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July 1987

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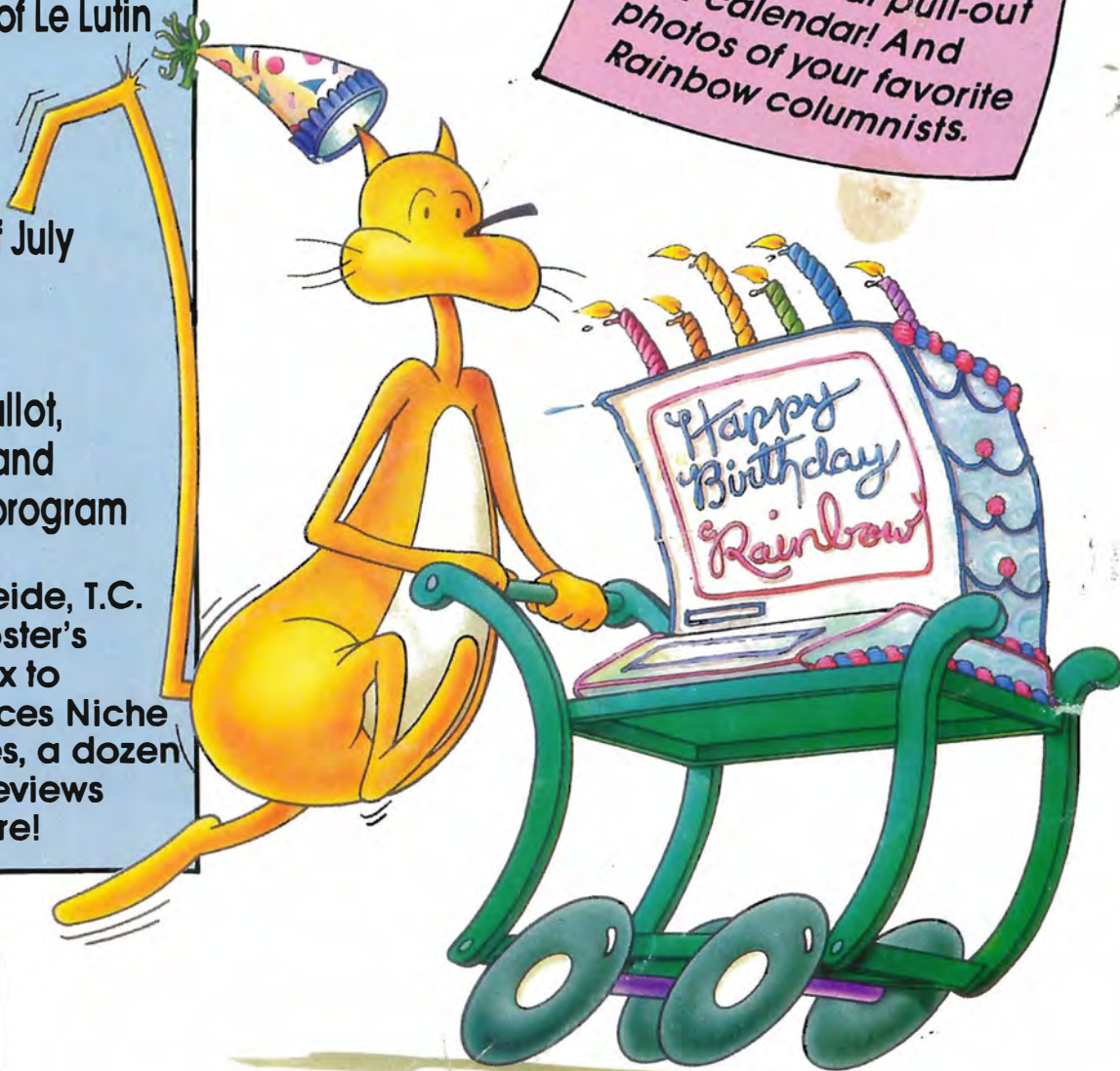
CoCo tunes up for the Fourth of July

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Hall of Fame ballot, learning tools, and CoCo writes a program

PLUS Dennis Weide, T.C. Taulli, Leslie Foster's sixth year index to Rainbow, Novices Niche shorties, utilities, a dozen new product reviews and much more!

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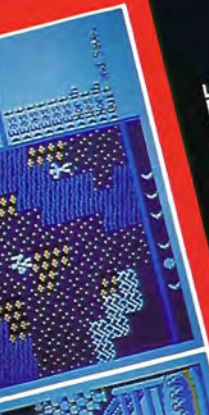
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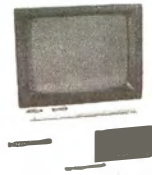
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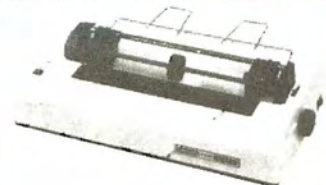
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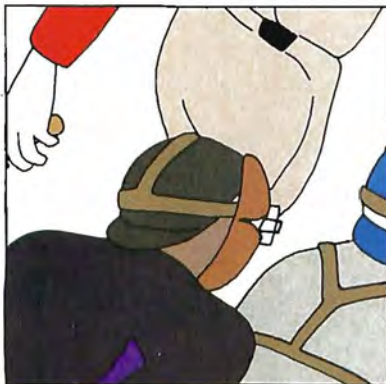
# RAINBOW



20



58



105


## FEATURES

-  **Red, White and Blue**/*Ingrid Lawrence and Mark Bourdeaux* **MUSIC** *A 211th birthday salute to the U.S.* 20
-  **The Perfect Disk Manager**/*A. L. McGarrity* **DISK UTILITY** *Organization at your fingertips* 30
-  **A Colorful Resistance**/*Gary MacLellan* **EDUCATION** *Learn color codes for different resistances* 44
-  **Achieving Simple Equality**/*Richard Monroe* **EDUCATION** *Reinforce problem-solving skills* 50
-  **Le Lutin**/*Louis Parson* **ADVENTURE** *An interesting challenge in a fascinating world* 58
-  **The CoCo Writes a Program**/*Dennis H. Weide* **PROGRAMMING UTILITY** *Use machine language in BASIC* 84
- Purr-fect Friends and Pull-Out Calendar**/*Staff* **ANNIVERSARY SPECIAL** *CoCo Cat excitement abounds* 99
-  **A Computer's Ancient Native Language**/*Peter Dibble* **TUTORIAL** *A look at some profound magic for the CoCo* 100
-  **Batter Up!**/*T. C. Taulli* **GAME** *Trivia fun for the whole family* 105
- Hall of Fame Ballot** **ANNIVERSARY SPECIAL** *Nominate the candidate of your choice* 109
- Who's Gonna Know?**/*Edward Samuels* **COPYRIGHT LAW** *What you can do with others' programs* 123
- The Sixth Year of Rainbow**/*Leslie A. Foster* **INDEX** *A guide to articles, reviews and authors of the past year* 145

## NOVICES NICHE



- Powerful Pages** 94  
*Matt Krom*
- Hit The Road** 95  
*Fred Rau*
- An Inside View** 97  
*Michael Berenz*
- Prompt Attention** 97  
*Joseph Forgione*
- Backup And Go** 98  
*Matt Lawson*

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 The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ad on Page 38.

**NEXT MONTH:** The dog days of August are here, so relax, take it slow. We make it easy with our Games Issue. Take out your frustrations with action-packed shoot-'em-ups, get rid of the summertime blues with tricky brain teasers, and test yourself with devious delights. Of course, there's always our fine offering of tutorials, utilities, reviews, commentary and Q & A columns. Whether it's fun time, or you're playing for keeps, THE RAINBOW is the primary information source for the Color Computers 1, 2 and 3.

## COLUMNS

<b>BASIC Training/Joseph Kolar</b> _____	<b>157</b>
<i>Graphics experience you can draw from</i>	
<b>Building July's Rainbow/Jim Reed</b> _____	<b>16</b>
<i>Managing Editor's comments</i>	
<b>CoCo Consultations/Marty Goodman</b> _____	<b>78</b>
<i>Just what the doctor ordered</i>	
<b>Delphi Bureau/Cray Augsburg</b> _____	<b>120</b>
<i>Some changes, a map and Hutchison's database report</i>	
<b>Doctor ASCII/Richard Esposito</b> _____	<b>126</b>
<i>The question fixer</i>	
 <b>Education Notes/Steve Blyn</b> _____	<b>56</b>
<i>Spell down to vocabulary fitness</i>	
<b>PRINT#-2/Lawrence C. Falk</b> _____	<b>12</b>
<i>Editor's notes</i>	
<b>Turn of the Screw/Tony DiStefano</b> _____	<b>89</b>
<i>Cache of the day</i>	
 <b>Wishing Well/Fred Scerbo</b> _____	<b>112</b>
<i>Keying into CoCo's power</i>	
<i>"Education Overview" will return next month.</i>	

## RAINBOWTECH

 <b>Bits and Bytes of BASIC/Richard White</b> _____	<b>163</b>
<i>BASIC09 and Level II: Focusing on modules</i>	
<b>Downloads/Dan Downard</b> _____	<b>161</b>
<i>Answers to your technical questions</i>	
 <b>KISSable OS-9/Dale L. Puckett</b> _____	<b>167</b>
<i>An OS-9 convert speaks out</i>	
<i>"Barden's Buffer" will return next month.</i>	

## DEPARTMENTS

<b>Advertiser Index</b> _____	<b>176</b>	<b>Rainbow Info</b> _____	<b>99</b>
<b>Back Issue Information</b> _____	<b>135</b>	<b>Received &amp; Certified</b> _____	<b>131</b>
<b>CoCo Gallery</b> _____	<b>18</b>	<b>Scoreboard Pointers</b> _____	<b>76</b>
<b>Corrections</b> _____	<b>111, 137</b>	<b>Submitting Material</b>	
<b>Letters to Rainbow</b> _____	<b>6</b>	<b>to Rainbow</b> _____	<b>54</b>
<b>The Pipeline</b> _____	<b>144</b>	<b>Subscription Info</b> _____	<b>111</b>
<b>One-Liner Contest</b>		<b>Where to Find Rainbow</b> _____	<b>174</b>
<b>Information</b> _____	<b>88</b>		

## PRODUCT REVIEWS

<b>Product Review Contents</b> _____	<b>129</b>
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# THE RAINBOW

July 1987

Vol. VI No. 12

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## Turning in the Eyepatch: A Pirate Reforms

*Editor:*

After reading Mr. Falk's column in the April 1987 issue, and remembering several other articles and letters addressing the subject of piracy, I have finally decided that I am tired of being "the bad apple" in my CoCo System. Over the past year or so, I have pirated several programs — nearly 15 percent of my library and accounting for a third of its value. I am truly sorry I have done this, and I have erased every pirated program from my disks. It took a long time to decide to do it, but I think it was the best thing to do.

To those of you who also have pirated software, it's up to you whether or not to continue breaking the law. There is no effective way of stopping piracy, but piracy is an effective way of stopping the CoCo Community from the rapid and substantial growth that has become a trademark of our favorite micro. People often say (I did) that the pricing of software is outrageous; it may be, it may not. The pricing of the IBM PC is outrageous, but that doesn't mean people stole them instead of buying them. To the software vendors that I pirated from, I'm really sorry. That probably doesn't do much good, though. I will try my best to purchase more software from your companies.

*Lost and Mistaken  
Idaho Falls, ID*

### An Offer You Can't Refuse

*Editor:*

This letter is being written for two reasons, the first of which is to tell you that I am no longer a member of the CoCo Community. I am the owner of an IBM Compatible and I will be subscribing to RAINBOW's sister publication, SOFT SECTOR. The CoCo will be given to my 7-year-old granddaughter so that she can become familiar with computers and their use.

The second reason for writing is that I have saved almost all of my RAINBOW magazines which date back to November 1982. I want to get rid of them and don't want to toss them out in the trash. I would like to donate my collection to a club or organization that needs them. I will even throw in about 18 issues of *Color Computer* magazine, too.

*Harry Norkin  
103 W. Janss Road  
Thousand Oaks, CA 91360*

### A Fix Here, a Fix There

*Editor:*

I have been a proud owner of a CoCo 2 for two years and enjoyed OS-9 Level I. I recently bought a CoCo 3 and OS-9 Level II. Level II is unbelievable. However, when updating my DEFS files with the new system calls, I found out that on Page 8-69 of the OS-9 II reference manual, important information is missing: the call number of F\$A11HRam, which should be I03F XX. I am missing the XX and cannot complete my updates.

In the April 1987 issue, I read the letter from Mike Roush. Looking at the schematic, the two rows with O and G are hooked to the joysticks. Two capacitors (C15, C18) are also hooked to these rows and, after a time, the capacitors tend to leak (slowly short to ground). I cured my problem by changing those capacitors. I propose to Mike to unsolder those two capacitors and, if the problem is cured, just replace them. Page 51 of the CoCo 2 Service Manual, Paragraph 5.3.1, "No Keyboard Entry," mentions those two capacitors as a potential cause.

Finally, I want to congratulate your magazine for having comprehensive and honest product reviews that uncover not-so-honest suppliers.

*Jean-Maurice Moreau  
Kingston, Ontario*

### RoBoCoCo

*Editor:*

I have developed what you might call a beginner's robot. It is a remote-controlled tank such as Radio Shack sells, hooked up to the CoCo, with a minimum of parts. I am working on ways of marketing this device, but, meanwhile, plans are available for enterprising types for \$25. If interested, contact me at 523 W. Spring Street, 22664.

*Rich Taylor  
Woodstock, VA*

### TV Joker Poker

*Editor:*

To make *Joker Poker* work on a TV set instead of a monitor, change the PALETTE RGB commands in lines 1 and 5999 to PALETTE CMP, change PALETTE 0,1:CLS1 in Line 14 to PALETTE 0,0:CLS1, and change HCOLOR 2 in lines 1099, 1200 and 5918 to HCOLOR 6.

*Robert L. Brimmer  
Pittsburgh, PA*

### Educational Fair

*Editor:*

ECCO, The Educational Computer Consortium of Ohio, announces its Seventh Annual Educational Computer Fair, on Thursday and Friday, October 8-9, 1987, at the Stouffer Tower City Plaza in Cleveland. For further information, contact me at ECCO, 1123 S.O.M. Center Road, Cleveland, OH 44124, or call (216) 461-0800.

*Alice Fredman, Director  
Cleveland, OH*

### BACK TALK

*Editor:*

I read with amazement the letter from John Tiffany in the March 1987 issue. John claims to be "against the abuse of illegal drugs" but is "shocked and annoyed" at your using CoCo Cat to spread the word concerning the dangers of drug abuse.

You can't have it both ways. You can't oppose illegal drug use and at the same time remain silent on the issue. RAINBOW has taken the lead in trying to reach the youth of our great nation by using our magazine to inform them that drugs are indeed "not user-friendly." How can you say that you are "against the use of abuse of illegal drugs" and in the same breath take our magazine to task for saying exactly the same thing?

*Mel Waxman  
Freehold, NJ*

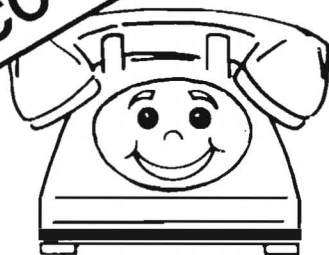
### The Borrowing Attitude

*Editor:*

No matter how much protection a small developer may have, the economics of law make it very difficult for any but the giants to bring successful action against a company that is stealing software — especially since most corporate theft occurs when distributors underreport copies sold on royalty reports. Who, but the largest can afford accountants to verify reports? However, the theft of computer software in this blatant manner is isolated and protected (as your article pointed out).

The reason so much computer software is stolen is an attitude in the general public that "borrowing" software is OK. I believe this attitude is fostered by a number of forces in our society. A few of which come to mind

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*Phyllis.*

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include schools that purchase one copy of a piece of software and then make copies for all their machines. Software developers themselves must shoulder a part of the blame. After buying a dozen pieces of software that are overpriced or just don't work, it's no wonder people are concerned about shelling out another \$30 for a pig in a poke.

Currently, the Canadian government is working on a new copyright law. And although there is no doubt that it is needed and overdue, I really greet it with a long yawn. The fact is that laws are only useful when the majority of people decide to obey them. What is needed now is a massive public education program to change the attitudes of the general public.

*Bob van der Poel*  
Edmonton, Alberta

**COCO 3**

*Editor:*

I've been waiting on pins and needles for Tandy to finally come out with a new CoCo with enhanced graphics, 80-column text display and more memory. Now it's here, and yet I'm still waiting to buy one. Why? Because at a time when everyone else is making their computers user-friendly and easier to operate, the CoCo 3 requires that we learn the OS-9 operating system and know how to program.

*Peter M. White*  
Coconut Creek, FL

**And Still They Complain**

*Editor:*

Why all this hostility toward the CoCo 3? Tandy gives us a computer that does virtually everything we ask and people are not happy. I think the only valid thing to get upset about is third-party software not running. Will there be patches? I think so. What about the couple of Tandy programs that don't run? I feel Tandy should send a patch to all of the registered owners of those programs.

*Gary Pagac*  
Spokane, WA

**REQUEST HOTLINE**

*Editor:*

Does anyone have a Canadian stamp program for the CoCo 2? I have a large Canadian collection and would love to be able to enter this into my computer.

*W. C. Arrowsmith*  
R. R. #4  
Stouffville, Ontario  
Canada L4A 7X5

**Terminal Driver Search**

*Editor:*

I am looking for a 300/1200 baud terminal driver for my custom-designed 1200 BPS, DCM-5 modem. In the past, I was using a 64K CoCo 2 with an unmodified DCM-5, *Remote 2* terminal driver and the *CoCo Chronograph* [June 1985, page 83]. I have upgraded to a 128K CoCo 3, 1200 BPS and Xmodem.

*Steve Finlayson*  
Box 19  
Kaleden, British Columbia  
Canada V0H 1K0

**The Indonesian CoCo 2**

*Editor:*

I would like to know if there are any Indonesian language programs available for the CoCo 2. If not, would anybody be interested in writing one?

*Tracy D. Long*  
2805 Butler Street  
Oceanside, CA 92054

**80-Micro Interest**

*Editor:*

In the December 1986 "Print#-2," column, mention was made of *80 Micro* magazine, which is basically for Model I, II, III and 4 computers. Could you possibly print the address of this publication?

*Peter Cormier*  
100 Tour Du Lac  
Ste. Agathe Des Monts, Quebec  
Canada J8C 1B1

The address is CW Communications, 80 Pine Street, Peterborough, NH 03458.

**INFORMATION PLEASE**

*Editor:*

I need help getting Radio Shack's *Codump* and *X-Pad* programs to work together. I own a 64K CoCo 2 (ECB) with a multipack. I can't get both *Codump* and *Demo* into memory at the same time, no matter where I put *Codump* in memory. The

manual says CLEAR200,1484B, but this is for a 16K machine.

Andrew Wiest  
Rt. 6, Box 183A  
Anderson, SC 29624

### Seeking Circle City

Editor:

Some time ago I purchased *Masterlink* from Circle City Software, Box 30166, Indianapolis, IN 46220. I didn't use it right away and only recently discovered that my copy does not work. Do you have an address for this company? My letter was returned with "address unknown" on it. Does anyone have a working copy of this program? I get an I/O Error in 6.

Ben Zinney  
1644 Seagirt Blvd.  
Far Rockaway, NY

### A Vanishing Act

Editor:

I just received *Disk Utility 2.1A* from my local Radio Shack. In the January 1987 issue of *RAINBOW* [Page 110], the Spectrum Projects ad stated that *Disk Utility* is compatible with CoCo 3. Mine does not boot. I have tried to call Mr. Rosen only to find that his answering machine no longer takes messages. I tried to leave him E-Mail on Delphi only to find he is not listed in the member directory. I don't know what to do. Tandy says that they are not responsible for "90 series" software and that I would have to speak to the company that produced it. I would appreciate any help you can give me.

John D. Farrar  
Cumberland University  
Lebanon, TN 37087

*The Spectrum Projects ad indicates that a CoCo 3 upgrade is available for Disk Utility 2.1 and can be had for \$15 with proof of purchase.*

### Get the Connection

Editor:

I do a lot of work with the database *Profile* and the word processor *Scriptsit*. I would like to know if there is software able to connect those two programs so I would be able to write an original letter or form letter with *Scriptsit* and have names and addresses from *Profile* inserted automatically.

If not, can you recommend a database that can write the original letter or form letter using uppercase and lowercase letters? The Report Format of *Profile* is limited to the use of uppercase letters.

Marie LeBlanc  
C.P. 431  
Perce, Quebec  
Canada G0C 2L0

### No Double-Sided Access

Editor:

When my new CoCo 3 arrived, I discovered it is not compatible with my two half-size, double-sided drives with a 16K JFD-CP controller. The CoCo 3 doesn't recognize double-sided drives or J&M, so all of my disks formatted as such failed to produce any working programs. The J&M doesn't recognize any of the new CoCo's commands. I'm stuck with using my expensive double-sided drive system as an RS-DOS single-sided system with over 90 percent of my

programs inaccessible. I have always liked J&M and their products, but I have received no help as to what I can do to make my two systems compatible.

Rick Butler  
30 Annapolis Lane  
Rotonda West, FL 33947

### Strange Connection

Editor:

I have a problem with my modem, the DCM-3. My friend has a VIC-20 and a modem. So we decided to try to connect. I used my *Color Compac*, and we set our parameters the same. Something strange happened when we connected. I received his messages, but he did not receive mine. We tried changing the settings. I even checked the system at Radio Shack. But nothing worked. Please help.

Charles D. Baum  
1116 W. 39th Place  
Hobart, IN 46342

### Where Is Four Star?

Editor:

I have been trying, without success, to contact Four Star Software in Canada. It seems they are no longer in business, as my last letter to them was returned "Moved/Address Unknown." I would like to contact anyone from Four Star, or one of the *Penpal* programmers, Dave Shewchun or Roland Knight. If anyone can help, please write.

Dave Suiter  
P.O. Box 65  
Harborton, VA 23389

### Escaping With CoCo 3

Editor:

How do you set CoCo 3 to send an escape character? I would like to access my work database over the phone using *Compac*, but I must send an ESCXX sequence to identify my terminal type. (Pressing BREAK while using *Compac* sends me back to the menu.)

I could use an IBM 3270-type emulation package for the CoCo to take advantage of SPF's full screen edit.

Ron Potter  
10914 Oliver Road  
Cleveland, OH 44111

### KUDOS

Editor:

I'd like to congratulate you on a great magazine! I received *HOT CoCo* magazine until its demise in February 1986, and I was glad to see that the Doctor ASCII column was picked up by your magazine. This column has already saved me a painful repair bill.

Mike Mumper Jr.  
Loysville, PA

### Software House Comes Through

Editor:

Once again one of your advertisers has shown outstanding concern and has gone the extra distance to satisfy a customer. I would like to publicly acknowledge The Software House in Redford, Michigan. When I had a problem with an order, Dallas Cox corresponded with me and compensated me far beyond my expectations.

Ron Draeger  
Spencer, WI

## BULLETIN BOARD SYSTEMS

*CORRECTION: The numbers published in RAINBOW for The Presidio and Colorboard of San Francisco, Gatorboard of Redwood City, Colorboard of Vallejo, Hal 2001 of San Mateo, and Color Users Board of Los Angeles are no longer being used for BBS activity. We apologize for any inconvenience to our readers and present holders of these numbers.*

● The Color Computer Board of Mobile has been online since May 1986. It's run on a 'D' board 64K CoCo 1 at 300 baud. Parameters are 7 bits, 1 stop bit, no parity. Call (205) 341-1616.

Edward Jones  
281 Lakeview Drive  
Mobile, AL 36609

● I would like to announce the opening of Complex, a new BBS in Encino, California. Over 30 menus of things to do. Running on a CoCo 1 with eight drives. Call (818) 996-9290 24 hrs.

Cliff Redding  
Encino, CA

● King Arthur's Court is run on a CoCo 2 with homemade software. It has up/downloads for several types of computers and is currently running at 300 baud. Online 24 hrs., seven days a week. Call (619) 320-5072.

Paul Estes  
352 Glen Circle  
Palm Springs, CA 92262

● The Citrus Color Computer Club in Colton, California, is sponsoring the Color-Book BBS. Featuring articles, message base and download section. Online 24 hrs. at 300 baud, even parity and 7 bit. A password is required, but new users are allowed online. (714) 877-2714.

James C. Gracey  
San Bernardino, CA

● I am proud to announce a new CoCo BBS in the Denver area. It is called the CoCo County Airport. 300/1200 baud, 24 hrs. It has 2 Meg of online storage. Call (303) 343-6707.

Ronald A. Bihler  
Aurora, CO

● ParityVille is a great CoCo board running on a modified CoBBS 24 hrs., seven days a week. Call (404) 949-0596.

Ernest Fielder  
Ga. Tech Box 36353  
Atlanta, GA 30332

● The High Level BBS now operates with over 12 Meg online, 24 hrs. at 300/1200 baud. Call (312) 566-8856. The system runs on a CoCo 2 with a megadisk hard drive.

Brian Smith  
265 Rouse Avenue  
Mundelein, IL 60060

● The Nebula Concept BBS is running seven days a week from noon to midnight at 7 or 8 bits, 300 baud. Call (502) 821-1954.

Joseph L. Adams  
1142 Perry Street  
Madisonville, KY 42431



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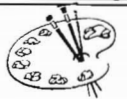
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- The Reservation is run by James and Rose Brannigan. It operates at 8 bits, no parity, with a complete section for the CoCo. Open 24 hrs., seven days a week, at 300/1200 baud. Call (504) 886-3151; (504) 886-5505 voice.

*Darrell Diolman  
1114 Byrd Avenue  
Bogalusa, LA 70427*

- The Duckpond BBS is online 24 hrs. a day at 300/1200 baud, running on a Tandy 1000. Handles are accepted. Call (318) 745-3646.

*Samurai Duck  
P.O. Box 873  
Doyline, LA 71023*

- I would like to announce the opening of a new BBS in Mansfield. It is run on and fully dedicated to the CoCo. It is currently running on a 64K with three disks and Richard Duncan's CoBBS Version 1.2. It is up 24 hrs. a day and goes by the name of CoCoBBS. Call (617) 339-1996.

*Roy Jerman  
17 Bonney Lane, #30  
Mansfield, MA 02048*

- The CoCo-Nuts BBS Service is online at (919) 425-8242.

*Tom Taylor  
6310 Belle Terre Court  
Fayetteville, NC 28304*

- The War Room BBS can be reached at (704) 847-5795, 24 hrs., seven days a week. Settings are 300 baud, 7, E, 1. Validation is required. Devoted entirely to the CoCo.

*Tim Bohnslav  
802 Brenham Lane  
Matthews, NC 28105*

- The Siouxland Color Computer BBS is changing. It will be for members only and there is a sign-up fee to get on the board. If you would like to join, send me your full name and address along with a phone number where we can call and verify the information. There is a \$5 per year fee. Call (402) 494-2284.

*Alan Pedersen  
611 D Street  
South Sioux City, NE 68776*

- I am pleased to announce another CoCo BBS. It will be up 24 hrs., seven days a week, on the new Colorama 4.0. Parameters are 8 bits, no parity, 300 baud, full duplex. Supports up/downloads. Call (718) 241-8264.

*Mark Shmueli  
2246 National Drive  
Brooklyn, NY 11234*

- There are two BBSs in the Buffalo, NY, area. They are: Tandy Town BBS, 300/1200 baud, CoCo download section, online 24 hrs., (716) 735-9625. SysOp Frank Voesburg and Trailin Tail BBS, 300/1200 baud, operated on a CoCo 2, online 24 hrs., (716) 433-8108.

*Paul S. Turley  
Grand Island, NY*

- The Island CoCo Club BBS can be reached at (516) 227-1285.

*D.K. Lee  
P.O. Box 426  
Massapequa Park, NY 11762*

- The Full Tilt GCT BBS is running on an IBM XT for the CoCo Community. We have over 300 files and support 300/1200/2400 baud. Users need to be verified by sending a self-addressed stamped envelope, although anyone can call and take a look around. Call (212) 682-0681. 9 a.m. to midnight. 8 bits, no parity.

*Steve Schechter  
Box 8414 FDR Station  
New York, NY 10150*

- The CoCo Nut Tree is operating 24 hrs. at 300/1200 baud. Large download section, and allows full access from the first sign-on. Call (216) 792-9745.

*Larry Cadman  
P.O. Box 478  
Canfield, OH 44406*

- The BACCUG BBS is online 24 hrs. at (513) 836-2741. It supports all models of CoCos. 300/1200 baud, 8, N, 1 or 7, E, 2. There are no user fees. First time callers are given access for 20 minutes. Operated by the Dayton Area Color Computer Users Group.

*Joe Josey  
707 Angelia Court  
Englewood, OH 45322*

- The Pixel Palace BBS is running from 10 p.m. to 4 p.m. weekdays and 10 p.m. to 10 a.m. weekends. Runs at 300/1200 baud with software especially designed for the Color Computer 3 using 512K. Call (216) 364-5061.

*Alvin Tanpoco  
1025 4th Street N.E.  
New Philadelphia, OH 44663*

- The Encyclopedia Galactica BBS is online from 10 a.m. to 10 p.m. daily. Call (717) 586-0221. 300/1200 baud, 8 bits, no parity, and 1 stop bit.

*Andrew Robinson  
R.D. 1 Box 4  
Pleasant Mt., PA 18453*

- The Computech-80 BBS, 300 baud, 7 p.m. to 7 a.m. Monday-Sunday. 7 or 8 bits, access is \$2 per month. Multiple computer forums available. Call (703) 365-2018 or write (please enclose an SASE).

*Ricky Sutphin  
Route 1, Box 20  
Henry, VA 24102*

- We have a new BBS running 24 hrs. Up/downloads, message base, forums and a buy/sell/wanted board. Access is free. Please leave suggestions for improvements. Call (608) 735-4509.

*Robert Howard  
RR 2  
Gays Mills, WI 54631*

- Nightlink is a full-featured, free, Christian BBS online 24 hrs., seven days a week at 8 bit, no parity, 1 stop bit, full duplex and 300 baud (1200 on the way). Call (414) 834-4450 or write.

*Steve Truesdale  
Nightlink International  
Box 222  
Oconto, WI 54153*

- The Grand Centre Connection BBS runs on a Tandy 1000 at 300 baud, 8 bit words, no parity and 1 stop bit. It supports uploads and downloads in ASCII and Xmodem protocol, with many public domain pro-

grams available for the CoCo. There is no charge for access to this BBS. Call (403) 594-1525, Monday through Wednesday, and Friday 6 p.m. to 9 a.m., Thursday 9 p.m. to 9 a.m., and Saturday 6 p.m. to 9 a.m. (all times are Mountain).

*Steve Frampton  
Medley, Alberta*

- The CoCo Knights sponsor two BBSs. Rainboard, run by a CoCo, is open 8 p.m. to 11 p.m. nightly at 382-9080. ComLine, run by a Tandy 1000, is also online from 8 p.m. to 11 p.m. at 727-0352.

*A. Ooievaar  
Victoria, British Columbia*

- Announcing a new BBS in northern Ontario that is free to all. It features E-mail, gallery, up/downloading, want ads, hints and tips and much more. Call (705) 848-1221, Monday to Friday from 7 p.m. till 7 a.m., Friday at 7 p.m. till Sunday at 9 p.m. Soon to be run 24 hrs.

*Mike Dickerson, SysOp  
52 Colwill Drive  
Elliot Lake, Ontario  
Canada P5A 2Z8*

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.



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## Sacy, Please Come Home

This is our Sixth Anniversary Issue, and it is always a time for good feelings on everyone's part here and, I hope, in the CoCo Community. Naturally, we're pleased and proud to be celebrating our Anniversary again and, as usual, we have a nice surprise inside — our CoCo Cat calendar.

The calendar is filled with interesting dates in the history of the CoCo as well as the usual holidays and a few "extra special" days you probably didn't know about until now. I know everyone will be interested, for instance, in celebrating National Pig Week in an appropriate manner.

With all the hullabaloo, I hate to be on a downer, but I am. And, though I usually do not share "personal" type things in this column, this one has been bothering me for some time. I know no one can help, but, somehow, it seems better to share this tale of "man's inhumanity to man."

My eldest daughter, Wendy, is just back from a "Semester At Sea," a program through the University of Pittsburgh. Wendy, who works on the magazine when she is home, is now a senior at the University of Wisconsin-Madison. She's 20 years old.

Wendy approached me about 18 months ago to take a "Semester At Sea." The program is fully accredited and includes regular college credit courses and practicum studies while the students spend about four months on a ship as it circles the globe. The spring semester included stops in Spain, Yugoslavia, Turkey, the Soviet Union, Egypt, India, Malaysia, Taiwan, China, Hong Kong and Japan. The ship left the Bahamas and docked a few weeks ago in Seattle.



To balance out costs for the academic year, Wendy stayed home during the fall semester and attended the University of Louisville. She also worked part-time — to pay for part of her tuition this spring and to provide herself with spending money for the trip. I was really proud that she was so mature in accepting part of the financial responsibility for the trip. In sum, her junior year in college didn't cost "Daddy" any more than it would have had she been at Wisconsin.

And it was a wonderful experience for her. She was exposed to many different cultures, formed firsthand opinions of countries, peoples and economic systems, and she learned a great deal, too, through her practicum classes in addition to more traditional studies on ship.

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Everyone was looking forward to her return — to hearing the stories, getting her impressions, looking at her photographs.

Wendy took 17 rolls of pictures, almost 550 of them. Friends snapped her standing in front of a line of gray-clad Russian soldiers in Red Square, at the Taj Mahal, beside the Golden Horn, on a camel at the pyramids, at a market in China, in front of the bullet train in Japan. And so on.

We don't have a single one of those pictures.

We don't have the one present Wendy bought herself — some pearls she had saved money for so she could get them in Hong Kong.

We don't have Sacy, either.

Sacy is Wendy's teddy bear. He's 17 years old. The name, incidentally, means "Soft And Cuddly." Sacy is who Wendy cried with when she didn't get in the high school club she wanted. He accompanied her on a scholarship summer to Israel. He kept her company when she broke both her arms at the same time.

Sacy has been to Denver and to Washington, D.C. He's been to Florida and he's been to Kansas City. He's lived in Tuscaloosa, Alabama, Chicago and Madison, Wisconsin.

And he's been almost all the way around the world.

Someone, you see, stole Wendy's tote bag from the customs shed of Pier 28 in Seattle while Wendy went back onto the ship to get her other luggage. That tote bag contained Wendy's pearls, a present for Wendy's sister, 17 rolls of film. And Sacy.

Wendy spent four hours searching the pier for her tote bag. She talked to longshoremen and ship personnel, to the police and customs agents, to other students and strangers. No tote bag. No Sacy.

Wendy has written to all 400 students who traveled with her, asking if anyone might have seen something. So far, no one has. Students have volunteered to send her copies of their pictures — but no one has many pictures of Wendy, of course.

And no one has Sacy.

Just last night, Wendy came to talk to me, so upset I thought she had broken up with her boyfriend.

"Why did they have to steal Sacy and my pictures?" she asked. "Couldn't they have at least sent Sacy home?" Then: "Do you think Sacy's OK?"

I told her I was sure Sacy was, but we both knew it was a lie. Whoever stole the tote bag knew it belonged to a youngster — that the film had to represent irreplaceable memories and the teddy bear had to be very, very special. They could have kept the other stuff and just sent the pictures back.

And sent Sacy home.

So I'm down even if this is our Sixth Anniversary Issue. Somehow it helps to have written about it and I hope you'll pardon my injecting a personal issue in this space.

After all, it's the first anniversary issue when Sacy hasn't been here to celebrate with us.

— Lonnie Falk

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## BUILDING JULY'S RAINBOW

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The OS-9 Users Group battles back

And, Rainbow's Color Computer Hall of Fame

If you saw *People* magazine's special issue on Russia a few weeks ago, perhaps you read that many videotapes produced here in the West are stolen by underground "video garage" operations in the USSR and reproduced to run on Russian video cassette recorders. Among the "hot" videos are the Rambo duo.

Curiously enough, not only is Sylvester Stallone's dialogue dubbed in by a woman on one popular, but illegal copy (she does the entire sound track), but the word "Rambo" was mistranslated into "Rainbow"! A soprano soldier named Rainbow wielding a machine gun! Well, recollection of this came immediately to mind during my vacation recently as I was riding an express train out of Helsinki, Finland. Destination: Moscow.

We had been warned to use the restrooms early, before the fretfully hot coach would be sealed for an enroute immigration/customs inspection. Thus, it was expected when a tall Russian soldier came into the compartment I shared with my wife and asked to see our documents, which we were careful to have in total order. It was just by chance that he asked me to open the very suitcase in which I had a copy of what else, *THE RAINBOW*. It immediately caught his eye. "Rainbow!" he said, and, were it anywhere else, I might have blurted, "Oh, are you a reader?" Instead, I volunteered, "It's a magazine for home computer users." Home users, indeed, in a country where even the hotels and biggest retail stores still use the abacus! He thumbed through it, laid it down, picked it up again and muttered "Rainbow, Raaaainnnnn-bowww" drawing it out as if he might be considering whether this was the book that inspired the video! Replacing it in my suitcase, he made a cursory inspection of our compartment and then picked it up a third time. I was quite ready to give it to him, but thought better of it when, at last, he dropped it, saluted us and moved on.

Yes, I am proud of *THE RAINBOW*, now entering its seventh year! Was this the first copy of *THE RAINBOW* to enter Russia? Well, while we have no subscribers in the USSR, and while I saw no computer magazines at any newsstands anywhere, I suspect my copy is not the first. In fact, a while back, I'm told, the Russians approached Tandy, as they did Apple, about introducing the Color Computer to the Russian marketplace! Whatever negotiations took place apparently did not work out, so, alas, the Russian soldier and I still have little common ground.

Bruce Warner hasn't told me if any copies of the OS-9 Users Group's *MOTD* newsletter are headed toward the Kremlin, but I do want to report that, after an eight-month suspension, publication of *MOTD* has resumed and a fresh copy is right here on my desk. If you didn't get one, you might write to: OS-9 Users Group, ATTN: Membership, 1715 East Fowler Avenue, Suite R237, Tampa, FL 33612. The group has suffered some setbacks over the past year, but appears to be getting back on track with folks like Bruce, Bill Turner, David Kaleita and Carl Krieder putting in enormous amounts of volunteer hours to get things moving again. That's good news for all of us and, while I know many of you may be frustrated over past experience with the group, I urge you to please show patience and understanding and help these new officers get things rolling again.

Along with my usual invitation for you to join the tens of thousands who subscribe to *THE RAINBOW* (the magazine, not the soprano soldier), let me cordially invite you to nominate someone for induction into Rainbow's Color Computer Hall of Fame! Yes, you can nominate your favorite CoCo Community citizen and the selection committee will carefully consider your nomination. The time and site for the formal induction ceremony are yet to be determined, but now is the time for nominations. All you do is fill out the nomination form (see Page 104) and mail it in. No essay nor documentation is required or desired, and just one nomination per reader please. We'll discuss the Hall of Fame in more detail later on; in the meantime, keep following *THE RAINBOW*, the Rambo of computer magazines.

