on screen phosphor, just as a bookworm consumes paper. The phosphor worm contentedly munches its way through the CoCo screen phosphor until the phosphor is gone. At that point the worm dies.

The basic simulation for this is shown in Figure 1. It's a 256-by-192 CoCo 1, 2 or 3 graphics screen with a border. The border is drawn by a `LINE(0,0)-(255,191),PRESET,B` command. We'll assume the border contains an electric charge that keeps the worm from moving past it.

My first attempt at creating this simple life form (Quick, Igor, the switch!) obeyed these simple rules:

- The worm can travel up, down, right or left, but can't move diagonally across the screen.
- The worm travels in the same direction until it senses that the next pixel contains no food (i.e., if it has already passed over a pixel or is at a border).
- If the worm cannot travel straight, it turns to the right, *if* there's food (a pixel) there. If there is no food to the right, the worm turns to the left. If there is no food there, the worm dies (its return path contains no food — just phosphor droppings).
- The worm starts at the screen center and moves up.

Figure 2 shows the result of this simple life. The worm first heads straight up, tracing a vertical line as it goes. At the border, the worm senses no food and turns right. It continues right until the right-hand border is encountered, at which point it follows that border to the bottom of the screen. At the bottom border, the worm turns right and continues across the bottom of the screen to the left-hand border where it begins moving up again. At the top border the worm turns right again, marching across the screen until it reaches the vertical line in the center. Then the worm moves down until it reaches the bottom (no food) border. The worm turns to its right (left on the screen) and continues around the border until it eats its way into the center and dies.

OK. It's not a remarkable life; it's a pretty boring picture, to say the least. However, if the rules of the life are changed slightly, the worm's life gets more interesting. Suppose that instead of always being on the straight and narrow, the worm turns to the right when there is a food supply in that direction. In the first case the worm lived an *SRL* (straight, right, left) existence. The new worm — after est, Dianetics, and a few therapy sessions — becomes a little kinky and develops an *RLS* life. The worm's new pattern is shown in Figure 3.

Our worm's food path is now diamond-shaped and begins at the center of the screen. Another variation, an *RSL* worm, produces a similar rotten-to-the-core display, but creates a center square instead of diamond. (See Figure 3.)

---

*Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.*

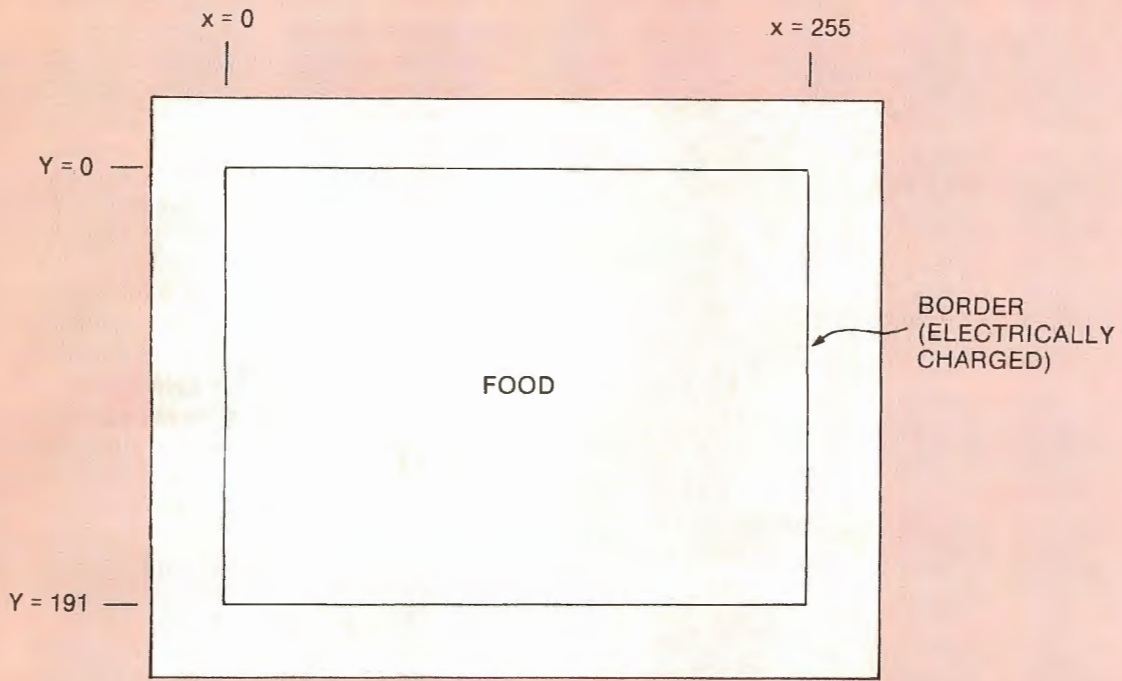


Figure 1: The Land of the Phosphor Worm

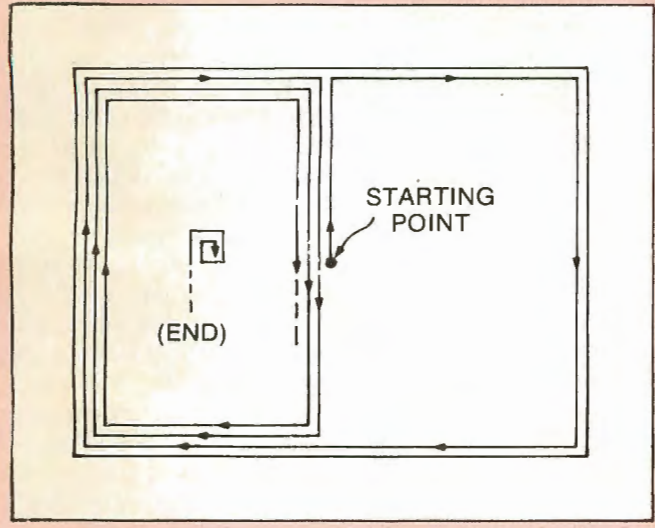


Figure 2: An S(1)R(1)L(1) Worm's Life

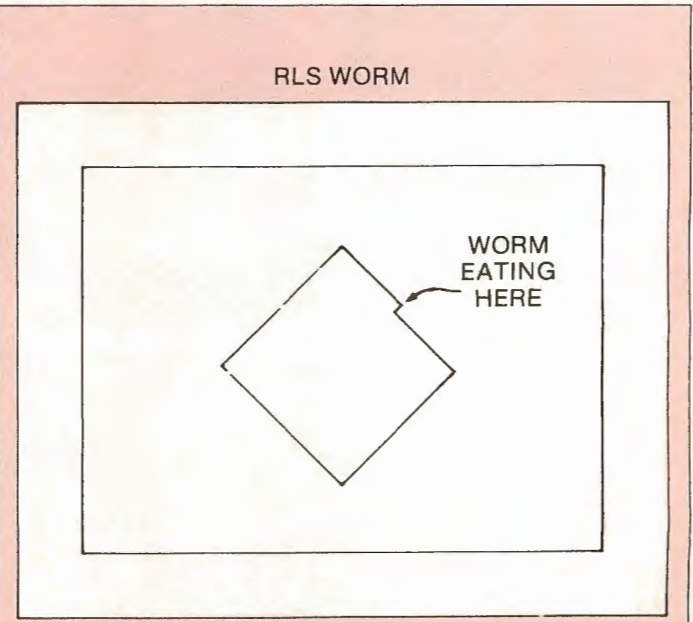


Figure 3: The Eating Patterns of RLS and RSL Worms

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## WORM PATTERNS

### Right-Angled Worms

The pattern traced by the worm in these figures is not obvious from the figure. To get a better idea of the worm's path, I increased the distance the worm traveled by a factor of nine. The rules of life remain the same, but the worm disregards whole sections of phosphor, traveling nine pixels instead of one. The result is shown in Figure 4, where a diamond (RLS) figure is traced. The worm's life is more interesting when viewed at this scale.

The path of travel goes like this: The worm travels right for nine pixels after sensing food in that direction. It then turns right again, heading down, after sensing nine pixels of food in that direction. After determining food to the left, it turns again. It then turns right again, and moves up. At this point, the worm is one pixel to the right of the starting point. There's no food to the right — it's been eaten. Therefore, the worm turns left. Nine pixels later, the worm turns right (up) again, placing it eight pixels above the starting point. There's only eight pixels' worth of phosphor in the down direction, so the worm turns left (up). You can see how the worm traces a diamond shape until it reaches a point where there's not enough food in any direction and the worm dies.

If we magnify the RSL worm's path, we see that it generates a large spiral. (See Figure 5.)

### Octagonal Worms

The worm concept can be extended to worm paths in any direction. However, it becomes quite a chore to maintain the travel of a worm that can go in any direction. A more reasonable model is a worm that can travel up, right, down, left, and in the four directions that run between these four possibilities. We'll use the same letters (E, F, G and H) to identify these directions as are used by the Extended BASIC DRAW command. The directions are shown in Figure 6.

The first worm we'll try is an *EHS* worm, which tries to turn to the right by 45 degrees. (The *EHS* refers to the worm's heading up, but the worm can go in any of eight directions.) If there is not enough food in that direction, the worm will try 45 degrees in the other direction. If that path doesn't supply food, the worm will go straight. If that path doesn't have food, the worm will die. The path of the worm that follows these rules is shown in Figure 7.

This is a complex path, and it leads to an important question: If the worm must be guaranteed of food along each segment of its path, how can the path intersect existing lines? The worm can munch away at each pixel and cross diagonal lines without conflict. Diagonal lines are like the lines shown in Figure 8. The diagonal lines can be crossed as long as the

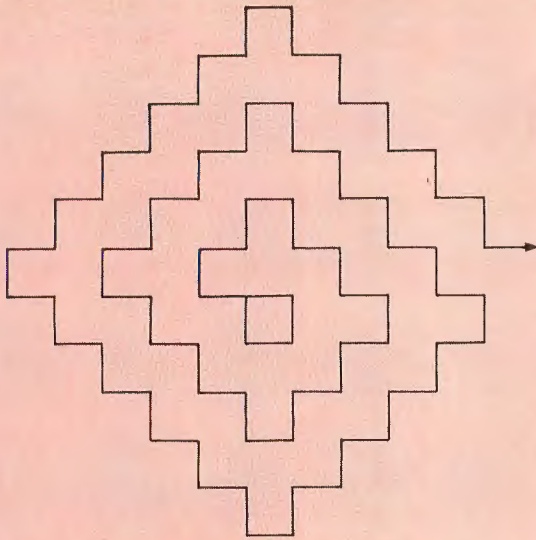


Figure 4: An R(9)L(9)S(9) Worm

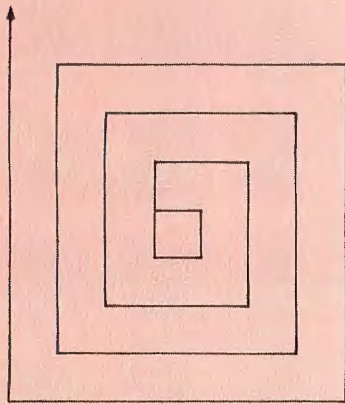


Figure 5: An R(9)S(9)L(9) Worm

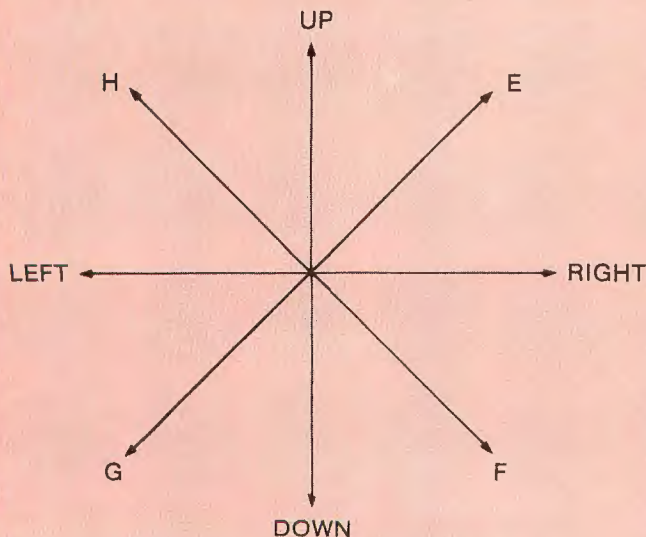


Figure 6: Octagonal Worm Travel

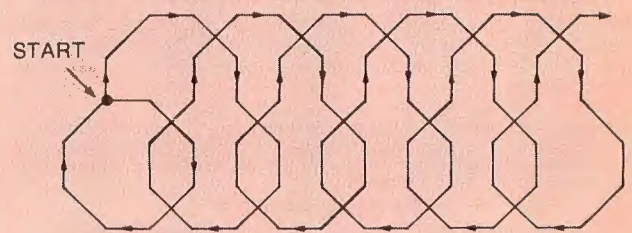


Figure 7: An Octagonal Worm Path

worm path does not intersect a pixel that has been eaten.

In the path shown in Figure 7, the worm dies on the right-hand side of the screen after checking the food 45 degrees to the right, 45 degrees to the left, and straight ahead. (Never mind that there's some food to eat. It's less than what is necessary to survive, and this is a philosophic worm that meets its end without qualms.) To save the worms, we can change the rules and offer them more options. After all, there are seven possible directions for the worm — any valid direction less the one from which the worm just came. The path shown in Figure 9 follows this rule: Turn to the right 45 degrees at a step, taking the first path that offers food. If none of the seven directions offer food, meet the worm deity of your choice.

The path shown in Figure 9 is *quite* complicated. When the worm encounters the top border, it follows that border until it's on the right side of the main path. Then it starts down the screen again. The worm traverses the left side of the main path until it reaches the bottom and finally dies at the upper-left corner of the screen.

### Designer Worms

By now you get the idea — there are some interesting designs to be produced on the screen by a few simple, repetitive rules. And we've just touched the surface here. What if you assume the worm does not have to eat continually and allow it to travel through areas that contain no food for a short period of time? To provide a tool for experimentation, I offer the program shown in Listing 1. It's a *Worm Driver*. You define the rules, and the driver does the rest.