— Jim Reed

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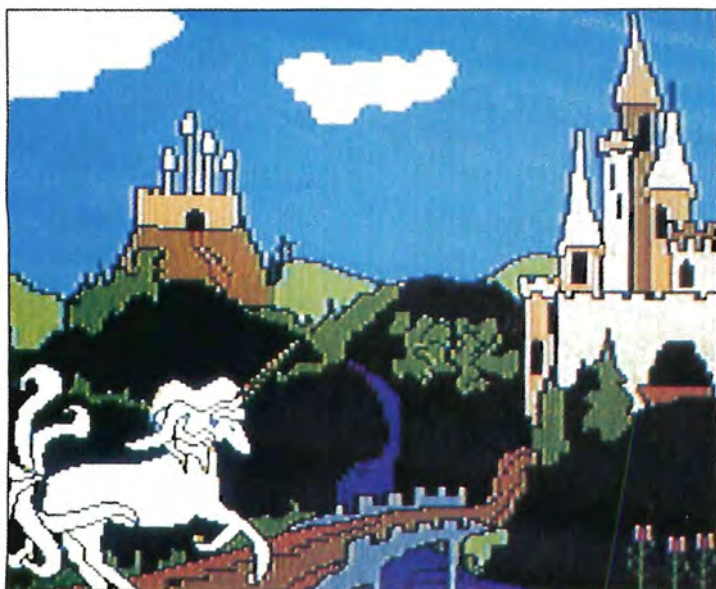
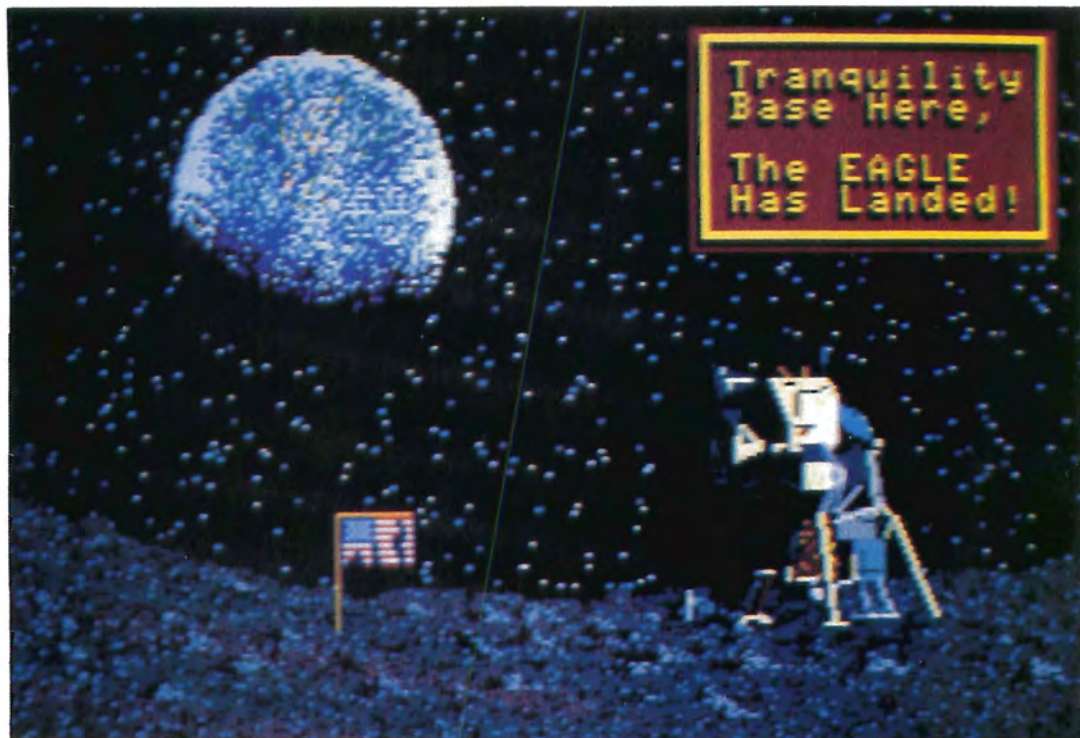
# The CoCo Gallery

1<sup>st</sup>

COCO 3

## Tranquility Base *James Upperman*

James of Amlin, Ohio, created this graphic of the aerospace outpost with a BASIC drawing utility he wrote. He is an architect and has had a Color Computer for about 4½ years.



2<sup>nd</sup>

## Unicorn *James Stewart*

James of Highland Falls, New York, created this dreamland in BASIC on the CoCo 3. He is confined to a wheelchair and does his programming with a mouthstick.

**SHOWCASE YOUR BEST!** You are invited to showcase your 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 award 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.

— Angela Kapfhammer, Curator

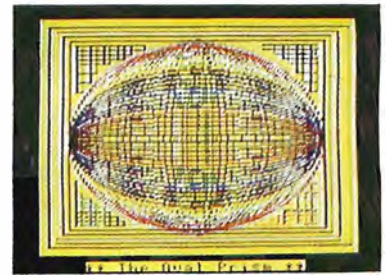


3<sup>rd</sup>

**Spring Window**  
*Logan Ward*

Color Max 3 and the CoCo 3 were used to create this varied scene. Logan lives in Memphis, Tennessee, and is a technician for The Computer Center.

HONORABLE MENTION



**The Oval Prism** *Ron Stanwood*

This bright and colorful graphic was created on the CoCo 3 with a program Ron wrote. He is an independent software designer in Langley, British Columbia.

1<sup>st</sup>

COCO 1 & 2

**Liberty**  
*Thomas White*

CoCo Draw was used to visualize "Liberty Enlightening the World." Thomas lives in Mission Viejo, California. He enjoys art, bicycling and his CoCo.





## Hurray for the Red, White and Blue

By Ingrid Lawrence  
and Mark Bourdeaux

**F**rom sea to shining sea, the United States is celebrating its 211th birthday this year and we are in the spirit! For your listening pleasure, we have combined submissions from two RAINBOW readers who are programming patriots.

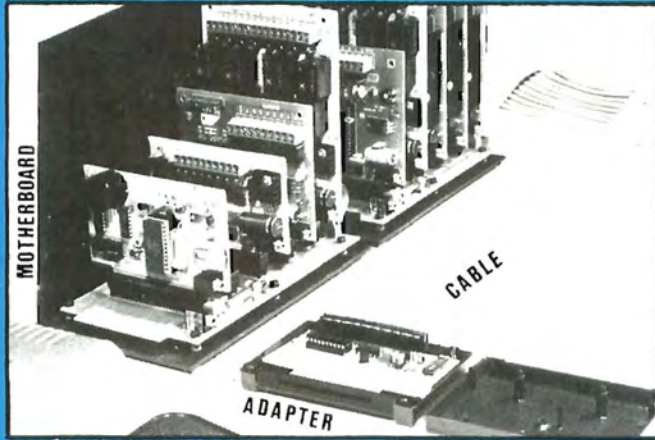
Ingrid Lawrence salutes the flag with her rendition of "The Star-Spangled Banner." Mark Bourdeaux adds to the festivities with "America the Beautiful," "My Country 'Tis of Thee" and "The Stars and Stripes Forever." But these songs are not for the ears only; there are stirring graphics, too. So come on and join us in wishing the U.S. a very happy birthday! □

*Ingrid Lawrence lives in Elkton, Ohio, where she attends Beaver Local School. Ingrid is 14 years old and enjoys programming her 64K CoCo.*

*Mark Bourdeaux is a freshman at Western High School in Spring Arbor, Michigan. Mark is 14 years old and enjoys computing, golf and basketball.*

# The Amazing A-BUS

**NEW**



An A-BUS system with two Motherboards  
A-BUS adapter in foreground

The A-BUS system works with the original CoCo,  
the CoCo2 and the CoCo 3.

## About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples)

### Relay Card

RE-140: \$129

Includes eight industrial relays. (3 amp contacts. SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

### Reed Relay Card

RE-156: \$99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

### Analog Input Card

AD-142: \$129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

### 12 Bit A/D Converter

AN-146: \$139

This analog to digital converter is accurate to 0.25%. Input range is -4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple strain gauge, etc. 1 channel (Expand to 8 channels using the RE-156 card)

### Digital Input Card

IN-141: \$59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

### 24 Line TTL I/O

DG-148: \$65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

### Clock with Alarm

CL-144: \$89

Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

### Touch Tone® Decoder

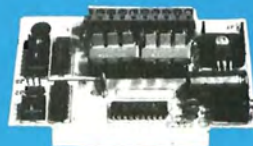
PH-145: \$79

Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

### A-BUS Prototyping Card

PR-152: \$15

3 1/2 by 4 1/2 in. with power and ground bus. Fits up to 10 I.C.s



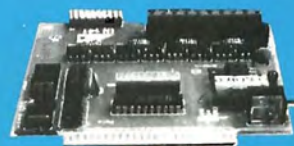
ST-143



CL-144



RE-140



IN-141



AD-142

## Smart Stepper Controller SC-149: \$299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

## Remote Control Keypad Option RC-121: \$49

To control the 4 motors directly, and "teach" sequences of motions.

## Power Driver Board Option PD-123: \$89

Boost controller drive to 5 amps per phase. For two motors (eight drivers).

## Breakout Board Option BB-122: \$19

For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

## Stepper Motor Driver ST-143: \$79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V. bidirectional, 4 phase, 350mA per phase).

## Special Package: 2 motors (MO-103) + ST-143: PA-181: \$99

## Stepper Motors MO-103: \$15 or 4 for \$39

Pancake type, 2 1/4" dia. 1/4" shaft, 7.5"/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar. 5 oz-in torque same as Airpax K82701-P2.

## Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

## A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot	AR-133: \$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot	AR-133: \$69
Apple II, II+, IIe. Uses any slot	AR-134: \$49
TRS-80 Model 102, 200. Plugs into 40 pin "system bus"	AR-136: \$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter)	AR-135: \$69
TRS-80 Mod 3, 4, 4D. Fits 50 pin bus. (With hard disk use V-cable)	AR-132: \$49
TRS-80 Model 4P. Includes extra cable (50 pin bus is recessed)	AR-137: \$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I	AR-131: \$39
Color Computers (Tandy). Fits ROM slot, Multi-pak, or Y-cable.	AR-138: \$49

## A-BUS Cable (3 ft, 50 cond.) CA-163: \$24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard

## Special cable for two A-BUS cards: CA-162: \$34

## A-BUS Motherboard MB-120: \$99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: \$12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

• The A-BUS is not a replacement for the Multi-pak

Add \$3.00 per order for shipping.  
Visa, MC, checks, M.O. welcome.  
CT & NY residents add sales tax.  
C.O.D. add \$3.00 extra.  
Canada: shipping is \$5  
Overseas add 10%



# ALPHA Products

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Orders only Except in CT 800 221-0916

Connecticut orders: (203) 348-9436

All lines open weekdays 9 to 5 Eastern time

# CoCo Max™ II



You'll use it all the time and love using it.

## What is CoCo Max?

Simply the most incredible graphic and text creation "system" you have ever seen. A Hi-Res Input Pack (more on the pack later) is combined with high speed machine language software. The result will dazzle you.



CoCo Max disk system, with Y-cable.

## Is CoCo Max for you?

Anyone who has ever held a pencil or a crayon for fun, school or business will love it. A 4 year-old will have fun doodling, a 15 year-old will do class projects and adults will play with it for hours before starting useful applications (illustrations, cards, artwork, business graphics, flyers, charts, memos, etc.) This is one of the rare packages that will be enjoyed by the whole family.

## What made CoCo Max an instant success?

First there's nothing to learn, no syntax to worry about. Even a child who can't read will enjoy CoCo Max. Its power can be unleashed by simply **pointing** and **clicking** with your mouse or joystick. With **icons** and **pull down menus**, you control CoCo Max intuitively; it works the same way you think.

Don't be misled by this apparent simplicity. CoCo Max has more power than you thought possible. Its blinding speed will astound you.

It lets you work on an area 3.5 times the size of the window on the screen. It's so friendly that you will easily recover from mistakes: The **undo** feature lets you revert to your image prior to the mistake. As usual, it only takes a single click.

Later, we will tell you about the "typesetting" capabilities of CoCo Max II, but first let's glance at a few of its graphic creation tools:

With the **pencil** you can draw free hand lines, then use the **eraser** to make corrections or changes. For straight lines, the convenient **rubber-banding** lets you preview your lines before they are fixed on your picture. It's fun and accurate. Lines can be of any width and made of any color or texture.

The **paint brush**, with its 32 selectable brush shapes, will adapt to any job, and make complicated graphics or calligraphy simple.

For special effects, the **spray can** is really fun: 86 standard colors and textures, all available at a click. It's like the real thing except the paint doesn't drip.

CoCo Max will instantly create many shapes: circles, squares, rectangles (with or without rounded corners), ellipses, etc. Shapes can be filled with any pattern. You can also add hundreds of custom patterns to the 86 which are included.

The **Glyphics** are 58 small drawings (symbols, faces, etc.) that can be used as rubber stamps. They're really great for enhancing your work without effort.



Pull down menus



Zoom in!

## Control Over Your Work

CoCo Max's advanced "tools" let you take any part of the screen, (text or picture) and perform many feats:

- You can move it around
- Copy it
- Shrink or enlarge it in both directions
- Save it on the electronic **Clipbook**
- Flip it vertically or horizontally
- Rotate it
- Invert it
- Clear it, etc. etc.

All this is done instantly, and you can always **undo** it if you don't like the results.

For detail work, the **fat bits** (zoom) feature is great, giving you easy control over each pixel.

To top it all, CoCo Max II works in color. Imagine the pictures in this ad in color. If you own a Radio Shack CGP-220 or CGP-115, you can even print your work in full color!

There is so much more to say, such as the capability to use CoCo Max images with your BASIC programs, the possibility to use CoCo Max's magic on any standard binary image file. There are also many advanced features such as the incredible **lasso**.



Inside the Hi-Res Input Pack

## Why a Hi-Res Input Pack?

Did you know that the CoCo joystick input port can only access 4096 positions (64x64)? That's less than 10% of the Hi-Res screen, which has 49152 points! (256x192). You lose 90% of the potential. The Hi-Res Input Pack distinguishes each of the 49152 distinct joystick or mouse positions. That's the key to CoCo Max's power. The pack plugs into the rom slot (like a rom cartridge). Inside the pack is a high speed multichannel analog to digital converter. Your existing joystick or mouse simply plugs into the back of the Hi-Res Pack.

## Electronic Typesetting...

You'll be impressed with CoCo Max's capability. Text can be added and moved around anywhere on the picture. (You can also rotate, invert and flip it...) At a click, you can choose from 14 built in **fonts** each with 16 variations. That's over 200 typestyles!



Examples of printouts

## Printing Your Creations

There are a dozen ways to print your work. All are available with a click of your joystick (or mouse) without exiting CoCo Max. Your CoCo Max disk includes drivers for over 30 printers!

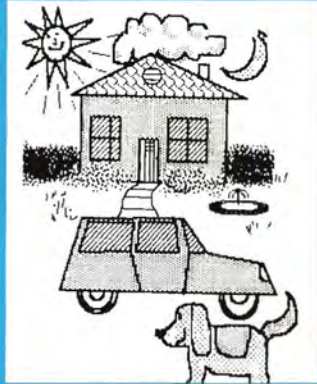
# CoCo Max II™

The whole family will enjoy CoCo Max. Here are a few examples of the possibilities.

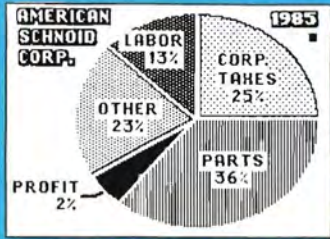
All these pictures are unretouched screen photos or printouts (on an Epson RX-80).



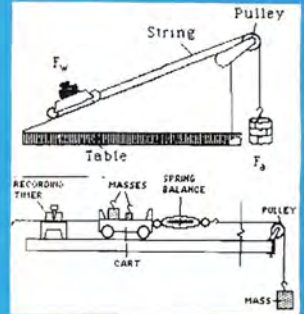
1 Publish a newsletter or bulletin



2 Fun for children while stimulating creativity.



3 Business graphs, charts, diagrams. Also memos



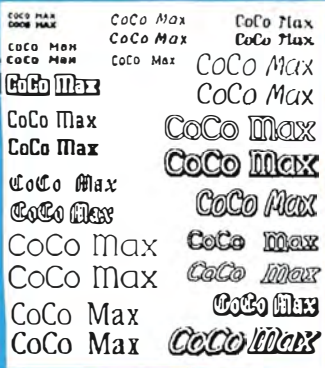
4 Junior's homework and science projects. Term papers too!



7 Video portrait (with optional digitizer).



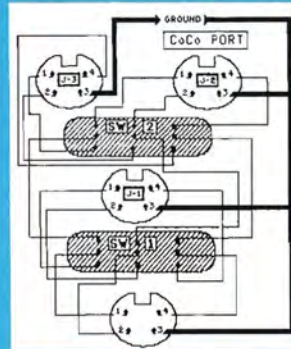
8 This is a cartoon.



5 Over 200 typstyles to choose from! generate flyers.



6 A new way to express your imagination.



9 schematics and floor plans.



10 Logos and letterheads.

## CoCo Max II now works with the CoCo 3

The new CoCo Max II has exactly the same features and resolution (256 x 192) as the original CoCo Max II

### System Requirements:

Any 64K CoCo and a standard joystick or mouse. (Koala pads and track balls work, but are not recommended.) Disk systems need a Multi-Pak or our Y-Cable. CoCo Max is compatible with any Radio Shack DOS & ADOS. Note: the tape version of CoCo Max includes almost all the features of CoCo Max II except *Shrink, Stretch, Rotate, and Glyphics*. Also, it has 5 fonts instead of 14. CoCo Max is not compatible with JDOS, DoubleDOS, MDOS, OS-9, the X-pad, and Daisy Wheel Printers.

### Printers Supported:

Epson MX, RX, FX and LX series, Gemini Star, Micronix, Delta 10, 10X, 15, 15X, SG-10, Okidata 82A, 92, 93, C-Ifth Pro-writer, Apple Image-writer, Hewlett-Packard Thinkjet, Radio Shack DMP 100, 105, 110, 120, 200, 400, 500, Line Printer 7, Line Printer 8, TRP-100, CGP-220 (DMP-110 use Line Printer VIII), PMC printers, Gorilla Banana. Color printing: CGP-200, CGP-115

### New Video Digitizer DS-69B

This Low Cost Digitizer is the next step in sophistication for your CoCo Max system. With the DS-69B you will be able to digitize and bring into CoCo Max a frame from any video source, such as your VCR, tuner, or video camera. Works with any CoCo, 8 frames per second. Includes software on disk ..... \$149.95

### Pricing

CoCo Max on tape ..... \$69.95  
with Hi-Res Pack and manual.  
CoCo Max II (on disk only) ..... \$79.95  
with Hi-Res Pack and manual.  
Upgrade to make CoCo Max II compatible with the CoCo 3: Send your CoCo Max Hi-Res Pak (the cartridge) to us. We will modify it and return it to you. Enclose payment of \$29.95  
Y-Cable: *Special Price* ..... \$19.95  
Super Picture Disks #1, #2, and #3  
each: \$14.95  
All three picture disks ..... \$29.95

**Guaranteed Satisfaction**  
Use CoCo Max for a full month.  
If you are not delighted with it,  
we will refund every penny.



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Add \$3.00 per order for shipping.  
Visa, MC, checks, M.O. welcome.  
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C.O.D. add \$3.00 extra.  
Canada: shipping is \$5  
Overseas add 10%

110	.....	137
170	.....	136
400	.....	75
656	.....	151
END	.....	85

Listing 1: SSBANNER

```

1 'INGRID LAWRENCE
3 'PO BOX 23
4 'ST. RT. 154
5 'ELKTON, OHIO 44415
1Ø CLS
2Ø PRINT"
*****
*****
"
3Ø PRINT "STAR SPANGLED BANNER
BY F.S.KEY
ARRANGED BY
INGRID LAWRENCE
4Ø PRINT "
"
5Ø PRINT"*****
*****"

```

```

6Ø FOR X = 1TO3ØØØ:NEXT X
7Ø CLS
8Ø PRINT @ 96,"OH! SAY CAN YOU S
EE BY THE DAWNS EARLY LIGHT, WHA
T SO PROUDLY WE HAILED AT THE TW
ILIGHT'S LAST GLEAMING!"
9Ø A$="O3;L8;G;E;L4;C;E;G;O4;L2;
C;L8;E;D;L4;C;O3;L4;E;F#;L2;G;L8
;G;G;O4;L3;E;L8;D;L4;C;O3;L2;B;L
8;A;B;O4;L4;C;C;O3;L4;G;E;C"
1ØØ PLAY A$
11Ø CLS
12Ø PRINT@96,"WHOSE BROAD STRIPE
S AND BRIGHT STARS THRO' THE PE
RILOUS FIGHT, O'ER THE RAMPARTS
WE WATCHED WERE SO GALLANTLY
STREAMING;AND THE ROCKET'S RED G
LARE, BOMBS BURSTING IN AIR, G
AVE PROOF THRO' THE NIGHT TH
AT OUR FLAG WAS STILL THERE
13Ø B$="L8;G;E;L4;C;E;G;O4;L2;C;
L8;E;D;L4;C;O3;L4;E;F#;L2;G;L8;G
;G;O4;L3;E;L8;D;L4;C;O3;L2;B;L8;
A;B;O4;L4;C;C;O3;L4;G;E;C;O4;L8;
E;E;L4;E;F;G;L2;G;L8;F;E;L4;D;E;
F;L2;F;L4;F;L2;E;L8;D;C;O3;L2;B;
L8;A;B;O4;L4;C;O3;L4;E;F#;L2;G"

```

# The Rainbow Introductory Guide to Statistics

Most people have been using statistics since they learned to talk. Statistical results and concepts turn up everywhere. A large part of our daily news consists of statistics. Results of opinion polls, surveys, research studies, the Dow Jones industrial average and, of course, our sports news are all statistics. But statistics are often misused. The informed person needs to understand the basic concepts in order to judge the appropriateness of applications.

Rainbow Contributing Editor Dr. Michael Plog and co-author Dr. Norman Stenzel have written **The Rainbow Introductory Guide to Statistics** just for beginners. It is an easy-to-understand guide to this sometimes mysterious area of mathematics. Their aim is to introduce readers to the realm of statistical processes and thinking, and they believe that the Tandy Color Computer is an ideal machine for the reduction of data.

Sharpen your skills with **The Rainbow Introductory Guide to Statistics** for only \$6.95. Included in the book is the *CoCo-Stat* program, a BASIC statistics program just for the Color Computer. (80-column printer required.) Forget the typing hassle by ordering the accompanying Statistics Tape or Disk for only \$5.95. Spend your time learning and enjoying the new material, not debugging your typing. Just pop in the tape or disk and you're ready for action!

Save when you buy **The Rainbow Introductory Guide to Statistics** book together with the tape or disk. Get both for only \$11.95.

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Signature \_\_\_\_\_

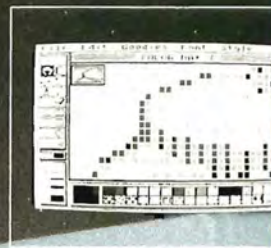
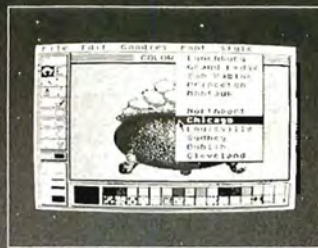
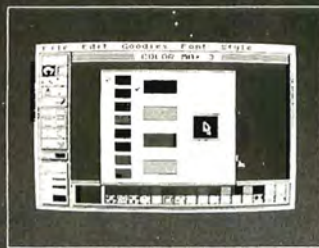
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To order by phone (credit card orders only), call (800) 847-0309, 8 a.m. to 5 p.m. EST. For other inquiries, call (502) 228-4492.

\*Add \$1.50 per book for shipping and handling in the U.S. Outside the U.S. add \$4 per book (U.S. currency only). Kentucky residents add 5% sales tax. In order to hold down costs, we do not bill. Please allow 6-8 weeks for delivery.

Note: The tape and disk are not stand-alone products. If you buy either the tape or disk, you still need to purchase the book for instructions.





# INTRODUCING COLOR MAX 3

Unleash the power of your CoCo 3 with 320 x 200 screen resolution, and the choice of any 16 colors from the CoCo 3's 64 color palette, and your graphic creations almost can't help but come alive with color and detail. Icons, pull down menus, and dialog boxes make COLOR MAX 3 very easy to use. 11 fonts are supplied, making hundreds of lettering styles possible. Text can use any combinations of color, shadow, outline, bold, and italics. Painting is a snap with 16 colors and 32 editable patterns. COLOR MAX 3 requires a 128K CoCo 3 with disk drive, High-Resolution Joystick interface, and a joystick device (mouse, touch pad, or joystick).

## ORDER YOURS TODAY!

Please include \$3.00 shipping & handling. PA residents add 6% sale tax. Specify catalog numbers when ordering.

- 200MD Color Max 3 (without print driver)
- 201MD Color Max 3 (with EPSON MX/RX/FX & compatibles driver)
- 202MD Color Max 3 (with DMP-105/120/130 driver)
- 203MD Color Max 3 (with CGP-220 driver)

### Color Max 3 Accessories

- 220MD Color Max 3 Pix Converter 1 (Contains 6 converters) \$29.95
  - CoCo MAX B&W to 'MGE' format
  - CoCo MAX artifact to 'MGE' format
  - 6K B&W binary file to 'MGE' format
  - 6K artifact binary file to 'MGE' format
  - GRAPHICOM B&W file to 'MGE' format
  - GRAPHICOM artifact file to 'MGE' format
- 221CH High-Resolution Joystick interface \$12.00 (Radio Shack Cat. No. 26-3028)

INTRODUCTORY PRICE

# \$59.95

Graphicom Part II requires a 64K CoCo (I, II, III) and disk drive. It will load and save both STANDARD/BIN files and GRAPHICOM screens. GRAPHICOM PART II does NOT require Graphicom to RUN!

Graphicom Part II is a video processing package that provides many functions that are missing in GRAPHICOM. Here are just a few of the features provided by Graphicom Part II. Enlarge/Reduce/Rotate • Multi-pattern Paint • Pan & Zoom • Typesetter & Font Editor • Pixel Blaster. GRAPHICOM PART II does NOT require Graphicom to RUN!

Order Catalog# 132WD. See RAINBOW REVIEW (11/85 on page 209)

GRAPHICOM PART II DISK \$24.95

HARDCOPY is more than just a screen print utility, compare these features with any other graphic dump program on the market: Gray Scale or B&W printouts, 1x1 2x2, 3x3, Labels, posters, and greeting cards with your graphics and much much more! See RAINBOW REVIEW (10/85) on page 218) HARDCOPY requires a 64K CoCo (I, II, or III) and disk drive. Please specify printer and catalog # when ordering.

105 480/560-G C# 170WD • DX1 82A (Digraph) C# 175WD • DK01A 92 C# 171WD • GEMINI 10X C# 174WD • GEMINI SG 10/15 C# 178WD • DMP-105 C# 183WD • DMP-110 C# 189WD • DMP-120 C# 176WD • DMP-130 C# 182WD • DMP-200 C# 175WD • CGP-220 C# 181WD • EPSON LK-80 C# 173WD • EPSON MX-80 C# 172WD • EPSON RX/FX BD C# 173WD • RITEMAN PLUS C# 177WD

HARDCOPY DISK \$29.95

Adding COLORSCAN, new software for the CGP-220 and your 64K CoCo (I, II, III). This program is a must for anyone who owns a Radio Shack Ink Jet Printer, and enjoys creating graphics with Graphicom. Graphicom Part II. CoCo MAX, or any other program that produces a standard 6K binary picture files. COLORSCAN will print program listings in blazing color. Help create colorful banners up to 55 inches in length, produce 1x1/2x2 or poster printout of your favorite 6K graphic disk files.

Order Catalog# 184WD. See RAINBOW REVIEW (1/87 page 136)

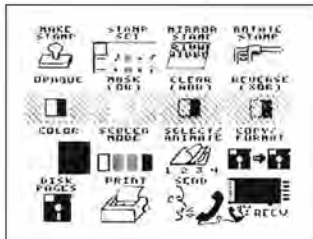
COLORSCAN DISK \$29.95

GRAPHICOM FEATURES: 4 page animation mode, Send/Receive pictures over modem • multiple Hi-Res fonts • Utility for transferring Graphicom screens to basic or M/L programs • Built in Hi-Res screen print program • Send/Receive slow scan TV

Many additional features, operating hints hardware mod's and suggestions, etc. Requires 64K CoCo, 1 disk drive, and 2 analog joysticks

Order Catalog# 111GD. See RAINBOW REVIEW (4/84 on page 225)

GRAPHICOM DISK \$24.95



NEW COCO 3 SOFTWARE

# Adventures 'R' Us

## Our Fourth Adventure Contest

**T**ime passes quickly as you use your nimble fingers to escape the very passion that consumes you. Thoughts are fleeting at a time in which you need them most. The spidery web of mystery and intrigue you have spun is now entangling you. Every breath you take . . . Every move you make . . . Is it correct? Will it even accomplish the task at hand? Is there any time left?

No, we don't mean to imply time is nearly up for our Fourth Adventure Contest. Plenty of time remains. However, the final deadline for your entry in this contest is August 15, 1987 — a date that is rapidly approaching. So, you'd better get started soon, if you haven't already begun.

What? No ideas, you say? Just take a look around you! Your everyday life presents you with hundreds. Just sit down and start now! We await the very best you have to offer. If you want some pointers, check out "The Adventure Writer's Toolkit" (April 1985, Page 105) by Eric W. Tilenius. Or, for another helping hand, see "The Adventure Processor" (August 1986, Page 26) by Bill Cook. These articles, and many more, are just what you need to get started on the right track.

Your Adventure can be written for a 4K early model CoCo, or it can be written to take advantage of all the features in a 512K CoCo 3. It can be written under Disk BASIC, or it might be a creation in BASIC09.

**Judging:** The judges of the Fourth Rainbow Adventure Contest will be looking for several things in each entry. In addition to ensuring each submission is complete, they will consider the following:

- Originality
- Creativity
- Programming Efficiency
- Clarity of Instructions
- Ease of Use
- Vocabulary and Grammar
- Responsiveness
- Level of Challenge
- Enjoyment

The judges will also be concerned with the "publishability" of each Adventure. A shorter program is easier to fit into print (both in THE RAINBOW and any subsequent Adventure book) as well as being easier for the reader to type in. While the use of graphics tends to enhance any program, graphics are not necessary for an Adventure to win. The winning entry will be chosen for its unique appearance. Make your Adventure stand above the rest!

**RULES:** Your submission should include all programs and information needed to set up and run the Adventure. All programs must be sent on tape or disk with several saves of each program including at least one ASCII save. If an Adventure cannot be loaded, it cannot be judged. We will not type in even the shortest of programs! Hard copy of all program listings and instructions must also be included. If your Adventure uses machine language routines, all source code, as well as assembled object code, should be included on the tape or disk. Indicate the minimum CoCo system required to run your Adventure and include a complete solution!

Please, don't use packed lines that can't be LISTed or LLISTed for the benefit of our readers. Your program should run on standard Radio Shack equipment without requiring any special modifications and should not rely on commercial software for its execution. The only exception is the use of the OS-9 operating system (Level I and Level II) and BASIC09. If your Adventure uses graphics, make sure the graphics are self-contained. In other words, don't submit a program that loads several different graphics screens unless those graphics are created by a publishable program included in the submission.

In summary, send a complete package. Put the accompanying article, documentation, listings, complete instructions and solution, and cover letter on paper. Include your name, address and telephone number on each page of all materials. Be sure to write-protect your disk or punch out the tabs on your cassette to avoid accidental erasure, and label each with the name of the program(s) and your name and address. As in any contest, packaging does make a difference.

Your entry must be postmarked no later than August 15, 1987, in error-free condition. Each

entrant will receive a free pass to the RAINBOWfest of his or her choice. You may also win one of the many prizes donated by our generous advertisers as well as have your program published in THE RAINBOW. So, get a move on! Write it up, put it together and send it to:

**Adventure Contest Editor, Rainbow Magazine, 9509 U.S. Highway 42,  
P.O. Box 385, Prospect, KY 40059.**

**Additional Rules:** All entries must be original, unpublished and unmarketed works (no "conversions"). No programs that have been placed in the public domain are eligible. All entries become the property of Falsoft, Inc., publisher of the THE RAINBOW. The decisions of the judges will be final. Duplicate prizes will be awarded in the event of a tie. Winning entries will be featured in a future issue of THE RAINBOW.

**Prizes:** Following is partial list of the prizes the winners of our Fourth Rainbow Adventure Contest will be receiving. And, many more prizes are being donated each day!

<b>Tandy/Radio Shack</b>	DMP-106 Printer	\$200
<b>Tandy Home Education Systems</b>	VIDTEX Creative Exploration Series Spectaculator Hands On Problem Solving Series Cooperative Strategy Series	\$30 \$99
<b>Computer Island</b>	Chemistry Tutor Area & Perimeter Division of Fractions Quadratic Equations Tutor Distance Problems Cloze Exercises First Games The CoCo Wheel of Fortune	\$30 \$20 \$20 \$20 \$20 \$20 \$25 \$20
<b>Frank Hogg Laboratory, Inc.</b>	Inside OS-9 Level II (5 books)	\$40 ea.
<b>Howard Medical</b>	Zenith 12" Amber Video Monitor	\$150
<b>H.J.L. Products</b>	Softswitch Auto/Manual Printer Switch with cables	\$140
<b>Compuize</b>	Color Max 3 (2 programs)	\$60 ea.
<b>RAINBOW's Delphi SIGs</b>	Three five-hour free evenings in your choice of the CoCo or OS-9 Online SIGs.	\$36 ea.
<b>Diecom Products</b>	Bouncing Boulders Caludril Lansford Mansion	\$29 \$39 \$39
<b>Computer Plus</b>	Color Computer 2	\$100
<b>Derringer Software</b>	Pro-Color-Series Enhanced Version 2.1	\$80
<b>Speech Systems</b>	Super Voice Speech Synthesizer includes Text-to-Speech Translator Program	\$80
<b>Tom Mix Software</b>	Worlds of Flight (2 programs)	\$35 ea.
<b>Spectrum Projects</b>	Three Book Set: CoCo III Secrets Revealed The History of the CoCo BASIC Programming Tricks	\$50
<b>CompuServe</b>	IntroPak — An Introductory Subscription (3 IntroPaks) includes \$15 usage credit	\$15 ea.
<b>Microcom Software</b>	Utility Routines Volume II	\$30
<b>Sugar Software</b>	Trig Attack	\$20

```

14Ø PLAY B$
15Ø CLS
16Ø PRINT@96,"OH! SAY DOES THAT
STAR SPANGLED BANNER YET WAVE, O
'ER THE LAND OF THE FREE, AND T
HE HOME OF THE BRAVE.
17Ø C$="O3;L4;G;O4;L4;C;C;L8;C;O
3;L8;B;L4;A;A;A;O4;L4;D;L8;F;E;D
;C;L4;C;O3;L3;B;L8;G;G;O4;L3;C;L
8;D;E;F;L2;G;L8;C;D;L3;E;L8;F;L4
;D;L1;C"
18Ø PLAY C$
19Ø CLS
20Ø CLS (5)
205 FOR A = 2 TO 27
206 SET (A,1,3)
207 NEXT A
21Ø SET (1,1,3)
22Ø SET (1,2,3)
23Ø SET (1,3,3)
24Ø SET (1,4,3)
25Ø SET (1,5,3)
26Ø SET (1,6,3)
27Ø SET (1,7,3)
28Ø SET (1,8,3)
29Ø SET (1,9,3)
30Ø SET (1,10,3)
31Ø SET (1,11,3)
32Ø SET (1,12,3)
33Ø FOR B = 2 TO 27
34Ø SET (B,2,3)
35Ø NEXT B
36Ø FOR C = 2 TO 27
37Ø SET (C,2,3)
39Ø SET (C,3,3)
40Ø SET (C,4,3)
41Ø SET (C,5,3)
42Ø SET (C,6,3)
43Ø SET (C,7,3)
44Ø SET (C,8,3)
45Ø SET (C,9,3)
46Ø SET (C,10,3)
47Ø SET (C,11,3)
48Ø SET (C,12,3)
49Ø NEXT C
50Ø FOR D = 28 TO 63
51Ø SET (D,1,4)
53Ø SET (D,5,4)
55Ø SET (D,9,4)
57Ø SET (D,13,4)
58Ø NEXT D
583 FOR E = 1 TO 63
585 SET (E,17,4)
59Ø SET (E,21,4)
60Ø SET (E,25,4)
61Ø NEXT E
65Ø FOR F=1 TO 63
652 SET (F,27,1)
653 SET (F,28,1)

```

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```

655 SET (F,29,1)
656 SET (F,31,1)
658 NEXT F
660 PRINT @ 454,"***AMERICAN FLA
G***"
670 SET (3,3,5)
680 SET (3,7,5)
690 SET (3,11,5)
700 SET (7,3,5)
710 SET (7,7,5)
720 SET (7,11,5)
730 SET (11,3,5)

```

```

740 SET (11,7,5)
750 SET (11,11,5)
760 SET (15,3,5)
770 SET (15,7,5)
780 SET (15,11,5)
790 SET (19,3,5)
800 SET (19,7,5)
810 SET (19,11,5)
820 SET (23,3,5)
830 SET (23,7,5)
840 SET (23,11,5)
850 GOTO 850

```

310	.....	143
450	.....	161
600	.....	83
770	.....	13
END	.....	188

Listing 2: USSONGS

```

10 J=0
20 PMODE 3,1:PCLS:SCREEN 1,0
30 LINE(1,1)-(240,130),PSET,B
40 LINE(1,1)-(95,60),PSET,B
50 FOR T=60 TO 120 STEP 10
60 LINE(1,T)-(240,T),PSET
70 NEXT
80 FOR Y=10 TO 50 STEP 10
90 LINE(95,Y)-(240,Y),PSET
100 NEXT
110 FOR T=5 TO 130 STEP 20
120 PAINT(110,T),0,0
130 NEXT
140 FOR T=15 TO 125 STEP 20
150 PAINT(99,T),2,0
160 NEXT
170 PAINT(5,5),3,0
180 FOR T=2 TO 92 STEP 10
190 FOR Z=5 TO 7
200 PSET(T,Z,2)
210 NEXT:NEXT
220 FOR T=2 TO 92 STEP 10
230 FOR Z=18 TO 20

```

```

240 PSET(T,Z,2)
250 NEXT:NEXT
260 FOR T=2 TO 92 STEP 10
270 FOR Z=31 TO 33
280 PSET(T,Z,2)
290 NEXT:NEXT
300 FOR T=2 TO 92 STEP 10
310 FOR Z=44 TO 46
320 PSET(T,Z,2)
330 NEXT:NEXT
340 FOR T=2 TO 92 STEP 10
350 FOR Z=57 TO 59
360 PSET(T,Z,2)
370 NEXT:NEXT
380 IF J=>1 THEN J=0:GOTO 470
390 GOTO 530
400 PLAY"V15T3L4O2FL3FL8DL4DDL3F
L8CL4CDE-FGAL2FP8L4FL3FL8DL4DFL3
FL8CL4CO+CO-BO+CDO-GO+L2CP8O-L4F
O+L3DL8DL4CO-B-L3B-L8AL4AB-O+CO-
AGFL2B-P8L4B-L3B-L8GL4GL4B-L3B-L
8FL4FFGB-FO+CO-L1B-":GOSUB510
410 PLAY"T2"
420 POKE 65495,0
430 GOTO 670
440 FORA=1TO2:PLAY"L5O2L5FL16DO1
L4B-O2DFL3B-O3L5DL8CO2L4B-DEL3FL
8FFO3L3DL8CO2L4B-L3AL8GAL4B-B-FD
O1B-":NEXT:PLAY"O2L8DDL4DE-FL3FL

```

**\*\*\***  
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```

8E-DL4CDE-L3E-O3L4E-L3DO2L4B-L3A
L8GAL4B-DEL3FL4FB-B-L8B-AL4GGGO3
CL8E-DCO2B-L4B-AL8FFL3B-
45Ø PLAY"O3L8CDE-L3FO2L8B-O3CL3D
L8E-L4CO2L2B-":GOSUB51Ø:GOSUB73Ø
:PLAY"O2L4FFGL3EL8FL4GAAB-L3AL8G
L4FGFEL2FO3L4CCCL3CO2L8B-L4AB-B-
B-L3B-L8AL4GAL8V25B-AGFV31L3AL8B
-O3L4CL8DO2B-L4AGL1F":GOSUB 51Ø
46Ø GOSUB 79Ø
47Ø PLAY"T5O2L3DDL4CO1BL3BL4A#BL
1BL4A#BL3BL4A#BO2L3DO1L4BO2DL1CO
1L2AL4AL3AL4G#AL3AL4G#AO2L1CO1L4
BABO2L3DL4DL3EEO1L1AL3AO2DDL4CO1
BL3BL4A#BL1BL4A#BL3BL4A#BO2CO1BL
3AL8F#L1AL2GL4GL3GL4F#GL3B-AGO2L
1GL4GO1GAB"
48Ø PLAY"O2DO1GABO2L4DO1DEBL1AL4
GP4O4G":GOSUB 51Ø:POKE 65494,Ø:G
OTO 39Ø
50Ø Z$=INKEY$:IF Z$="" THEN 50Ø
51Ø LINE(1,15Ø)-(23Ø,185),PRESET
,BF
52Ø RETURN
53Ø A=Ø:B=2:C=3
54Ø A$=INKEY$
55Ø DRAW"BM8,185;C=A;U3ØR1ØL1ØD1
5R5BM38,185;C=B;U3ØR1ØD1ØL1ØD5F1
5BM68,185;C=C;U3ØR1ØL1ØD15R1ØL1Ø
D15R1ØBM98,185;C=A;U3ØR1ØL1ØD15R
1ØL1ØD15R1ØBM128,185;C=B;U3ØF1ØD
1ØG1ØBM158,185;C=C;U3ØR1ØD3ØL1ØB
M188,185;C=A;U3ØF1ØE1ØD3ØBM228,1
85;C=B;U5C1;U5;C=B;U2Ø"
56Ø GOSUB 58Ø
57Ø GOTO 65Ø
58Ø A=A+1:IF A=1 THEN A=2
59Ø IF A=>4 THEN A=Ø
60Ø B=B+1:IF B=1 THEN B=2
61Ø IF B=>4 THEN B=Ø
62Ø C=C+1:IF C=1 THEN C=2
63Ø IF C=>4 THEN C=Ø
64Ø RETURN
65Ø IF A$="" THEN 54Ø
66Ø DRAW"CØ":GOTO 4ØØ
67Ø A=Ø:B=2:C=3
68Ø B$=INKEY$
69Ø DRAW"BM4Ø,185;C=A;R1ØU15L1ØU
15R1ØBM7Ø,185;C=B;U3ØR1ØD15L1ØR1
ØD15BM1ØØ,185R1ØL1ØU3ØBM13Ø,185;
C=C;U3ØD3ØR1ØU3ØBM165,185;C=A;U3
ØR5L1ØBM19Ø,185;C=B;U3ØR1ØL1ØD15
R1ØL1ØD15R1Ø"
70Ø GOSUB 58Ø
71Ø IF B$="" THEN 68Ø
72Ø DRAW"CØ":GOTO 44Ø
73Ø A=3:B=2:C=Ø
74Ø C$=INKEY$
75Ø DRAW"BM3Ø,185;C=A;U3ØD3ØR1ØB
M65,185;C=B;L5R1ØL5U3ØR5L1ØBM9Ø,
185;C=C;U3ØF5D1ØL5R7F5D1ØL9BM12Ø
,185;C=A;U3ØR1ØL1ØD15R1ØL1ØD15R1
ØBM15Ø,185;C=B;U3ØR1ØD15L1ØD5F1Ø
BM 185,185;C=C;U3ØR5L11BM215,185
;C=A;U15E15G15H15"
76Ø GOSUB 58Ø
77Ø IF C$="" THEN 74Ø
78Ø DRAW"CØ":RETURN
79Ø A=2:B=Ø:C=3
80Ø D$=INKEY$
81Ø PCLS:PMODE3,1:SCREEN1,Ø
82Ø IF J=1 THEN GOTO 3Ø
83Ø J=J+1
84Ø DRAW"C2"
85Ø LINE(9Ø,27)-(9Ø,15Ø),PSET
86Ø LINE-(19Ø,7Ø),PSET
87Ø LINE-(2Ø,7Ø),PSET
88Ø LINE-(19Ø,145),PSET
89Ø LINE-(9Ø,3Ø),PSET
90Ø PAINT(95,4Ø),2,2
91Ø PAINT(16Ø,8Ø),2,2
92Ø PAINT(5Ø,8Ø),2,2
93Ø PAINT(16Ø,12Ø),2,2
94Ø PAINT(95,8Ø),2,2
95Ø PAINT(95,12Ø),2,2
96Ø RETURN

```

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# The Perfect Disk Manager

By A.L. McGarrity

I suppose my personal search for the quintessential disk management utility really began almost the day I plugged in my first CoCo disk drive. After storing a few short test files, I eagerly typed DIR, and filename, extension, file type, format, and number of granules appeared. I suppose I was relatively content with DIR at that moment — until I stored my 15th file. Whoops! Didn't an entry "roll off" the top of the screen?