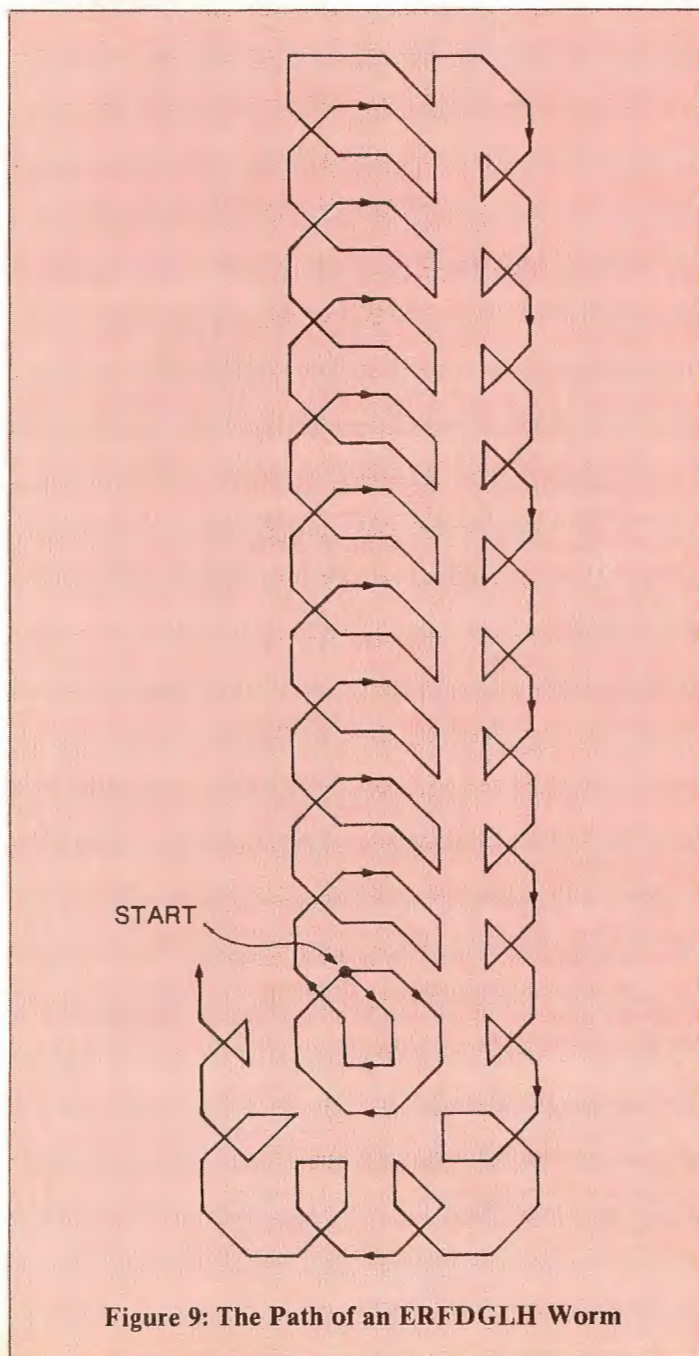
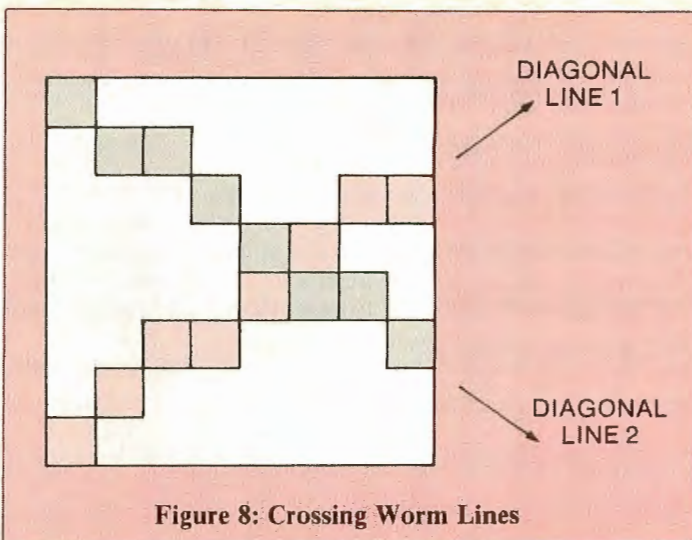
I've also included an example of a *Calling* program in Listing 2.

You must provide four things for the *Worm Driver*:

- The starting position on the screen.  $x$  and  $y$  specify a valid  $x,y$  coordinate for the 256-by-192 mode.
- The actions to be taken for up, right, down, left, E, F, G and H directions are coded as the string constants  $U\$, R\$, D\$, L\$, E\$, F\$, G\%$  and  $H\%$ , respectively. The first two characters of the string are a zero followed by the number of actions. The remaining characters specify the actions to be taken. In other words, if  $U\%$  is "07E5R5F5D5G5L5H5", we know that there are seven actions if the worm is going up (U): Move five pixels in the E direction if food is found, or move five pixels in the R direction if food is found, or move five pixels in the F direction if food is found, or ...you get the idea. If your worm reaches the action, moves five pixels in the H direction, and cannot act, it will die. For right-angled worms, only the up, down, right and left strings need to be specified. It's all right to use fewer than seven actions. You may want only two or three actions — provided you can get a decent pattern with that number.

The  $LA$  variable looks for food. It counts the number of pixels in every possible direction. Generally, this value should match the value in the actions (e.g., if  $E5$  is used to specify a move of five pixels, then  $LA5$  should be used). However, you may make  $LA$  larger than any of the pixel values for actions (up to 9). In this case the worm will cross lines (eaten areas), provided there's food on the other side.

The starting direction is specified in  $DI\%$ . Use U, R, D, L, E, F, G or H. Save the *Worm Driver* as an ASCII file (do a  $SAVE "WF", A$ ) and then merge *Worm Driver* with your four or five lines of code defining the rules and starting conditions of the worm path. The parameters used in my previous example are shown in Listing 2.



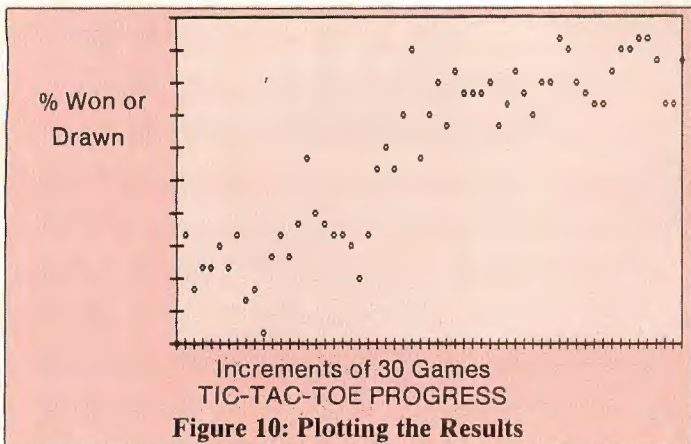
## Please Send Me Worm Trails

Strange as it seems, I'd be interested in the worm trails you generate. If there's enough interest, I'll list them in this column with appropriate credit.

## Old Business — Can the CoCo Learn?

My July '88 RAINBOW column (Page 160) discussed a learning tic-tac-toe program. I asked for volunteers to help the program learn how to play a serious game of tic-tac-toe. This month I'd like to tell you the results of that teaching.

First, let me recap what I presented in that July column: The concept came from a description of MENACE, a Matchbox Educable Naughts and Crosses Engine, described



by Donald Michie, a biologist at the University of Edinburgh. Michie's matchboxes have a copy of a tic-tac-toe position on their covers. Inside each matchbox are beads of different colors, each bead representing a move. There's a hole in each matchbox so that one bead can be randomly selected from all beads. The color of the bead selected determines the move.

The machine makes the first move (this is done by someone shaking the matchbox with the empty tic-tac-toe matrix on the cover and noting the color of the bead). This matchbox is then left open to indicate that a move of that configuration has taken place. A human opponent makes odd moves — 1, 3, 5, 7 and 9.

At the end of the game, there are several open matchboxes representing the moves that occurred. Each open matchbox has a selected color bead that determined the next move. If the machine won the game, more beads of that color are added to each open matchbox. If there was a draw game, only one bead of that color is added to the matchboxes. If the machine lost the game, one bead of that color is taken from each matchbox.

Over many games, the matchboxes accumulate more beads representing winning moves than non-winning moves. The chance of selecting a winning bead (move) is much greater than of selecting a losing or drawing bead. Gradually, the machine becomes smarter. I tried to emulate that strategy in the tic-tac-toe learning program.

## Tic-Tac-Toe Positions

The tic-tac-toe matrix was represented by assigning each square a number of 1 through 9 and using a nine-character string to represent an O, X or hyphen (no move yet). The string -X-O--XXO, for example, represents the following:

```

- X -
O - -
X X O

```

There are 19,683 possible strings of X's, O's and hyphens, but only those strings with an equal number of X's and O's represent valid tic-tac-toe configurations. There are 3,139 possible configurations with an equal number of X's and O's, such as XXXXO-OOO (19,535), XXXXOO-OO (19,553), XXXXOOO-O (19,559), and XXXXOOOO- (19,561). The number in parentheses is the number of the original 19,683 configuration and represents the Base 3 (ternary) number derived by assigning digits of 0, 1 and 2 in place of the X's, O's and hyphens. The ternary number makes it easier to convert a tic-tac-toe configuration to a value that can be found in a table holding the 3,139 possible configurations.

## Selecting the Next Move

The next move in Michie's MENACE was made by shaking up the matchbox and choosing a colored bead at random. Michie started out with four beads in each of nine colors for the first-move matchbox, three beads of each color for the third-move matchboxes, two beads of each color for the fifth-move matchboxes, and one bead of each color for the seventh-move matchboxes (the ninth move has only one possibility). We used counts of five, four, three, two and one. The count represents the number of colored beads. The configuration OO--X-X-- is a fifth move configuration with five possible next moves by the machine. We'll put three beads in our figurative matchbox for each of the five possible moves:

OO--X-X--      0,0,3,3,0,3,0,3,3

The impossible moves (those already occupied by an X or O) are initialized with a count of zero. Possible moves are initialized with a count of three.

The next move can be selected at random by adding up all of the counts (3+3+3+3+3=15) and then generating a random number from one to 15. The machine will accumulate counts from left to right and stop when the total is equal to the random number of zero through 15. The machine will then use the square represented by the position of that count. In this example, if the number generated was eight, the machine would use the third count (tic-tac-toe Square 6). The person would respond with another move creating a new configuration, and the machine would use the same algorithm to compute the next move. The game would continue until a player won the game or a draw occurred.

At the end of the game adjustments are made to the *active* configurations (those used in the game sequence). If the game was won by the machine, three counts are added to each position. Similar adjustments would be made for draws (one would be added) and losses (one would be subtracted). The process emulates a reward and punishment training method.

## Recording the Counts

The counts are held in a random disk file with records of 18 bytes. The first nine bytes hold the configuration, a string of hyphens, O's and X's. The next nine bytes are nine fields, each field containing a count of zero through 255. An initial file is generated by an initialization program, which eliminates invalid end-game conditions for a total of 2423 configurations and the 43,614-byte file of configurations.

The actual tic-tac-toe program draws the diagram, checks for an end condition, and rewards or punishes the tic-tac-toe data in the file as the program learns. Each time the machine plays, a record is made of the entry number and the position in which the response was made. (This corresponds to



opening the box in Michie's MENACE.) At the end of the game, each entry is adjusted by adding or subtracting counts from the entry position. Three is added for a win, one is added for a draw, and one is subtracted for a loss. The updated entries for the data are written to disk, so that the data file always reflects the accumulated knowledge of the machine.

A history file is also updated at the end of the game. This file is another random file with one-byte records. For each game, a new letter is added to the end of the file — either a W, D or L.

#### User Response

Reader response to this project was enthusiastic. The following 25 people volunteered information first:

Heath Dingwell, Litchfield, Connecticut  
Tom Seagrove, North Charleston, South Carolina  
Daniel Montalvo, Baltimore, Maryland  
H.C. Mehlenbacher, Grand Marais, Michigan  
John L. Malon, Loring AFB, Maine  
Louis Knoepp, Jr., Spartanburg, South Carolina  
Russell C. Obbink, Lower Burrell, Pennsylvania  
Duane Schwartz, Merrill, Wisconsin  
Jim DeStafeno, Wyoming, Delaware  
John Stanford, Baldwin, Mississippi  
Steve Ostrom, Minneapolis, Minnesota  
William A. Queen III, Bessemer City, North Carolina  
Eric Parish, Vista, California  
F. Bruhns, Fallbrook, California  
Jack Bowman, Jr., Piqua, Ohio  
Kevin Sloan, Meridian, Mississippi  
Rommel Bruehl, Baton Rouge, Louisiana  
Jeff Byers, Creve Coeur, Illinois  
John Collins, Oceanside, California  
Clayton B. Shaffer, Visalia, California  
Vern Clark, Redondo Beach, California  
H.D. Vaughn, Virginia Beach, Virginia  
John Marshall, Willits, California  
Joel M. DeYoung, Manson, Manitoba  
Steven Moreno, Stockton, California

Although I had estimated a month's worth of time to play three or four thousand games, I had underestimated the time lag for mail delivery to a volunteer and back to me. After four months, we had accumulated about 1754 games. However, those games were enough to prove the basic premise — the CoCo can indeed learn to play a reasonable game of tic-tac-toe.

A chronological plot of the first 1754 games is shown in Figure 10. The CoCo's losses were heavy initially, but its wins begin to increase dramatically. Halfway through, the CoCo was winning or drawing over one-half the games. At the end of the 1754 games, the CoCo was winning or drawing about 90 percent of the games played.

If you would like to have the programs and accumulated 1754 games for your own research, they're available. To make it as easy on your columnist as possible, please send a self-addressed envelope with 45 cents postage and a formatted CoCo disk to me at P.O. Box 3568, Mission Viejo, CA 92692.

See you next month with more CoCo topics. □

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JUN '83 Printers	\$2.95 <input type="checkbox"/>	AUG '86 Games	\$3.95 <input type="checkbox"/>
JUL '83 Anniversary	\$2.95 <input type="checkbox"/>	SEP '86 Education	\$3.95 <input type="checkbox"/>
<b>VOLUME 3</b>		OCT '86 Graphics	\$3.95 <input type="checkbox"/>
AUG '83 Games	\$2.95 <input type="checkbox"/>	NOV '86 Data Comm.	\$3.95 <input type="checkbox"/>
SEP '83 Education	\$2.95 <input type="checkbox"/>	DEC '86 Holiday	\$3.95 <input type="checkbox"/>
OCT '83 Graphics	\$3.95 <input type="checkbox"/>	JAN '87 Beginners	\$3.95 <input type="checkbox"/>
DEC '83 Holiday	\$3.95 <input type="checkbox"/>	FEB '87 Utilities	\$3.95 <input type="checkbox"/>
MAR '84 Business	\$3.95 <input type="checkbox"/>	MAR '87 Business	\$3.95 <input type="checkbox"/>
APR '84 Gaming	\$3.95 <input type="checkbox"/>	APR '87 Home Help	\$3.95 <input type="checkbox"/>
MAY '84 Printer	\$3.95 <input type="checkbox"/>	MAY '87 Printer	\$3.95 <input type="checkbox"/>
JUN '84 Music	\$3.95 <input type="checkbox"/>	JUN '87 Music	\$3.95 <input type="checkbox"/>
JUL '84 Anniversary	\$3.95 <input type="checkbox"/>	JUL '87 Anniversary	\$3.95 <input type="checkbox"/>
<b>VOLUME 4</b>		<b>VOLUME 7</b>	
AUG '84 Games	\$3.95 <input type="checkbox"/>	AUG '87 Games	\$3.95 <input type="checkbox"/>
SEP '84 Education	\$3.95 <input type="checkbox"/>	SEP '87 Education	\$3.95 <input type="checkbox"/>
OCT '84 Graphics	\$3.95 <input type="checkbox"/>	OCT '87 Graphics	\$3.95 <input type="checkbox"/>
NOV '84 Data Comm.	\$3.95 <input type="checkbox"/>	NOV '87 Data Comm.	\$3.95 <input type="checkbox"/>
DEC '84 Holiday	\$3.95 <input type="checkbox"/>	DEC '87 Holiday	\$3.95 <input type="checkbox"/>
JAN '85 Beginners	\$3.95 <input type="checkbox"/>	JAN '88 Beginners	\$3.95 <input type="checkbox"/>
FEB '85 Utilities	\$3.95 <input type="checkbox"/>	FEB '88 Utilities	\$3.95 <input type="checkbox"/>
MAR '85 Business	\$3.95 <input type="checkbox"/>	MAR '88 Business	\$3.95 <input type="checkbox"/>
APR '85 Simulations	\$3.95 <input type="checkbox"/>	APR '88 Home Help	\$3.95 <input type="checkbox"/>
MAY '85 Printer	\$3.95 <input type="checkbox"/>	MAY '88 Printer	\$3.95 <input type="checkbox"/>
JUN '85 Music	\$3.95 <input type="checkbox"/>	JUN '88 Music	\$3.95 <input type="checkbox"/>
JUL '85 Anniversary	\$3.95 <input type="checkbox"/>	JUL '88 Anniversary	\$3.95 <input type="checkbox"/>
<b>VOLUME 8</b>			
AUG '88 Games	\$3.95 <input type="checkbox"/>		
SEP '88 Education	\$3.95 <input type="checkbox"/>		
OCT '88 Graphics	\$3.95 <input type="checkbox"/>		
NOV '88 Data Comm.	\$3.95 <input type="checkbox"/>		
DEC '88 Holiday	\$3.95 <input type="checkbox"/>		
JAN '89 Beginners	\$3.95 <input type="checkbox"/>		
FEB '89 Home Help	\$3.95 <input type="checkbox"/>		