Reading a bit, I became acquainted with (but not very good at) the SHIFT-@ technique. There had to be a better way.

Later, having obtained a GE TermiNet 300 to produce hard copy, I encountered the first of several references to the "device number" poke: PDK

*Mr. McGarrity holds a BS in mechanical engineering from the Georgia Institute of Technology and has been designing teleprocessing applications for clients of General Electric Information Services since 1967. He took up micro-computers as a hobby about two years ago.*

111,254:DIR. I could finally view the entire directory at one time. Still, by now I had been through the RS Disk Manual with a fine-toothed comb and knew that just about all the information I could ever want was there on Track 17.

At about this time, Michael Plog's article and program on a printed directory appeared in RAINBOW (March 1983, Page 126). The format was particularly handy, because it printed the directory entries into columns: When cut out and folded in half, it made a nice record to tuck in the jacket with the disk. I quickly added a number of enhancements (sorted filenames, time and date, suppression of the printing of deleted filenames, and the option of printing the File Allocation Table) and still use it today.

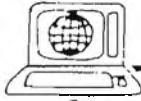
The next thing that attracted my attention was Melvin Hefter's article in the July 1983 RAINBOW (Page 152), describing his program to provide a granule trace for each file. I had just encountered an incident where DOS had obviously become a bit confused and allocated some of the same granules to several different files. This hasn't happened again, but Melvin's program was useful in helping me salvage what I could from that disk before re-initializing it. Also, when one of the many published disk-checking programs advises you that, say, Track 10, Sector 6, Granule 20 is bad, it allows you to immediately see which program is damaged.

Then Marvin Swan's comprehensive *Handler* utility was published in the November 1984 RAINBOW (Page 100), providing interesting composite information across all disks. Although I found the package as a whole a bit time-consuming for my own regular use, I was intrigued by the calculation of the total number of bytes in each file. I think there are at least two good reasons for having this information handy. First, it provides a fairly reliable clue in comparing two versions (copies) of the same program to determine whether they are identical — if the totals agree, they probably are.

Second, when you see, for example, that you have accumulated three or four

RAINBOW ON DISK - β4/87											β4/28/87										
FILENAME	EXT	TYP	FMT	GR	---	BYTES	---	NS	ODD	---	GRANULE	TRACE	---								
					USED	LOST															
3 WRITER	BAS	BAS	BIN	3	6,608	304	8	208	50	51	52										
ADDITION	BAS	BAS	BIN	3	4,617	2,295	1	9	53	54	55										
BASEBALL	BAS	BAS	BIN	1	1,098	1,206	5	74	21												
BLUEBERT	BAS	BAS	BIN	1	2,169	135	9	121	39												
CEMENT	BAS	BAS	BIN	1	1,072	1,232	5	48	24												
CHECKS	BAS	BAS	BIN	1	818	1,486	4	50	25												
CIRCLES	BAS	BAS	BIN	1	221	2,083	1	221	18												
COCOCALC	BAS	BAS	BIN	3	4,810	2,102	1	202	29	30	31										
EASTER	BAS	BAS	BIN	4	6,978	2,238	1	66	35	36	37	38									
FIFTHDIM	BAS	BAS	BIN	1	1,035	1,269	5	11	β												
FREEZER	BAS	BAS	BIN	3	5,279	1,633	3	159	6	7	8										
GRAPHS	BAS	BAS	BIN	2	2,308	2,300	1	4	9	10											
GROCERY	BAS	BAS	BIN	1	1,597	707	7	61	20												
HURRTRAK	BAS	BAS	BIN	5	11,418	102	9	154	1	2	3	4	5								
INPUT	BAS	BAS	BIN	1	1,302	1,002	6	22	49												
IPOPPER	BAS	BAS	BIN	1	216	2,088	1	216	19												
LIFESKL6	BAS	BAS	BIN	3	5,984	928	6	96	26	27	28										
LISTER	BAS	BAS	BIN	1	670	1,634	3	158	64												
MENU	BAS	BAS	BIN	2	2,366	2,242	1	62	33	34											
MPG	BAS	BAS	BIN	1	1,630	674	7	94	23												
RECIPE	BAS	BAS	BIN	1	1,386	918	6	106	22												
RNDROBIN	BAS	BAS	BIN	3	6,499	413	8	99	46	47	48										
ROMANS	BAS	BAS	BIN	1	2,055	249	9	7	58												
SAUCER	BAS	BAS	BIN	3	4,652	2,260	1	44	43	44	45										
SPINNER	BAS	BAS	BIN	1	281	2,023	2	25	17												
SPREAD	BAS	BAS	BIN	5	11,179	341	8	171	59	60	61	62	63								
WORDGUES	BAS	BAS	BIN	3	6,160	752	7	16	14	15	16										
YARDSALE	BAS	BAS	BIN	3	6,468	444	8	68	12	13	11										
TOTALS				66	110,079	41,985															
AVAILABLE				2	4,608																

Sample output from DISKDATA.



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disk utility programs each containing 400 to 500 bytes (but each taking up  $\frac{1}{68}$  of a disk), it suggests the need to combine them into a single file for storage efficiency. In the simplest case, you can just RUN 1000, RUN 2000, etc. If you want to get a little fancier, you can add a short "menu" program (at the lowest range of line numbers) informing the user what is available, should he neglect to type a line number after RUN.

With this rich background of ideas, I carefully considered what information I most wanted in directory reporting for my expanding disk library (preferably in an 8½-by-11 format), and the result is embodied in the programs *Diskdata* and *Locator*.

### Diskdata

First, only currently stored files are listed, and these are sorted alphabetically (using a fairly fast "pointer" sorting algorithm). Extension, file type, and file format are listed, along with the number of granules, bytes used, and total bytes *lost* — that is, the unused bytes in the last granule. The granules, bytes used, and bytes lost columns are totaled, so it will be evident what degree of storage efficiency you are achieving.

Referring to the column headings, NS is the number of sectors used in the last granule (1 to 9), and ODD is the number of bytes used in the last sector (0 to 256); these are not terribly useful, perhaps, except in verifying the correctness of the figure shown for total bytes used. You could, in fact, replace them with other information (e.g., storage efficiency =  $100 \times [\text{used}] / [\text{used} + \text{lost}]$ ) — or delete them altogether and "close up" the report format. Lastly, the granule trace is shown for each file. The logic flow is as follows:

After sizing the string pool, declaring the dimensioned variables, and defining the PRINT USING formats and report header strings (lines 160 to 280), the program prompts for disk name and the current date and time (320 to 440). It then prints the report headings (460 to

560) and reads in the File Allocation Table from Track 17, Sector 2 (600 to 630).

It next begins reading the (up to) nine sectors of Track 17 containing directory entries and storing all the data for each file (including calculated values such as number of granules and total bytes) in the dimensioned arrays (670 to 1080).

When data for the last file has been stored away, the program jumps to the sort routine, which alphabetizes the filename array, N\$ (1120 to 1360). Finally, the sorted directory entries are printed (1400 to 1520), footed by the aforementioned totals. Note that the subroutine to slew to top of form (1570 to 1630) has substantial delays built in for my TermiNet 300, which predates buffered printers. If you are fortunate enough to have a modern, buffered printer, you can probably replace lines 1570 to 1590 with a simple PRINT#-2, CHR\$(12).

Also note that the program keeps you informed (via the text screen) as to exactly what is going on at each phase of the run — something of a personal fetish.

The program, of course, requires Extended BASIC (since RS-DOS itself does) and fits easily into 32K. It probably could be made to run in 16K via PCLEAR 1 (or the pokes to achieve PCLEAR 0 — see RAINBOW September 1983, Page 112) and, if necessary, shrinking the DIMs in Line 220 (after all, it is very unlikely that you will ever get 68 files on one disk anyway!).

### Locator

When you bought your second disk, you undoubtedly stored copies of at least some of your favorite programs from old number one — either for convenience, backup or both. As you continued to expand your disk library, it became expedient to store more and more files on more than one disk — some high-use utility programs on every one, perhaps. After acquiring about a dozen disks, I found I could no longer

remember where a particular file (and/or its backup copies) could be found. Thus, the need for a program like *Locator*.

*Locator* simply reads and accumulates the directory entries (Track 17) for each disk in your library and generates a paged, sorted, cross-referenced listing of filename/extension versus disk ID. The disk IDs have arbitrarily been limited to two-character strings, so that 20 of them will comfortably fit on a line no more than 80 columns wide. I refer to my disks as 00, 01, 02, etc., but A1, A2, etc., would work just as well.

The program first prompts for the current date, which is centered in the report heading. So, whether you prefer December 20, 1985, or 12/20/85, it still looks neat. It then prompts you to insert each disk and enter the two-character ID associated with it. A null response (i.e., ENTER only) indicates you have no more disks to insert.

Notice that after the first one is read, cumulative totals for number of disks and number of (unique) filenames appears at the bottom of the screen, as well as a list of IDs of disks already processed.

When the last disk has been processed, you are asked whether you would like the filenames sorted. If so, the same pointer sort used in *Diskdata* takes place. Sorting 200 filenames (with their extensions) takes about 95 seconds. The report is then printed.

As with *Diskdata*, you may want to remove some of the printer delays that my unbuffered TermiNet requires.

With *Diskdata* and *Locator*, I feel that I have finally achieved my own quintessential disk management utility. Perhaps it will become yours, too, or maybe it will merely provide the starting point in your own search.

*(Questions about these programs can be addressed to the author at 861 Beaver Lane, Lilburn, GA 30247. Please enclose an SASE for a response.)* □

```

350 .....77 1250 .....170
580 .....127 1480 .....214
810 .....195 END .....154
1000 .....123
  
```

Listing 1: DISKDATA

```

100 ' SORTED DIRECTORY TO PRINT
R
  
```

```

110 '
120 '      By: A. L. McGarrity
130 '
140 '      Last Modified: 01/31/85
150 '
160 CLEAR 3000
210 CLS
220 DIM N$(68),E$(68),A$(68),Y$(
68),R$(68),G(68),B(68),S(68),O(6
8),W(68),P(68)
  
```



```

23Ø F1$="%      % % % % % %
### ###,### #,###"
24Ø F2$="#### #### %
%"
25Ø F3$="%      %
### ###,### ##,###"
26Ø T$="SORTED DIRECTORY TO PRIN
TER"
27Ø H1$="FILENAME EXT TYP FMT
GR --- BYTES --- NS ODD"
28Ø H2$=" --- GRANULE TRACE --
-"
29Ø '
30Ø ' PROMPT FOR INPUT
31Ø '
32Ø PRINT@34,T$: PRINT: PRINT
33Ø PRINT@135,"NAME OF DISKETTE
:"
34Ø PRINT@194,STRING$(28,"-")
35Ø PRINT@162,"";
36Ø LINE INPUT X$
37Ø PRINT@263,"DATE (MM/DD/YY):"
38Ø PRINT@331,"--/--/--"
39Ø PRINT@299,"";
40Ø LINE INPUT DA$
41Ø PRINT@391,"TIME (HHMM EST):"
42Ø PRINT@459,"---- ----"
43Ø PRINT@427,"";
44Ø LINE INPUT TI$
45Ø CLS
46Ø PRINT@34,T$
47Ø PRINT@327,"PRINTING HEADINGS
"
48Ø '
49Ø ' PRINT HEADINGS
50Ø '
51Ø GOSUB 157Ø
52Ø PRINT#-2,X$;TAB(36);DA$;TAB(
69);TI$
53Ø PRINT#-2,"      ":PRINT#-2,"
"
54Ø PRINT#-2,H1$;H2$
55Ø PRINT#-2,TAB(33);"USED  LOS
T"
56Ø PRINT#-2,STRING$(76,"-")
57Ø '
58Ø ' READ FILE ALLOCATION TABLE
59Ø '
60Ø PRINT@32Ø,STRING$(32," ")
61Ø PRINT@323,"READING TRACK"17"
SECTOR"2
62Ø PRINT@388,"(FILE ALLOCATION
TABLE)"
63Ø DSKI$ Ø,17,2,F$,X$
64Ø '
65Ø ' READ ALL SECTORS CONTAININ
G DIRECTORY ENTRIES
66Ø '
67Ø FOR S=3 TO 11

```

```

68Ø PRINT@323,"READING TRACK"17"
SECTOR"S
69Ø PRINT@388," (DIRECTORY ENTR
IES) "
70Ø DSKI$ Ø,17,S,A$,B$
71Ø X$=A$+LEFT$(B$,112)
72Ø GOSUB 75Ø
73Ø NEXT S
74Ø GOTO 112Ø
75Ø FOR F=1 TO 8: FØ=32*F
76Ø N1$=MID$(X$,FØ-31,8) ' FILE
NAME
77Ø IF LEFT$(N1$,1)=CHR$(255) TH
EN 112Ø
78Ø IF LEFT$(N1$,1)=CHR$(Ø) THEN
92Ø
79Ø N1=N1+1
80Ø N$(N1)=N1$
81Ø E$(N1)=MID$(X$,FØ-23,3) ' EX
TENSION
82Ø X=ASC(MID$(X$,FØ-2Ø,1)) ' FI
LE TYPE
83Ø IF X=Ø THEN Y$(N1)="BAS" ELS
E IF X=1 THEN Y$(N1)="DAT" ELSE
Y$(N1)="M/L"
84Ø X=ASC(MID$(X$,FØ-19,1)) ' FI
LE FORMAT
85Ø IF X=Ø THEN A$(N1)="BIN" ELS

```

### Two-Liner Contest Winner . . .

After an evening of looking at the stars in the sky, maybe this program will answer some of those off-the-wall questions you have.

#### The listing:

```

1 DATAMERCURY,4.1,.37,62Ø;VENUS,
1.6,.88,9ØØ,MARS,.53,.38,-1Ø,JUP
ITER,.Ø8,2.64,-24Ø,SATURN,.Ø3,1.
15,-3ØØ,URANUS,.Ø1,1.15,-34Ø,NEP
TUNE,.ØØ6,1.12,-37Ø,PLUTO,.ØØ4,.
Ø4,-4ØØ:CLS:INPUT"YOUR AGE";A:IN
PUT"YOUR WEIGHT";B:FORX=1TO8:REA
DA$,C,D,E
2 CLSØ:PRINT"ON "A$" YOU'D BE"A*
C"YEARS OLD, WEIGH"B*D"POUNDS AN
D LIVE WITH A NORMAL CLIMATIC TE
MPERATURE OF "E"DEGREES FAHRENHE
IT.":PRINT:INPUT"PRESS enter FOR
ANOTHER PLANET";F:CLSØ:NEXTX

```

Jerry Gerhardt  
Alameda, CA

(For this winning two-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

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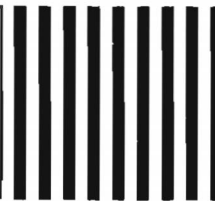
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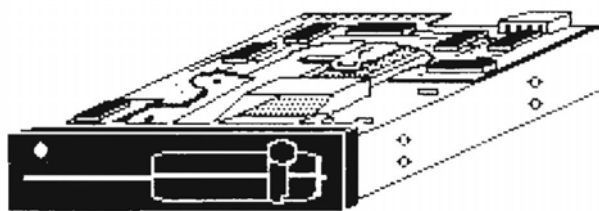
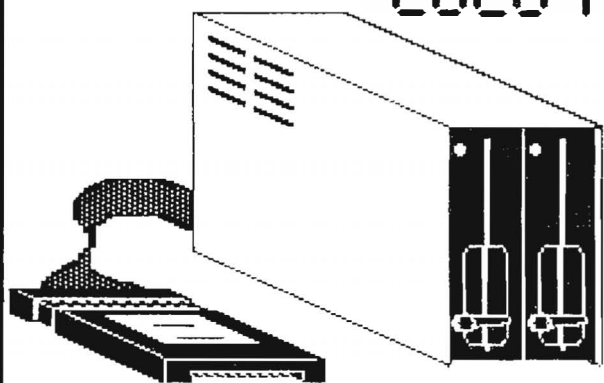
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```

E A$(N1)="ASC"
86Ø X=ASC(MID$(X$,FØ-18,1)) ' FI
RST GRANULE
87Ø IF X>9 THEN R$(N1)=STR$(X) E
LSE R$(N1)=" "+STR$(X)
88Ø Z1=ASC(MID$(X$,FØ-17,1))
89Ø Z2=ASC(MID$(X$,FØ-16,1))
90Ø Z3=256*Z1+Z2
91Ø GOSUB97Ø
92Ø NEXT F
93Ø RETURN
94Ø '
95Ø ' SUBROUTINE TO CALCULATE NU
MBER OF GRANULES, SECTORS, TOTAL
BYTES
96Ø '
97Ø G=Ø
98Ø G=G+1
99Ø B=ASC(MID$(F$,X+1,1))
100Ø IF B>=7Ø THEN 104Ø
101Ø X=B
102Ø IF X>9 THEN R$(N1)=R$(N1)+S
TR$(X) ELSE R$(N1)=R$(N1)+" "+ST
R$(X)
103Ø GOTO 98Ø
104Ø G(N1)=G
105Ø B(N1)=23Ø4*(G-1)+256*(B-193
)+Z3 ' TOTAL BYTES
106Ø S(N1)=B-192:O(N1)=Z3:W(N1)=
23Ø4*G-B(N1)
107Ø TG=TG+G
108Ø RETURN
109Ø '
110Ø ' NOW SORT THE FILE NAMES
111Ø '
112Ø PRINT@323,"SORTING DIRECTOR
Y ENTRIES"
113Ø PRINT@384,STRING$(32," ")
114Ø M=127
115Ø FOR I=1 TO N1
116Ø P(I)=I
117Ø NEXT I
118Ø FOR K=1 TO 6
119Ø M=(M-1)/2
120Ø IF N1-M-1 < Ø THEN 136Ø
121Ø M1=M+1
122Ø I=M1
123Ø I1=P(I)
124Ø M2=I-M
125Ø J=1
126Ø J1=M2-J+1: I2=P(J1)
127Ø IF N$(I1)>=N$(I2) THEN 133Ø
128Ø P(J1+M)=P(J1)
129Ø IF J+M > M2 THEN 131Ø
130Ø J=J+M: GOTO 126Ø
131Ø P(J1)=I1

```

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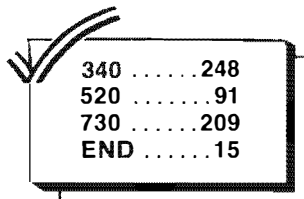
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```

1320 GOTO 1340
1330 P(J1+M)=I1
1340 IF I+1 > N1 THEN 1360
1350 I=I+1: GOTO 1230
1360 NEXT K
1370 '
1380 ' FINALLY, PRINT THE DIRECT
ORY ENTRIES
1390 '
1400 PRINT@323,STRING$(28," ")
1410 PRINT@323,"PRINTING DIRECTO
RY ENTRIES"
1420 FOR K=1 TO N1
1430 I=P(K): J=P(K+D)
1440 PRINT#-2,USING F1$;N$(I);E$
(I);Y$(I);A$(I);G(I);B(I);W(I);
1450 PRINT#-2,USING F2$;S(I);O(I
);R$(I)
1460 TB=TB+B(I):TW=TW+W(I)
1470 NEXT K
1480 FR=FREE(0)
1490 PRINT#-2,"      "
1500 PRINT#-2,USING F3$;"TOTALS
      ";TG;TB;TW
1510 PRINT#-2,"      "
1520 PRINT#-2,USING F3$;"AVAILAB
LE";FR;2304*FR
1530 END
1540 '
1550 ' SUBROUTINE TO EJECT PAGE
(TERMINET 300)
1560 '
1570 FOR UU=1 TO 500:NEXT
1580 PRINT#-2,CHR$(0);CHR$(12);C
HR$(0)
1590 FOR UU=1 TO 800:NEXT
1600 FOR UU=1 TO 3
1610 PRINT#-2,"      "
1620 NEXT
1630 RETURN

```



340	.....	248
520	.....	91
730	.....	209
END	.....	15

Listing 2: LOCATOR

```

100 ' PROGRAM TO GENERATE A DISK
FILES LOCATOR REPORT
110 '
120 ' By: A. L. McGarrity
130 '
140 ' Last Modified: 02/03/85
150 '
160 CLEAR 12000

```

```

170 DIM N$(20),F$(400),W$(400),P
(400),G(20)
180 CLS
190 PRINT:PRINT" DISK FILES LO
CATOR PROGRAM":PRINT:PRINTTAB(7)
;"DATE: ";
200 DH$=STRING$(15,"-")
210 LINE INPUT D$
220 PRINT
230 TP=INT((78-LEN(D$))/2)
240 PRINT@32*(ND-9*INT(ND/9))+16
0,"INSERT NEXT DISK, ENTER ##";
250 SOUND 32,2:SOUND 89,4
260 INPUT N$
270 IF N$="" THEN 470 ' NO MORE
DISKS
280 ND=ND+1: N$(ND)=N$
290 FOR S=3 TO 11
300 DSKI$ 0,17,S,A$,B$
310 A$=A$+LEFT$(B$,112)
320 FOR F=1 TO 8
330 F$=MID$(A$,32*F-31,11)
340 IF LEFT$(F$,1)=CHR$(255) THE
N 440 ' NO MORE FILES THIS DISK
350 IF LEFT$(F$,1)=CHR$(0) THEN
420 ' THIS FILE HAS BEEN DELETED
360 IF NF=0 THEN 400
370 FOR I=1 TO NF
380 IF F$=F$(I) THEN 410
390 NEXT I
400 NF=NF+1:F$(NF)=F$:W$(NF)=STR
ING$(20,"-"):I=NF
410 MID$(W$(I),ND,1)="X"
420 NEXT F
430 NEXT S
440 G(ND)=FREE(0)
450 PRINT@480,"DISKETTES :";ND;T
AB(18);"FILES :";NF;
460 GOTO 240
470 CLS:PRINT"NUMBER OF DISKS : "
ND
480 PRINT"NUMBER OF FILES : "NF
490 GOTO 610
500 FOR K=1 TO 500:NEXT:PRINT#-2
,CHR$(0)+CHR$(12)+CHR$(0):FOR K=
1 TO 800:NEXT
510 NP=NP+1:FOR K=1 TO 3:PRINT#-
2,"      ":NEXT:PRINT#-2,TAB(26);
"DISK FILES LOCATOR REPORT";TAB(6
9);"PAGE"NP
520 PRINT#-2,"      ":PRINT#-2,TAB
(TP);D$
530 FOR J=1 TO 2:PRINT#-2,"      "
:NEXT
540 PRINT#-2,"FILENAME EXT ";D
H$;" DISKETTE(S) ON WHICH STORED
";DH$
550 PRINT#-2,TAB(16);
560 FOR J=1 TO ND

```

```

570 PRINT#-2,N$(J);" ";
580 NEXT
590 FOR J=1 TO 2:PRINT#-2,"      "
:NEXT
600 NL=0: RETURN
610 PRINT@128,"SORT FILENAMES (Y
/N) ";;INPUT R$:R$=LEFT$(R$,1)
620 IF R$<>"Y" AND R$<>"N" THEN
610
630 M=511: NL=48
640 FOR I=1 TO NF:P(I)=I:NEXT I
650 IF R$="N" THEN 810
660 PRINT@192,"SORTING █████ PLEAS
E WAIT":TIMER=0
670 FOR K=1 TO 8:M=(M-1)/2
680 IF NF-M-1 < 0 THEN 790 ELSE
M1=M+1:I=M1
690 I1=P(I):M2=I-M:J=1
700 J1=M2-J+1:I2=P(J1)
710 IF F$(I1)>=F$(I2) THEN 760
720 P(J1+M)=P(J1)
730 IF J+M>M2 THEN 750
740 J=J+M:GOTO 700
750 P(J1)=I1:GOTO 770
760 P(J1+M)=I1
770 IF I+1>NF THEN 790
780 I=I+1:GOTO 690

```

```

790 NEXT K
800 PRINT@256,"SORTING TOOK";INT
(TIMER/60);"SECONDS"
810 FOR L=1 TO NF: I=P(L)
820 IF NL=48 THEN GOSUB 500
830 PRINT#-2,LEFT$(F$(I),8);"  "
;RIGHT$(F$(I),3);" ";
840 FOR J=1 TO ND
850 PRINT#-2,MID$(W$(I),J,1);"
";
860 NEXT J
870 PRINT#-2,"      "
880 NL=NL+1
890 NEXT L
900 PRINT#-2,"      "
910 PRINT#-2,"GRANULES USED ";
920 FOR I=1 TO ND: PRINT #-2,USI
NG "###";68-G(I);:NEXT I
930 PRINT#-2,"      ":PRINT#-2,"
"
940 PRINT#-2,"GRANULES FREE ";
950 FOR I=1 TO ND: PRINT #-2,USI
NG "###";G(I);:NEXT I
960 PRINT#-2,"      "

```

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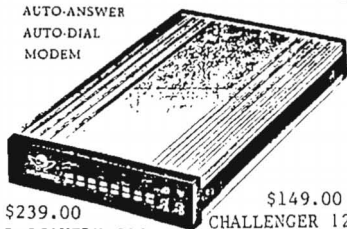


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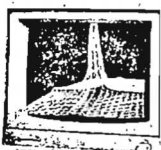
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### COMMANDS SUPPORTED

- I/O commands
 

CLOSE	CLOADM	CSAVEM	DIR	DRIVE	DSKIS	DSKOS	FIELD
FILES	GET	INPUT	KILL	LSET	OPEN	PRINT	PUT
RSET	USING	LINEINPUT					
- Program control commands
 

CALL	DEFUSR	END	EXEC	FOR	NEXT	GOSUB	GOTO
IF	THEN	ELSE	ERROR	ON	RETURN	STOP	USR
- Functions
 

ABS	ASC	ATN	COS	CVN	EOF	EXP	FIX
HPPOINT	INSTR	INT	LEN	LOG	LPEEK	LOC	LOF
PEEK	POINT	PPPOINT	RND	SGN	SIN	SQR	TAN
TIMER	VAL	VARPTR					
- String functions
 

CHR\$	INKEY\$	LEFT\$	MIDS	MKNS	RIGHT\$	STR\$	STRING\$
-------	---------	--------	------	------	---------	-------	----------
- Graphic/Screen commands
 

ATTR	COLOR	CLS	CIRCLE	DRAW	HCOLOR	HSCREEN	HDRAW
HLINE	HPAINT	HPRINT	HRESET	HCIRCLE	HCLS	HSET	JOYSTK
LINE	LOCATE	PALETTE	PAINTE	PCLEAR	PCLS	PLAY	PMODE
PRESET	PSET	RESET	SCREEN	SET	SOUND	WIDTH	
- Other commands
 

DATA	DIM	MOTOR	POKE	LPOKE	RESTORE	READ	REM
TRON	TROFF	TAB	VERIFY				

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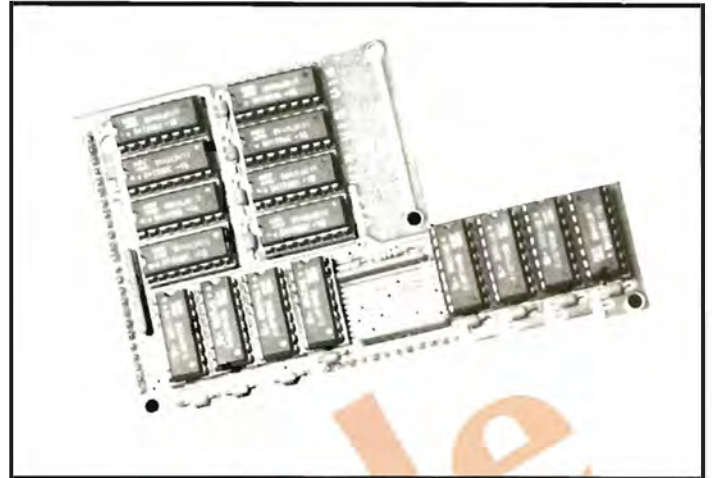
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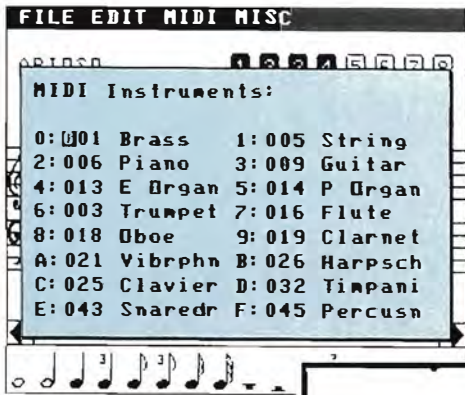
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**COCO MIDI 2 (disk only) #CM147 . \$149.95**  
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# A Colorful Resistance

By Gary MacLellan

**R**esistors is a colorful, educational program that can help teach the color codes that denote different amounts of resistance. It is self-prompting and easy to use, which makes it useful for individuals learning electronics or for electronics classes, as well as for anyone who needs a handy way to identify the various color codes.

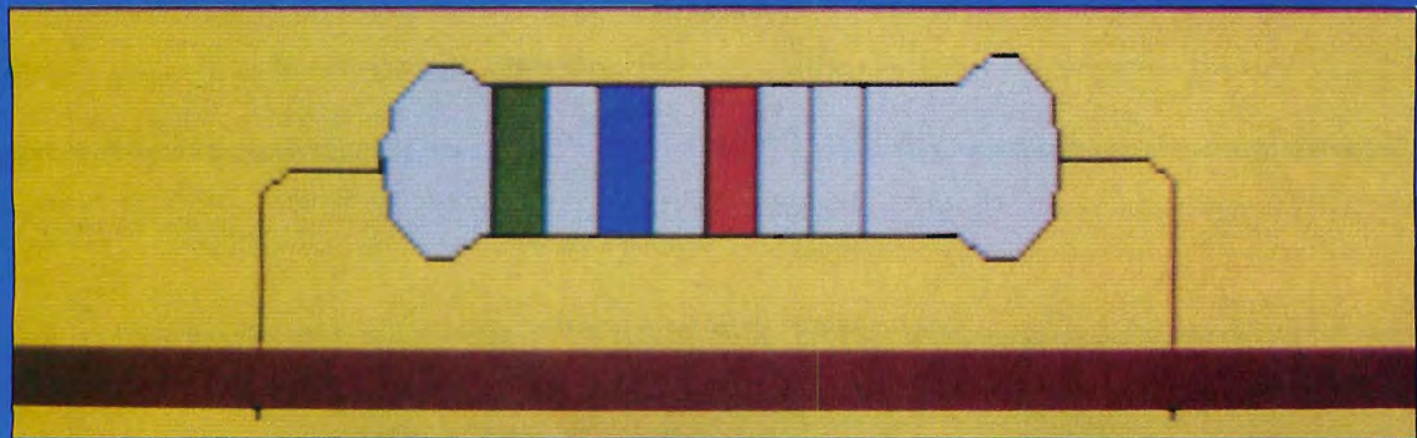
*Resistors* first prompts for type of monitor, then displays a set of color bars for a color test. After you make any necessary adjustments, you have two choices. If you enter a resistance (e.g., 680 ohms), the program will provide a graphic display of the corresponding color code (blue/gray/brown, in this case).

The other option is to enter the color code. You are prompted to enter the names of three colors, one at a time. The program then responds with the corresponding resistance.

Whether you're an electronics novice looking for a learning aid or an experienced electronics enthusiast in need of a timesaving resource, I hope this program makes identifying resistors easier for you.