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**Listing 1: WORMDRVVR**

```

100 ' WORM DRIVER PROGRAM FOR CO
CO 1, 2, OR 3 IN 256 BY 192 MODE
110 WIDTH 32
120 PMODE 4,1
130 PCLS 1
140 SCREEN 1,0
150 LINE (0,0)-(255,195),PRESET,
B
160 GOSUB 360
170 IF DI$="U" THEN A$=U$ ELSE I
F DI$="R" THEN A$=R$ ELSE IF DI$
="D" THEN A$=D$ ELSE IF DI$=
"L" THEN A$=L$ ELSE IF DI$="E" T
HEN A$=E$ ELSE IF DI$="F" THEN
A$=F$ ELSE IF DI$="G" THEN A
$=G$ ELSE A$=H$
180 J=VAL(MID$(A$,1,2))
190 FOR I=1 TO J:ND$=MID$(A$,I*2
+1,1):NF=VAL(MID$(A$,I*2+2,1))
200 IF ND$="U" THEN IF FU>=NF TH
EN XD=0: YD=-1: GOTO 300
210 IF ND$="E" THEN IF FE>=NF TH
EN XD=1: YD=-1: GOTO 300
220 IF ND$="R" THEN IF FR>=NF TH
EN XD=1: YD=0: GOTO 300
230 IF ND$="F" THEN IF FF>=NF TH
EN XD=1: YD=1: GOTO 300
240 IF ND$="D" THEN IF FD>=NF TH
EN XD=0: YD=1: GOTO 300
250 IF ND$="G" THEN IF FG>=NF TH
EN XD=-1: YD=1: GOTO 300
260 IF ND$="L" THEN IF FL>=NF TH
EN XD=-1: YD=0: GOTO 300
270 IF ND$="H" THEN IF FH>=NF TH
EN XD=-1: YD=-1: GOTO 300
280 NEXT
290 XD=0: YD=0
300 DI$=ND$
310 FOR I=1 TO NF
320 X=X+XD: Y=Y+YD
330 PRESET(X,Y)
340 NEXT
350 GOTO 160
360 'FIND FOOD
370 FU=0:FOR I=1 TO LA:YN=Y-I:IF
YN<1 THEN GOTO 390 ELSE FU=FU+P
POINT(X,YN)
380 NEXT
390 FE=0:FOR I=1 TO LA:YN=X+I:YN
=Y-I:IF (YN>254 OR YN<1) THEN GO
TO 410 ELSE FE= FE+PPOINT(XN
,YN)
400 NEXT
410 FR=0:FOR I=1 TO LA:YN=X+I:IF
X>254 THEN GOTO 430 ELSE FR=FR+
PPOINT(XN,Y)
420 NEXT
430 FF=0:FOR I=1 TO LA:YN=X+I:YN
=Y+I:IF (YN>254 OR YN>190) THEN
    
```

```

GOTO 45Ø ELSE      FF=FF+PPOINT
(XN,YN)
44Ø NEXT
45Ø FD=Ø:FOR I=1 TO LA:YN=Y+I:IF
Y>19Ø THEN GOTO 47Ø ELSE FD=FD+
PPOINT(X,YN)
46Ø NEXT
47Ø FG=Ø:FOR I=1 TO LA:YN=X-I:YN
=Y+I:IF (XN<1 OR YN>19Ø) THEN GO
TO 49Ø ELSE FG=      FG+PPOINT(XN
,YN)

```

```

48Ø NEXT
49Ø FL=Ø:FOR I=1 TO LA:YN=X-I:IF
XN<1 THEN GOTO 51Ø ELSE FL=FL+P
POINT(XN,Y)
50Ø NEXT
51Ø FH=Ø:FOR I=1 TO LA:YN=X-I:YN
=Y-I:IF (XN<1 OR YN<1) THEN GOTO
53Ø ELSE FH=FH+      PPOINT(XN,YN
)
52Ø NEXT
53Ø RETURN

```

Listing 2: WORMSMPL

```

1Ø 'SRL WORM
11 X=128: Y=96
12 LA=1
13 U$="Ø3U1R1L1": R$="Ø3R1D1U1":
D$="Ø3D1L1R1": L$="Ø3L1U1D1"
14 DI$="U"
15 'MERGE WORM DRIVER HERE
16 '
2Ø 'RLS WORM
21 X=128: Y=96
22 LA=1
23 U$="Ø3R1U1L1": R$="Ø3D1R1U1":
D$="Ø3L1D1R1": L$="Ø3U1L1D1"
24 DI$="U"
25 'MERGE WORM DRIVER HERE
26 '
3Ø 'RSL WORM
31 X=128: Y=96
32 LA=1
33 U$="Ø3R1U1L1": R$="Ø3D1R1U1":
D$="Ø3L1D1R1": L$="Ø3U1L1D1"
34 DI$="U"
35 'MERGE WORM DRIVER HERE
36 '
4Ø 'NINE PIXEL RLS WORM
41 X=128: Y=96
42 LA=9
43 U$="Ø3R9L9U9": R$="Ø3D9U9R9":
D$="Ø3L9R9D9": L$="Ø3U9D9L9"
44 DI$="U"
45 'MERGE WORM DRIVER HERE
46 '
5Ø 'NINE PIXEL RLS WORM
51 X=128: Y=96
52 LA=9
53 U$="Ø3R9U9L9": R$="Ø3D9R9U9":
D$="Ø3L9D9R9": L$="Ø3U9L9D9"
54 DI$="U"
55 'MERGE WORM DRIVER HERE
56 '
6Ø 'EHS OCTAGONAL WORM
61 LA=5
62 X=2Ø: Y=96
63 U$="Ø3E5H5U5": R$="Ø3F5E5R5":
D$="Ø3G5F5D5": L$="Ø3H5G5L5"
64 E$="Ø3R5U5E5": F$="Ø3D5R5F5":
G$="Ø3L5D5G5": H$="Ø3U5L5H5"

```

```

65 DI$="E"
66 'MERGE WORM DRIVER HERE
67 '
7Ø 'ERFDGLH OCTAGONAL WORM
71 LA=5
72 X=128: Y=96
73 U$="Ø7E5R5F5D5G5L5H5": R$="Ø7
F5D5G5L5H5U5E5": D$="Ø7G5L5H5U5E
5R5F5": L$="Ø7H5U5E5R
5F5D5G5"
74 E$="Ø7R5F5D5G5L5H5U5": F$="Ø7
D5G5L5H5U5E5R5": G$="Ø7L5H5U5E5R
5F5D5": H$="Ø7U5R5F5D
5G5L5"
75 DI$="E"
76 'MERGE WORM DRIVER HERE
77 '

```

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# Advances in OS-9 Technology

By Dale L. Puckett  
Rainbow Contributing Editor

I noticed several exciting advances in both hardware and software at Princeton's RAINBOWfest. While Owl-Ware's *Window Writer* offered the most sophisticated advances in OS-9 software, Tony Distefano (CRC/Disto) and Bruce Isted (FHL) presented their latest plug-in cards — designed to eliminate the need for the Tandy Multi-Pak Interface. This month's column will feature interviews with Owl-Ware's Tom Roginski and Bruce Navarre, Jr., CRC's Tony DiStefano, and FHL's Bruce Isted.

In this column, I will discuss icons and buffers and pass on a few tricks I discovered recently. In addition, I will present an OS-9 program by Don Hitko and discuss Paul Ward's new book, *Start OS-9*.

## *Window Writer on the Way*

Tom Roginski at Owl-Ware heard about *Window Writer* last February when he received the first version in the mail from Rojah (pronounced Roger) Dash at RAM International, Inc. Dash is a Chicago-area OS-9 user. A college

student at the University of Illinois, Dash visited Roginski in the Spring and brought another early version with him. Roginski was impressed with the word processor's speed and its ability to run effectively on a floppy disk, a hard drive or a RAM disk. Roginski explained, "With 512K of memory, you can work with nearly 40 pages of text. If you run from a hard drive, the size of the file is limited only by the size of your hard disk drive. That's impressive, even when you compare it to IBM standards."

In addition, thanks to OS-9's multi-tasking environment, if you start *Window Writer* with multiple windows, you can have more than one iteration of the program running at the same time. This means you can edit two files at once, moving back and forth between the windows — cutting and pasting between the two versions of your prose along the way. You can do this because *Window Writer* maintains a common buffer — a clipboard of sorts — that makes it possible.

Roginski had nothing but praise for Dash's efforts. He compared the system to several popular word processors running in the IBM and Macintosh environments. Roginski had obtained the early beta release only a week before he came to RAINBOWfest, but he was planning a production release in early 1989. He said the users guide would be laser printed. The program will sell for \$59, but Roginski plans to introduce it at a special price of \$49. *Window Writer* will work with both *TS Spell* and *DynaSpell* and comes with a large selection

of configuration files that match it to most popular printers.

Bruce Navarre, Jr., the Chief Technician at Owl-Ware, has also worked with *Window Writer* since February 1988. He believes that the system compares to the best MS-DOS word processors on the market. It has all the popular features built in, including support for a laser printer.

The first version of *Window Writer* doesn't support graphics, but Roginski says Dash is working on it. He told us that Dash's ultimate goal was to put out something comparable to the latest version of *WordPerfect*. That's a lofty goal and one that will be a true challenge on the 6809-based Color Computer. Roginski says the big disadvantage of graphics-based word processors centers on the limitations of their printed resolution. However, *Window Writer*'s pull-down menus can use the cursor control keys or the mouse.

Dash's word processor uses a built-in map that lets you set up the special codes needed by your printer. You can determine the form in which your text will be printed by glancing at the screen. While the approach is not pure WY-SIWYG, it does use characters of various colors to indicate what the final print looks like. When using *Window Writer*, you enter a single character. The printer driver translates it to the right code sequence for your printer.

While Roginski works with both the Color Computer and the IBM crowd, Navarre spends all of his time helping Color Computer users. I asked Navarre

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Dale L. Puckett, a freelance writer and programmer, serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. His username on Delphi is DALEP; on packet-radio, K0HYD @ N4QQ; on GENIE, D.PUCKETT2; and on CIS, 71446,736.

why Owl-Ware was making such a big investment in OS-9 Level II software. Navarre explained, "We felt we needed to do something to help our users reach the potential of the more expensive software packages running on other computers like the IBM PC and Macintosh. OS-9 makes it possible to do this kind of program, but no one has made the investment needed to pull it off." Navarre believes that in the past most third-party vendors could not afford the time or the money to effectively use the OS-9 environment.

As a student, Dash has been able to invest more than a year on *Window Writer*. Navarre said that Dash came to Owl-Ware because he had seen its ads for years and wanted the company to market his product. *Window Writer* was developed in BASIC09; however, Dash used assembly language subroutines where speed is needed. The program was written on a standard Color Computer 3.

"One of the biggest problems I've run into as a software publisher is that you cannot buy a run-time OS-9 Level II package," Roginski said. "For a time, you could do this with OS-9 Level I software. I believe that OS-9 is going to

die undeveloped because programmers are unable to produce a program that will run out of the box. I almost made the decision not to market this software package because of this problem."

Both Roginski and Navarre support OS-9. Roginski feels that OS-9 helped him learn MS-DOS without the expected problems. In addition, OS-9 is a more powerful operating system than Disk BASIC.

Navarre believes that the OS-9 market is growing and that most users who are serious about the Color Computer are now using this system. "In the last year, the interest in our OS-9 programs has tripled," Navarre said. "It's still not a high percentage of the Color Computer market, but that goes right back to the need to be able to buy software that runs out of the box.

"The knowledge our Color Computer users have is incredible. When I first came to Owl-Ware, Tom said, 'you will learn OS-9.' Before long, I had picked it up and was put in charge of the LR Tech hard-drive support. OS-9 unleashes the power of the Color Computer. CoCo doesn't have nearly as much power under Disk BASIC."

Some of Roginski's customers are

testing the beta version of *Window Writer*, and he is asking them for suggestions regarding features and improvements. I also had the opportunity to work with the program for several hours before I started this column.

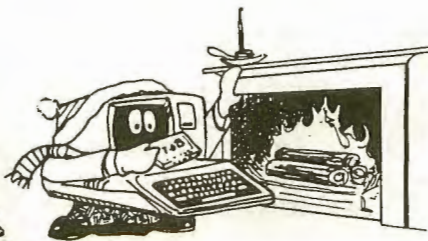
My initial reaction? Dash is on the right track with *Window Writer*. Since I use *MS Word* at work, I noticed several actions that were not as intuitive as they should be. I also suggested that Dash make his menu interface work the same as all other *Multi-View*-based programs and cautioned him to follow OS-9's rules religiously to avoid any problems that might occur in a multi-tasking environment. I also suggested he make it possible for two edit windows to be open in the same screen. That enhancement alone would make a cut-and-paste editor's day. If these guys take these suggestions to heart and continue to enhance the program after its release, *Window Writer* may be the OS-9 word processor we've all been waiting for.

#### On the Hardware Front

While Roginski and Navarre were busy telling RAINBOWfest visitors about *Window Writer*, Bruce Isted and

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Tony DiStefano were busy talking about the new hardware add-ons they had completed. I talked to Isted first as he presented his new Eliminator card at the FHL booth.