*(You may direct questions to the author at 160 Neville Street, Dominion, Nova Scotia, Canada B0A 1E0. Please enclose an SASE for a response.)* □

*Gary MacLellan lives in Dominion, Nova Scotia, where he works as a meatcutter. Gary has been working with his CoCo for four years, and he hopes to learn machine language and become a full-time programmer.*



180	.....77	830	.....136
300	.....75	920	.....96
430	.....166	1050	.....143
490	.....75	1170	.....125
630	.....0	END	.....229
680	.....180		

The listing: RESISTOR

```

10 ON BRK GOTO310
20 POKE65497,0:HSCREEN 2:HCLS8:H
PRINT(5,10),"Do you have an RGB
Monitor [y/n]?"
30 A$=INKEY$:IF A$="Y" THEN380 E
LSEIF A$="N" THEN400 ELSEIFA$<>"
Y" OR A$<>"N" THEN30
40 HCLS0
50 GOSUB90
60 HCOLOR5:HPRINT(16,0),"Resisto
rs":HPRINT(14,4),"Programed by:"
:HPRINT(13,8),"Gary MacLellan.":
HPRINT(13,9),"160 Neville ST.":H
PRINT(13,10),"Dominion, N.S.":HP
RINT(17,11),"CANADA."
70 GOSUB180
80 GOTO220
90 HCOLOR15:HLINE(0,116)-(320,11
6),PSET
100 HPAINT(0,127),4,15
110 HDRAW"BM65,144;C14R32U5E2U4E
7R6F1R1F2R90E3R1E2R5F7D5F1D5NR32
D5G1D4G7L6H2L1H2L90G2L1G2L5H7U4H
1U5
120 HPAINT(160,144),9,14
130 FOR Y=118 TO 178 STEP20
140 FOR YY=128 TO 188 STEP 20
150 HLINE(Y,129)-(Y,155),PSET:HL
INE(YY,129)-(YY,154),PSET
160 NEXTYY,Y
170 RETURN
180 HCOLOR 0
190 HPRINT(8,22),"Press any key
to continue"
200 A$=INKEY$:IF A$="" THEN200 ELS
E HPAINT(0,0),12,15
210 RETURN
220 HCOLOR5:HPRINT(2,2),"This pr
ogram is to help with finding":H
PRINT(16,0),"RESISTORS"
230 HPRINT(10,4),"1) The resista
nce or":HPRINT(10,6),"2) The col
or code"
240 GOSUB180
250 HPAINT(0,0),14,15
260 GOSUB350
270 HCOLOR5:HPRINT(7,1),"If you

```

```

know the resistance,":HPRINT(5,2
),"and want to know the color co
de":HPRINT(17,4),"PRESS C"
280 HPRINT(19,5),"or":HPRINT(7,7
),"If you know the color code,":
HPRINT(5,8),"and want to know th
e resistance":HPRINT(17,10),"PRE
SS R"
290 HPRINT(13,13),"PRESS Q to qu
it"
300 A$=INKEY$:IFA$="" THEN 300 EL
SEIFA$<>"C" AND A$<>"R" AND A$<>
"Q" THEN300 ELSEIFA$="C" THEN420
ELSEIFA$="R" THEN700 ELSEIFA$="Q"
THEN 310
310 HCLS0
320 HPRINT(2,9),"I hope this pro
gram was of some help":HPRINT(6,
10),"and I thank you for using i
t.":HPRINT(4,11),"Press the Q to
end this program."
330 POKE65496,0
340 Q$=INKEY$:IF Q$="" THEN 340
ELSE IFQ$<>"Q" AND Q$<>"q" THEN
340 ELSECLS:END
350 HCOLOR1:HLINE(0,175)-(320,18
5),PSET,BF
360 HDRAW"BM65,144C4R15C14G2L1G2
D26C1D11C14D2;BM257,142C4L15C14F
2R1F2D28C1D11C14D2"
370 RETURN
380 PALETTE RGB:PALETTE0,0:PALET
TE1,34:PALETTE2,36:PALETTE3,38:P
ALETTE4,54:PALETTE5,16:PALETTE6,
11:PALETTE7,41:PALETTE8,56:PALET
TE9,63:PALETTE15,46
390 GOSUB1180:GOTO40
400 PALETTE0,0:PALETTE1,4:PALETT
E2,6:PALETTE3,21:PALETTE4,36:PAL
ETTE5,18:PALETTE6,10:PALETTE7,23
:PALETTE8,32:PALETTE9,48
410 GOSUB1180:GOTO40
420 HPAINT(0,0),10,15
430 HCOLOR13:HPRINT(7,0),"Please
input the resistance":HPRINT(13
,1),"and press ENTER"
440 Z$=INKEY$:IF Z$="" THEN440ELSE
HPRINT(15,10),Z$
450 Z1$=INKEY$:IF Z1$="" THEN450EL
SEIFZ1$="K" OR Z1$="M" THENHPRINT
(16,10),Z1$+" OHMS":GOTO540:ELSE
HPRINT(16,10),Z1$
460 Z2$=INKEY$:IF Z2$="" THEN460EL
SEIFZ2$=CHR$(13) THENHPRINT(18,10
)," OHMS":GOTO540:ELSEIFZ2$="K"
OR Z2$="M" THENHPRINT(17,10),Z2$+
" OHMS":GOTO550:ELSEHPRINT(17,10

```

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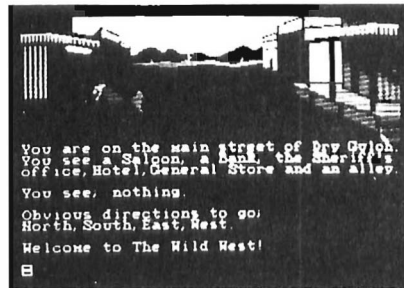
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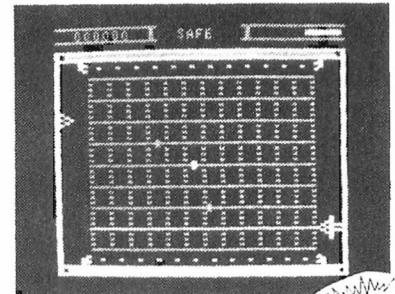
## \*The Wild West

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- A vocabulary of over 100 words.
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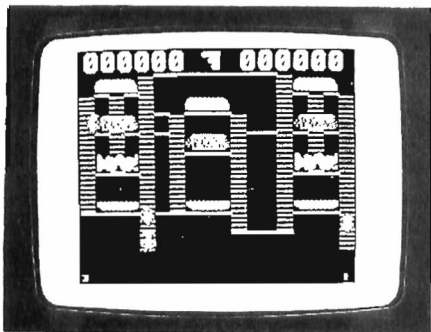
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Fast-paced action, super graphics and above all else, sound from your COCO the likes you have never heard before. Be careful — don't let a meltdown occur before you complete the "NEUTROID PROJECT"!

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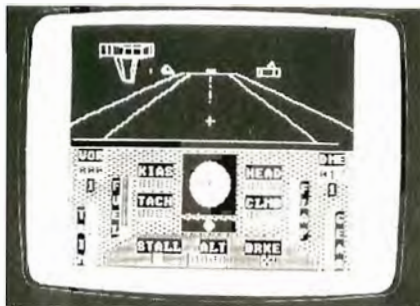
**Vocabulary Management System**—Helps children learn and practice using vocabulary and spelling words. Eleven programs including three printer segments for tests, puzzles, worksheets and five games; many features make this a popular seller!

Requires 16K Ext. Basic/ \$42.95  
32K for Printer Output  
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**Fractions**—A Three-Program Package. 1/Mixed & Improper 2/Equivalence 3/Lowest Terms. Practice, review and definitions make learning easy.

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32K Machine Language  
Joysticks Required \$34.95

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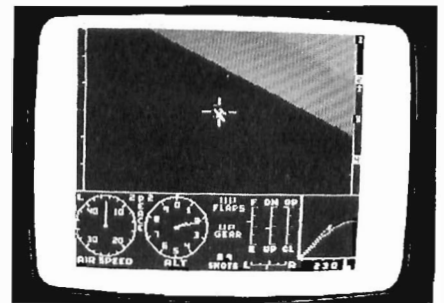
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\*COCO 3 Compatible



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### \*P-51 Mustang Attack/Flight Simulation

The ultimate video experience! Link two CoCo's together by cable or modem, and compete against your opponent across the table OR across the country! (Both computers require a copy of this program). The P-51 flight simulator lets you fly this WWII attack fighter in actual combat situations against another player, OR a non-combatant computer drone.

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Disk

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- No Joysticks Required

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### \*Trapfall

The "Pitfalls" in this game are many. Hidden treasures, jump over the pits, swing on the vine, watch out for alligators, beware of the scorpion. Another game for the Color Computer with the same high resolution graphics as "The King."

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- Authors—We pay top royalties!



```

),Z2$
470 Z3$=INKEY$:IFZ3$=""THEN470EL
SEIFZ3$=CHR$(13)THENHPRINT(19,10
)," OHMS":GOTO550:ELSEIFZ3$="K"
OR Z3$="M"THENHPRINT(18,10),Z3$+
" OHMS":GOTO560:ELSEHPRINT(18,10
),Z3$
480 Z4$=INKEY$:IFZ4$=""THEN480EL
SEIFZ4$=CHR$(13)THENHPRINT(20,10
)," OHMS":GOTO560:ELSEHPRINT(19,
10),Z4$
490 Z5$=INKEY$:IFZ5$=""THEN490EL
SEIFZ5$=CHR$(13)THENHPRINT(21,10
)," OHMS":GOTO570:ELSEHPRINT(20,
10),Z5$
500 Z6$=INKEY$:IFZ6$=""THEN500:EL
SEIFZ6$=CHR$(13)THENHPRINT(22,1
0)," OHMS":GOTO580:ELSEHPRINT(21
,10),Z6$
510 Z7$=INKEY$:IFZ7$=""THEN510EL
SEIFZ7$=CHR$(13)THENHPRINT(23,10
)," OHMS":GOTO590:ELSEHPRINT(22,
10),Z7$
520 Z8$=INKEY$:IFZ8$=""THEN520EL
SEIFZ8$=CHR$(13)THENHPRINT(24,10
)," OHMS":GOTO600:ELSEHPRINT(23,
10),Z8$
530 Z9$=INKEY$:IFZ9$=""THEN530EL
SEIFZ9$=CHR$(13)THENHPRINT(25,10
)," OHMS":GOTO610
540 R$=Z$+Z1$:GOTO620
550 R$=Z$+Z1$+Z2$:GOTO620
560 R$=Z$+Z1$+Z2$+Z3$:GOTO620
570 R$=Z$+Z1$+Z2$+Z3$+Z4$:GOTO62
0
580 R$=Z$+Z1$+Z2$+Z3$+Z4$+Z5$:GO
TO620
590 R$=Z$+Z1$+Z2$+Z3$+Z4$+Z5$+Z6
$:GOTO620
600 R$=Z$+Z1$+Z2$+Z3$+Z4$+Z5$+Z6
$+Z7$:GOTO620
610 R$=Z$+Z1$+Z2$+Z3$+Z4$+Z5$+Z6$
+Z7$+Z8$
620 L=LEN(R$)-2
630 IF MID$(R$,2,1)<>"." AND MID
$(R$,2,1)<>"K" AND MID$(R$,2,1)<
>"M" AND MID$(R$,3,1)<>"K" AND M
ID$(R$,3,1)<>"M" AND MID$(R$,4,1
)<>"K" THENHPAINT(160,130),L,14
640 IFMID$(R$,3,1)="0" AND MID$(
R$,4,1)="K" THEN HPAINT(160,130)
,4,14
650 HPAINT(120,130),VAL(LEFT$(R$
,1),14:IF MID$(R$,2,1)="."THEN
HPAINT(140,130),VAL(MID$(R$,3,1)
),14 ELSEIF MID$(R$,2,1)="K" OR
MID$(R$,2,1)="M" THEN HPAINT(140
,130),0,14 ELSE HPAINT(140,130),

```

```

VAL(MID$(R$,2,1),14
660 IFMID$(R$,2,1)="K" OR MID$(R
$,2,1)="." AND MID$(R$,4,1)="K"
THENHPAINT(160,130),2,14ELSEIFMI
D$(R$,3,1)="K"THENHPAINT(160,130
),3,14 ELSEIFMID$(R$,2,1)="M" OR
MID$(R$,4,1)="M"THENHPAINT(160,
130),5,14ELSEIFMID$(R$,3,1)="M"TH
ENHPAINT(160,130),6,14
670 HPRINT(11,13),"Another one
[y/n]?"
680 A$=INKEY$:IFA$="" THEN 680EL
SEIFA$<>"Y" AND A$<>"N" THEN680
ELSE IFA$="Y" THENHPAINT(120,130
),9,14:HPAINT(140,130),9,14:HPAI
NT(160,130),9,14:HPAINT(0,0),14,
15:GOTO420 ELSE IFA$="N" THEN 69
0
690 HPAINT(120,130),9,14:HPAINT(
140,130),9,14:HPAINT(160,130),9,
14:GOTO250
700 HPAINT(0,0),10,15
710 HPRINT(7,1),"Press ENTER aft
er each color"
720 HPRINT(5,2),"Please type in
the first color"
730 C$=INKEY$:IFC$=""THEN730 ELS
EHPRINT(17,3),C$
740 C1$=INKEY$:IFC1$=""THEN740EL
SEHPRINT(18,3),C1$
750 C2$=INKEY$:IFC2$="" THEN750EL
SEHPRINT(19,3),C2$
760 C3$=INKEY$:IFC3$=""THEN760EL
SEIFC3$=CHR$(13)THEN790ELSEHPRIN
T(20,3),C3$
770 C4$=INKEY$:IFC4$=""THEN770EL
SEIFC4$=CHR$(13)THEN800ELSEHPRIN
T(21,3),C4$
780 C5$=INKEY$:IFC5$=""THEN780EL
SEIFC5$=CHR$(13)THEN810ELSEHPRIN
T(22,3),C5$
781 C6$=INKEY$:IFC6$=""THEN781EL
SEIFC6$=CHR$(13)THEN820
790 F$=C$+C1$+C2$:GOTO830
800 F$=C$+C1$+C2$+C3$:GOTO830
810 F$=C$+C1$+C2$+C3$+C4$:GOTO83
0
820 F$=C$+C1$+C2$+C3$+C4$+C5$
830 IFLEFT$(F$,3)="BRO" THENC=1
ELSE IFLEFT$(F$,1)="R" THENC=2 E
LSEIFLEFT$(F$,1)="O" THENC=3 ELS
EIFLEFT$(F$,1)="Y" THENC=4 ELSEI
FLEFT$(F$,3)="GRE" THENC=5 ELSEI
FLEFT$(F$,3)="BLU" THENC=6 ELSEI
FLEFT$(F$,1)="V" THENC=7
840 IFLEFT$(F$,3)="GRA" THENC=8
ELSEIFLEFT$(F$,1)="W" THENC=9
850 HPRINT(5,4),"Please type in

```

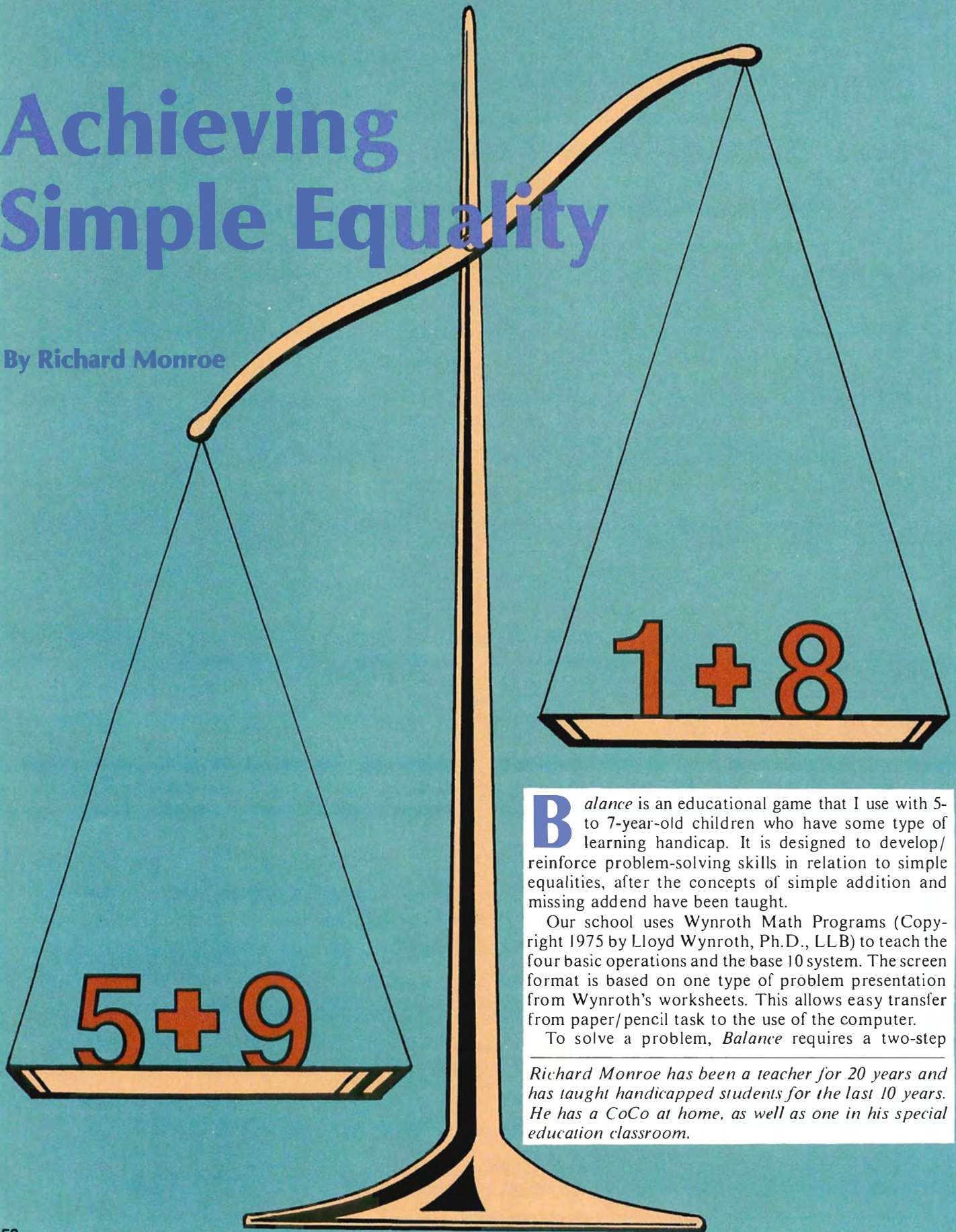
the second color"

```
860 D$=INKEY$:IFD$=""THEN860ELSE
HPRINT(17,5),D$
870 D1$=INKEY$:IFD1$=""THEN870EL
SEHPRINT(18,5),D1$
880 D2$=INKEY$:IFD2$=""THEN880EL
SEHPRINT(19,5),D2$
890 D3$=INKEY$:IFD3$=""THEN890EL
SEIFD3$=CHR$(13)THEN920ELSEHPRIN
T(20,5),D3$
900 D4$=INKEY$:IFD4$=""THEN900EL
SEIFD4$=CHR$(13)THEN930ELSEHPRIN
T(21,5),D4$
910 D5$=INKEY$:IFD5$=""THEN910EL
SEIFD5$=CHR$(13)THEN940ELSEHPRIN
T(22,5),D5$
911 D6$=INKEY$:IFD6$=""THEN911EL
SEIFD6$=CHR$(13)THEN950
920 S$=D$+D1$+D2$:GOTO960
930 S$=D$+D1$+D2$+D3$:GOTO960
940 S$=D$+D1$+D2$+D3$+D4$:GOTO96
0
950 S$=D$+D1$+D2$+D3$+D4$+D5$
960 IFLEFT$(S$,3)="BLA" THEND=0
ELSEIFLEFT$(S$,3)="BRO" THEND=1
ELSEIFLEFT$(S$,1)="R" THEND=2 EL
SEIFLEFT$(S$,1)="O" THEND=3 ELSE
IFLEFT$(S$,1)="Y" THEND=4 ELSEIF
LEFT$(S$,3)="GRE" THEND=5 ELSEIF
LEFT$(S$,3)="BLU" THEND=6 ELSE I
FLEFT$(S$,1)="V" THEND=7
970 IFLEFT$(S$,3)="GRA" THEND=8
ELSEIFLEFT$(S$,1)="W" THEND=9
980 HPRINT(5,6),"Please type in
the third color"
990 M$=INKEY$:IFM$=""THEN990ELSE
HPRINT(17,7),M$
1000 M1$=INKEY$:IFM1$=""THEN1000
ELSEHPRINT(18,7),M1$
1010 M2$=INKEY$:IFM2$=""THEN1010
ELSEHPRINT(19,7),M2$
1020 M3$=INKEY$:IFM3$=""THEN1020
ELSEIFM3$=CHR$(13)THEN1050ELSEHP
RINT(20,7),M3$
1030 M4$=INKEY$:IFM4$=""THEN1030
ELSEIFM4$=CHR$(13)THEN1060ELSEHP
RINT(21,7),M4$
1040 M5$=INKEY$:IFM5$=""THEN1040
ELSEIFM5$=CHR$(13)THEN1070ELSEHP
RINT(22,7),M5$
1041 M6$=INKEY$:IFM6$=""THEN1041
ELSEIFM6$=CHR$(13)THEN1080
1050 T$=M$+M1$+M2$:GOTO1090
1060 T$=M$+M1$+M2$+M3$:GOTO1090
1070 T$=M$+M1$+M2$+M3$+M4$:GOTO1
090
1080 T$=M$+M1$+M2$+M3$+M4$+M5$
1090 IFLEFT$(T$,3)="BLA" THENL$=
```

```
" ELSEIFLEFT$(T$,3)="BRO" THENL
$="" ELSEIFLEFT$(T$,1)="R" THEN
L$="" ELSEIFLEFT$(T$,1)="O" T
HENL$="" ELSEIFLEFT$(T$,1)="Y
" THENL$="" ELSEIFLEFT$(T$,3
)="GRE" THENL$="" ELSEIFLEFT$(T$,3
)= "BLU" THENL$=
" ELSEIFLEFT$(T$,1)="V" T
HEN L$=""
1110 L=LEN(L$)
1120 A=120:B=140:E=160:F=140
1130 HPAINT(A,F),C,14:HPAINT(B,F
),D,14:HPAINT(E,F),L,14
1140 HPRINT(14,10),C:HPRINT(15,1
0),D:HPRINT(17,10),L$+" Ohms"
1150 HPRINT(11,13),"Another one
[y/n]?"
1160 A$=INKEY$:IFA$="" THEN1160
ELSEIFA$<>"Y" AND A$<>"N" THEN11
60 ELSE IFA$="Y" THENHPAINT(120,
130),9,14:HPAINT(140,130),9,14:H
PAINT(160,130),9,14:HPAINT(0,0),
14,15:GOTO700 ELSEIFA$="N" THEN1
170
1170 HPAINT(120,130),9,14:HPAINT
(140,130),9,14:HPAINT(160,130),9
,14:GOTO250
1180 HSCREEN 2
1190 FOR C=0 TO320 STEP 20
1200 HCOLOR5:HLINE(C,0)-(C,191),
PSET
1210 NEXT C
1220 A=0:FORB=5 TO315 STEP20
1230 HPAINT(B,10),A,5
1240 A=A+1:NEXT B
1250 HCOLOR0:HLINE(0,0)-(320,50)
,PSET,BF:HLINE(320,191)-(0,141),
PSET,BF
1260 HCOLOR13:HPRINT(10,0),"This
is a color test.":HPRINT(5,1),"
The colors should be as follows"
:HPRINT(6,2),"Black,Brown,Red,Or
ange,Yellow":HPRINT(6,3),"Green,
Blue,Violet,Gray,White":HPRINT(6
,4),"Black,White,Black,Green,Bla
ck":HPRINT(18,5),"Pink."
1270 HPRINT(9,19),"Are the color
s correct?":HPRINT(18,20),"[Y/N]
"
1280 B$=INKEY$:IFB$="" THEN1280
ELSEIFB$="Y" THEN 1290ELSEIFB$="
N" THEN 1300 ELSEIFB$<>"Y" OR B$
<>"N" THEN1280
1290 RETURN
1300 HPRINT(8,21),"Please a just
your colors":HPRINT(16,22),"and
rerun"
1310 GOTO1310
```

# Achieving Simple Equality

By Richard Monroe



**B**alance is an educational game that I use with 5- to 7-year-old children who have some type of learning handicap. It is designed to develop/reinforce problem-solving skills in relation to simple equalities, after the concepts of simple addition and missing addend have been taught.

Our school uses Wynroth Math Programs (Copyright 1975 by Lloyd Wynroth, Ph.D., LLB) to teach the four basic operations and the base 10 system. The screen format is based on one type of problem presentation from Wynroth's worksheets. This allows easy transfer from paper/pencil task to the use of the computer.

To solve a problem, *Balance* requires a two-step

*Richard Monroe has been a teacher for 20 years and has taught handicapped students for the last 10 years. He has a CoCo at home, as well as one in his special education classroom.*

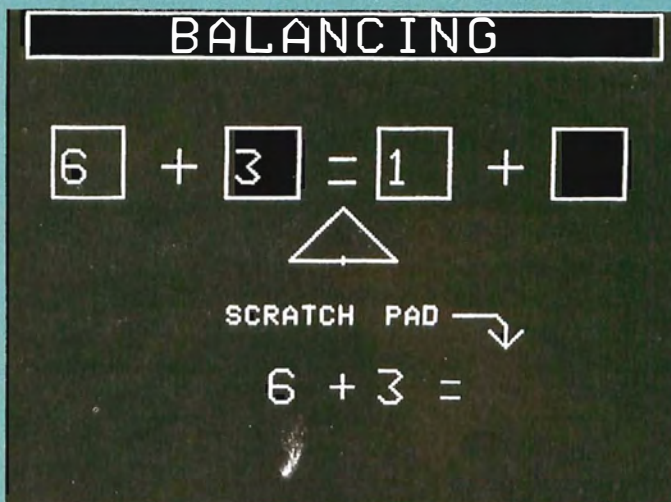
approach. First, the child must solve the left side of the equation by adding two randomly chosen numbers from 0 to 10. The "Scratch Pad" area reproduces this problem in the lower part of the screen. This sum must be solved correctly before the second step is encountered. If the sum is entered correctly, it appears and "floats" over and up to the left side of the equation. This sum will stop over the plus sign.

The second step begins with an arrow cue, which points to the empty box on the right side of the equation. The child is now required to apply the missing addend concept to balance the equation. Incorrect responses are not tallied during the first step, but are tallied during the second step, accompanied with sound cues and screen messages. On the third incorrect response, a special sound cue is used to alert the teacher. When the problem is solved, the sum on the right side of the equation will appear over the plus sign, indicating that the equation has indeed been balanced.

After 10 problems, the screen displays the score and a prompt to continue or end the program. The sounds at the end of the program were adapted from Raymond Larabie's One-Liner that appeared in the December 1985 issue of RAINBOW.

Ideally, the empty box (missing addend) should appear in different positions on the screen. But since this is my first

graphics program, I will leave that refinement to other interested readers/teachers, who are free to modify any part of this program. □



Sample printout

### Variable List

Variables	Function
A\$-Z\$	Draw Statements for alphabet
N\$	Numeric array (1-20)
BX\$	Draw statement for box
DA\$	Draw statement for dash
EQ\$	Draw statement for question mark
PL\$	Draw statement for plus sign
RE\$	INKEY\$ response for sum
RT\$	INKEY\$ response for tens-place
D,L,N,U,X,Y,Z	FOR/NEXT variables
F,S,T	First, second, and third addends
O,T	Ones and tens
Q	Number of problems or the problem number
R	Number correct on first try
TR	Number of attempts to solve problem
V	Array for GET/PUT

### Program Outline

Lines	Function
10-80	Remarks for name
90-210	Program set up and send to screen display
220	Send to scratch pad routine for first sum
230-260	Determine if sum is double digit, get and evaluate response
270	Evaluate and send to correct response routine
280	Evaluate and send to incorrect response routine
290-340	Double digit routine
350-440	Incorrect response routine
450-600	Correct response routine
610-750	Scratch pad display and routine
760-920	Get/Put response
930-990	Screen display routine
1000-1070	Remarks for credits for alphanumerics
1080-1550	Alphanumeric strings/array
1560-1610	Sound warning for help
1620-1690	Report score
1700-1720	Continue/end program

270	.....	57
430	.....	12
620	.....	31
760	.....	254
1010	.....	26
1250	.....	222
1410	.....	85
1600	.....	107
END	.....	66

### The listing: BALANCE

```

10 ' *****
20 ' ** BALANCING EQUATIONS **
30 ' ** A PROGRAM BY **
40 ' ** RICHARD MONROE **
50 ' ** 17 EAST COURT **
60 ' ** FISHKILL, N. Y. **

```

```

70 ' ** 12524 **
80 ' *****
90 CLEAR 5000: DIM N$(20): DIM V(3
0,30)
100 GOSUB 1040: REM alphanumerics
110 PCLS(0)
120 PMODE4,1
130 SCREEN1,1
140 PCLS: Q=Q+1: TR=0: RT=0: IF Q>10
THEN GOTO 1660
150 GOSUB 960: REM screen display
160 F=RND(11)-1: S=RND(11)-1: T=RN
D(11)-1
170 IF T>F+S THEN 160
180 IF F+S-T>10 THEN 160
190 DRAW" S8; BM22,66"+N$(F)
200 DRAW" BM88,66"+N$(S)

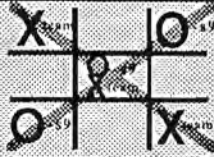
```

```

210 DRAW"BM144,66"+N$(T)
220 GOSUB 640:REM scratch pad
230 IF F+S-T>9 THEN GOSUB 290:RE
M double digit response
240 RE$=INKEY$:IF RE$=""THEN 240
250 SOUND 1,4
260 RE=VAL(RE$)+RT
270 IF RE+T=F+S THEN DRAW"C0;BM2
20,22;D6E3G3H3":DRAW"C5;S8;BM211
,66"+N$(RE):GOSUB 450:REM correc
t response
280 IF RE+T<>F+S THEN GOSUB 350:
REM incorrect response
290 REM DOUBLE DIGIT RESPONSE
300 RT$=INKEY$:IF RT$=""THEN 300
310 IF RT$<>"1" THEN SOUND 200,5
:SOUND 100,5:GOTO 300
320 SOUND 1,4
330 RT=VAL(RT$)*10
340 RETURN
350 REM incorrect response
360 TR=TR+1
370 IF TR=1 THEN DRAW"S8;BM30,13
0"+O$+O$+P$+S$+DAS
380 IF TR=2 THEN DRAW"S8;BM70,15
0"+O$+N$+C$+E$:DRAW"BM140,150"+M
$+O$+R$+E$
390 IF TR=>3 THEN DRAW"S8;BM100,
180"+H$+E$+L$+P$:GOSUB 1600:REM
help sound warning
400 IF TR>1 THEN LINE(8,110)-(24
8,188),PSET,BF
410 SOUND 200,3:SOUND 185,6
420 DRAW"BM110,130"+T$+R$+Y$
430 DRAW"BM160,130"+A$+G$+A$+I$+
N$
440 GOTO 230
450 REM correct response
460 DRAW"BM179,40"+N$(RE+T)
470 IF TR=0 THEN R=R+1
480 FOR Z=1 TO 255 STEP 10
490 SOUND Z,1
500 NEXT Z
510 DRAW"BM180,40"+N$(RE+T)
520 IF Q=1 THEN DRAW"S12;BM30,16
0"+B$+L$+A$+S$+T$:DRAW"BM160,160
"+O$+F$+F$
530 IF Q=2 THEN DRAW"S12;BM40,16
0"+N$+I$+C$+E$:DRAW"BM140,160"+W
$+O$+R$+K$
540 IF Q=3 THEN DRAW"S12;BM70,16
0"+A$+DAS+DAS+DAS+O$+K$
550 IF Q=4 THEN DRAW"S12;BM100,1
60"+W$+O$+W$
560 IF Q=5 THEN DRAW"S12;BM10,16
0"+G$+O$+O$+D$:DRAW"BM110,160"+T
$+H$+I$+N$+K$+E$+R$
570 IF Q=6 THEN DRAW"S12;BM80,16
0"+G$+R$+E$+A$+T$
580 IF Q=7 THEN DRAW"S12;BM50,16
0"+G$+O$+O$+D$+DAS+J$+O$+B$
590 IF Q=8 THEN DRAW"S12;BM70,16
0"+G$+E$+N$+I$+U$+S$
600 IF Q=9 THEN DRAW"S12;BM40,16
0"+F$+A$+N$+T$+A$+S$+T$+I$+C$
610 IF Q=10 THEN DRAW"S12;BM82,1
60"+S$+U$+P$+E$+R$
620 LINE(8,110)-(248,188),PSET
,BF
630 GOTO 140
640 REM scratch pad
650 DRAW"S4;BM85,120"+S$+C$+R$+A
$+T$+C$+H$:DRAW"BM145,120"+P$+A$
+D$
660 DRAW"S8;BM101,150"+N$(F):DRA
W"BM128,152"+PL$:DRAW"BM142,150"
+N$(S)
670 DRAW"BM172,152"+EQ$
680 DRAW"BM170,117;R8F1F1D4E3G3H
3
690 IF F+S>9 THEN GOSUB 290:REM
double digit
700 RE$=INKEY$:IF RE$="" THEN 70
0
710 RE=VAL(RE$)+RT
720 IF RE=F+S THEN SOUND 1,4:DRA
W"S8;BM180,150"+N$(RE)
730 IF RE<>F+S THEN SOUND 200,5:
SOUND 100,5:RT=0:GOTO 640
740 GOSUB 790:REM get/put respon
se
750 IF RE=F+S THEN SOUND 168,5:D
RAW"S8;BM54,39"+N$(RE):RT=0:LINE
(8,110)-(248,188),PSET,BF
760 FOR Z=125 TO 255 STEP 20:SOU
ND Z,1:NEXT Z
770 IF RE=F+S THEN DRAW"BM220,22
;D6E3G3H3
780 RETURN
790 REM get/put response
800 GET(175,135)-(210,165),V,G
810 FOR D=1 TO 20 STEP 3
820 PUT(175,135+D)-(210,165+D),V
,PSET
830 SOUND D,1
840 NEXT D
850 FOR L=1 TO 126 STEP 3
860 PUT(175-L,135+D)-(210-L,165+
D),V,PSET
870 SOUND L,1
880 NEXT L
890 FOR U=1 TO 140 STEP 5
900 PUT(175-L,160-U)-(210-L,190-
U),V,PSET
910 SOUND U+D,1
920 NEXT U

```

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```

93Ø DRAW"S12;BM64,72"+PL$
94Ø DRAW"BM15,76;R74
95Ø RETURN
96Ø REM screen display
97Ø LINE(8,1)-(248,18),PSET,B
98Ø DRAW"S8;BM64,15"+B$+A$+L$+A$
+N$+C$+I$+N$+G$
99Ø DRAW"BM1Ø8,96;E1ØF1ØL2Ø
1ØØØ CIRCLE(128,96),1
1Ø1Ø DRAW"S12;BM18,72"+BX$+PL$+B
X$+EQ$+BX$+PL$+BX$
1Ø2Ø RETURN
1Ø3Ø '*****
1Ø4Ø '** ALPHANUMERICS **
1Ø5Ø '** DATA BASED ON **
1Ø6Ø '** GEO GAME **
1Ø7Ø '** BY J. S. PARAVATI **
1Ø8Ø '** RAINBOW, 8/84 **
1Ø9Ø '** AND R. VAN DYKE **
11ØØ '** TRS-8Ø NEWS, 4/82 **
111Ø '*****
112Ø A$="U4E2F2D2NL4D2;BM+3,Ø"
113Ø B$="U6R3F1D1G1NL3F1D1G1L3;B
M+7,Ø"
114Ø C$="BM+1,-Ø;H1U4E1R2F1;BM+Ø
,+4;G1L2;BM+6,Ø"
115Ø D$="U6R3F1D4G1L3;BM+7,Ø"
116Ø E$="NR4U3NR2U3R4;BM+3,+6"
117Ø F$="U3NR2U3R4;BM+3,+6"
118Ø G$="BM+1,-Ø;H1U4E1R2F1;BM+Ø
,+2;NL1D2G1L2;BM+6,Ø"
119Ø H$="U3NU3R4NU3D3;BM+3,Ø"
12ØØ I$="BM+1,Ø;R1NR1U6NL1R1;BM+
4,+6"
121Ø J$="BM+Ø,-1;F1R1E1U5NL1R1;B
M+3,6"
122Ø K$="U3NU3R1NE3F3;BM+3,Ø"
123Ø L$="NU6R4U1;BM+3,+1"
124Ø M$="U6F2ND1E2D6;BM+3,Ø"
125Ø N$="U6F1D1F2D1F1NU6;BM+3,Ø"
126Ø O$="BM+1,Ø;H1U4E1R2F1D4G1L2
;BM+6,Ø"
127Ø P$="U6R3F1D1G1L3;BM+7,3"
128Ø Q$="BM+1,Ø;H1U4E1R2F1D3G1NH
1NF1G1L1;BM+6,Ø"
129Ø R$="U6R3F1D1G1L2NL1F3;BM+3,
Ø"
13ØØ S$="BM+Ø,-1;F1R2E1U1H1L2H1U
1E1R2F1;BM+3,+5"
131Ø T$="BM+2,+Ø;U6NL2R2;BM+3,+6
"
132Ø U$="BM+Ø,-1;NU5F1R2E1U5;BM+
3,6"
133Ø V$="BM+Ø,-6;D2F1D1F1ND1E1U1
E1U2;BM+3,+6"
134Ø W$="NU6E2NU1F2U6;BM+3,6"
135Ø X$="U1E4U1;BM-4,Ø;D1F4D1;BM
+3,Ø"
136Ø Y$="BM+Ø,-6;D2F2ND2E2U2;BM+
3,6"

```

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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. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

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: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.



```

137Ø Z$="NR4U1E4U1L4;BM+7,6"
138Ø BX$="U9R9D9L9;BM+16,Ø"
139Ø DA$="BM+2,-3;R2;BM+4,+3"
14ØØ EQ$="BM-3,-5;R3;BM-3,+3;R3;
BM+3,+2"
141Ø PL$="BM-2,-4;R4;BM-2,-2;D4;
BM+6,+2"
142Ø QU$="BM+2,-5;E1R2F1D1G2;BM+
Ø,+1;D1"
143Ø REM numeric $
144Ø N$(Ø)="BM+1,Ø;H1U4E1R2F1D4G
1L2;BM+6,Ø"
145Ø N$(1)="BM+1,Ø;R1NR1U6G1;BM+
5,+5"
146Ø N$(2)="NR4U1E1R1E2U1H1L2G1;
BM+9,+5"
147Ø N$(3)="BM+Ø,-1;F1R2E1H2E2H1
L3;BM+1Ø,6"
148Ø N$(4)="BM+3,Ø;U2NR1L3U1E3D3
;BM+6,3"
149Ø N$(5)="BM+Ø,-1;F1R2E1U2H1L3
U2R4;BM+5,+6"
15ØØ N$(6)="BM+4,-5;H1L2G1D4F1R2
E1U1H1L3;BM+1Ø,+3"
151Ø N$(7)="U1E4U1L4;BM+1Ø,+6"
152Ø N$(8)="BM+1,-Ø;H1U1E1H1U1E1
R2F1D1G1NL2F1D1G1L2;BM+8,Ø"
153Ø N$(9)="BM+Ø,-1;F1R2E1U4H1L2
G1D1F1R2;BM+6,+3"
154Ø T=1:Ø=Ø:FOR N=1Ø TO 2Ø

```

```

155Ø N$(N)=N$(T)+N$(Ø)
156Ø O=Ø+1
157Ø IF O>9 THEN T=T+1:Ø=Ø
158Ø NEXT N
159Ø RETURN
16ØØ REM help sound warning
161Ø FOR Z=1 TO 5
162Ø SOUND 2ØØ,5
163Ø SOUND 1ØØ,5
164Ø NEXT Z
165Ø RETURN
166Ø REM report card
167Ø DRAW"BM5Ø,4Ø"+S$+C$+Ø$+R$+E
$+DA$
168Ø DRAW"BM178,4Ø"+ N$(R)
169Ø LINE(8,8)-(246,18Ø),PSET,B
17ØØ POKE178,1:PAINT(128,7),,5:P
ØKE178,3
171Ø DRAW"BM65,125"+A$+G$+A$+I$+
N$+QU$
172Ø DRAW"BM95,16Ø"+Y$+DA$+N$
173Ø Z=16Ø:FOR X=1 TO 3:FOR Y=1
TO 1Ø:SOUND Z,2:READ Z:NEXT Y:RE
STORE:NEXT X:DATA 16Ø,3,224,35,3
5,83,99,51,243,8Ø,Ø
174Ø RE$=INKEY$:IF RE$="" THEN 1
74Ø
175Ø IF RE$="Y" THEN Q=Ø:GOTO 14
Ø
176Ø IF RE$<>"N" THEN END

```

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# Spell Down to Vocabulary Fitness

By Steve Blyn  
Rainbow Contributing Editor

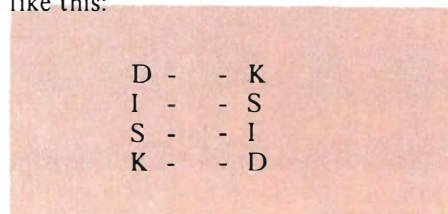
This month, we present a language arts game we have played with classes for many years. It is useful for helping students become more familiar with certain key words. These are usually spelling words, but may be any kind of vocabulary words.

We call this game *Spelldown*. It is a way of practicing spelling and dictionary skills. A key word is introduced on the blackboard or computer. The word is then written vertically, letter by letter, down the side. The word is also written in backward spelling order.

The idea is to make a word that begins with the first letter and ends with the last. Next, try to make a word that starts with the second letter and ends with the second to last letter. The game proceeds in this fashion until all of the letters are used. The student has now thought of or used the dictionary to locate as many words as there are letters in the key word.

Let us suppose that the word "disk" is typed in as the key word. The com-

puter prints the letters D, I, S and K down the side of the screen. The letters K, S, I and D form the word spelled backward. They are also written down the side of the screen. The screen looks like this:



The student's task is to figure out words that begin and end with the letters on each line. Examples might be as follows:



After these four words are entered, the computer has you evaluate each. Since the words "desk," "icicles" and "kend" begin and end with the correct letters, you will merely be asked whether or not they are correct — real words spelled correctly. The child's honesty is assumed here.

A dictionary would have to be inserted into this program if we wanted the computer to check the spelling of the many words that are possible. We would hope, instead, that the child uses a real

dictionary to check the spelling. A teacher, parent or a buddy may also be used to check the correctness of these words.

At this point, the student should get credit for the words "desk" and "icicles." Since "kend" is not a real word, no credit is given for it.

Words that do not start or end with the proper letters are flagged by the computer. A message appears to tell the student where the mistake is. In our example, the word "some" is incorrect because even though it is a real word, it does not end with the required letter I.

After all of the words are evaluated, the score for this round is shown. In our sample, the child receives a score of 50 percent. The student may then either press the letter E to end the program or A to go again.

Here is how the main program elements operate. Lines 50 to 80 ask the child to put in a key word. The program rejects words that are longer than 10 letters. The reason for this is that the screen would not accommodate longer words neatly. The new CoCo 3 has a larger screen that overcomes such problems.

Lines 90 to 190 print the first and the last letters of the word up and down near the right side of the screen. Lines 210 to 240 allow the child to put in the created words. Lines 260 to 360 evaluate these words. Correct words are stored

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.



by the variable R, so Line 380 can then print out the final score at the end of each session.

We have played this game in classes with several computers. The children were divided into teams. Each team types in the same key word. The team

having the most complete list of words was judged the winner. We have also tried to encourage greater thought by sometimes assigning greater point values for longer words. We have encouraged the use of real dictionaries by the students during the game. Our

feeling is that it is important to encourage students' use of reference materials whenever possible.

As always, we at Computer Island hope that your children or students both enjoy and learn from our programs. □

### The listing: SPELLOWN

```

10 REM SPELLOWN GAME
20 REM (C) STEVE BLYN, COMPUTER I
  SLAND, STATEN ISLAND, NY, 1987
30 CLS:P$=STRING$(32,255)
40 PRINT@8,"spelling game";
50 PRINT@384,"TYPE A SPELLING WO
  RD";
60 INPUT A$
70 A=LEN(A$):X=A
80 IF A>10 THEN PRINT@480,"THIS
  WORD IS TOO LONG";:FORT=1TO 2000
  :NEXT T:RUN
90 FOR T= 1 TO A
100 PRINT@34+D,MID$(A$,T,1)+" "+
  "-";
110 PLAY"O4L20AB"
120 D=D+32
130 NEXT T
140 T=0:D=0
150 FOR T=A TO 1 STEP-1
160 PRINT@40+D,"- "+MID$(A$,T,1)
  ;
170 D=D+32
180 PLAY"O2L20AB"
190 NEXT T
200 D=0:T=0
210 FOR T= 1 TO A
220 PRINT@47+D,"";:LINE INPUT C$
  (T)
230 D=D+32
240 NEXT T
250 PRINT P$;
260 FOR T= 1 TO A
270 EN$="" :PRINT@384," ":PRINT@
  416," "
280 IF LEFT$(C$(T),1)<>MID$(A$,T
  ,1) THEN PRINT@384,T;" ". ";C$(T)
  " DOESN'T START":PRINT" WITH
  THE LETTER "MID$(A$,T,1):GOTO 33
  0
290 IF RIGHT$(C$(T),1)<>MID$(A$,
  A,1) THEN PRINT@384,T;" ". ";C$(T)
  " DOESN'T END":PRINT" WITH T
  HE LETTER ";MID$(A$,A,1):GOTO 33
  0

```

```

300 PRINT@384,T;" . IS "C$(T)" CO
  RRECT ? ";
310 EN$=INKEY$
320 IF EN$="Y" THEN R=R+1 ELSE I
  F EN$="N" THEN W=W+1 ELSE 310
330 PRINT EN$
340 AN$=INKEY$
350 IF AN$=CHR$(13) THEN 360 ELS
  E 340
360 A=A-1:NEXT T
370 PRINT@384,P$+P$;
380 PRINT@452,"YOUR SCORE IS";IN
  T((R/X)*100+.5);"% "
390 PRINT@484,"PRESS 'A' OR 'E'
  ";
400 IN$=INKEY$
410 IF IN$="A" THEN RUN ELSE IF
  IN$="E" THEN 420 ELSE 400
420 CLS:END

```

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# The Kingdom of Le Lutin

By Louis Parson.



Every morning and evening, I travel across Rigaud Mountain to reach the school where I work. One day, I was intrigued by small tracks left in the snow; tracks that bore no resemblance to the ones already familiar to me and whose sight usually delighted me: deers being pursued by coyotes, hares looking for food and partridges walking to their hide-outs. I was curious as to what sort of creature could make tracks like that, but I soon forgot about them.

One rainy day last summer, I noticed the same peculiar tracks glistening on a big rock by the side of the road. My curiosity was piqued. The following weekend, I decided to make an expedition to examine those strange tracks that sometimes looked like very small human footprints.

What I couldn't have known was where this expedition would lead me — right into a fairy world! This world is now for you to discover. Can you get to the wonderful, tiny human being I discovered with luck and magic? The only thing I can tell you is that his domain is well-protected against intruders. Good luck! You're going to need it.

*Le Lutin* (The Elf) is a beginners graphics Adventure. It doesn't have a save feature, but it offers an interesting challenge in the fascinating world of imagination. Like most Adventures, *Le Lutin* requires two-word commands.

The only abbreviations used are INV for inventory and

---

*Louis Parson is the principal of a small elementary school in Ste-Marthe, Quebec. He also is in charge of coordinating the children's computer classes for the Vaudreuil School Board, whose elementary schools all have a computer laboratory of at least 15 CoCos.*

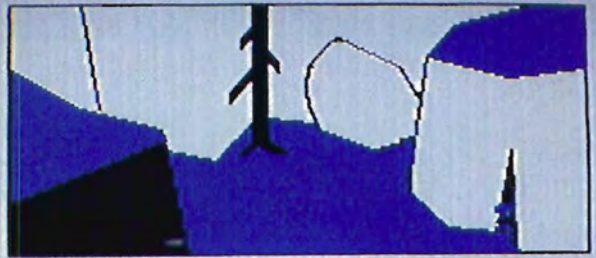
EXAM for examine. When asked for the password, you need only type one word. All other words should be completely and correctly spelled. You should not be surprised if some objects leave traces after being picked up (this is an imaginary world).

(Questions about this Adventure may be addressed to the author at 82 St. Pierre, C.P. 12, Rigaud, Quebec, Canada J0P 1P0. Be sure to include an SASE when writing for a reply.) □



YOU ARE IN THE DEAD WOODS  
 OBVIOUS EXITS: NORTH SOUTH EAST WEST  
 YOU SEE A KEY ... A SWAMP

AND NOW?



YOU ARE AMONG THE ROCKS  
 OBVIOUS EXITS: EAST  
 YOU SEE A STRANGE BOULDER

AND NOW?

**Editor's Note:** The following listing is for the CoCo 1 and 2. A version for the CoCo 3 is included on this month's RAINBOW ON TAPE and RAINBOW ON DISK.

5	84	160	20	290	77
13	59	183	156	296	53
28	126	198	244	302	8
48	75	214	39	310	9
68	71	219	162	317	126
84	168	228	194	321	202
94	135	236	242	332	16
104	13	247	4	346	69
116	100	260	50	END	27
124	138	272	243		
140	61	277	181		

The listing: LE LUTIN

```
1 POKE65495,0:CLS0:PRINT@99,"les
";CHR$(128);"lutins";CHR$(128);"
du";CHR$(128);"mont";CHR$(128);"
rigaud";:PRINT@238,"par";:PRINT@
329,"louis";CHR$(128);"parson";:
PRINT@459,"<C> 1986";:FORX=1TO30
00:NEXT:CLR8000:PMODE4,1:PCLS1:
SCREEN1,1
2 X=14:Y=15:DIML$(X+1):DIMLO$(Y+
1):DIMO$(Y+1):DIMC$(22):DIMT(4,X
+1):DIMC(27):DIMO(Y+1):DIMG$(Y+1
):DIMW$(35):W$(1)="BM+3,0;U4E2F2
D2L4R4D2":W$(2)="BM+3,0;R3L3U6R3
FDGL3R3FDGBR":W$(3)="BM+3,0;BUFR
```

```
3L3HU4ER3BD6":W$(4)="BM+3,0;R3L3
U6R3FD4GBR"
3 W$(5)="BM+3,0;R4L4U3R3L3U3R4BD
6":W$(6)="BM+3,0;U3R3L3U3R4BD6BL
":W$(7)="BM+3,0;BUFR2EUHLBL2D2U4
ER3BRBD6":W$(8)="BM+3,0;U6D3R4U3
D6":W$(9)="BM+3,0;R4L2U6L2R4BD6"
:W$(10)="BM+3,0;BUFR2EU5BD6":W$(
11)="BM+3,0;U6D3RE3G3F3"
4 W$(12)="BM+3,0;BU6D6R4BL":W$(1
3)="BM+3,0;U6F2E2D6":W$(14)="BM+
3,0;U6DF2F2DU6BD6";:W$(15)="BM+3
,0;BUU4ER2FD4GL2HFBR3":W$(16)="B
M+3,0;U6R3FDGL2BD3BR3":W$(17)="B
M+3,0;BUU4ER2FD4GL2HFR2EHF2BL":W
$(18)="BM+3,0;U6R3FDGL3R2F2D"
5 W$(19)="BM+3,0;BUFR2EUHL2HEUR2
FBD5":W$(20)="BM+3,0;BU6R4L2D6BR
2":W$(21)="BM+3,0;BU6D5FR2EU5BD6
":W$(22)="BM+3,0;BU6D2FD2FEU2EU2
BD6":W$(23)="BM+3,0;BU6D6E2F2U6B
D6":W$(24)="BM+3,0;UE4UBL4DF4D":
W$(25)="BM+3,0;BU5UDF2E2UDG2D3BR
"
```

```
6 W$(26)="BM+3,0;BU6R4DG4D1R4"
7 DATA IN THE GREEN WOODS,IN THE
GREEN WOODS,AMONG THE ROCKS,AMO
NG THE ROCKS,IN THE DEAD WOODS,I
N THE DEAD WOODS
8 DATA IN THE DEAD WOODS,IN A SW
AMP,IN THE SECRET CAVES,IN THE G
REEN WOODS,AMONG THE ROCKS
9 DATA NOWHERE...,IN THE LEPRECH
AUN'S PLACE,NOWHERE
10 DATA AN URN,WIND,7,BUTTERFLY
WINGS,WINGS,2,.....*,9,A KEY,KE
Y,5,A PARCHMENT,PARCHMENT,3
11 DATAA MUSHROOM,MUSHROOM,14,A
SHOVEL,SHOVEL,1,A TUBE,TUBE,4,A
TORCH,TORCH,6,A BOX,BOX,10
12 DATAA STRANGE BOULDER,*,11,...
```

```

.A SWAMP,* ,4,...A SWAMP,* ,5,SIGN
S ON A TREE,* ,6,...A SWAMP,* ,6
13 DATA 2,0,10,11,4,1,5,3,4,-7,2
,0,1000,2,-2,3,1000,10,6,2,1000,
7,0,5,6,0,0,10,1000,1000,1000,10
00,-3,-4,0,-2,5,0,7,1,-7,0,1,0,0
,-1,-5,0,0,1000,-6,0,0,-3,0,-6
14 DATATAKE,1,GET,1,PUT,2,DROP,2
,GO,3,LOOK,4,EXAM,4,READ,4,USE,5
,GLUE,6,RUB,7,STRIKE,7,UNLOCK,8
,OPEN,9,EAT,10,DIG,11,LIGHT,12,SW
IM,13,FLY,14,PUSH,15,DRINK,16,IN
V,17
15 FORC=1TOX:READL$(C):NEXTC
16 FORC=1TOY:READLO$(C),O$(C),O(
C):NEXTC
17 FORC=1TOX:READT(1,C),T(2,C),T
(3,C),T(4,C):NEXTC
18 T$(1)="NORTH":T$(2)="SOUTH":T
$(3)="EAST":T$(4)="WEST"
19 N=22
20 FORC=1TON:READC$(C),C(C):NEXT
C
21 L=11
22 GOSUB325
23 SCREEN1,1
24 GOSUB335
25 PCLS1:ONLGOSUB178,211,227,234
,250,271,275,280,281,288,297,305
,310,318
26 FORC=1TOY:IFO(C)=LTHENGOSUB32
5:POKE178,3:DRAWG$(C)
27 NEXTC
28 IFL=9ANDW=1ANDO(9)=1000THENG
OSUB283
29 IFL=11ANDZA=1THENGOSUB304
30 IFL=14ANDVL=1THENGOSUB324
31 COLOR8,1:N$="YOU ARE "+L$(L):
DRAW"BM5,108;":GOSUB150
32 N$="OBVIOUS EXITS: "
33 FORC=1TO4:IFT(C,L)>0THENN$=N$
+T$(C)+" "
34 NEXTC
35 DRAW"BM 5,123;":GOSUB150
36 N$="YOU SEE "
37 FORC=1TOY:IFO(C)=LTHENN$=N$+L
O$(C)+" "
38 NEXTC
39 IFLEN(N$)<39THENGOTO41
40 IFLEN(N$)>38THENGOTO339
41 IFN$="YOU SEE "THENN$="YOU SE
E NOTHING INTERESTING"
42 DRAW"BM 5,138;":GOSUB150:GOTO
43
43 N$="AND NOW?":DRAW"BM0,168;":
GOSUB150
44 LINE(10,172)-(255,184),PSET,B

```

```

:SOUND250,1
45 COLOR6,1
46 A$="":GOSUB165
47 IFA$="CALM"ANDL=6ANDZE=1THENG
OTO338
48 IFZE=1ANDL=6ANDA$<>"CALM"THEN
330
49 FORC=1TOLEN(A$):IFMID$(A$,C,1
)=" "THENA1$=LEFT$(A$,C-1):B$=MI
D$(A$,C+1,LEN(A$)-C):GOTO51ELSEN
EXTC
50 A1$=A$
51 FORC=1TON
52 IFC$(C)=A1$THENA=C(C):GOTO55
53 NEXTC
54 GOSUB331:N$="WHAT...?":GOSUB1
50:GOSUB332:GOTO46
55 ONAGOTO56,65,73,78,98,100,102
,106,108,113,116,119,121,122,124
,126,133
56 IFB$="URN"THENB$="WIND"
57 IFB$="MATCHES"THENB$="BOX"
58 IFVV<4THEN59ELSEGOTO64
59 FORC=1TOY
60 IFB$=O$(C)AND O(C)=L AND O$(C
)<>"*" THEN O(C)=1000:GOSUB325:P
OKE178,0:DRAW G$(C):GOSUB331:N$=
"DONE YOU HAVE IT!":VV=VV+1:GOSU
B150:GOSUB332:GOSUB334:GOTO36
62 NEXTC
63 GOSUB331:N$="YOU CAN'T":GOSUB
150:GOSUB332:GOTO46
64 GOSUB331:N$="YOUR HANDS ARE F
ULL":GOSUB150:GOSUB332:GOTO46
65 IFB$="MATCHES"THENB$="BOX"
66 IFB$="URN"THENB$="WIND"
67 IFB$="TORCH"THEN WM=0
68 IFB$="TORCH" AND L=9 THENPOKE
178,0:GOSUB284
69 FORC=1TOY
70 IFB$=O$(C)AND O(C)=1000THENO(C
)=L:VV=VV-1:GOSUB325:POKE178,3:D
RAWG$(C):POKE178,0:GOSUB331:N$="
DONE...!":GOSUB150:GOSUB332
71 NEXTC
72 GOSUB334:GOTO36
73 IFB$="HOLE"ANDL=11ANDZA=1THEN
L=3:GOTO25
74 FORC=1TO4:IFB$=T$(C)THENDR=C:
GOTO76
75 NEXTC:GOTO46
76 IFT(DR,L)>0THENL=T(DR,L):IFL=
1000THENGOSUB331:N$="YOU ARE SIN
KING...TOO BAD.":GOSUB150:GOTO28
6
77 GOTO24
78 IFA$=A1$THENGOSUB335:GOTO25

```

```

79 GOSUB331
80 IFB$="WIND"THENB$="URN"
81 IFB$="BOX"THENB$="MATCHES"
82 IFB$="URN"AND(1)=1000THENN$="
IT IS PRESSURIZED WIND":GOSUB15
0:GOSUB332:GOTO46
83 IFB$="RING"AND(3)=1000THENN$="
A GOLD RING...MAGIC?":GOSUB150:
GOSUB332:GOTO46
84 IFB$="WINGS"AND(2)=1000THENN$="
HUGE AND VERY STRONG":GOSUB150:
GOSUB332:GOTO46
85 IFB$="KEY"AND(4)=1000THENN$="
MADE OF SILVER...PRECIOUS.":GOS
UB150:GOSUB332:GOTO46
86 IFB$="PARCHMENT"AND(5)=1000T
HENN$="...WITH CALM YOU WILL SUC
CEED.":GOSUB150:GOSUB332:GOTO46
87 IFB$="MUSHROOM"AND(6)=1000TH
ENN$="BIZARRE...MIGHT BE EDIBLE"
:GOSUB150:GOSUB332:GOTO46
88 IFB$="SHOVEL"AND(7)=1000THEN
N$="MADE OF STEEL WITH A WOOD HA
NDLE":GOSUB150:GOSUB332:GOTO46
89 IFB$="TUBE"AND(8)=1000THENN$="
LOOKS LIKE STRONG GLUE":GOSUB1
50:GOSUB332:GOTO46
90 IFB$="TORCH"AND(9)=1000ANDWM
<>1THENN$="OF RESIN...ACTUALLY O
FF":GOSUB150:GOSUB332:GOTO46
91 IFB$="TORCH"ANDWM=1THENN$="..
.IT IS AFLAME.":GOSUB150:GOSUB33
2:GOTO46
92 IFB$="MATCHES"AND(10)=1000TH
ENN$="MATCHES...DRY AND WELL PRE
SERVED":GOSUB150:GOSUB332:GOTO46
93 IFB$="HOLE"ANDL=3THENN$="BIG
ENOUGH FOR YOU TO ENTER...":GOSU
B150:GOSUB332:GOTO46
94 IFB$="BOULDER"ANDL=11THENN$="
SEEMS A LITTLE UNSTABLE.":GOSUB3
32:GOTO46
95 IFB$="TREE"THENB$="SIGNS"
96 IFB$="SIGNS"ANDL=6AND(5)=100
0THENN$="THE PASSWORD?":GOSUB15
0:FORX=1TO600:NEXTX:GOSUB332:ZE=
1:GOTO46
97 N$="YOU DON'T HAVE IT.":GOSUB
150:GOSUB332:GOTO46
98 IFB$="WIND"AND(1)=1000ANDVGM
=1ANDL=4THENGOSUB331:N$="YOU ARE
FLYING OVER THE SWAMP.":GOSUB150
:GOSUB332:GOSUB287:L=14:GOTO25
99 GOSUB331:N$=" NOTHING TO DO":
GOSUB150:GOSUB332:GOTO46
100 IFB$="WINGS"AND(2)=1000AND(
8)=1000ANDVK=1THENGOSUB331:N$="
DONE!":VG=1:GOSUB150:GOSUB332:
GOTO46
101 GOSUB331:N$=" NOTHING TO DO
":GOSUB150:GOSUB332:GOTO46
102 IFB$="MATCH"AND(10)=1000THE
NGOSUB331:N$=" IT IS LIT.":VH=1:
GOSUB150:GOSUB332:GOTO46
103 IFB$="RING"AND(3)=1000ANDL=
14THENGOSUB331:N$=" THERE IS NOW
A WAY...":VL=1:GOSUB150:GOSUB33
2
104 IFVL=1THENT(4,14)=12:T(1,12)
=14:GOSUB324:GOSUB336:GOTO32
105 GOSUB331:N$=" NOTHING TO DO"
:GOSUB150:GOSUB332:GOTO46
106 IFB$="DOOR"ANDL=9AND(4)=100
0ANDWM=1THENGOSUB331:N$="IT IS U
NLOCKED":VJ=1:GOSUB150:GOSUB332:
GOTO46
107 GOSUB331:N$="IMPOSSIBLE":GOS
UB150:GOSUB332:GOTO46
108 IFB$="DOOR"ANDL=9ANDVJ=1THEN
POKE178,0:GOSUB285::GOSUB331:N$="
YOU ARE GIVEN SOMETHING...":O(3
)=1000:GOSUB150:GOSUB332:GOSUB33
6:GOSUB334:GOTO32
109 IFB$="TUBE"AND(8)=1000THENG
OSUB331:N$=" DONE!":VK=1:GOSUB
150:GOSUB332:GOTO46
110 IFB$="BOX"AND(10)=1000THENG
OSUB331:N$=" DONE!":GOSUB150:G
OSUB332:GOTO46
111 IFB$="URN"THENB$="WIND":GOTO
98
112 GOSUB331:N$=" IMPOSSIBLE":G
OSUB150:GOSUB332:GOTO46
113 IFB$="MUSHROOM"ANDL=12AND(6
)=1000THENGOSUB331:N$="YOU HALLU
CINATE...":GOSUB150:GOSUB332:T(3
,12)=13:T(4,13)=12:GOSUB336:O(3)
=1000:GOTO32
114 IFB$="MUSHROOM"AND(6)=1000T
HENGOSUB331:N$="NOT BAD...":GOSU
B150:GOSUB332:O(6)=100:GOTO46
115 GOSUB331:N$="YOU CAN'T.":GOS
UB150:GOSUB332:GOTO46
116 IFA$=A1$ANDL=4AND(7)=1000TH
ENT(3,4)=9:T(4,9)=4:GOSUB331:N$="
...AN UNDERGROUND PASSAGE APPEA
RS":GOSUB150:GOSUB332:GOSUB336:G
OTO32
117 IFA$=A1$AND(7)<>1000THENGOS
UB331:N$="TOO HARD...!":GOSUB150
:GOSUB332:GOTO46
118 IFA$=A1$THENGOSUB331:N$="NOT
HERE":GOSUB150:GOSUB332:GOTO46
119 IFB$="TORCH"AND(9)=1000ANDV
H=1THENGOSUB331:N$=" ONE SEES CL
EARLY NOW...":WM=1:GOSUB150:GOSU
B332:IFL=9ANDWM=1THENGOSUB283:GO
SUB332:GOTO46

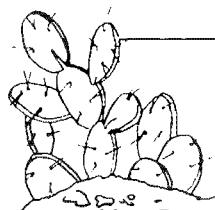
```



```

120 GOSUB331:N$="      ? ?
? ?":GOSUB150:GOSUB332:GOTO46
121 IFA$=A1$ANDL=4ORL=5ORL=6THEN
GOSUB331:N$="YOU ARE SINKING...T
OO BAD.":GOSUB150:GOTO286
122 IFA$=A1$ANDL=4ANDVG=1THENGOS
UB331:N$="IT IS NOT WINDY ENOUGH
":GOSUB150:GOSUB332:GOTO46
123 GOSUB331:N$="YOU CAN'T.":GOS
UB150:GOSUB332:GOTO46
124 IFB$="BOULDER"ANDL=11THENGOS
UB331:N$="IT MOVES...":GOSUB150:
GOSUB332:T(1,11)=3:T(2,3)=11:LO$
(11)="A DARK HOLE":GOSUB334:GOSU
B336:ZA=1:GOSUB304:GOTO32
125 GOSUB331:N$="YOU CAN'T":GOSU
B150:GOSUB332:GOTO46
126 IFA$=A1$THENGOSUB331:N$="WHA
T...?":GOSUB150:GOSUB332:GOTO46
127 IFB$="WATER"ANDL=4THENGOTO13
1
128 IFB$="WATER"ANDL=5THENGOTO13
1
129 IFB$="WATER"ANDL=6THENGOTO13
1
130 GOTO132
131 GOSUB331:N$="WATER PARALYSES
YOU...":GOSUB150:GOSUB332:GOSUB
286
132 GOSUB331:N$="NOTHING TO DRIN
K...":GOSUB150:GOSUB332:GOTO46
133 IFA$=A1$THENGOSUB335:N$="YOU
ARE CARRYING:"
134 HORIZONTAL=10:VERTICAL=1
135 DRAW"BM10,118;":GOSUB150:DRA
W"BM 45,128;"
136 N$=" "
137 FORV=1TOY
138 IFO(V)=1000THENN$=N$+LO$(V)+
" "
139 HO=HO+6*LEN(N$):IFHO>1000THEN
141
140 GOTO146
141 VE=VE+1:HO=10
142 IFVE=2THENDRAW"BM 10,138"
143 IFVE=3THENDRAW"BM 10,148;"
144 IFVE=4THENDRAW"BM 10,158;"
145 IFVE=5THENDRAW"BM10,168;"
146 IFVE=6THENDRAW"BM10,178;"
147 GOSUB150:N$=" "
148 NEXTV:FORX=1TO1200:NEXTX:GOS
UB335:GOTO31
149 STOP
150 FORC=1TOLEN(N$)
151 N1$=MID$(N$,C,1)
152 N1=ASC(N1$)

```



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```

153 IFN1=32THENDRAW"BM+6,Ø":GOTO
163
154 IFN1=58THENDRAW"BM+3,Ø;BR1BU
1U1BU2U1BU1BR2BD6BR2":GOTO163
155 IFN1=39THENDRAW"BM+3,Ø;BR2BU
4U2BR1BD6":GOTO163
156 IFN1=46THENDRAW"BM+3,Ø;BR1R1
BR1":GOTO163
157 IFN1=63THENDRAW"BM+3,Ø;BU4U2
R2D3BL1D3BR1":GOTO163
158 IFN1=33THENDRAW"BM+3,Ø;BR1R1
BU2U4BR1BD6":GOTO163
159 IFN1=44THENDRAW"BM+3,Ø;BR1U2
BD3BL1L1BR3BU1":GOTO163
16Ø IFN1>=65ANDN1<=9ØTHENGOTO161
ELSENEXTC
161 N1=N1-64
162 DRAWW$(N1)
163 NEXTC
164 RETURN
165 LINE(75,161)-(256,169),PRESE
T,BF:DRAW"BM75,168;":A$="":GOTO1
67
166 DRAW"BM75,191;":A$=""
167 I$=INKEY$
168 IFI$=""THEN167
169 SOUND23Ø,1
17Ø IFI$=CHR$(13)THENRETURN
171 N1=ASC(I$)
172 IFN1=32THENDRAW"BM+7,Ø":A$=A
$+CHR$(32):GOTO167
173 IFN1=8ANDLEN(A$)>ØTHENA$=LEF
T$(A$,LEN(A$)-1):POKE178,3:DRAW"
BM-6,Ø;R6U1L6U1R6U1L6U1R6U1L6U1R
6D6BL7":POKE178,Ø:GOTO167
174 IFN1>=65ANDN1<=9ØTHENA$=A$+I
$ELSEGOTO167
175 N1=N1-64:DRAWW$(N1)
176 IFL=2THENGOTO182
177 GOTO167
178 GOSUB328
179 IFL=2THENGOTO182
18Ø LINE(2Ø,6Ø)-(32,27),PSET
181 IFL=1ØTHENGOTO184
182 LINE(32,28)-(2Ø,22),PSET:LIN
E(36,12)-(16,4),PSET:LINE(2Ø,6)-
(2Ø,Ø),PSET:LINE(36,12)-(4Ø,Ø),P
SET
183 IFL=2THENGOTO19Ø
184 LINE(76,8Ø)-(76,68),PSET:LIN
E(76,68)-(96,64),PSET:LINE(96,64
)-(96,52),PSET
185 IFL=1ØTHENGOTO187
186 LINE(96,52)-(8Ø,52),PSET:LIN
E(8Ø,52)-(92,Ø),PSET
187 LINE(76,8Ø)-(96,96),PSET
188 LINE(2Ø,64)-(2Ø,22),PSET
189 IFL=1ØTHENGOTO192
19Ø DRAW"BM12,96;E1ØF5E12F12E8F8

```

```

E5F1Ø"
191 LINE(124,Ø)-(112,16),PSET:LI
NE(112,16)-(144,16),PSET
192 LINE(144,16)-(12Ø,44),PSET:L
INE(12Ø,44)-(144,48),PSET:LINE(1
44,48)-(14Ø,56),PSET:LINE(14Ø,56
)-(168,62),PSET:LINE(168,62)-(17
6,72),PSET
193 LINE(176,72)-(224,44),PSET:L
INE(224,44)-(244,6Ø),PSET:LINE(2
24,44)-(244,28),PSET:LINE(244,6Ø
)-(256,6Ø),PSET
194 IFL=2THENGOTO198
195 IFL=1ØTHENRETURN
196 LINE(16Ø,6Ø)-(152,96),PSET
197 LINE(224,44)-(234,95),PSET
198 LINE(25Ø,6Ø)-(234,95),PSET
199 IFL=2THENRETURN
2ØØ LINE(116,96)-(156,8Ø),PSET
2Ø1 CIRCLE(116,132),65,Ø,1,.65,.
86
2Ø2 POKE178,Ø:PAINT(4Ø,4Ø),,Ø:PA
INT(22Ø,6Ø),,Ø:PAINT(252,68),,Ø
2Ø3 POKE178,2:PAINT(4Ø,92),,Ø:PA
INT(136,92),,Ø:PAINT(2ØØ,1),,Ø:P
AINT(12Ø,8Ø),,Ø
2Ø4 POKE178,1Ø1:PAINT(236,6Ø),,Ø
:PAINT(32,4),,Ø:PAINT(26,32),,Ø:
PAINT(1ØØ,1),,Ø
2Ø5 POKE178,2:DRAW"BM79,79;U1ØBR
8BU2D8BR8U9BR8BU7D9BR8BU1U19BR8B
D3D19BR8D1U12BR8U3D17BR8D3U16BR8
BD4D16BR8BU5U11":DRAW"BM95,7;D16
BR8BD4U11BU5U5BU2U3BR8BD3D27BR8B
U4U1ØBR8BD4D9BR8BU6U7"
2Ø6 IFL=2THENRETURN
2Ø7 LINE(212,82)-(214,92),PSET
2Ø8 IFL=1ØTHENRETURN
2Ø9 POKE178,1:FORLL=1TO75:XX=RND
(44)+16:YY=RND(12)+8Ø:PSET(XX,YY
):NEXTLL
21Ø RETURN
211 GOSUB178
212 LINE(164,61)-(164,96),PSET:L
INE(18Ø,69)-(18Ø,96),PSET:LINE(2
ØØ,58)-(2ØØ,96),PSET:LINE(228,96
)-(228,47),PSET:IFL=1ØTHENRETURN
213 LINE(121,51)-(142,53),PSET:L
INE(36,12)-(4Ø,24),PSET:LINE(4Ø,
24)-(32,28),PSET
214 LINE(91,23)-(92,Ø),PSET:LINE
(146,88)-(15Ø,9Ø),PSET:LINE(18Ø,
76)-(2ØØ,8Ø),PSET
215 LINE(36,12)-(52,2),PSET:LINE
(52,2)-(6Ø,1Ø),PSET:LINE(6Ø,1Ø)-
(84,4),PSET:LINE(84,4)-(76,16),P
SET:LINE(76,16)-(1Ø4,28),PSET:LI
NE(1Ø4,28)-(1Ø4,4Ø),PSET:LINE(1Ø
4,4Ø)-(12Ø,48),PSET:LINE(12Ø,48)

```

```

-(124,60),PSET:LINE(124,60)-(148,88),PSET
216 LINE(38,26)-(67,42),PSET:LINE(68,39)-(38,23),PSET:LINE(126,77)-(143,86),PSET:LINE(84,51)-(101,61),PSET:LINE(61,18)-(47,27),PSET:LINE(45,34)-(42,56),PSET:LINE(73,64)-(66,41),PSET
217 LINE(96,57)-(108,54),PSET:LINE(96,62)-(108,76),PSET:LINE(66,37)-(91,34),PSET:LINE(124,61)-(147,88),PSET
218 LINE(32,80)-(16,52),PSET:LINE(16,52)-(32,28),PSET
219 LINE(148,88)-(108,92),PSET:LINE(120,92)-(104,92),PSET:LINE(104,92)-(100,88),PSET:LINE(100,88)-(92,88),PSET:LINE(92,88)-(88,76),PSET:LINE(88,76)-(76,80),PSET:LINE(104,92)-(112,96),PSET
220 LINE(112,96)-(76,80),PSET:LINE(76,80)-(44,72),PSET:LINE(44,72)-(32,80),PSET:LINE(228,80)-(244,80),PSET:LINE(20,22)-(20,48),PSET
221 POKE178,0:PAINT(8,8),,0:PAINT(170,72),,0:PAINT(224,56),,0:PAINT(252,68),,0:PAINT(64,4),,0:PA

```

```

INT(84,80),,0:PAINT(99,89),,0
222 POKE178,2:PAINT(56,8),,0:PAINT(40,88),,0:PAINT(142,60),,0:PAINT(200,4),,0:PAINT(188,88),,0:PAINT(60,48),,0:PAINT(235,85),,0
223 POKE178,101:PAINT(32,4),,0:PAINT(24,32),,0:PAINT(108,8),,0:PAINT(192,72),,0:PAINT(240,60),,0
224 POKE178,2:FORWW=1TO30:XX=RND(12)+32:YY=RND(4)+20:PSET(XX,YY):NEXT:POKE178,1:FORWW=1TO45:XX=RND(28):YY=RND(8)+88:PSET(XX,YY):NEXT
225 GOSUB205
226 RETURN
227 GOSUB328:GOSUB234:LINE(80,96)-(96,84),PSET:LINE(96,84)-(92,96),PSET:LINE(96,84)-(84,68),PSET:LINE(84,68)-(64,64),PSET:LINE(112,42)-(120,96),PSET
228 LINE(113,52)-(140,36),PSET:LINE(140,36)-(172,40),PSET:LINE(172,40)-(184,64),PSET:LINE(184,64)-(202,76),PSET:LINE(184,64)-(180,72),PSET:LINE(180,72)-(164,78),PSET
229 IFL=7THENRETURN
230 POKE178,2:PAINT(60,4),,0:PAI

```

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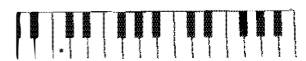
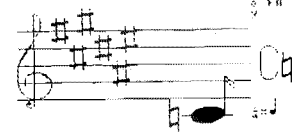
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```

NT(60,80),,0
231 POKE178,0:PAINT(88,92),,0:PO
KE178,1:FORLL=1TO30:XX=RND(76)+1
2:YY=RND(14)+72:PSET(XX,YY):NEXT
LL:POKE178,2:LINE(212,53)-(228,5
6),PSET:LINE(200,60)-(220,60),PS
ET
232 POKE178,1:FORLL=1TO30:XX=RND
(76)+12:YY=RND(14)+72:PSET(XX,YY
):NEXTLL
233 RETURN
234 GOSUB328:LINE(0,0)-(52,20),P
SET:LINE(52,20)-(68,20),PSET:LIN
E(68,20)-(80,26),PSET:LINE(80,26
)-(104,12),PSET:LINE(104,12)-(84
,0),PSET
235 IFL=3THENGOTO237
236 LINE(20,96)-(48,80),PSET:LIN
E(48,80)-(56,68),PSET:LINE(56,68
)-(86,52),PSET:LINE(86,52)-(100,
43),PSET:LINE(100,43)-(116,40),P
SET
237 LINE(104,12)-(112,41),PSET:D
RAW"BM52,20;D7L1D7BD8BL2D4L1D4BR
32BU23D5L1D5BD4D5L1D4"
238 LINE(0,0)-(52,20),PSET:LINE(
52,20)-(68,20),PSET:LINE(68,20)-
(80,26),PSET:LINE(80,26)-(104,12
),PSET:LINE(104,12)-(84,0),PSET
239 LINE(240,0)-(220,12),PSET:LI
NE(220,12)-(212,53),PSET:LINE(21
2,53)-(200,60),PSET:LINE(200,60)
-(204,96),PSET:DRAW"BM200,60;R18
BL6BU7R4D1R4D1R4D1R4D1"
240 IFL=3THENGOTO243
241 DRAW"BM48,80;R4D1R4D1R4D1R4D
1F5R4D1R4D1R4D1BR44BU24E10R4U1R4
U2R3U2E5R2U2"
242 LINE(116,40)-(144,40),PSET:L
INE(144,40)-(156,44),PSET:LINE(1
56,44)-(164,60),PSET:LINE(164,60
)-(172,68),PSET:LINE(172,68)-(19
6,80),PSET:LINE(196,80)-(204,96)
,PSET
243 LINE(0,48)-(36,62),PSET:LINE
(36,62)-(64,64),PSET
244 IFL=3THENRETURN
245 CIRCLE(172,44),52,,.25,.57,.
92:LINE(151,32)-(149,0),PSET:LIN
E(199,33)-(201,0),PSET
246 POKE178,2:PAINT(60,4),,0:PAI
NT(172,44),,0:PAINT(4,60),,0
247 POKE178,3:DRAW"BM147,34;R48B
D2R12L72BD2L6R85BD2L67BD2BR3R61B
D2L54BD2BR1R53BD2L51BD2R51BD2L50
BD2BR1R46BD2BL3L41BD2R37BD2BL3L3
2BD2BR1R31BD2L29BD2BR2R29BD2L26B
D2BR3R23BD2L18BD2BR3R15BD2L10BD2
BR3R6BD2L2BD2BR1R2BD2R2BD2L1"
248 POKE178,1:FORLL=1TO20:XX=RND
(36)+4:YY=RND(16)+62:PSET(XX,YY)
:NEXTLL
249 RETURN
250 GOSUB328
251 IFL=7THENRETURN
252 IFL=6THENRETURN
253 SO$="U24E32R12D4R12F10R12F7H
2D4L4G3H3L16U4H5L8U4H10;BR50BD20
D38;F15D3L24H17L16H3L39"
254 IFL=6THENRETURN
255 DRAW"S4;BM0,76;"+SO$
256 EP$="U4L20E20L20E20U4L16E16U
4L16E16U8;R4D4F14E6U4E2F2D4F8L8D
4F8E12U4L12E12U4R4F12L12D4F16L16
D4F20L20F20L20D8;L4U4L20E20U4L20
F12L12D8L4U4L12;F10L20D8L4U4R2U2
"
257 IFL=6THENRETURN
258 IFL=6THENRETURN
259 DRAW"S3;BM110,84;"+EP$
260 TR$="D7F3E8L6E2L6":DRAW"BM11
8,42;R7D3G2H5":DRAW"BM115,49;R5G
4L2U5":DRAW"BM114,63;R4G4U4":IFL
=6THENRETURN
261 DRAW"BM131,45;R12G6H6"
262 DRAW"BM114,30;"+TR$
263 AR$="D32E28D8R4G32D32;E24D4R
4G12R8D2L10G14D12;L28U24H10L6U2R
4H8E4U4F16;U28H24U4E4F20U21R28"
264 IFL=6THENRETURN
265 IFL=7THENRETURN
266 DRAW"S4;BM224,0;"+AR$
267 POKE178,0:PAINT(41,64),,0:PA
INT(106,30),,0:PAINT(208,8),,0
268 LINE(64,56)-(256,84),PSET:CI
RCLE(170,66),95,,.25,.55,.96:POK
E178,2:PAINT(136,60),,0:PAINT(13
6,46),,0:PAINT(117,51),,0:PAINT(
99,54),,0:PAINT(166,54),,0:PAINT
(191,51),,0:PAINT(231,53),,0:PAI
NT(249,65),,0
269 POKE178,88:PAINT(80,4),,0:PA
INT(117,33),,0:PAINT(187,6),,0:P
AINT(236,6),,0:PAINT(240,36),,0:
PAINT(120,4),,0:PAINT(172,20),,0
:DRAW"BM75,40;H3L11H7L3H3BR13BD4
D5F6":FORLL=1TO25:XX=RND(60)+4:Y
Y=RND(8)+80:PSET(XX,YY):NEXTLL
270 RETURN
271 GOSUB250:GOSUB253:DRAW"S3;BM
166,76;"+SO$:GOSUB263:DRAW"S4;BM
156,0;"+AR$:GOSUB256:DRAW"BM32,8
4;"+EP$:DRAW"BM166,76;D1R1":DRAW
"BM166,62;G19R19E8":POKE178,3:DR