Bruce Isted hails from Calgary, Alberta, and works for Madis Engineering. These days, he stays busy keeping the company's computers running. He also designs circuits and OS-9 software used in many microcontroller applications. His products are found in monitor stations used by security companies, burglar alarms, phone dialers and radio alarms. He builds real-time applications, and that's why he likes OS-9. Isted has worked with OS-9 for about five years and has started doing some design work for the Color Computer.

"I guess you could say it's gone beyond a hobby, but it's not yet a business," he said. To produce his existing hard-disk interface, Isted has the circuit boards etched and then builds the units himself. He has the market cornered, from soldering to marketing. When his new Eliminator card reaches the market, he hopes to farm out the board assembly. Isted saw a lot of interest at Princeton. Many people filled out tentative order forms, and he will get in touch with them when the board is ready.

Isted's first commercial product was the hard-disk controller. He started that project because his Pro System hard disk wouldn't work on the Color Computer 3. He decided to make it work, and a new hard disk interface was born. Isted designed his own interface because he wanted one controller to run his hard disk and floppy disks in a no-halt mode. After he had his new design working, he sold it to people with Pro System hard disks who wanted more from the system. Then, when Dennis Welby purchased one, he called Frank Hogg. Isted has been in business ever since. He sold the controllers for a year on his own and then began shipping them to FHL in early January, 1988.

Isted wrote The Eliminator's OS-9 software himself. The name for his new product was Frank Hogg's idea. Essentially, Hogg thinks Isted's card should eliminate the need for a Multi-Pak Interface. It features a hard disk interface, a real-time clock, parallel printer, two serial ports and an EPROM socket for booting automatically to OS-9. You can also plug in a Disk BASIC-compatible ROM if you like.

Isted had The Eliminator working at Princeton, but he felt it still needed some polish. The only comparable

interface card is the Four-in-One from CRC, which provides identical functions but has one serial port instead of two. Because it is an expansion card that plugs on top of the Disto Super Controller II, it uses separate floppy- and hard-disk controllers. Isted said that DiStefano has an advantage here because the regular floppy controller lets you use all available Disk BASIC-based software.

*"Anyone just starting with the Color Computer will discover that you need more than just a disk to go beyond playing a few games."*

"Regardless of what his ROM does, if a Disk BASIC program disk is plugged in, it is going to work," Isted said. "My card is not as compatible as his. Programs like VIP software that do their own disk I/O will not work because the controllers are different."

I then asked Isted to comment on OS-9 in general. "I think the new Four-in-One controller and The Eliminator are necessary for the Color Computer to keep growing because there's no longer a Multi-Pak," he said. "Anyone just starting with the Color Computer will discover that you need more than just a disk to go beyond playing a few games. Communications is also important because you can live 500 miles away from the next user and still use a BBS system to get all the help you need."

Isted feels that getting rid of the Multi-Pak is good because to keep it reliable you need to clean the connectors every two or three months. Both new cards eliminate the need for slot switching. The Multi-Pak had the cartridge interrupts separated. To use more than one card that generates an interrupt, you had to modify the Multi-Pak. With the new all-in-one cards, you can have all of the devices on the card interrupt driven. This is important especially when dealing with communications.

### **Disto Four-in-One Card**

"By 1995, I should have 11 devices on a card," Tony DiStefano said with a slight grin. "Don't call to ask when the CoCo-on-a-card will be ready until 1994." Disto's Three-in-One card is already out. It features a serial port, parallel port and a real-time clock. Tony was selling it at the CRC booth at Princeton, and it had a good reception. When I asked DiStefano to list the advantages of his Four-in-One card, he said that it gives the Color Computer something it wasn't born with. Its four devices deliver the capabilities needed under OS-9.

All of the new devices work well at the Color Computer 3's 2MHz clock speed. This was a problem with some of the older clocks, which had been designed for the CoCo 2. The Three-in-One cards sold for \$55 at Princeton. Their regular price will run \$60 to \$65. The exact price of the Four-in-One card isn't known at present, but Tony expects it to be under \$100. The Four-in-One card has everything found in the Three-in-One card and a hard-disk adapter. Its beta-test copy caused a stir at Princeton. DiStefano believes that his new card is everything you need. He promises the card will be out before you read this column.

Distefano feels that his card's compatibility with Disk BASIC is its main selling point. When asked what is next, he said that the CoCo market still needs a high-density, floppy-disk controller. However, he noted that this product is still on the drawing board.

### **Displaying Icons**

Radio buttons are becoming more common as the visual interface in new software today. These buttons highlight an area on the screen and show us where to push the mouse button when we want to start an action. At first, the action we expected when we pushed the button was printed on the button itself in plain English. Today, however, many of the buttons take the shape of an intuitive icon that describes without words the action initiated by the button. Some contain both a picture and a word or two.

One day while thinking about the design of a new piece of software, I considered using graphic icons as buttons that would let me navigate through the program visually. This led to a logical question: How could I display an icon as a radio button? Research began immediately.

I decided to first determine how

*Multi-View's* standard icons could be displayed on an OS-9 graphics window. Several public-domain icon editors are available on Delphi, CompuServe and GENie, in addition to those found on many local Color Computer BBSs. If I could display these standard icons, I could create my own radio button icons with the standard-icon editors and let the program display them in the proper window at the proper time.

I had wondered about this problem before, but — as usual — need was the mother of invention. I found that there are system calls built into OS-9 that do what I wanted. And fortunately, I found that I could make these calls by sending the proper series of display codes to the window or screen in question.

My first problem was to find the proper display codes, so I looked up *icon* in the index to the Windowing section of OS-9's technical reference manual — the last section of the 3-inch-thick documentation supplied with OS-9 Level II. Unfortunately, that wasn't the place to look. I found the answer under `PutBlk` — OS-9's name for the Put Block system call. Before I solved that puzzle, I had looked under `GPLoad` (Get/Put Buffer Load), and `KilBuf`

(Kill Get/Put Buffer).

The `PutBlk` system call is used to move a bit pattern from a buffer used internally by OS-9 to your Color Computer screen. But before you can move a bit pattern to the screen, you must create a buffer and load it with the graphics images you want to display. This can be accomplished by creating a buffer and moving a bit pattern from the screen into the buffer or by loading a bit pattern from a file into a buffer. Since my goal was to display the bit pattern stored in the standard icon files, I took the second approach.

#### A Step-by-Step Approach

Once I located the proper section of the OS-9 manual, I began to experiment. When I started, my `/term` device was a 40-column text window. I also had another Shell running in Window Device `/w7` — an 80-column text window. My first step was to create a graphics window where I could run some tests. I had set up Window Device `/w4` with the `iniz` utility by including the line `iniz w4` in the startup file. I then started a Shell in that window by typing `shell i=/w4&`.

Because I used the standard window

device descriptors supplied with OS-9 Level II's production copy, my Shell appeared in a small window in the upper-left corner of a new screen. My next step was to turn that *small* window into an 80-by-24, four-color (Type 7) graphics window. To do this, I used the CLEAR key to move to that window and typed `merge /dd/mgw4`. The desired screen popped into place as the Merge utility finished its work.

Once I had a proper graphics screen, I loaded an icon into an OS-9 buffer. I then entered a command line like the following:

```
display 1b2b 50 1 7 0018 0018 1fff ;
merge /dd/cmds/icons/icon.telecom
```

In this command line, `Display` is the standard OS-9 utility command used to send non-printing characters to a window or other device. The Hex code `1b2b` means `GPLoad` (Get/Put Buffer Load) to OS-9. Next, the parameters needed by `GPLoad` include the buffer's group number, 50, and the buffer number, 1. I used a Type 7 window to get an 80-by-24 screen with four colors. As defined in the command line, the icon is an 18-by-18-hex square.