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**SPECTRUM PROJECTS**  
**PO BOX 264**  
**HOWARD BEACH NY 11414**

**COCO HOT LINE**  
**718-835-1344**

```

AW"BM166,80;U16":POKE178,0
272 PAINT(87,67),,0:PAINT(135,67)
,,0:PAINT(169,67),,0:PAINT(193,68)
,,0:LINE(0,40)-(256,76),PSET:CIRCLE(178,48),86,,.11,.54,1:POKE178,3:DRAW"BM199,40R11":POKE178,2:PAINT(123,48),,0:PAINT(164,48),,0:PAINT(106,48),,0:PAINT(238,52),,0
273 POKE178,88:PAINT(14,6),,0:PAINT(49,6),,0:PAINT(97,6),,0:PAINT(120,6),,0:PAINT(167,6),,0:POKE178,0:FORLL=1TO50:XX=RND(100):YY=RND(24)+68:PSET(XX,YY):NEXTLL:FORLL=1TO25:XX=RND(60)+160:YY=RND(12)+78:PSET(XX,YY):NEXTLL
274 RETURN
275 GOSUB250:GOSUB256:DRAW"S4;BM32,84;"+EP$:GOSUB256:DRAW"S3;BM10,84;"+EP$:GOSUB263:DRAW"S4;BM24,0;"+AR$
276 LINE(232,0)-(232,96),PSET:LINE(251,0)-(251,96),PSET:POKE178,3:LINE(240,2)-(240,94),PSET:POKE178,0:PAINT(240,90),,0:PAINT(214,13),,0:PAINT(143,39),,0:PAINT(76,39),,0:PAINT(252,13),,0:LINE(0,56)-(256,28),PSET
277 FORLL=1TO50:XX=RND(170)+6:YY=RND(32)+62:PSET(XX,YY):NEXTLL
278 POKE178,88:PAINT(9,16),,0:PAINT(57,3),,0:PAINT(100,3),,0:PAINT(230,4),,0:PAINT(100,37),,0:PAINT(185,2),,0
279 RETURN
280 :GOSUB328:RETURN
281 GOSUB328
282 PAINT(100,2),,0:RETURN
283 POKE178,3
284 DRAW"BM80,80;U32BR12U8D32BR28BU16BL4L4BR8U32R24D32BR3R5":LINE(64,96)-(80,80),PSET:LINE(80,48)-(92,40),PSET:LINE(94,70)-(108,56),PSET:LINE(156,56)-(200,96),PSET
285 DRAW"BM124,38;D6BD12R8BR4R4":POKE178,0:RETURN
286 POKE178,0:FORP=175TO1STEP-1:CIRCLE(128,96),P,0,1,.5:NEXTP:FORP=1TO1500:NEXT:POKE65494,0:END
287 SCREEN0:CLS7:FORC=1TO10:CLS3:FORP=1TO30:NEXTP:CLS5:FORP=1TO30:NEXTP:CLS1:FORP=1TO30:NEXTP:NEXTC:PCLS1:SCREEN1,1:RETURN
288 GOSUB211
289 LINE(0,8)-(12,20),PSET:LINE(12,20)-(30,22),PSET:LINE(30,22)-

```

```

(48,44),PSET:LINE(48,44)-(68,36),PSET:LINE(68,36)-(80,52),PSET:LINE(80,52)-(94,52),PSET:LINE(120,45)-(143,16),PSET
290 LINE(94,52)-(112,40),PSET:LINE(112,40)-(120,44),PSET:LINE(116,96)-(164,88),PSET:LINE(180,88)-(196,96),PSET:LINE(240,96)-(240,55),PSET:LINE(152,0)-(144,8),PSET:LINE(144,8)-(144,16),PSET
291 DRAW"BM0,64;E8F16E4F8E8F20E4F11"
292 POKE178,2:PAINT(80,4),,0:PAINT(200,4),,0:PAINT(8,64),,0:PAINT(154,92),,0:PAINT(184,92),,0:POKE178,0:PAINT(8,20),,0:PAINT(168,80),,0:PAINT(208,80),,0:PAINT(250,80),,0
293 POKE178,101:PAINT(24,28),,0:PAINT(120,48),,0:PAINT(192,80),,0:PAINT(235,80),,0
294 POKE178,2:DRAW"BM79,68;D5BR8U6D7BR8BU2U7BR8BU2U14BR8U9BD14D5BD4D5BR8BU3U17BR8U4D8BD8D4BR8BD3U12BU4U4BR8BD8D3BD5D8BR8BU2U12BR8D8BR24BD2D5BR8D3U15BR40BU12D12BD3D9":DRAW"BM23,24;D7BD4D6"
295 POKE178,1:FORLL=1TO30:XX=RND(32)+20:YY=RND(12)+64:PSET(XX,YY):NEXTLL
296 RETURN
297 GOSUB328:LINE(0,24)-(32,40),PSET:LINE(32,0)-(40,40),PSET:LINE(32,40)-(68,48),PSET:LINE(68,48)-(80,96),PSET:LINE(70,52)-(0,76),PSET
298 LINE(70,56)-(92,60),PSET:LINE(92,60)-(109,44),PSET:LINE(115,44)-(134,46),PSET:LINE(136,48)-(160,56),PSET:LINE(132,24)-(142,14),PSET:LINE(148,14)-(172,24),PSET:LINE(172,24)-(180,36),PSET
299 DRAW"BM136,48;U2L1U2L1U2L1U2L1U4L1U4U4R1U4R2":DRAW"BM142,14;R2U1R2D1R2":DRAW"BM160,56;R4U1R4U1R4U2R4U1R2"
300 LINE(184,20)-(176,64),PSET:LINE(176,64)-(176,72),PSET:LINE(176,72)-(192,86),PSET:LINE(192,86)-(216,88),PSET:LINE(216,88)-(224,96),PSET:LINE(213,88)-(220,56),PSET:LINE(184,20)-(196,8),PSET:LINE(196,8)-(232,0),PSET
301 DRAW"BM104,56;E4U24G10U4E10U12G5U4E5U9R6D17F5D4H5D32R2D1R2D1R2D1R2D1L4L2U1L2U1L2U1L2U1G5L4E3":LINE(220,56)-(222,93),PSET:PAI

```

# ◀◀◀◀ COLORFUL UTILITIES ▶▶▶▶

## MULTI-PAK CRAK

Save ROMPAKS to your 64K Disk system using the RS Multi-Pak Interface. Eliminate constant plugging in of ROMPAKS now by keeping all your PAK software on disk. Includes POKES for "PROBLEM" ROMPAKS- including the NEW 16K PAKS! (Demon Attack, Dragons Lair, etc) Now CoCo III compatible! (Upgrade \$15 w/proof of purchase) \$29.95

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## COCO III ULTRA-EDITOR+

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## COCO III SOFTWARE BONANZA PACKAGE

Create an instant library of Spectrum Projects TOP CoCo III software!!! Get FONT BONANZA, FONT DISK #1, FKEYS III, C III GRAPHICS, CoCo III UTILITIES and FASTDUPE III (a \$150 plus value) for only \$49.95!!!



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Supports 40/80 column mode, ASCII or XMODEM uploads & downloads, Deluxe RS232 PAK or Serial "BITRANGER" port, 300/1200 Baud!!! Plus "STRINGS" (predefined sequences of text) can be read into the BUFFER from DISK & transmitted by NAME! Type-ahead & auto-repeat are also supported. RTERM 2.0 Req. 128K CoCoIII DISK \$39.95



'DMP-105'

## COCO III SCREEN DUMP

'DMP-130'

This is the program for HARDCOPY GRAPHICS for RS bit-image dot-matrix printers! Will print from any HSCREEN 1-4 and PMODE 0-4. 16 different printing patterns can be CUSTOMIZED for any color on the screen! 128K CoCo III DISK \$24.95

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A powerful package that transfers tape to disk and disk to tape automatically. Does an automatic copy of an entire disk of programs to tape. Ideal for Rainbow On Tape to disk. Also copies tape to tape & prints tape & disk directories. TAPE/DISK \$24.95 (see Sept '83 Rainbow Review)

## COCO III UTILITIES

Terrific utility support programs for the new Color Computer III! Includes a CoCo II to CoCo III converter, 32K Hi-Res screen saver, 40/80 column Word Processor, RAM tester, DEMO BALL generator, SMOOTH scrolling demos. 128K DISK \$24.95

## ELITEWORD 80

The third generation CoCo Word Processor is here! All the powerful features, advantages and benefits of EliteWord plus 40/80 column display formats for the CoCo III. Available only from Spectrum Projects! \$79.95 Special word processing package of EliteWord and EliteSpel for \$99.95 (see Rainbow Review Mar '87 page 134)

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**SPECTRUM PROJECTS**  
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**HOWARD BEACH NY 11414**

# Now Create Your Own Signs, Banners, and Greeting Cards.

## Introducing The Coco Graphics Designer

Last Christmas we introduced our COCO Greeting Card Designer program (see review April 86 Rainbow). It has been so popular that we've now expanded it into a new program called the COCO Graphics Designer. The Coco Graphics Designer produces greeting cards plus banners and signs. This program will further increase the usefulness and enjoyment of your dot matrix printer.

The Coco Graphics Designer allows you to mix text and pictures in all your creations. The program features picture, border, and character font editors, so that you can modify or expand the already built in libraries. Plus a special "grabber" utility is included to capture areas of high resolution screens for your picture library.

**Requirements:** a Coco or Coco II with a minimum of 32K, One Disk Drive (Disk Ext. BASIC 1.0/1.1, ADOS, or JDOS). Printers supported include: Epson RX/FX, GEMINI 10X, SG-10, NX-10, C-Itoh 8510, DMP-100/130/400/430, Seikosha GP-100/250, Legend 808 and Gorilla Bannana. Send a SASE for complete list of compatible printers.  
#C332 Coco Graphics Designer \$29.95

### Over 100 More Pictures

An optional supplementary library diskette containing over one hundred additional pictures is available.  
#C333 Picture Disk #1 \$14.95.

### Colored Paper Packs

Now available are packs containing 120 sheets of tractor-feed paper and 42 matching envelopes in assorted bright RED, GREEN, and BLUE. Perfect for making your productions unforgettable.  
#C274 Paper Pack \$19.95



With Zebra's Coco Graphics Designer it's easy and enjoyable making your own greeting cards, signs, and banners.

**NEWS FLASH!**  
CGP-220 and DMP-105  
NOW SUPPORTED

As of June 1, 1987 we are shipping version 2.3 of the CoCo Graphics Designer. This version includes drivers for the CGP-220 and DMP-105 printers, and improved menu dialogs for single disk drive users. By the time this issue appears in print we will probably also have added Okidata printer drivers - check with us if you have an Okidata.

**Ordering Instructions:** All orders add \$3.00 Shipping & Handling. UPS COD add \$3.00. VISA/MC Accepted. NY residents add sales tax.

**Zebra Systems, Inc**  
78-06 Jamaica Ave.  
Woodhaven, NY 11421  
(718) 296-2385

```
NT(217,85),,Ø:LINE(184,2Ø)-(22Ø,28),PSET:LINE(22Ø,28)-(256,24),PSET
```

```
3Ø2 POKE178,Ø:PAINT(4Ø,8Ø),,Ø:PAINT(112,4):POKE178,2:PAINT(24Ø,4),,Ø:PAINT(12Ø,8Ø),,Ø:PAINT(2Ø,44),,Ø:FORLL=1TO7Ø:XX=RND(8)+212:YY=RND(16)+76:PSET(XX,YY):NEXTLL:POKE178,Ø:FORLL=1TO5Ø:XX=RND(96)+8Ø:YY=RND(36)+6Ø:PSET(XX,YY):NEXTLL
```

```
3Ø3 RETURN
```

```
3Ø4 :POKE178,Ø:PAINT(16Ø,4Ø),,Ø:RETURN
```

```
3Ø5 GOSUB328
```

```
3Ø6 GOSUB3Ø9
```

```
3Ø7 POKE178,16Ø:PAINT(4,4),,Ø:PAINT(24Ø,4),,Ø:POKE178,Ø:PAINT(12Ø,8Ø),,2:POKE178,2:CIRCLE(128,146),88,,1,.62,.9Ø:DRAW"BM85,51;U2L1U5L1U12R1U8R1U5R1U4R2U3BR87U2D2R2D6R2D7R2D1ØL1D7L1D5L1D3L2D3L2D3L1":GOSUB3Ø9
```

```
3Ø8 POKE178,1:DRAW"BM121,66;D1U66BR14D3L13D8R13U8D16L13D8R13U8D16L13D8R13U8D16L13D8R13U8D15":FORLL=1TO3Ø:XX=RND(8Ø)+92:YY=RND(16)+68:PSET(XX,YY):NEXTLL:RETURN
```

```
3Ø9 CIRCLE(16Ø,4Ø),115,,1,.43,.6Ø:CIRCLE(96,4Ø),115,,1,.93,.Ø9:RAW"BM59,95;U3R1BR136U1L1BD4R2":RETURN
```

```
31Ø GOSUB328
```

```
311 CIRCLE(128,96),128,Ø,.8,.5:CIRCLE(128,136),152,Ø,.5,.6Ø,.92:CIRCLE(128,7Ø),8Ø,Ø,.95,.5:CIRCLE(128,58),4Ø,,1.5,.49,1.Ø1:DRAW"BM168,58;D2L1D3":POKE178,3:DRAW"BM119,61;R1E1R13F1R2":POKE178,Ø312 DRAW"BM117,88;L1U7E1U13E1U13E1U8R1U1L1U3E1U6D6G1L1U2H1U2H1U8R1E1R2E1R2E1R1BD2BR2R1U1L1H3U5E1U2E1U3E1U2E1U2D2F1D3F1D3F1D2L2G1L1H1L2BR7D5G3E2F1R1F1R2F1R2F1R1D8G1D2G1D2L1H1U6BD7BR1D4L1D1R1D8F1D13F1D13F1D7L1G1L2G1L2G1L2G1L2H1L2H1L2H1L1"
```

```
313 CIRCLE(53,84),8,,.3:CIRCLE(86,71),8,,.3:CIRCLE(96,85),9,,.3:CIRCLE(154,7Ø),8,,.3:CIRCLE(167,86),9,,.3:CIRCLE(2Ø1,83),9,,.3
```

```
314 POKE178,6:PAINT(128,2),,Ø:POKE178,88:PAINT(24Ø,2),,Ø:PAINT(2,2),,Ø:POKE178,1:PAINT(4Ø,49),,Ø:PAINT(219,49),,Ø:PAINT(53,84),,Ø:PAINT(154,7Ø),,Ø
```

```
315 POKE178,2:PAINT(68,49),,Ø:PAINT(181,49),,Ø:PAINT(96,85),,Ø:PAINT(2Ø1,83),,Ø:PAINT(128,4Ø),,Ø
```



```

:POKE178,Ø:PAINT(4Ø,92),,Ø:DRAW"
BM126,19;R1BR2R1BD2BL2L1"
316 GOSUB335:DRAW"BM1Ø,123;":N$=
"YOU ARE IN THE LEPRECHAUN'S PLA
CE.":GOSUB15Ø:FORV=1TO6ØØ:NEXTV:
GOSUB335:DRAW"BM1Ø,138;":N$="HE
IS GLAD TO MEET YOU ADVENTURER!!
!":GOSUB15Ø
317 DRAW"S8;BM1Ø,168;":N$="CONGR
ATULATIONS!":GOSUB15Ø:DRAW"S4;BM
6Ø,19Ø;":N$="YOUR QUEST IS OVER!
":GOSUB15Ø:FORV=1TO8ØØ:NEXTV:POK
E178,3:FORXX=175TO1STEP-2:CIRCLE
(128,96),XX,3,1,.5:NEXT:GOSUB351
:POKE65494,Ø:END
318 GOSUB328:CIRCLE(Ø,32),8Ø,Ø,1
,.8Ø,.Ø95:CIRCLE(8,Ø),114,Ø,.8Ø,
.161,.5:DRAW"BM55,81U2R1U3R1U3R1
U3R1U3R1U4R1U4R1U5R1U5R1U12L5D1L
4D1L4D1L7D1L6D5L1D4L1D5L1D5L1D4L
1D6L1D4L1D5L1D6L1D3BU27BR1ØD3L1"
319 CIRCLE(15Ø,192),28Ø,Ø,.65,.7
2Ø,.78:LINE(78,15)-(96,14),PSET
32Ø CH$="U2L1U3L1U8R1U5R1U2L1U1L
4U1L4U1L3U1L1U1L1U1L1U3R1U3R1E7R
1U1R2U1R5U1R1ØD1R5D1R2D1R2D1R2D1
R1D1R2F3R1D2R1D2R1D2R1D3L2D1L3D1
L5D1L4D1L3D1L13U1L3BR17D2R1D1R1D
5R1D7L1D3L1D2L5D1L9U1L4U1"
321 DRAW"S8;BM189,9Ø;"+CH$:DRAW"
S4;BM122,56;"+CH$:POKE178,16Ø:PA
INT(9Ø,2),,Ø:POKE178,Ø:PAINT(9Ø,
8Ø),,Ø:POKE178,15:PAINT(2,2),,Ø:
PAINT(132,42),,Ø:PAINT(2Ø3,73),,
Ø
322 POKE178,2:PAINT(2Ø3,48),,Ø:F
ORLL=1TO3Ø:XX=RND(1Ø4)+72:YY=RND
(28)+6Ø:PSET(XX,YY):NEXTLL:POKE1
78,1:PAINT(141,28),,Ø
323 RETURN
324 POKE178,Ø:PAINT(53,48),,Ø:RE
TURN
325 G$(7)="BM65,69;R4L2D2ØU5L1R3
D3BL1BD1L2BRD1BU2BL2U3":G$(2)="B
M3,64;D6F3R2L5D1ØE5U11H5BR15G5D1
1F5U1ØL4R2E3U7BD14BL3U1BL1ØD1":G
$(5)="BM37,67;L8BD1L1R8BD1BL1L8R
1BD1R8BDR1L8BD1L1R8BD1BL1L8":G$(
1)="BM24Ø,94;U9R4U1L2U1R2D2R2D9L
5"
326 G$(4)="BM78,94;U4R2D4U2R12D2
U1R1":G$(6)="BM241,8Ø;U4L4R7L1U1
L5":G$(1Ø)="BM72,83;R7F3L7H3D2F3
R7U2":G$(8)="BM1Ø,85;R13U1R2L15U
1R13":G$(9)="BM196,78;U13L1R2U1L
2U1R2":RETURN
327 RETURN
328 PMODE4,1:PCLS1:SCREEN1,1:POK
E178,Ø:LINE(Ø,Ø)-(256,96),PSET,B

```

# Pro-Color-Series: If You're Serious About Getting Organized.

Our *Pro-Color-Series* consists of three programs.

**Pro-Color-File** \*Enhanced\* V2.0 Design a record structure up to 60 fields with 1020 spaces per record, four custom-designed data entry screens and math functions on single records. Report totals, averages and summaries. Generate mailing labels. Output reports to the printer, disk or screen. Send information directly into a *Dynacalc*® compatible file for use in spread sheets. Streamline repetitive tasks into one keystroke with the command processor. Sort 750 records in less than five minutes and create special indexes of your file for reporting and accessing. Store as many records as your disk will hold! **\$59.95**

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Our *Pro-Color-Series* gives you database capabilities found on larger computers, at a fraction of the cost! So if you're serious about getting organized, try our *Pro-Color-Series*. It lets you organize important information together in one place, right at your fingertips, and at a savings — just **\$79.95** for all three!

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# Fill out your CoCo library with these selections

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```

:RETURN
329 N$="YOU'R WELCOME.":GOSUB150
:GOTO331
330 GOSUB331:N$="MY MAGIC IS CAR
RYING YOU...":L=RND(7):GOSUB150:
ZE=0:GOTO24
331 DRAW"BM10,182;":RETURN
332 FORX=1TO800:NEXTX:LINE(11,17
3)-(255,183),PRESET,BF:LINE(10,1
72)-(255,184),PSET,B
333 RETURN
334 LINE(0,130)-(256,160),PRESET
,BF:RETURN
335 COLOR8,1:LINE(0,100)-(255,19
1),PRESET,BF:RETURN
336 LINE(60,116)-(248,124),PRESE
T,BF
337 DRAW"BM10,190;":RETURN
338 GOSUB331:N$="RIGHT. GOOD LUC
K!!!":GOSUB150:T(1,6)=9:T(2,9)=
6:L=9:ZE=0:GOTO24
339 CX$=CHR$(32)
340 FOR CX=38TO1STEP-1
341 IF MID$(N$,CX,1)=CX$THENCV=C
X:ZB$=LEFT$(N$,CV-1):GOTO343

```

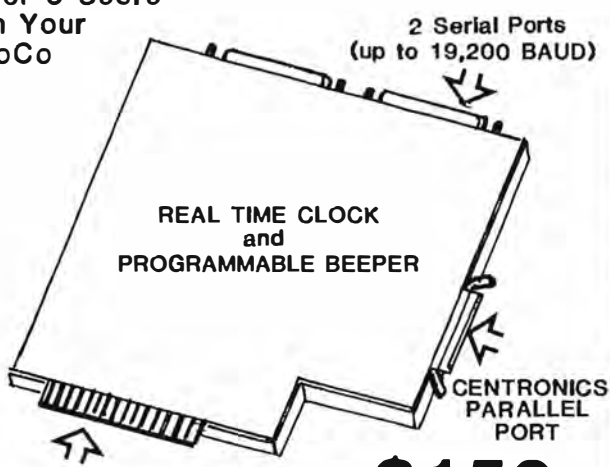
```

342 NEXTCX
343 PP=38+CV
344 FOR CX= PP TO 1 STEP-1
345 IFMID$(N$,CX,1)=CX$THENCX=CX
:ZC$=MID$(N$,CV+1,CC-LEN(ZB$)-2)
:GOTO347
346 NEXTCX
347 IFLEN(N$)<PP+1THEN349
348 ZD$=MID$(N$,CC+1,LEN(N$)-CC)
:GOTO350
349 N$=ZB$+CX$:DRAW"BM5,138;":GO
SUB150:N$=ZC$+CX$:DRAW"BM0,148;":
:GOSUB150:GOTO43
350 N$=ZB$+CX$:DRAW"BM5,138;":GO
SUB150:N$=ZC$+CX$:DRAW"BM0,148;":
:GOSUB150:N$=ZD$+CX$:DRAW"BM0,15
8;":GOSUB150:GOTO43
351 A$=";T5;C;E;F;L1;G;P4;L4;C;E
;F;L1;G":B$="P4;L4;C;E;F;L2;G;E;
C;E;L1;D":C$="P8;L4;E;E;D;L2;C;L
4;C;L2;E":D$="L4;G;G;G;L1;F;L4;E
;F":E$="L2;G;E;L4;C;L8;D;D+;E;G;
L4;A;L1;O3;C":X$=A$+B$+C$+D$+E$:
PLAYX$:X$="V6;"+A$+B$+C$+D$+E$:P
LAYX$:RETURN

```

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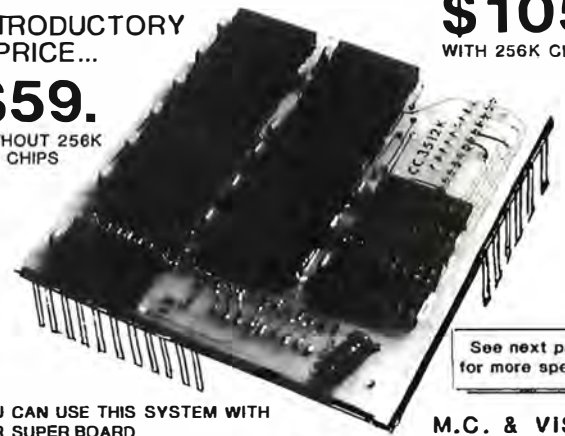
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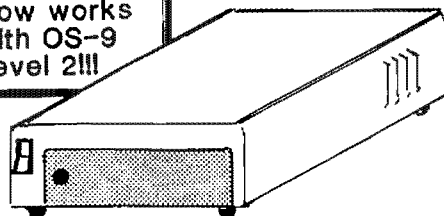
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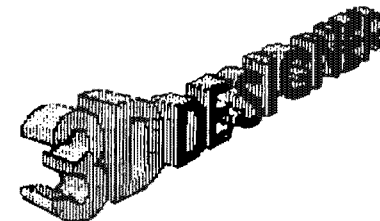
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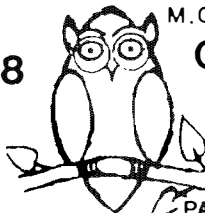
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# SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

## FEEDBACK

In response to letters from:

● Marshall Miller: The cover must be examined and then opened by using the scepter in *Sands of Egypt*.

● Noel Nelson and Matthew Lohse: In *Dallas Quest*, the parrot knows how to get past the anaconda. Try EXAMINING him. To get through the wheat field, you first must calm the cows in the pasture by playing the bugle for them and then you must dig. Read the message written on the stone and it will tell you the directions to get through the wheat field.

In *Raaka-Tu*, where do you find the jeweled lever, the candle and the lamp that are used to get past the gargoyle?

Philip Manwarren  
Harrington, ME

● John Austin: On *Zork I*, you have to read the book after you light the candles and ring the bell.

● Chad Johnson: When you meet up with the ghosts in *Wishbringer*, there is nothing you can do to keep them from taking your items. When you hear the boots coming, go in a different direction. There is a token in the fountain that is guarded by piranhas. To get the token, you need a worm.

In the *Interbank Incident*, what do you do with the book, vase of roses, rope, dice, perfume, pass, quarter and the old newspaper?

John Haupt  
Salem, OH

● Ian Renauld: In *Vortex Factor*, to open the safe you must travel back to get the document from the desk; it has the combination on it.

● Emilie Bruchon: In *Black Sanctum*, have you tried going upstairs? Type GO DOOR and GO MIRROR.

In the *Interbank Incident*, how do I get on the train to get to Paris? In *Ghostown*, where is the bag of gold and how do you blow up the safe?

Dianne Piper  
Belait, WI

● Normand Schafer: To get past the serpent in *Pyramid*, GET the statue box, then GO EAST to the room with the bird statue and get the statue. Go to the serpent and THROW the bird.

Andrew Irwin  
Port Haron, MI

## Half a Chance

Scoreboard:

Some hints for *Sands of Egypt*: You need the oil from the snake to get the scepter. With the scepter you can unplug the drain and go underground. Be sure you save the game right when you are underground because you only have a 50 percent chance of making the right move.

Phil Derksen  
Hendersonville, NC

## Two-Bit Lock

Scoreboard:

In *Dallas Quest*, what do you do after you give the chief of the cannibals your gift of courage?

In *The Interbank Incident*, I can unlock the locker at the Seattle Metro station by putting the quarter in it, but I can't open it.

Chris Hogg  
Canoga Park, CA

## Coconuts Come First

Scoreboard:

I have a few helpful hints for *Dallas Quest*. Once in Africa, go south, stay on the path and talk to the parrot. To find the eggs, you must first get the coconuts and choose a nest egg.

Jeff Pagliuca  
Taunton, MA

## Asks About Flasks

Scoreboard:

How do you incant the Vulcan ring in *Dungeons of Daggorath*? Are there scrolls or flasks on the first level? At what point do the other torches reveal themselves?

Amber Murray  
Gresham, OR

## Ring Request

Scoreboard:

How do you use the ring to get by the cannibals in *Dallas Quest*?

Lori Morrish  
Toronto, Ontario

## Tribal Diplomacy

Scoreboard:

To get past the angry tribesmen in *Dallas Quest*, try typing WAVE RING and see what happens.

Roy Grant  
Toledo, OH

## Snake in the Quest

Scoreboard:

How do you get past the snake in *Dallas Quest*?

Howard Larsen  
Galt, CA

## Blob-icide

Scoreboard:

In *Dungeons of Daggorath*, how do you kill the blobs and are there any scrolls or flasks on levels 1 and 2? How do you kill the warrior on Level 2?

Richard Little  
Columbiana, OH

## Monkey Business

Scoreboard:

To get out of the jungle in *Dallas Quest*, go south. When the chief sends you to the crossroads, get the coconuts and go to the nest egg. To unmask the chief, give the monkey the mirror.

In *Dungeons of Daggorath*, kill most of the other creatures before you kill the blobs. It also helps to find the shield.

In *Sands of Egypt*, how do you get the treasure in the treasure room and how do you get out of the underground passage?

Jason Bell  
Goff, KS

## Respiration Aggravation

Scoreboard:

In *The White Fire of Eternity*, I can't figure out what to do at the corner of the

underground tunnel where it says "Cough . . . Gasp . . . I can't breathe."

I can't figure out what to do at the pool in the Northern Castle in *Delirium*.

Craig Schreder  
Sarnia, Ontario

### Opportunity for Advancement

Scoreboard:

In *Madness and the Minotaur*, I can't advance through the rooms or get out of the maze.

Someone said never carry more than three items, but where do you put the rest, and which three do you keep? What does it mean when you step into a room and hear garbled noise from the TV and when it says, "Nothing special happens"?

Tony Kwan  
Rosemead, CA

### Sweet Sixteen

Scoreboard:

In *Madness and the Minotaur*, once the ledge has been exposed, CLIMB LEDGE (with the rope). The packrat is a devious creature. There are 16 treasures worth points and the packrat always controls one of these treasures. At the beginning of the game, the packrat is given his treasure and one of the 16 treasures worth points becomes the "key" to get the packrat to give up his treasure. When you enter the packrat's room with the "key" treasure, he will give up his treasure. If the packrat's treasure and the "key" treasure are one and the same, the packrat gives up his treasure the instant you enter the room.

John Holladay  
Tacoma, WA

### Out of Gas

Scoreboard:

In *Zaxxon*, how can I improve my score? I keep running out of gas.

Daniel Bradford  
Birmingham, AL

### Level Best

Scoreboard:

I cannot find the exit on Level 13 in *Gantelet*.

On Level 2 there are three foods for extra health. On Level 7 the exit is in the lower left-hand corner. You can get extra armor, magical health, extra shots, a potion, five foods and a lot of points or damage.

On Level 8, how do you get the warrior and wizard through the first teleporter?

David Gordon  
Pierre, SD

### Bell, Book and Candle

Scoreboard:

In *Enchanter*, try talking to the frog after using the Nitefall spell on him. You can use the scroll from inside the egg in the treasure room to bring the Adventurer in front of you.

In *Zork*, try ringing the bell, lighting the candles, and reading the black book, while standing in the entrance to hades. How do I get the powerful scroll in *Enchanter* without dying? In *Hitchhiker's Guide to the Galaxy*, how do I get past the brick?

Joseph Delaney  
Augusta, GA

### Fill 'er Up

Scoreboard:

How do you fill the pool in *Hall Of The King*?

Erik Yoder  
Evanston, IL

### Lake Mistake

Scoreboard:

In *Magic of Zanth*, I am stuck at the lake. How do you open the bottle? How do you find out what is under the water? If I swim the lake, I can't get out of it. How do you get past the lake?

Joan Michel  
Kennewick, WA

### The First Rainbow Book of Adventures

Scoreboard:

On *Polynesian Adventure*, how do I get the Hot Knife? I tried to use the mat as a potholder but that didn't work. I tried to get water in the gasoline can to pour on it but that didn't work either.

In *Search for the Ruby Chalice*, how do I keep the wildcat from killing me?

How do I get out of the first room in *Dr. Avaloe*?

John Tiffany  
Washington, D.C.

### Jump the Gate

Scoreboard:

How do I get out of the subway in *Robot Odessey I*? I keep trying to get the token but I get caught by the sentry.

Thomas Payton  
Anderson, SC

### Extra, Extra

Scoreboard:

In *Paper Route*, I found that by throwing the papers from the street you avoid being hit by the cars, kids, dogs and the lady with the boomerang. It is best to

wait to see if a paper makes the mailbox before going farther down the street. This allows for a second chance at the box. Don't be alarmed when the man count resets to zero after nine men, as only the last digit is displayed. The full 10 or more men are still there. Pick up the bundle halfway down the street for best results.

Neil Haupt  
Elyria, OH

### Wall Fire

Scoreboard:

To make the monsters shoot through the wall in the game *Monster Maze*, face the wall you want to shoot through. Ease up to the wall by holding the firebutton and letting go and then holding it in again. Be sure to turn around before you stop firing or else you run into the wall.

Chris Buziak  
Buffalo, NY

### Ladder Chatter

Scoreboard:

Here are a few tips for *Planetfall*: Look in Floyd; get the key from the crevice in the Admin Corridor South with the bar; extend the ladder and put it over the rift; and send Floyd through the robot doorway in the repair shop.

Marshall Miller  
Oneonta, NY

### Shedding Some Lamp Light

Scoreboard:

Once you get inside the pyramid in *Pyramid 2000*, type LIGHT LAMP and DROP PANEL. Go south and you will see bars of silver and a hole that leads east and west.

James Ruth  
Newark, NJ



To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG > prompt, pick MAIL, then type SEND and address to: EDITORS. Be sure to include your complete name and address.

— Jody Doyle



# The Values of the Hi-Res Joystick Interface

By Marty Goodman  
Rainbow Contributing Editor

*How can I read the values of the Tandy Hi-Res Joystick interface? How does this device work?*

Gill Winograd  
(DEMONN)  
Glen Ellyn, IL

The Interface cannot be read without special machine language subroutines. Steve Bjork presented such a subroutine in his Mouse articles in the July and August 1986 issues. A glance at that source code will assist programmers who want to write their own drivers for this device. OS-9 Level II has drivers for the Hi-Res Interface, too, so program development can be done to support it.

The Interface consists of a quad op amp and an RC ramp generator circuit. Using a trigger signal from the cassette output line, it starts the ramp generator, and then timing loops in assembly language software are used to measure the exact amount of time it takes for the

voltage in the RC circuit to rise to the level of the wiper of the pots in the joystick. By measuring this time very precisely, the joystick position can be read to 10 times the precision measured with the ordinary (6-bit DAC) joystick port.

The price for such great resolution is that it takes more time to read the thing, and the readings may jitter just a little. But the port still can be read at 30 times per second in an application like *Color Max 3*, which is fast enough to produce the feel of smooth response. Only programs written specifically for the Hi-Res Joystick Interface can use it.

ter) in order to format a disk and still have a BASIC program left in memory. I actually did that with my MS-DOS formatter program published in the July 1986 issue. I suggest you just remember to format a bunch of disks before starting any programming session.

---

## Drive Power

*How much power do I need to supply to a disk drive system that has four 5¼-inch drives?*

James A. Nyman  
(NYMAN)  
Seattle, WA

---

## Try to Remember

*I'd like to know how to keep a BASIC program in memory while I format a disk.*

Vince Casingal  
(DESH)  
Miami, FL

The DSKINI (format) command in BASIC wipes out any program residing in the ordinary part of the computer's memory, for it uses that area to build the image of the track it writes to disk in the course of formatting that disk. There is no simple way around this. You'd have to write your own disk format code in assembly language and place it elsewhere in memory (and hope that your BASIC program is not so big as to conflict with that special format-

These drives use 300 milliamps on the 5-volt line and a maximum of 600 milliamps on the 12-volt motor line. But that maximum current figure on the 12-volt line is for both motors going; the spindle motor spinning and the head stepper motor madly stepping the head back and forth. On the CoCo, while all drive spindle motors are turned on when any drive is accessed, only one head at a time is stepped! The figures cited are rule of thumb figures, and the figures for any given specific model of drive may vary by as much as plus or minus 50 percent. Qume drives are noted by several owners to be power hogs, requiring more power than most others.

For your four-drive system, I'd say allow for 1.2 amps on the 5-volt line and

*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. Marty is the database manager of RAINBOW's CoCo and OS-9 Online SIGs on Delphi. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.*





2.0 amps on the 12-volt line, if the power is being supplied by a single source for all drives. Many disk drive power supplies use a separate monolithic linear voltage regulator for each drive's voltage supply. Of course, it is critical that you properly mount (for heat dissipation) those regulators on a well ventilated heat sink.

I recommend using your multimeter to measure the actual current consumption of your brand of drive. Measure it on the 12-volt line first with just the spindle motor spinning, then write a BASIC two-line program to step the head madly back and forth. Run that program, then measure the current consumption again. This should give you a good idea of how power hungry your particular drives are.

### Hosting a Hard Drive

*I own a CoCo 3, an upgraded Multi-Pak, an RS-232 pack, Speech/Sound pack, disk drive system and printer. I just acquired a 20-megabyte Seagate ST225 hard drive and want to hook this to my system under OS-9. I cannot*

*obtain the Tandy host adapter for the hard drive system. Can you suggest an approach for this?*

*Mike Perron  
(MIKEPA)  
Sudbury, Ontario*

Hard drive systems require a "host adapter" that plugs into the CoCo system bus. Some hard drive systems (those made by Disto/CRC and by J&M) have the hard drive host adapter port on the floppy disk controller card, but for those, you'd have to buy their particular brand of disk controller.

In general, hard drive systems on the CoCo consist of the host adapter, which is a simple dedicated kind of parallel port (SASI or SCSI standard) that connects (usually through a 50-pin ribbon cable) to a hard disk drive controller board. The hard drive controller board is a smart device, with CPUs and memory and all sorts of good stuff. In turn, this hard drive controller board hooks to the bare hard drive, such as the Seagate you have. Different host adapters are designed to work with differing brands of hard drive controller boards. For example, the Tandy host adapter requires the Western Digital

WD 1010 type controller board. Whereas the L&R Tech (sold by Owlware) and the Disto host adapters are designed to work with the XEBEC 1410A hard drive controller board.

Owlware offers what may be an attractive deal: For around \$110 they sell you their host adapter, OS-9 driver software, and instructions on how to hook in a hard drive controller and hard drives. You then can "do it yourself" in terms of obtaining the hard drive controller board and drive.

### Clean Up Your Act

*I want to know how to keep the drive motor on long enough to properly use my disk drive head cleaning kit.*

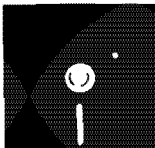
*Richard Jackson  
(GOFER)  
Brandon, FL*

A quick and dirty solution would be the following. Place a normal formatted disk in the drive. Type CLEAR 10000: T=RND(33)+1: DSK I\$ 0, T, 1, A\$, B\$ and press ENTER (this moves the head to a random track). Put your disk-cleaning disk in the drive, and

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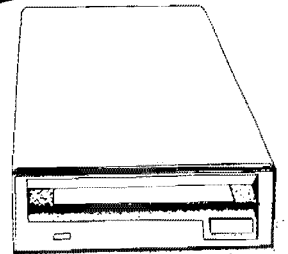
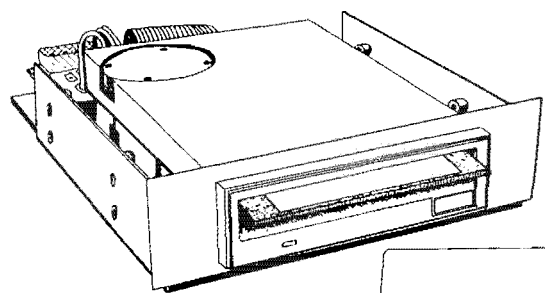
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type POKE &HFF40,B. This starts the drives spinning. To stop the drives from spinning, type POKE &HFF40,0 or just press reset.

To clean a drive other than Drive 0, substitute the drive number for that first zero in the DSKI\$ command above.

There are machine language programs that "exercise" the head, causing it to wipe over all parts of the cleaning disk. But my quick and dirty approach should do the job for you.

---

### Jostle Prevention

*I have recently blown out the 6809 in both my old CoCo 2 and my new CoCo 3. This has happened when the Multi-Pak got jostled and partly unplugged while the power was on. Can you suggest a way of preventing this?*

*Rick Bettis  
Oakland, CA*

I suggest you obtain a piece of 1-inch thick plywood, the size of the area covered by both the CoCo and the Multi-Pak. Open up both the CoCo and the Multi-Pak, and attach both cases to the plywood using wood screws or counter-sunk bolts. This should make jostling less likely to result in the CoCo and Multi-Pak being separated. I might add that I recommend putting this unit at some distance from your main work area using a remote keyboard cable, to further lessen the likelihood of the system being jostled.

---

### Missing Analog Input

*I purchased a Magnavox 8CM562 a while ago for my CoCo 2. At that time I was told it had an analog RGB input. And so I reasoned it would work with the CoCo 3. When I got my CoCo 3, I was unable to find the analog input on the 8CM562. Can you help?*

*Jim Stewart  
(WHEELJIMMER)  
Fort Wayne, IN*

The Magnavox 8CM562 lacks an analog RGB input and so cannot be used in RGB mode with the CoCo 3. The two Magnavox monitors that will work with the CoCo 3 and give a nice 80-column display are the 8CM515 and 8CM643. The 8CM505 does possess an analog input, but its resolution is too poor to support readable 80-column

display. I recommend you write to the dealer who sold you the thing under such false pretenses and to North American Phillips, the maker of the monitor. Perhaps one of those can give you some satisfaction on this unfortunate incident of apparent product misrepresentation.

---

## ***"NEC DRAM chips are generally felt to be the best for upgrading current CoCo 3s."***

---

### A Hot 512K

*The chips on my PBJ 512K board run disturbingly hot. Will this be a problem?*

*Bill Jackson  
(BILLJACKSON)  
Sacramento, CA*

Because of a flaw in the GIME chip, the timing for the DRAM chips used on the 512K upgrade boards is a bit off, and this results in both the chips running hotter than one might like and in some particular brands and speeds of chips doing better than others. NEC DRAM chips are generally felt to be the best for upgrading current CoCo 3s. 120 ns are usually preferred, although one recent rumor has it that the 150 ns chips may do as well or better. As long as you can put your finger on the chip and hold it there without suffering pain or a real burn, things should be OK. Hopefully, in the future, a fix for this problem will be available.

---

### ROM Switching

*I own a Radio Shack controller and want to switch between two different DOS ROMs. How can I do this?*

*Mike Tolbert  
(MIKEGT)  
Greenville, SC*

SpectroSystems currently is marketing a clever device that allows you to use either a 28-pin 2764 (8K-by-8) or a 28-pin 27128 (16K by 8) with the Radio Shack disk controller. This 24-pin to 28-

pin adapter allows for several tricks. Apart from allowing the use of the inexpensive and common 2764-type EPROMs in the Radio Shack controller, it also allows you to prepare a 27128 with one DOS in the lower 8K and another in the upper 8K, and to switch between the two by switching the state of the A13 address line on the chip between ground and +5 volts. The device comes with instructions for use, although some sophistication and possession of or access to an EPROM programmer is required. When used as an adapter for a 2764, no soldering (but some pin bending) is required. When used as an adapter for a 27128, soldering of one or two connections will be required. The really clever thing about this adapter is that it permits the adapted EPROM to actually fit inside the tight space inside the controller. Look for the SpectroSystems ad in RAINBOW.

---

### Avatex Difference

*What is the difference between the Avatex 1200 and the Avatex 1200 HC modems?*

*Jay Browning  
(ZARATHUSTRA)  
Savannah, GA*

The "HC" in "Avatex 1200HC" stands for "Hayes-Compatible." The old Avatex 1200 was apparently rushed to market with emulation of only a very minimal subset of the Hayes commands. The 1200HC is fully Hayes-compatible. The Avatex 1200 is adequate for use with most CoCo terminal software, but may give problems if you want to use it with sophisticated automated software written for IBM PCs and clones. Also, full and proper Hayes compatibility is often required for use with CoCo Bulletin Board host systems. Overall, I recommend spending the few extra dollars to get full Hayes compatibility. Your modem will then be far more flexible and usable with other systems.

---

### Disto Compatibility

*How can I make my Disto Controller work properly with my CoCo 3?*

*Denis Giguere  
(GIGUEREDENIS)  
Shawinigan-Sud, Quebec*

To the best of my knowledge, the Disto Controller is completely hardware-compatible with the CoCo 3. If there are problems, they probably stem from use of some DOS ROM other than an unmodified Radio Shack Disk Extended BASIC ROM. Most current alternate DOS ROMs (ADOS, CDOS, JDOS, SpectrumDOS, EDOS and others) will not work properly with the CoCo 3. Art Flexser will soon be releasing ADOS-3, a totally re-done version of his ADOS that will work with the CoCo 3. The Disto controller presents the problem of not supporting a legitimate Radio Shack ROM because all of its ROM slots are 28-pin. Most Disto owners who also own EPROM programmers will burn a 2764 with the data from a legitimate Disk BASIC ROM and use it to make their Disto Controller compatible with the CoCo 3.

### DRAM Trouble on CoCo 2s

*I've heard of some DRAM problems with the CoCo 2 that sells for \$99. What can you tell me about this? Is it true that*

*blown 68B09s are the most common cause of dead CoCo 3s?*

*Dennis McMillan  
Pittsburg, CA*

It is true that some of the 'B' suffix CoCo 2s being sold appear to have an odd sort of DRAM problem. Specifically, these are the CoCo 2s that had provisions on the main board for upgrade to 64K in any one of three ways: via two 4464 chips, by a satellite board that had eight 64K-by-1 chips, or by soldering eight 64K-by-1 chips directly to the motherboard. It seems the units that have the problems are those made to have 64K by using eight 64K-by-1 chips, either soldered directly to the motherboard or on a satellite adapter. Such computers fail to work with some educational software ROM packs sold by Tandy. Most of these problem units had Hitachi brand 64K-by-1 DRAM chips. The fix for this consists of removing the eight 64K-by-1 DRAM chips and then doing the upgrade using two 4464 chips inserted into the two 18-pin DRAM chip sockets.

A dead 68B09 is commonly found as the cause of a dead CoCo 3. In most cases, the 68B09 is zapped due to abuse

by the owner of the CoCo 3. It is a great pity Tandy did not elect to socket that vulnerable chip. On my own unit, which I subject to hideous risks in occasional hacking experiments, I de-soldered and socketted that chip, knowing that sooner or later I will want to be able to quickly and cleanly replace it. I recommend also socketting the 74LS245 data line buffer chip (IC 3) and the 74LS04 inverter/buffer on the RGB sync lines (IC 15) because both of these chips also have pins that connect directly to the outside world.

**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.**

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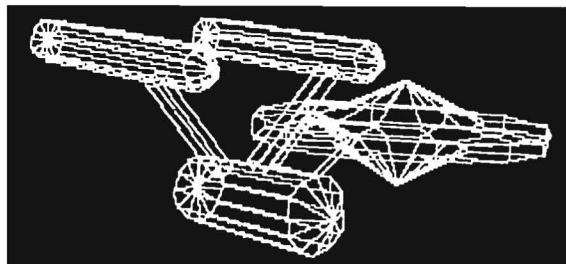
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COVER 1  
RACETRACK  
HANGMAN  
MUSIC ALBUM  
LIFE EXPECTANCY  
WORD TESTS  
KILLER MANSION  
BARTENDER  
CALENDAR  
ROBOT WAR

## ISSUE #2, AUGUST 1982

UFO COVER PT. 1  
BIORHYTHM  
BOMBARDMENT  
BLACK JACK  
COST OF LIVING  
FRENZY  
BUSINESS LETTER  
QUICK THINK  
QUEST INSTRUCTIONS  
QUEST FOR LENORE

## ISSUE #3, SEPTEMBER 1982

UFO COVER PT. 2  
BASKETBALL  
CHUCKLUCK  
SLOT MACHINE  
ALPHABETIZER  
NFL PREDICTIONS  
FLAG CAPTURE  
ROBOT BOMBER

## ISSUE #4, OCTOBER 1982

UFO RESCUE  
TANK BATTLE  
DRIVEWAY  
SOUNDS  
BALLOON DROP  
MIND BOGGLE  
COCO-TERRSTRAL ADV.  
CALORIE COUNTER  
JACK-O-LANTERN

## ISSUE #5, NOVEMBER 1982

CATALOG COVER  
BOWLING  
PROGRAM INVENTORY  
PROMISSORY-LOANS  
CHECKBOOK BALANCER  
TRIGONOMETRY TUTOR  
CONVOY  
BAG-IT  
SPECTRA SOUND  
CONVEYOR BELT

## ISSUE #6, DECEMBER 1982

CHRISTMAS COVER  
RAINDROPS  
STOCK MARKET  
ADVANCED PONG  
DESTROY  
SOUND ANALYZER  
CREATIVITY TEST  
VOICE DATA  
ML TUTORIAL PT. 1  
LOONY LANDER

## ISSUE #7, JANUARY 1983

NEW YEARS COVER  
LIST ENHANCER  
SUPER PRECISION DIV.  
BOMB DIFFUSE  
SPACE STATION  
ML TUTORIAL PT. 2  
SHOOT OUT  
FIND UTILITY  
CYBORG INS.  
CYBORG FACES

## ISSUE #8, FEBRUARY 1983

COVER 8  
DEFEND  
3 DIMENSIONAL MAZE  
COCO CONCENTRATION  
AUTO LINE NUMBERING  
ML TUTORIAL PT. 3A  
ML TUTORIAL PT. 3B  
NUCLEAR POWER PLANT  
DUAL BARRIER  
BRICKS

## ISSUE #9, MARCH 1983

TIME MACHINE COVER  
TRIG DEMO  
PYRAMID OF CHEOPS  
PROGRAM PACKER  
BUDGET  
ELECTRONIC DATEBOOK  
ML TUTORIAL PT. 4  
TAPE DIRECTORY  
BLOCK-STIR  
COCO ADDING MACHINE

## ISSUE #10, APRIL 1983

TENTH COVER  
PYRAMID OF DANGER  
TYPING TUTOR  
ML TUTORIAL PT. 5  
TINYCALC  
STOCK MARKET COMP  
YAH-HOO  
MISSILE ATTACK  
SCREEN PRINT  
BRIKPONG

## ISSUE #11, MAY 1983

ELEVENTH COVER  
ARCHERY  
FROG JUMP  
ML TUTORIAL PT. 6  
MLT DICTIONARY  
BASIC SPEED UP TOT.  
METRIC CONVERTOR  
GRAPHIC QUAD ANTENNA  
GRAPHICS PROGRAM  
CATERPILLAR CAVE

## ISSUE #12, JUNE 1983

TWELFTH COVER  
SHOOTING GALLERY  
BOMB STOPPER  
VALLEY BOMBER  
STARFIGHTER  
WHEEL OF FORTUNE  
ML TUTORIAL PT. 7  
MERGE UTILITY  
RAM TEST  
LANDER

## ISSUE #13, JULY 1983

THIRTEENTH COVER  
FLASH CARD  
ICE BLOCK  
COSMIC FORTRESS  
MAIL LIST  
DOLLARS & CENTS  
ML TUTORIAL PT. 8  
SDSK COPY  
MUSIC SYNTHESIZER  
CRAWLER

## ISSUE #14, AUGUST 1983

MYSTERY COVER  
ROW BOAT  
COMPUTER TUTL PT. 1  
INDEX DATABASE  
DISK ZAPPER  
COCO-MONITOR  
COCO-ARTIST  
ROBOT COMMAND  
TEST SCREEN PRINT  
HIGH RESOLUTION TEXT

## ISSUE #15, SEPTEMBER 1983

MYSTERY COVER PT. 2  
GOLD VALUES  
TREK INSTRUCTIONS  
TREK  
HIGH TEXT MODIFICATION  
ASTRO DODGE  
DR. COCO  
PEG JUMP  
MORSE CODE  
PURGE UTILITY

## ISSUE #16, OCTOBER 1983

MYSTERY COVER  
BOPOTRON  
DIRECTORY RECALL  
VECTOR GRAPHICS INST.  
VECTOR GRAPHICS  
SKYDIVER  
SWERVE AND DODGE  
NIMBO BATTLE  
TAPE ANALYSIS UTILITY  
LIFE GENERATIONS

## ISSUE #17, NOVEMBER 1983

THANKSGIVING COVER  
3-D TIC-TAC-TOE  
INDY 500  
COLLEGE ADVENTURE  
MEMORY GAME  
DUNGEON MASTER  
WEATHER FORECASTER  
GRID FACTOR INST.  
GRID FACTOR  
DRAW

## ISSUE #18, DECEMBER 1983

CHRISTMAS COVER  
CLIMBER  
GALACTIC CONQUEST  
WARLORDS  
STATES REVIEW  
MATH TUTOR  
MACHINE LANGUAGE DATA  
PRINTER UTILITY INST.  
PRINTER UTILITY  
MUTANT WAFFLES

## ISSUE #19, JANUARY 1984

BANNER  
PROBE  
DISK DIRECTORY PROTECTOR  
OPTICAL CONFUSION  
WORD PROCESSOR  
WORD SEARCH  
ASTRONAUT RESCUE  
STAR TRAP  
PIE CHART  
FORCE FIELD

## ISSUE #20, FEBRUARY 1984

INTRODUCTION:  
HINTS FOR YOUR COCO  
ESCAPE ADVENTURE  
SEEKERS  
MASTER BRAIN  
LIST CONTROLLER  
DISKETTE CERTIFIER  
ROM COPY  
BASIC RAM  
SNAFUS

## ISSUE #21, MARCH 1984

BASIC CONVERSIONS  
FINANCIAL ADVISE  
CASTLE STORM  
DOS HEAD CLEANER  
COCO TERMINAL  
SNAKE CRAWLER  
WAR CASTLE  
SKY FIRE  
EASY BASIC  
DOTS 3-D

## ISSUE #22, APRIL 1984

HEALTH HINTS  
GLIBLIBS  
CLOTHER SLITHER  
BIBLE 1 & 2  
BIBLE 3 & 4  
CATCH ALL  
INVADER  
ALIEN RAID  
MOON ROVER  
IO ERROR IGNORER

## ISSUE #23, MAY 1984

MONEY SAVERS 1 & 2  
STOCKS OR BOMBS  
WALL AROUND  
COCO TECHNICAL LOOK PT. 1  
NUCLEAR WAR INST.  
THERMONUCLEAR WAR  
CIRCUIT DRAWER  
MOUSE RACES  
SUPER-SQUEEZE  
DATA FALL

## ISSUE #24, JUNE 1984

DIR PACK & SORT  
BRICK OUT  
COCO TECHNICAL LOOK PT. 2  
USA SLIDE PUZZLE  
51 '24 SCREEN EDITOR  
51 '24 SCREEN  
CITY INVADERS  
PRINTER SPOOLER  
STEPS  
SNAKE

## ISSUE #25, JULY 1984

CLOCK  
COCO TECHNICAL LOOK PT. 3  
SKID ROW ADVENTURE  
MONEY MAKER  
PIN-HEAD CLEANING  
LINE EDITOR INST.  
LINE EDITOR  
BOOMERANG  
BUBBLE BUSTER  
RECOCHET

## ISSUE #26, AUGUST 1984

PEEK, POLE & EXECUTE  
SAUCER RESCUE  
YOUNG TYPER TUTOR  
O-TEL-O  
OLYMPIC EVENTS  
DOUBLE DICE  
COCO DATABASE  
BATTLE STAR  
COCO-PIN BALL  
MONTEZUMAS DUNGEONS

## ISSUE #27, SEPTEMBER 1984

COCO TO COM 64  
GALACTIC SMUGGLER  
INDY RACE  
ACCOUNT MANAGER  
CASSETTE MERGE UTILITY  
STRING PACKING TUTORIAL  
SPACE DUEL  
BUGS  
TRAP-BALL  
BALLOON FIRE

## ISSUE #28, OCTOBER 1984

HANGING TREE  
CHECKERS  
FOOTBALL +  
MORE PEEKS, POKES  
SPELLING CHECKER  
SOUND DEVELOPMENT  
WORD GAME  
SCREEN REVERSE  
AUTO COPY  
RAT ATTACK

## ISSUE #29, NOVEMBER 1984

DISK ROLL OUT  
ROBOT ON  
MULTIPONG  
ADVENTURE GENERATOR  
QUEST ADVENTURE  
QUARTER BOUNCE  
DUAL OUTPUT  
KEY REPEAT  
FULL EDITOR  
METEOR

## ISSUE #30, DECEMBER 1984

MATH HELP  
ZECTOR ADVENTURE  
WORLD CONQUEST  
DRAG RACE  
MINE FIELD  
T-NOTES TUTORIAL  
T & D PROGRAM INDEXER  
SYSTEM STATUS  
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TREASURES OF BARSOOM  
BATTLE GROUND  
STRUCTURED COMPILED LANGUAGE  
LIBRARY MODULE  
MINIATURE GOLF  
STAR DUEL  
ARITHMETIC FOOTBALL  
GRID RUN  
SPIRAL ATTACK  
FAST SORT  
MUNCHMAN

## ISSUE #32, FEBRUARY 1985

DR. SIGMUND  
ICE WORLD ADVENTURE  
LOTTERY ANALYST  
BASIC COMPILER  
MUSIC CREATOR  
MEANIE PATROL  
TRI-COLOR CARDS  
SHAPE RECOGNITION  
DISK BACKUP  
SPACE PROTECTOR

## ISSUE #33, MARCH 1985

LIGHT CYCLE  
PAINT  
SKEET SHOOTING  
GUITAR NOTES  
ML DISK ANALYZER  
PERSONAL DIRECTORY  
NAUGH A ADVENTURE  
EGGS GAME  
DISK DIRECTORY PRINT  
SPEED KEY

## ISSUE #34, APRIL 1985

HOVER TANK  
POWER SWORD  
TERMITE INVASION  
SPELLING CHECKER  
DOS BOSS  
NINE CARD CHOICE  
MUSIC GENERATOR  
FYR-DRACA  
DRIVE TEST  
GRAPHIC TOUR

## ISSUE #35, MAY 1985

SELECT A GAME 1  
TAPE PROBLEMS  
STROLL TRIVIA  
SOFTBALL MANAGER  
FONTS DEMO  
CLOWN DUNK MATH  
ALPHA MISSION  
DOS ENHANCER  
HAUNTED HOUSE

## ISSUE #36, JUNE 1985

SELECT A GAME 2  
VIDEO COMPUTIZER  
SPEECH SYNTHESIS  
SPEECH RECOGNITION  
SPACE LAB  
AUTO COMMAND  
COMPUTER MATCHMAKER  
KNIGHT AND THE LABYRINTH  
STAR SIEGE  
TALKING SPELLING QUIZ

## ISSUE #37, JULY 1985

CHESS MASTER  
BIBLE 5-7  
SHIP WREK ADVENTURE  
FILE TRANSFER  
FOUR IN A ROW  
MARSHY  
TAPE CONTROLLER  
CATACOMB  
AUTO TALK  
SGR8PAK

## ISSUE #38, AUGUST 1985

GOLF PAR 3  
WIZARD ADVENTURE  
KITE DESIGN  
ROBOTS  
GOMOKU  
AMULET OF POWER  
LINE COPY UTILITY  
DISK PLUMBER  
SUPER RAM CHECKER  
GRAPHIC HORSE RACE

## ISSUE #39, SEPTEMBER 1985

DRUNK DRIVING  
CAR MANAGER  
SQUEEZE PLAY  
SUPER BACKUP  
RECIPE MACHINE  
ANTI-AIRCRAFT  
UNREASON ADVENTURE  
TALKING ALPHABET  
SUPER VADERS  
AUTOMATIC EDITOR

## ISSUE #40, OCTOBER 1985

STAR TREK  
HAM RADIO LOG  
COCO-WAR  
DISK LABELER  
SHIP WAR  
ELECTRIC COST  
MULTIKEY BUFFER  
NUKE AVENGER  
CURSOR KING  
SAND ROVER

## ISSUE #41, NOVEMBER 1985

GRUMPS  
DISK DRIVE SPEED TEST  
SOLAR CONQUEST  
GAS COST  
RIME WORLD MISSION  
WUMPUS  
CHARACTER EDITOR  
GRAPHIC TEXT  
GRAPHIC LOOPY  
BOLD PRINT

## ISSUE #42, DECEMBER 1985

HOME PRODUCT EVALUATION  
YAHTZEE  
DISK UTILITY  
MACH II  
ELECTRONIC BILLBOARD  
CAR CHASE  
SUPER MANSION ADVENTURE  
SLOT MACHINE GIVE AWAY  
TEXT BUFFER  
TUNNEL RUN

## ISSUE #43, JANUARY 1986

DUELING CANNONS  
WATER COST  
ZIGMA EXPERIMENT  
MUSICAL CHORDS  
SAFE PASSAGE  
PASSWORD SCRAMBLER  
GUNFIGHT  
KEYPAD ENTRY  
STYX GAME  
PRINTER DIVERT

## ISSUE #44, FEBRUARY 1986

HOME INVENTORY  
NINE BALL  
PRINTER REVIEW  
EXPLORER ADVENTURE  
SPANISH LESSONS  
CROSS FIRE  
RAM SAVER  
GRAY LADY  
JOYSTICK INPUT  
COSMIC SWEEPER

## ISSUE #45, MARCH 1986

INCOME PROPERTY MGMT.  
ELECTRONIC BILLBOARD 2  
MOUNTAIN BATTLE  
THE FIGHT  
COLO KEENO  
HOCKEY  
LOGICAL PATTERNS  
ON SCALE SCREEN  
LIBERTY SHIP  
SINGLE STEP RUN

## ISSUE #46, APRIL 1986

SPECIAL EVENTS REMINDER  
DISK LOCK  
SMALL BUSINESS MANAGER  
BOMB RUN  
TANKS  
TAR PITS  
BASEBALL  
NUMBER RELATIONSHIPS  
ROULETTE  
GLOBAL EDITOR

## ISSUE #47, MAY 1986

CHRISTMAS LIST  
BLACK HOLE  
PITCHING MANAGER  
SYMBOLIC DIFF.  
BUG SPRAY  
OWARE CAPTURE  
EASY GRAPHICS  
DESERT JOURNEY  
SCREEN CONTROL  
FULL ERROR MESSAGE

## ISSUE #48, JUNE 1986

CHESTER  
TV SCHEDULE  
BASE RACE  
ROMAN NUMERALS  
ASTRO DODGE  
HIRED AND FIRED  
MULTI COPY  
AUTO MATE  
SCROLL PROTECT  
NOISE GENERATOR

## ISSUE #49, JULY 1986

COMPUTER I.O.U.  
DISK DISASSEMBLER  
BAKCHEK  
PACHINKO  
STOCK CHARTING  
HAUNTED STAIRCASE  
CANYON BOMBERS  
DRAGONS 1 & 2  
GRAPHIC SCROLL ROUTINE  
AUTO BORDER

## ISSUE #50, AUGUST 1986

BUSINESS INVENTORY  
D & D ARENA  
DISK CLERK  
PC SURVEY  
TREASURE HUNT  
SCREEN GENERATOR  
ASTRO SMASH  
GRAY LADY  
BARN STORMING  
SMASH GAME

## ISSUE #51, SEPTEMBER 1986

ASSET MANAGER  
MONEY CHASE  
FISHING CONTEST  
RIP OFF  
HAND OFF  
BUDGET51  
VAN GAR  
DOS EMULATOR  
MEM DISK  
VARIABLE REFERENCE

## ISSUE #52, OCTOBER 1986

ACCOUNTS RECEIVABLE  
WORKMATE SERIES  
CALENDAR  
INVASION  
THE TRIP ADVENTURE  
FOOT RACE  
FLIPPY THE SEAL  
SCREEN CALCULATOR  
ABLE BUILDERS  
SUPER ERROR 2

## ISSUE #53, NOVEMBER 1986

CORE KILL  
LUCKY MONEY  
COOKIES ADVENTURE  
NICE LIST  
SPANISH QUIZZES  
PAINT EDITOR  
CAVERN CRUISER  
SNAP SHOT  
MEGA RACE  
KICK GUY

## ISSUE #54, DECEMBER 1986

JOB LOG  
PEGS  
DIGITAL SAMPLING  
JUNGLE ADVENTURE  
PAINT COCO 3  
CONVERT 3  
COMPUTER TYPE  
PANZER TANKS  
MRS PAC  
BIG NUM

## ISSUE #55, JANUARY 1987

GRADE BOOK  
MAIL LIST  
DOWN HILL  
FIRE FOX  
JETS CONTROL  
GALLOWES  
DIR MANAGER  
FIRE RUNNER  
GRAPHICS BORDER  
COSMIC RAYS

## ISSUE #56, FEBRUARY 1987

CALENDAR PRINT  
CRASH  
GALACTA  
OCEAN DIVER  
CLUE SUSPECT  
WORD EDITOR  
ALIEN HUNT  
DEMON'S CASTLE  
PICTURE DRAW  
DIG

## ISSUE #57, MARCH 1987

THE BAKERY  
ENCHANTED VALLEY ADV.  
SAFE KEEPER  
WAR 1  
BOMB DISABLE  
PIANO PLAYER  
SPREAD SHEET  
SLOT MANEUVER  
LIVING MAZE  
GEM SEARCH

## ISSUE #58, APRIL 1987

ACCOUNTS PAYABLE  
PRINTER GRAPHICS  
SIMON  
PANELING HELPER  
MULTI CAKES  
CAR RACE  
ELECTRONICS I  
BATTLE TANK  
DISKETTE VERIFY  
WEIRDO

## ISSUE #59, MAY 1987

GENEOLOGY  
PLANT CARE  
CHECK WRITING  
HELI RESCUE  
KABOOM  
NEW PONG  
CROQUET  
SUPER MONOPOLY  
ZOOM UTILITY  
ELECTRONICS II

## ISSUE #60, JUNE 1987

JOB COSTING  
CATCH A CAKE  
CONCENTRATION II  
PROGRAMMABLE ROBOTS  
CT ADVENTURE  
MOTOR CYCLING  
STAR EXPLORER  
ELECTRONICS III  
GRAPHICS EDITOR  
GRAPHICS UTILITY

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4	11	18	25	32	39	46	53	60
5	12	19	26	33	40	47	54	
6	13	20	27	34	41	48	55	
7	14	21	28	35	42	49	56	

PLEASE CIRCLE  
TAPE or DISK



# The CoCo Writes a Program

By Dennis H. Weide

**H**ave you ever wanted to use a machine language program in a BASIC program you've written? ML programs often offer functions only available on more expensive machines. You can write the BASIC program to load the ML program from tape or disk, but that can create more problems than it solves. The answer, of course, is to convert the ML program to BASIC DATA statements, write the FOR-NEXT loop and then append the resulting BASIC program to your program. *BASIC Data Writer* can accomplish this function for you in a matter of seconds.

*BASIC Data Writer* was written in PASCAL and compiled into a machine language program. It writes a complete BASIC program using REM, DATA, CLS, CLEAR, POKE, EXEC and FOR-NEXT statements and saves it to disk, cassette, screen or printer in ASCII format. The program can then be reloaded and run like any other BASIC program.

---

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

ASCII stands for American Standard Code for Information Interchange and is an alphanumeric character (non-binary) code that can be read by most computers. It is often used to transfer BASIC programs files from one computer to another. BASIC programs are usually stored in a tokenized format to reduce access time and the amount of cassette or disk space required to save them. But the CoCo can load and save BASIC programs in ASCII format. Since word processors read and write ASCII files, BASIC programs for the CoCo can be written on a word processor such as *VIP Writer* and saved to disk or cassette. After saving the program and exiting the word processor, the BASIC program can be reloaded and run in the normal manner. If you've used a word processor, you can see the advantage of using its global text editor when creating BASIC programs.

*BASIC Data Writer* takes advantage of that ability to create a BASIC program from a machine language program stored in memory. The listing shows the PASCAL source code for the program. If you have *Deft* or another version of PASCAL, you can key in the source code and compile it. Otherwise, you can get

# Telewriter-64™

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- No hardware modifications required

### THE ORIGINAL

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

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

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

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

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

— Color Computer News, Jan. 1982

### TELEWRITER-64

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

### 64K COMPATIBLE

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

### 64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

### RIGHT JUSTIFICATION & HYPHENATION

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

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

### FEATURES & SPECIFICATIONS:

**Printing and formatting:** Drives any printer (LPVII/VIII, BMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminus, etc).

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

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

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

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

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

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

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

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

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

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

— The RAINBOW, Jan. 1982

### PROFESSIONAL WORD PROCESSING

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

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the machine language version from RAINBOW ON TAPE.

### Using the Program

To use the program, first load the machine language program to be converted according to the instructions provided with it. You'll need to know the decimal addresses of the program. These are usually included in the instructions or articles that accompany the program. If not, here's how to find them. For a program loaded from cassette, use the following commands to determine these addresses:

```
Start: PRINT PEEK(487)*256
      +PEEK(488)
End:  PRINT PEEK(126)*256
      +PEEK(127)-1
Exec: PRINT PEEK(157)*256
      +PEEK(158)
```

For programs loaded from disk, only the start and execute addresses are saved in RAM when loading. It is easier to use one of the many disk utilities available to print these addresses. However, if you don't have a disk utility to do this, find the start and execute addresses by using these commands:

```
Start: PRINT PEEK(3288)*256
      +PEEK(3289)
Exec:  PRINT PEEK(157)*256
      +PEEK(158)
```

You'll have to make an educated guess to determine the end address. Usually, but not always, data statements containing zeroes for the last several data elements indicate blank memory after the ML program. The resulting BASIC program will have the start, end and execute addresses listed as remarks in the BASIC program.

Once the ML program has been loaded and the addresses determined, load *BASIC Data Writer*. The addresses of *BASIC Data Writer* are:

```
Start: Decimal 25000
End:   Decimal 30698
Exec:  Decimal 25000
```

If any part of the ML program falls inside the range of addresses of *BASIC Data Writer*, use the start address offset option with the CLOADM or LOADM command (see the computer manual for a complete description of these commands). Use a positive offset to load

*BASIC Data Writer* at a higher address or a negative offset to load it at a lower address. *Deft PASCAL* generates position-independent code so the program will load anywhere in RAM including the upper 32K.

Once loaded, execute *BASIC Data Writer* and answer the prompts. Enter the filename followed by the device number you want to save the BASIC program to. Here's a list of the device numbers used by *Deft PASCAL*:

```
:-3  Screen
:-2  Printer
:-1  Cassette
:0   Drive 0
:1   Drive 1
:2   Drive 2
:3   Drive 3
```

*Filename.BAS:0* would save the BASIC program to Drive 0. *Filename.BAS:-1* would save the BASIC program to cassette. Saving to screen or printer only prints the program; it doesn't save it for future use. Be sure the output device is ready to receive the program, then press ENTER. Enter the start, end and execute addresses in decimal when prompted. When the NOW



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WRITING BASIC PROGRAM message appears on the screen, *BASIC Data Writer* is writing your BASIC program. When the YOUR BASIC PROGRAM IS FINISHED message appears on the screen, you can load it back into the computer and run it or append other programs to it. It is a good idea to resave it again in the standard tokenized format so that it will load faster the next time you want to use it.

### Testing the Program

To test the program, first CLEAR 200,25000 to protect memory. Then load and execute it. Follow the prompts, as explained earlier. When

prompted for the addresses, give it its own addresses. When the BASIC program has been written to the device specified, turn the computer off, wait a few seconds and turn it back on. Since this is a long ML program (5,698 bytes), first PCLEAR1 then load the BASIC program back in and run it. You should get *BASIC Data Writer* back.

This program can be used to create BASIC programs from any binary file including music and graphics.

### Notes on Using the Program

1) Always use CLEAR 200, 25000 before loading and running *Data Writer*.

- 2) Be careful with start addresses. If you transfer a graphics file, the resultant BASIC program will issue a CLEAR 200, 3584. This gives BASIC a high address of 3584 bytes. You will want to delete this from the BASIC listing.
- 3) Be patient when running the resultant BASIC listing. Poking all those values in takes time!

If you have any questions or comments, you can address them to me at 14201 Marquette N.E., Albuquerque, NM 87123. Please be sure to include a self-addressed, stamped envelope if you want a reply.

### The listing: DATAWRIT

```
PROGRAM DATAWRITER(INPUT,OUTPUT);
(* ANY MACHINE LANGUAGE PROGRAM *)
(* INCLUDING GRAPHICS AND MUSIC *)
(* TO A COMPLETE BASIC PROGRAM *)
(* AND STORE IT IN ASCII FORMAT *)
(* ON THE SPECIFIED DEVICE. *)
(* THIS PROGRAM WAS CREATED *)
(* USING DEFT PASCAL WORKBENCH. *)

(* WRITTEN BY DENNIS H. WEIDE *)
(* 14201 MARQUETTE N.E. *)
(* ALBUQUERQUE, NEW MEXICO *)
(* 87123 *)
(* PHONE (505)293-5228 *)

(* THIS PROGRAM WILL CONVERT *)
CONST LINE10=' BASIC DATA STATEMENT WRITER';
```

**" I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine."**

**The RAINBOW, July 1987**

You've moved up to a CoCo 3. A powerful new machine. Now, it's time to give BASIC a shot in the arm, with ADOS-3. Wouldn't it be nice to turn on your machine and be greeted by an 80-column display, in the colors of your choice, with your own custom startup message? To run routinely at 2 MHz (double speed) without having to slow down for disk and printer operations? This and much, much more is possible with ADOS-3, our CoCo 3 adaptation of the acclaimed original ADOS, which shares the original's virtual 100% compatibility with commercial software. After customizing ADOS-3 using the provided configuring utility, you can have it burned into an EPROM that plugs into the Disk BASIC ROM socket, or just use it in RAM as a disk utility. (EPROM + burning will cost \$15-20; we provide information concerning how you can have this done.) Supports double-sided drives (35, 40, or 80 tracks). FAST and SLOW commands, auto line number prompts, RUNM command, keystroke macros, arrow-key scroll through BASIC programs, auto-edit of error line, and many more valuable features.

**"ON A SCALE OF 1 TO 10, I RATE ADOS-3 A SOLID 15."** RAINBOW, 7/87

Disk . . . \$34.95 Original ADOS for CoCo 1 or 2 \$27.95 (See 6/87 RAINBOW review)

#### THE PEEPER

ML program tracer that multitasks with the target program. An excellent learning tool for the ML novice; an invaluable debugging aid for the expert. CoCo 1, 2, or 3 compatible.

Disk \$23.95 Assembler source listing Add \$3.00

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```

LINE20=' WRITTEN BY DENNIS H. WEIDE';
LINE30='30 CLS: CLEAR 200';
LINE40='40 FOR X=';
LINE50='50 READ A$';
LINE60='60 A$="&H"+A$';
LINE70='70 POKE X, VAL(A$)';
LINE80='80 NEXT X';
LINE90='90 EXEC';

```

```

(* AND SAVE ON DESIRED *)
(* DEVICE *)

```

```

LINENUMBER:=1000;
STARTADDRESS:=ENCODE(ENTERSTART);
ENDADDRESS:=ENCODE(ENTEREND);
EXECADDRESS:=ENCODE(ENTEREXEC);
CURRENTADDRESS:=STARTADDRESS;

```

```

VAR OUTFILE:TEXT;
FILENAME:STRING;
DATA:STRING(95);
CONTENTS:STRING(2);
ENTERSTART,
ENTEREND,
ENTEREXEC:STRING(5);
COUNT,
LINENUMBER,
STARTADDRESS,
ENDADDRESS,
EXECADDRESS,
CURRENTADDRESS:INTEGER;

```

```

WHILE CURRENTADDRESS<=ENDADDRESS DO BEGIN
  DECODE(LINENUMBER,4,DATA);
  DATA:=DATA+' DATA';

```

```

  FOR COUNT:=1 TO 29 DO BEGIN
    HEX(CURRENTADDRESS,1,CONTENTS);
    DATA:=DATA+CONTENTS;
    IF COUNT<29 THEN DATA:=DATA+', ';
    CURRENTADDRESS:=SUCC(CURRENTADDRESS);
  END;

```

```

  WRITELN(OUTFILE,DATA);
  LINENUMBER:=SUCC(LINENUMBER);
END;
WRITELN(' YOUR BASIC PROGRAM IS FINISHED');
CLOSE(OUTFILE);
END.

```

```
BEGIN
```

```
PAGE;
```

```

(* SET UP SCREEN *)
(* ENTER ADDRESSES *)

```

```

WRITELN(LINE10);
WRITELN(LINE20);
WRITELN;
WRITELN;
WRITE('ENTER FILENAME >');
READLN(FILENAME);
WRITE('ENTER START ADDRESS >');
READLN(ENTERSTART);
WRITE('ENTER END ADDRESS >');
READLN(ENTEREND);
WRITE('ENTER EXEC ADDRESS >');
READLN(ENTEREXEC);
WRITELN;
WRITELN(' NOW WRITING BASIC PROGRAM');

```

```

(* OPEN DISK FILE *)
(* WRITE LINES 10-90 *)

```

```

REWRITE(OUTFILE,FILENAME);
WRITELN(OUTFILE,'0 REM ',FILENAME);
WRITELN(OUTFILE,'1 REM START ADDRESS=',ENTERSTART);
WRITELN(OUTFILE,'2 REM END ADDRESS=',ENTEREND);
WRITELN(OUTFILE,'3 REM EXEC ADDRESS=',ENTEREXEC);
WRITELN(OUTFILE,'10 REM',LINE10);
WRITELN(OUTFILE,'20 REM',LINE20);
WRITELN(OUTFILE,LINE30,ENTERSTART);
WRITELN(OUTFILE,LINE40,ENTERSTART,' TO ',ENTEREND);
WRITELN(OUTFILE,LINE50);
WRITELN(OUTFILE,LINE60);
WRITELN(OUTFILE,LINE70);
WRITELN(OUTFILE,LINE80);
WRITELN(OUTFILE,LINE90,ENTEREXEC);

```

```

(* CONVERT ML PROGRAM *)
(* TO BASIC DATA STATEMENTS *)

```

## About The One-Liner Contest . . .

THE RAINBOW'S One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

*Here are the guidelines:* The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be very short.