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On this command line, I reserved 8K of memory for the buffer — enough to store 56 icons. The following table lists the values and their abbreviations used in my Display command line:

```
Code = 1b2b
GRP = 50
BFN = 1
STY = 7
HSX = 00
LSX = 18
HSY = 00
LSY = 18
HBL = 1f
LBL = ff
```

The second half of the command line merged the data that describes (draws) the icon on the screen into the buffer.

The buffer group number for this experiment was chosen at random. If you use these techniques in an actual program, you must make the proper OS-9 system call to get the process number for your program and use *this* number as the *group* number. Because OS-9 allows only one process to run at a given time for each finite process number, this technique avoids problems that occur when more than one user is logged on to your computer at one time. In other words, if two people try to create a Buffer Group Number 50, the second person will get an error message.

Your experiments here will work best if you take advantage of your ability to issue more than one command on the same line in OS-9. When you use two commands on the same line, OS-9 merges the icon data stored in the file `icon.telecom` (make sure that an icon file with the name you type exists) with the preliminary data issued by the display command. When you issue the commands as shown in the sample line, the result will be a buffer in memory with the Group Number 50 and a bit pattern in which the Buffer Number 1 is stored.

If you press ENTER after you type the first half of the command line, you can run into problems. The only way to recover is to go to another window and issue the merge command while redirecting its output to Window Device / w4. However, you can only do this if you are running the OS-9 Users Group's *Shell+* Version 2.0 or later, which has a special no-block mode. You can break the command line into two separate lines if you run them from an OS-9 procedure file. The method used in the example above is the easiest however.

If you accidentally press ENTER, the

easiest thing to do is to use the CLEAR key to move to another window where *Shell* is running. Once there, you can kill the Shell in which you were experimenting. You can then `deiniz` the window, run `iniz` again and start another Shell. This is the easiest way to get out of this trap.

***“Your experiments here will work best if you take advantage of your ability to issue more than one command on the same line in OS-9.”***

#### Printing the Icon

Now that you have the image of an icon loaded into your buffer, you can print it to your screen. To do this, use the following command line:

```
display 1b 2d 50 1 0050 0050
```

In this command line, `1b2d` means `PutBlk` to OS-9. While the 50 and the 1 point to the buffer group and group number created above, the `0050` tells OS-9 where to print the icon on your screen. This command line will place the icon 80 pixels — 50 Hex — to the right and 80 pixels down from the upper-left corner of your screen. You may load more than one icon or other graphics image into a buffer as long as you give each one a unique buffer number and have enough room in the buffer. That's why I made the buffer 8K long in the first command line.

If you do have more than one image loaded into your buffer, you can use the same command line to display all of them at one time. To do this, type something like the following:

```
display 1b2d 50 1 0050 0050 1b2d 50 2
00B0 0050 1b2d 50 3 00b0 0050
```

Now that you know the secret to

printing an icon on your Color Computer screen, I hope you'll take some time to experiment with your own icons. You'll soon have an incentive to download one of the public domain icon editors, so you can create your own. The next step will be to let OS-9 know when someone has punched the mouse button while the pointer was over the icon. Sound like fun?

#### Charter

This month's listing was contributed by Don Hitko of Burton, Michigan. Hitko wrote a BASIC09 program, *Charter*, that adds to the functionality of the *Scratch Pad* screen editor written by Peter Dibble for *The Complete Rainbow Guide to OS-9 Level II: A Beginner's Guide to Windows*. The program uses two *Scratch Pad* modules, `ReadFile` and `ClearBuf`.

To run the program, load the four procedures into BASIC09 and enter `run charter`. You can also pack and merge the files to run them from the OS-9 command line. You can adapt Don's listing to your own printer by changing the data lines in the listing. He submitted it as an “idea starter,” hoping you may get some enjoyment and educational benefit from it. Thanks, Don.

Don does caution you to start printing a long document before you go to bed. “It may be done before you wake,” he quipped.

#### Start OS-9

Paul Ward introduced a new book designed for OS-9 beginners at the October RAINBOWfest. His book, *Start OS-9*, contains many tutorials and several useful essays. It comes with a disk containing a number of Steve Goldberg's excellent OS-9 utility programs. Paul called today to say that people who bought the preliminary copies at Princeton can get a copy of the final printing by sending him \$10 plus \$2.50 for postage and handling.

As I close this month's column, here's the latest on *Shell+*. Ron Lammardo was distributing copies of Version 2.1 at RAINBOWfest. In the not-too-distant future Ron hopes to add an environment file to *Shell+* like the one used by *Multi-View*. He is also planning a new version that would use `Get/Put` buffers to store all the *Shell+* variables. The buffers would make *Shell+* variables global.

That's it for another month. Enjoy your experiments with OS-9's `Get/Put` buffers while I think up something neat for March. □



### Listing 1: Charter

```

PROCEDURE charter
0000  BASE 1
0002  DIM ScreenData(100):STRING[80]
0013  DIM filename,cur_line:STRING[80]
0023  DIM cur_let:STRING[1]
002F  DIM line,letter,printer:INTEGER
003E
003F  PRINT "Enter the pathlist of the file to use:"
0069  INPUT filename
006E  RUN ReadFile(filename,ScreenData)
007D
007E  OPEN #printer,"/p"
0089  PRINT #printer,CHR$(1B)+CHR$(1C);
009A
009B  FOR line:=1 TO 100
00AB  cur_line:=ScreenData(line)
00B6  FOR letter:=1 TO 80
00C6  cur_let:=MID$(cur_line,letter,1)
00D4  RUN translate(cur_let)
00DE  PRINT #printer,cur_let;
00E9  NEXT letter
00F4  NEXT line
00FF
0100  CLOSE #printer
0106  END

```

### Listing 2: Translate

```

PROCEDURE translate
0000  PARAM cur_let:STRING[1]
000C  DIM char:STRING[1]
0018  DIM printer2,counter,number:INTEGER
0027
0028  OPEN #printer2,"/p"
0033  IF cur_let="b" THEN
0040  PRINT #printer2,CHR$(1B)+CHR$(1F);
0051  ELSE IF cur_let="c" THEN
0061  PRINT #printer2,CHR$(1B)+CHR$(20);
0072  ELSE IF cur_let="e" THEN
0082  PRINT #printer2,CHR$(1B)+CHR$(0E);
0093  ELSE IF cur_let="f" THEN
00A3  PRINT #printer2,CHR$(1B)+CHR$(0F);
00B4  ELSE ENDIF
00B9  ENDIF
00BB  ENDIF
00BD  ENDIF
00BF  IF cur_let="b" OR cur_let="c" OR cur_let="e" OR cur_let="f"

THEN
00E4  cur_let:= "
00EC  ELSE ENDIF
00F1  CLOSE #printer2
00F7
00F8  IF ASC(cur_let)<91 AND ASC(cur_let)>45 THEN END
010E  ELSE ENDIF
0113
0114  FOR counter:=1 TO 31
0124  READ char
0129  READ number
012E  IF cur_let=char THEN
013B  cur_let:=CHR$(number)
0144  ELSE ENDIF
0149  NEXT counter
0154  RESTORE
0156  END
0158
0159  DATA "i",224,"j",225,"k",226,"l",227
0179  DATA "m",228,"n",229,"o",230,"p",231
0199  DATA "q",232,"r",233,"s",234,"t",235
01B9  DATA "u",236,"v",237,"x",238,"#",239
01D9  DATA "[",240,"-",241,"]",242,"^",243
01F9  DATA ")",244,"|",245,"(",246,")",247
0219  DATA "^",248,"{",249,"+",250,"g",251
0239  DATA "h",252,"y",253,"z",254

```

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