Send your entry (preferably on cassette) to:

THE RAINBOW One-Liner Contest  
P.O. Box 385  
Prospect, KY 40059

# Cache of the Day

By Tony DiStefano  
Rainbow Contributing Editor

I recently asked some people who own computers, "What would you like to add to your computer?" Almost 80 percent of them said they wanted more memory. This is a universal problem. It is not limited to just the CoCo. The Apple, Commodore, Atari and IBM PC owners all said that they wanted more memory, too. They want it in whatever form they can get it: Main memory, bank-switched memory, RAM disk memory, ROM disk memory, ported memory — whatever the format, they want more! Well, the CoCo 3 has up to 512K of memory bank-switched into 8K blocks, we all know that. RAM disk adapters are available from several sources, including Disto (me). ROM disks are not that popular because they require an EPROM programmer and a knowledge of machine language programming.

What is left is ported memory. Now some people may say there is no difference between a RAM disk memory and ported memory. And as far as the hardware goes, there isn't. The difference is all in the software. A RAM disk and related software emulate a disk drive. You read and write to the RAM disk via files. To save data, you have to open a file, output to it, then close the

file. When you want to retrieve data you have to open the file again, read your data and close it up when you are finished. This process takes time. It also uses the DOS (Disk Operating System). Now, ported RAM is the same, but since it doesn't use the DOS, it is not restricted to using DOS and files.

You have to configure the use of the ported RAM yourself. The ported RAM you will see today is only 2K long. That means you will have 2,048 bytes to work with. Now, these bytes are only eight bits wide. The CPU in the CoCo can only handle eight bits at a time. So, when you want to save a numerical value, it can only be a number from 0 to 255. If you want to use numbers that are greater, you must use more than that one byte. For instance, if you want to use a number from 0 to 65,535, you will need two bytes. Or, if you want to use a signed number (i.e., a number from -32,767 to 32,767) you still need two bytes.

If you need still bigger numbers, you will have to go to a different type of format. A floating-point number takes up five bytes of memory for its mantissa and exponent. An explanation of these numbers goes beyond the scope of this article; see a math book for more details. You can also store alphanumeric characters. You need one byte for every character you have to store.

Now let's talk about memory-mapping. What, more memory-mapping? I am starting to sound like a broken record, but I still get a lot of letters about this subject. So, here we go again.

The CPU that is used in the CoCo is

an MC6809E. This CPU can directly access only 64K of memory. In order to access that much memory, the CPU has 16 address lines. If you count in binary numbers, 16 lines gives you 65,535 different locations, better known as 64K memory. There are ways of fooling the CPU into accessing more memory. The technique is called page- or bank-switching. Bank-switching means you have more memory than the CPU can use at one time, but the memory is switched back and forth. An example is the CoCo 3. It comes standard with 128K memory and is **upgradable** to 512K memory. How is this done?

There is a chip in the CoCo 3 called the GIME. One of the functions of the GIME is called an MMU or Memory Management Unit. The MMU part of the GIME has the job of accessing 512K of memory and, at the request of the CPU, accesses all of it a bit at a time.

A good illustration of this is a radio. A radio can receive many stations, but only one at a time. The CoCo 3 has the equivalent of eight radios. Each radio can tune in one station at a time. Each radio (at the choice of the CPU) can access the same station. In the CoCo 3, each radio or page is 8K or 8192 bytes. There are 64 of these pages in a 512K CoCo 3 ( $8K \times 64 = 512K$ ). These eight pages of 8K bytes represent 64K to the CPU. There are eight control bytes in the MMU for pages. Each byte tells the MMU which page the CPU wants to see. Changing the data in these bytes changes which page the CPU can access. That is how the CPU can access more than 64K memory.

Now, what I am about to show you

---

*Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.*

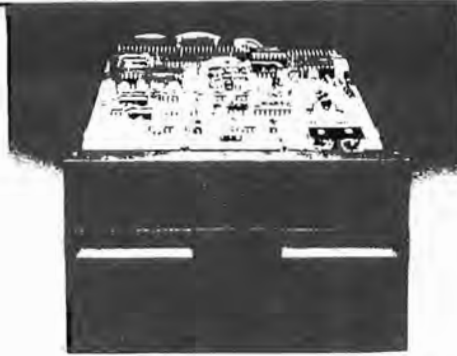


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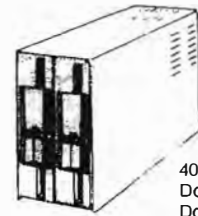
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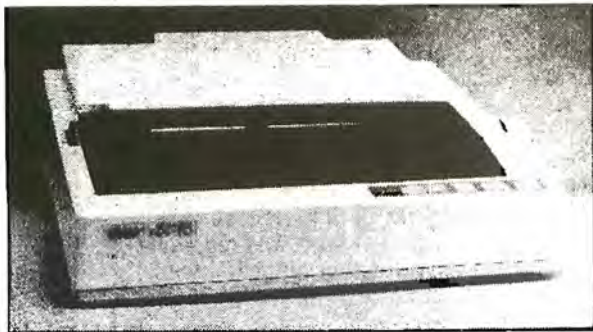
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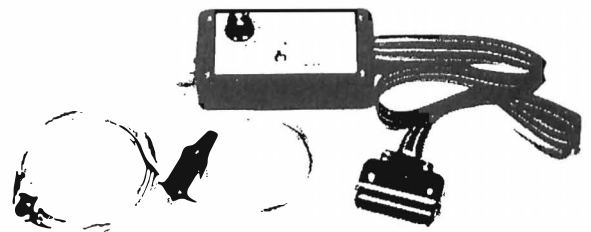
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is a mini-version of the MMU. Very mini. For users of the CoCo 3 with 512K of memory, this may not excite you, but for the memory-poor CoCo 1 or 2 user, a few extra bytes are always handy. The amount of extra memory is only 2K bytes. Not much by today's standards, but if you are working on that "does everything" program and you need "just a few more bytes" for something, this is where you are going to find them. I say mini because the "pages" are only 256 bytes long. With some special circuitry, that means this only uses up one byte of memory in the memory map. You also need one control or address byte. That is a total of two bytes in the memory map. Not too bad for 2K of memory. There is, however, a catch.

There are two ways of memory-

mapping this extra memory. The first is to have a couple of latches that hold the address of the memory. You set up the address of the memory byte you want, and then you read from, or write to, that address. That is the fastest way to get to any one byte, but you need to change the address every time you want another byte. The second way is to "auto-increment" every time you access data. For example, you read one byte, then when you read that same location again, you get Data Address 2; when you read it again, you get Address 3 and so on, until you get to the end of your memory. This is faster than setting up the address every time you need more data, but slower when the data you need is at the end of the file. If you are familiar with the structure of BASIC files, the first is

like a Random Access File and the second is like a Sequential File. Both have advantages and disadvantages.

What I have in mind is the best of both worlds. A little bit of auto-incrementing and a bit of address-latching. This way, you auto-increment by pages. I think a good auto-increment value is 256 bytes. That just happens to be the size of a disk sector. In a 2K RAM chip, there are eight 256-byte sectors, which means you can have up to eight pages of 256 bytes each. This is the basic description of the hardware project I have in mind for today. It is divided into three parts. The first is the hardware, the second is the memory-mapping of the hardware and the third is the software.

First, the hardware. In Figure 1, you will find the schematic diagram of the Memory Cache Project. The heart of the project is an HM6116 memory chip. This is a 2K-by-8-byte RAM (Random Access Memory) CMOS memory chip. It is made by virtually every memory manufacturing company. The 6116 number will always be the same, but the letters (which tell you which company the part comes from) may change.

Attached to the lower eight address lines is a binary counter. That is the auto-incrementing part. Attached to the upper address lines is a latch. That is the direct access part of the circuit. The fourth and fifth chips in the group are decoder chips, which map the thing properly.

The standard "project-building" tools are necessary, but there is one thing to remember. The memory chip I used is a CMOS part. It is easily destroyed by static electricity, so use a static-free work place. Also use sockets when trying out this circuit. It is better than soldering the chips directly — if you happen to burn one out, you won't have to desolder and resolder. All of these chips are available from your local electronics shop or from CRC Inc. The project board (to build your circuit on) can also be obtained from CRC Inc.

The second part of this project is memory-mapping. The circuit in Figure 1 is mapped at \$FF40 (65344). That, as you know by now, is where the disk drive and controller are mapped. If you have a multipack interface, it is not too bad; you can switch the multipack to the different slot and work with the extra memory from there.

If you only have a 'Y' cable, then the circuit in Figure 1 won't work. You need the second part. Figure 2 contains a circuit that decodes the address bus of

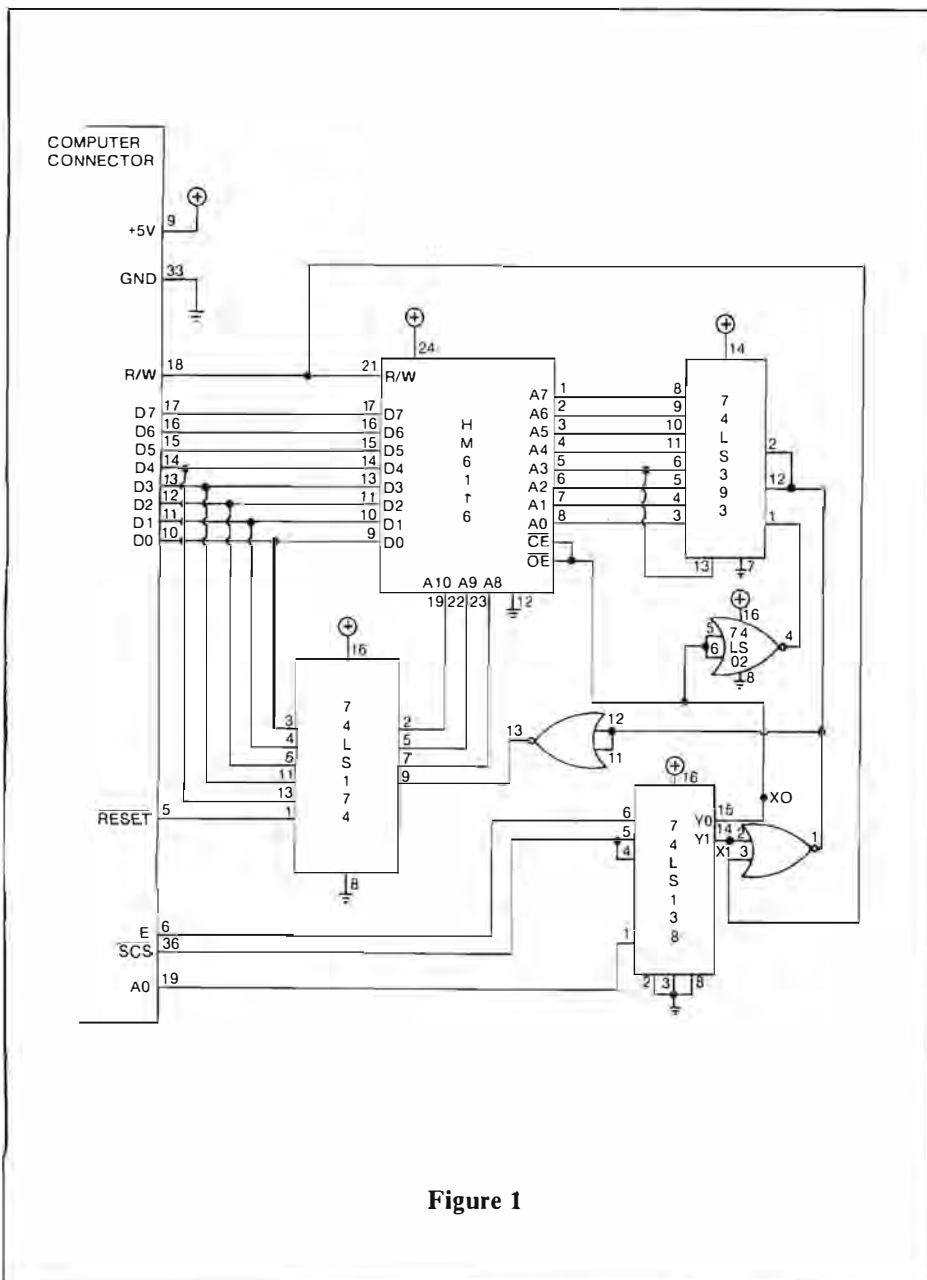


Figure 1

the CPU and maps it into a different place. It re-maps the address of \$FF40 (65344) to \$FF74 (65396), leaving \$FF40 free for the disk drive. This area of the memory map may be used by other products, so watch out for memory conflicts.

Finally, the software. It is not hard to access this memory cache. It is in two parts. The first part is to set up which of the eight pages you want to use. You do this by storing the page value at the base location. An example of this in BASIC is `POKE X, A`, where `X` is the base address. The base address is \$FF40 (65344) if you are using just the circuit in Figure 1 and \$FF74 (65396) if you are also using the circuit in Figure 2. The value `A` is the page number you want to access.

The second part is reading data or writing data into the 256-byte block. Remember, it is auto-incrementing and you have to access it 256 times to get to the last byte. An example of writing to the page in BASIC is:

```
1000 FOR I = 1 TO 256
1010 POKE Y, A(I)
1020 NEXT I
```

where `I` is your 256 auto-increment value. `Y` is your base address + 1 and `A(I)` is an array of data 256 bytes long, which must be previously defined. To read the block in BASIC, use this example:

```
2000 FOR I = 1 TO 256
2010 A(I) = PEEK (Y)
2020 NEXT I
```

where `I` is again your auto-increment value, `Y` is the base address + 1, and `A(I)` is your data array. Remember, though, this is just an example of how to read and write data to the RAM cache, just to show you how it is done.

You can use any method you choose. One point to keep in mind: Before you access a page, you must store the proper page number in the base address. This also clears your auto-increment counter to make sure you start at the right place. You wouldn't want to start in the middle.

If you have a problem with the circuit or want to make a comment on my projects, send me your letter along with a self-addressed, stamped envelope to me in care of RAINBOW, and I will get you an answer as soon as possible. (Please remember: no envelope, no answer.) □

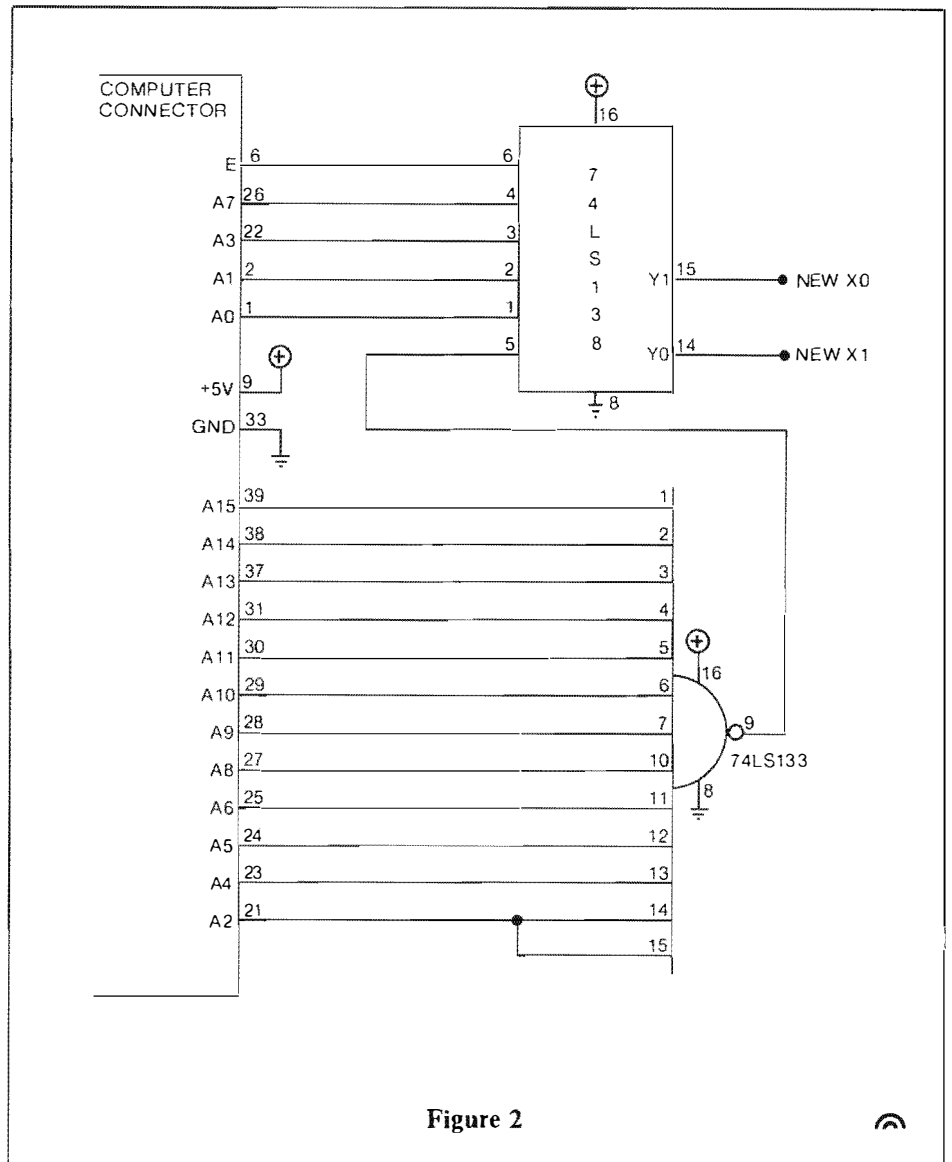


Figure 2

## LOTZALUK IS HERE!

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**T**HE 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.

## Graphics

32K  
ECB

### Powerful Pages

By Matt Krom

Here's a short little program that demonstrates a very powerful capability of the CoCo called "page-flipping." Just run Listing 1, sit back, and watch! What you see is actually four separate screens being rapidly switched, much like flipping pages of a book. This creates the illusion of motion.

Line 60 erases the first four graphics pages to white. These four pages will be used by the program as the four separate pictures.

Lines 80 to 110 set the computer to PMODE 0 and draw large letters spelling "Hi!" You can change these lines to draw anything you like. This is the drawing that will be in front of the moving grid. Line 130 then copies this drawing from the first page to the other three pages.

Lines 140 to 240 are the lines that draw the grid on the four pages. These lines may be a little difficult to understand, but if you carefully study the formulas in lines 190 and 230, you will see that each grid is moved down and to the right of the grid on the previous page. The grid lines do not affect the drawing because they are of the same color. The infinite loop in lines 250 to 290 then displays the pages in sequence, and the animation appears!

But how do you draw on the different pages? The secret here is the PMODE 0, x statement, where x denotes a number telling the computer what page to go to. For example, say you want to make a program in which a circle goes horizontally across the screen. The program should first set the computer to Page 1 by using PMODE 0, 1. Then draw a circle at the desired location. Now use PMODE 0, 2 and draw a circle a little to the right of the last one. Continue this procedure until you have drawn on as many pages as you want. When using PMODE 0, the number of pages can range from 1 to 8.

Listing 2 is a program like the one just described. It is less involved than the first, so programmers who are new to this technique should study it more closely. The PCLEAR B statement was necessary to reserve enough memory for the eight graphics pages.



**Listing 1: HI**

```

10 'HI! - BY MATT KROM
20 '10610 18TH ROAD
30 'ARGOS, IN 46501
40 '(219) 892-5226
50 '
60 PMODE4,1:PCLS1
70 CLS:PRINT@227,"WAIT TEN SECON
DS PLEASE..."
80 '*****DRAW "HI!" ON PAGE 1
90 PMODE0,1
100 DRAW"C0BM54,50S16D25R5U10R5D
10R5U25L5D10L5U10L5BR20R5D5L5U5B
D25U15R5D15NL5BR5NR5U5R5ND5BU5U1
5L5D15R5"
110 PAINT(56,52),0,0:PAINT(138,5
2),0,0:PAINT(138,132),0,0:PAINT(
180,52),0,0:PAINT(180,132),0,0
120 '*****PUT "HI!" ON THE
OTHER 3 PAGES
130 PCOPY1TO2:PCOPY1TO3:PCOPY1TO
4
140 '*****LOOP TO DRAW GRIDS
150 FORP=1TO4 'P=PAGE #
160 PMODE0,P
170 '***DRAW VERTICAL LINES
180 FORH=0TO248STEP8
190 LINE(H+P*2-2,0)-(H+P*2-2,191
),PRESET
200 NEXT
210 '***DRAW HORIZONTAL LINES
220 FORV=0TO184STEP8
230 LINE(0,V+P*2-2)-(255,V+P*2-2
),PRESET:NEXT
240 NEXT P
250 '*****"FLIP" ALL FOUR PAGES
TO CREATE ILLUSION OF MOVEMENT

```

```

260 FORK=1TO4
270 PMODE0,K:SCREEN1,1
280 FORL=1TO25:NEXT 'TIME DELAY
290 NEXT:GOTO260

```

**Listing 2: CIRCLE**

```

10 PCLEAR8
20 PMODE 0,1:PCLS1
30 CIRCLE(60,96),40,0:PAINT(60,9
6),0,0
40 PMODE 0,2:PCLS1
50 CIRCLE(80,96),40,0:PAINT(80,9
6),0,0
60 PMODE 0,3:PCLS1
70 CIRCLE(100,96),40,0:PAINT(100
,96),0,0
80 PMODE 0,4:PCLS1
90 CIRCLE(120,96),40,0:PAINT(120
,96),0,0
100 PMODE 0,5:PCLS1
110 CIRCLE(140,96),40,0:PAINT(14
0,96),0,0
120 PMODE 0,6:PCLS1
130 CIRCLE(160,96),40,0:PAINT(16
0,96),0,0
140 PMODE 0,7:PCLS1
150 CIRCLE(180,96),40,0:PAINT(18
0,96),0,0
160 PMODE 0,8:PCLS1
170 CIRCLE(200,96),40,0:PAINT(20
0,96),0,0
180 FOR X=1 TO 8
190 PMODE 0,X:SCREEN 1,1
200 FOR T=1 TO 90:NEXT
210 NEXT
220 GOTO180

```

# Home Help

4K

## Hit The Road

By Fred Rau

*Vacation Log* prints a log sheet for recording expenses when traveling on a business trip or a family vacation. There is room for up to four gas stops per day and three days per each printout.

.....

DATE :-----

ENDING MILES-----ENDING MILES-----ENDING MILES-----ENDING MILES-----

MILES START-----MILES START-----MILES START-----MILES START-----

TOTAL MILES-----TOTAL MILES-----TOTAL MILES-----TOTAL MILES-----

GALS. OF GAS-----GALS. OF GAS-----GALS. OF GAS-----GALS. OF GAS-----

M.P.G.-----M.P.G.-----M.P.G.-----M.P.G.-----

MEALS-----

CAMPGROUND/MOTEL-----

MISCELLANEOUS-----

.....

The listing: VACATION

```

10 *****
20 '*      VACATION LOG      *
30 '*
40 '*      BY FRED RAU      *
50 '*
60 *****
70 CLS3
80 INPUT "NO. OF PAGES";C
90 FOR P=1 TO C
100 CLS3:PRINT@104," V A C A T I
    O N ";
110 PRINT@141," L O G ";
120 PRINT@168," P R I N T I N G
    ";
130 PRINT#-2,"":PRINT#-2,""
140 FOR X=1 TO 3
150 K=2:L=K+L
160 PRINT#-2,""
170 PRINT#-2,"DATE :-----"
180 PRINT#-2,""
190 PRINT#-2,"ENDING MILES-----
--ENDING MILES-----ENDING MIL
ES-----ENDING MILES-----"
200 PRINT#-2,""
210 PRINT#-2,"MILES START-----
--MILES START-----MILES STAR
T-----MILES START-----"
220 PRINT#-2,""
230 PRINT#-2,"TOTAL MILES-----
--TOTAL MILES-----TOTAL MILE
S-----TOTAL MILES-----"

```

```

240 PRINT#-2,""
250 PRINT#-2,"GALS.OF GAS-----
--GALS.OF GAS-----GALS.OF GA
S-----GALS.OF GAS-----"
260 PRINT#-2,""
270 PRINT#-2,"M.P.G.-----
---M.P.G.-----M.P.G.--
-----M.P.G.-----"
280 PRINT#-2,""
290 PRINT#-2,"MEALS-----
-----"
300 PRINT#-2,""
310 PRINT#-2,"CAMPGROUND/MOTEL--
-----"
320 PRINT#-2,""
330 PRINT#-2,"MISCELLANEOUS-----
-----"
340 PRINT#-2,".....
....."
350 NEXT X
360 PRINT#-2,"":PRINT#-2,"":PRIN
T#-2,"":PRINT#-2,"":PRINT#-2,"":
PRINT#-2,"":PRINT#-2,"":PRINT#-2
,"":PRINT#-2,""
370 NEXT P
380 PRINT@324,"* * FINISHED PRIN
TING * *";
390 GOTO 390

```

Hint . . .

## A Coordinated Effort

Using the hardware joystick/mouse cartridge from *CoCo MAX* in your own programs is a snap! The address map for the cartridge is as follows.

```

$FF90  Button value — 0 if button is pressed
$FF91  Vertical coordinate (0-255)
$FF92  Horizontal coordinate (0-255)

```

The port can be accessed directly in BASIC or BASIC09 using peeks to the given location. For example, in BASIC09 you would use the following code to find the horizontal coordinate:

```

DIM xpos:BYTE
xpos = PEEK($ff92)

```

Some operational notes are in order here. First, the vertical coordinate can be anything from 0 to 255 but the screen only uses 0 to 191. You should use a conditional statement to check for this. Second, in OS-9 the vertical coordinates are reversed so you should subtract the actual value from 255 to get the proper location.

Tim Harris  
Des Moines, IA

Two-Liner Contest Winner . . .

This one is for those of you who have taken it easy this summer and haven't been exercising. Just sit back, relax and let your CoCo do all the work.

### The listing:

```

10 PMODEL,1:PCLS:SCREEN1,1:DIMV(
100,40):CIRCLE(72,53),20:CIRCLE(
184,53),20:PAINT(72,53):PAINT(18
9,53):LINE(93,53)-(164,53),PSET
20 GET(52,33)-(204,72),V:PCLS:PU
T(52,110)-(204,180),V:FORX=1TO99
:NEXTX:GET(52,110)-(204,180),V:P
CLS:PUT(52,33)-(204,72),V:FORX=1
TO99:NEXTX:GOTO20:'EASY EXERCISE

```

Dana Gongaware  
Greensboro, NC

(For this winning two-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

16K  
ECB

## An Inside View

By Michael Berenz

*Disk Seek* is a simple program that allows you to view the contents of a disk. Upon running, the program prompts you to place a disk in the drive. The current track and sector appear at the bottom of the screen. The up and down arrow keys change the track, and the left and right arrow keys change the sector. Moving up from Sector 18 will bring you to Sector 1 on the next track, and vice versa. You need not repeatedly press a key because of the peeks in Line 150. Holding the key down will suffice.

The program does not allow for editing of sectors, but is simply a fun little utility that tells you just what your drives are writing as they chomp away at your disks.

The listing: DISKSEEK

```
5 '*****
6 '* DISKSEEK - BY MIKE BERENZ *
7 '*****
```

```
10 CLS:PRINTSTRING$(33,175);" D
ISKSEEK - BY: MIKE BERENZ ";STR
ING$(33,175)
20 PRINT@449,"INSERT DISK AND HI
T <ENTER>";:LINEINPUT Z$
30 CLEAR 500:T=17:S=9:CLS
40 PRINT@480,"TRACK="T,"SECTOR="
S;
50 DSKI$0,T,S,A$,B$
60 PRINT@0,A$;B$
70 FOR Q=341 TO 344:POKE Q,255:N
EXT
80 IF PEEK(341)=247 THEN T=T+1 E
LSE IF PEEK(342)=247 THEN T=T-1
ELSE IF PEEK(343)=247 THEN S=S-1
ELSE IF PEEK(344)=247 THEN S=S+
1 ELSE 80
90 IF S<1 THEN S=18:T=T-1
100 IF S>18 THEN S=1:T=T+1
110 IF T<0 THEN T=0
120 IF T>34 THEN T=34
130 CLS:GOTO 40
```

64K

## Prompt Attention

By Joseph Forgione

Are you tired of the color-changing cursor and OK prompt on your CoCo? *Conversion* will allow you to change it.

Upon running, the OK prompt will be replaced by "Ready." However, for *Conversion* to work properly, you must be in the "all-RAM" mode. This means your CoCo must have all the ROM copied into RAM and be running entirely from RAM memory. Some DOSs have special commands allowing this, and the CoCo 3 is always in the RAM mode. But if you are using a standard Radio Shack CoCo 1 or 2 system, you can enter the RAM mode by first running Listing 1, DRIVER.

Then, by running CONVERT, you can change the color of the cursor by entering POKE 1023, xxx where xxx is the appropriate value from the following table:

Black	128
Green (invisible)	143
Yellow	159
Blue	175
Red	191
White	207
Blue/Green	223
Purple	239
Orange	255

For example, if you want to change the cursor color to purple, type POKE 1023,239 after running CONVERT.

Some program notes are in order. First, if you have the HJL keyboard, Line 110 allows you to use the F4 key to pause a screen scroll (works like SHIFT-@). If you do not have the HJL or similar keyboard, remove Line 110.

Second, if you want to retain the OK prompt, remove Line 90; if you want to retain the old cursor, remove lines 50, 60 and 70.

Finally, the program changes the message you receive when you press the BREAK key (Line 150). Instead of printing "Break In," the computer will respond with "Break At."

Listing 1: DRIVER

```
1 DATA 26,80,142,128,0,127,255,2
22,166,132,127,255,223,167,132,4
8,1,140,255,0,38,239,28,159,57
2 FORA=&HE00 TO &HE18:READX:POKE
A,X:NEXTA:EXEC3584:POKE65503,0:P
RINT"OS IS NOW IN RAM!"
```

Listing 2: CONVERT

```
10 DATA 82,69,65,68,89,13,0,246,
3,254,32,3,0,46,0,193,191,39,8,1
98,191,247,3,254,247,3,255,177,3
,255,39,5,182,3,255,32,2,134,96,
32,57,0
15 F=PEEK(41299):L=PEEK(41301)
20 FORA=41287 TO 41328
30 READX:POKEA,X:NEXTA
```

```

4Ø ' Jump to NEWBLINK routin
5Ø POKE&HA1A5,126
6Ø POKE&HA1A6,&HA1
7Ø POKE&HA1A7,&H4E
8Ø 'Tell basic were 'READY' is.
9Ø POKE44151,161:POKE44152,7Ø
1ØØ 'Pauses basic program with F
4
11Ø POKE44533,4

```

```

12Ø 'Allows 255 chracters on lin
e
13Ø POKE41954,255
14Ø 'Change BREAK IN to BREAK AT
15Ø POKE44ØØ9,65:POKE44Ø1Ø,84
155 POKE41299,F:POKE413Ø1,L'RESE
T VERSION AND RELEASE NUMBERS
16Ø CLS:EXEC49152

```

## Backup And Go

### By Matt Lawson

CoCo 3  
Disk

Anyone who has ever made a disk backup knows how tedious it is switching disks back and forth. However, now, with *Fast Copy* and any disk-based Color Computer 3, the problem can be eliminated.

Upon running the program, the computer asks if it should report errors to the printer or screen, then prompts you to insert the source disk (the disk to copy). The drive will churn for about 40 seconds and then ask for the destination disk (the disk to be copied to). This procedure must be repeated only one time before the disk copy is complete.

If the disk drive should encounter an error, the error type and where it occurred are reported. Note: The copying procedure does not stop for a disk error. This way, all of the intact data on the source disk can be copied, while the bad data could never be read again anyway. If you should encounter a Write Error, it will be necessary to reformat the destination disk and start over.

By the time the program finishes, most of the computer's memory is filled with disk data, so after making a backup, you should turn off the computer to achieve a cold start before doing anything else.

#### How It Works

The computer reads (or writes) half the disk at a time with the buffer in virtual memory locations (Hex) \$60000 to \$6FFFF and \$74000 to \$77FFF. The program uses a machine language ROM routine so that the user is not stopped with an ?IO Error message.

It appears as though the only memory locations used are \$4000 to \$7FFF. However, the CoCo 3 has a method of rearranging the memory map with a chip called the Dynamic Address Translator (DAT). The computer fills up \$4000 to \$5FFF, then swaps it for a different portion of memory, even though it uses the same addresses. One interesting, important note: The DAT switches are located at \$FFA0 to \$FFA7.

The ability to copy around disk errors should be a welcome feature to every disk owner.

#### The listing: FASTCOPY

```

1Ø ' COPYRIGHT 1987 MATT LAWSON
2Ø PCLEAR1:FILESØ,Ø: CLEAR 3ØØ,&H
3FFF:DSK=256*PEEK(&HCØØ4)+PEEK(&
HCØØ5):V1=&HEA
3Ø CLS:INPUT"REPORT ERRORS TO (S
)CREEN OR (P)RINTER";A$:IF A$
="P" OR A$="p" THEN D=-2 ELSE D=

```

```

Ø
4Ø CLS:PRINT"INSERT SOURCE DISK
AND PRESS (ENTER)":GOSUB 22Ø
5Ø PG=48:POKE V1,2:POKE V1+1,Ø:P
OKE V1+4,&H4Ø:POKE V1+5,Ø:POKE V
1+6,Ø:AD=&H4Ø
6Ø FOR TK=Ø+Z TO 16+Z+I:FOR SC=1
8 TO 1 STEP-1
7Ø POKE V1,2:GOSUB 14Ø:NEXT SC,T
K
8Ø PRINT"INSERT DESTINATION DISK
AND PRESS (ENTER)":GOSUB22Ø
9Ø AD=&H4Ø:PG=48
1ØØ FOR TK=Ø+Z TO 16+Z+I:FOR SC=
18 TO 1 STEP-1
11Ø POKE V1,3:GOSUB14Ø:NEXTSC,TK
12Ø IF Z=Ø THEN Z=17:I=1:GOTO 4Ø
13Ø PRINT"DONE! ";ER;" TOTAL ER
RORS":END
14Ø POKE &HFFA2,PG:POKE V1+2,TK:
POKE V1+3,SC:POKE V1+4,AD:EXEC D
SK:IF PEEK(V1+6)>Ø THEN 19Ø
15Ø AD=AD+1:IF AD<&H6Ø THEN RETU
RN
16Ø AD=&H4Ø:IF PG=59 THEN PG=58:
RETURN
17Ø IF PG=55 THEN PG=59:RETURN
18Ø PG=PG+1:RETURN
19Ø PRINT#D,"DISK ERROR #";PEEK(
V1+6):IF PEEK(V1)=2 THEN Z$="REA
D" ELSE Z$="WRITE"
2ØØ ER=ER+1
21Ø PRINT#D," "+Z$+" TRACK";
TK;" SECTOR";SC:GOTO 15Ø
22Ø A$=INKEY$:IF A$=CHR$(13) THE
N RETURN ELSE 22Ø

```

Contributions 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.

— Jutta Kapshammer  
Submissions Editor

# Purr-fect Friends



photo by Jim Reed

**T**he 1987 Chicago RAINBOWfest went very smoothly. While the terms “relaxed” and “excited” seem contradictory, they best describe the atmosphere at this show. Both exhibitors and attendees knew exactly why they were there and what they were doing, but they were clearly excited about all the new things to see. However, few were as excited as 3-year-old Austin Holt (above). Austin had known for two weeks that CoCo Cat would be making a first-time appearance and travelled all the way from Brandon, South Dakota, to see the fuzzy feline. The words Austin used to describe the meeting, “I love him!”, are evident in his smile.



# A Computer's Ancient Native Language

By Peter Dibble

**S**orcery books are almost unanimous: The most potent spells are written in strange, usually ancient, languages. It works the same way for computers. The most profound magic for the Color Computer is written in assembly language, the ancient native language of OS-9.

I want to include some assembly language code here, but there is a problem. Tandy chose not to include an assembler with OS-9 Level II. Old-timers will have the assembler from Level I. It works under Level II, but the `defs` files are incorrect. (The Level I `defs` files usually fit Level II, provided you stay out of the system data structures.) In any case, I will assume you don't have an assembler.

The assembler converts assembly language programs into modules. I could save you the trouble of typing in the program, if I could print the module here. However, modules are full of unprintable characters and RAINBOW is unable to print them.

This month's programs are a solution to the assembly language problem. CDump converts any file into a printable format. It is the program that I will use to encode modules so RAINBOW can print them. If you want to use it, type CDump into BASIC09 and save it to a disk file. Run CDump and tell it the name of the file to print. Wait while it writes CDump.output. CDump.output contains a printable code that can be converted back into the original file. When I asked CDump to encode the CDump source, the first few lines of CDump.output were:

```
1: 5052 4F43 4544 5552 4520 80826.  
2: 4344 756D 700D 4449 4D20 78478.  
3: 496E 4669 6C65 2C4F 7574 87306.
```

---

*Peter Dibble has a bachelor's degree in chemistry and is currently a graduate student in computer science. He has worked as an applications programmer, systems programmer and as the user services assistant director for the University of Rochester Computing Center. With Dale Puckett, he is the co-author of The Complete Rainbow Guide to OS-9.*



Each line has three parts: A line number, codes for 10 bytes of data and a check code for that line. You can use CSave to decode the output from CDump. To use it, type CSave into BASIC09 and save it to a disk file. Run CSave and tell it where to put the decoded file, then follow the directions CSave gives.

CSave prompts for input one line at a time. For each line, enter the five, four-character words of data and press ENTER. For instance, if line one from CDump is:

```
1: 5052 4F43 4544 5552 4520 80826.
```

you should respond:

```
5052 4F43 4544 5552 4520
```

when CSave prompts you for the first line. You may leave out the spaces if you like.

CSave computes a check code for the line and asks you if it is correct. If the code CSave calculates matches the one that CDump put at the end of the line, you probably typed the line correctly. Tell CSave you are content with the line by responding with a T to the question: "Right?" If you respond with an F, CSave prompts you to enter the same line again. After you have entered all the lines, and CSave prompts you for another line, press CTRL-BREAK to indicate end of file.

If you have a good text editor, you might want to modify CSave so it works with input from a file. You should require check codes in the input and quit when you find an incorrect check code.

CDump and CSave were written to solve the problem of the missing assembler, but they have other uses. CDump encodes any file in a printable format with error-detection codes. CSave decodes the file and checks the codes. Use them any time you need to send a file through a process that insists on printable characters and may be unreliable. For instance, if you want to send a module to an IBM mainframe over the phone line, you might want to send the CDumped code for the file. □

#### Listing 1: cdump

```
PROCEDURE CDump
  0000 DIM InFile,OutFile:BYTE
  000B DIM FileName:STRING[100]
  0017 DIM Buffer(10):BYTE
  0023 DIM i,j:INTEGER
  002E DIM line:INTEGER
  0035 DIM Sum:REAL
  003C
  003D INPUT "What file do you want to print:",FileName
  0064 ON ERROR GOTO 100
  006A OPEN #InFile,FileName:READ
  0076 ON ERROR GOTO 110
  007C CREATE #OutFile,"CDump.output":WRITE
  0093
  0094 ON ERROR GOTO 50
  009A line:=0
  00A1 LOOP
  00A3   line:=line+1
  00AE   FOR i:=1 TO 10
  00BE     GET #InFile,Buffer(i)
  00CC   NEXT i
  00D7   GOSUB 30
  00DB ENDLOOP
  00DF
  00E0 30 REM Write a checksummed buffer
  0100   Sum:=0
  0108   PRINT #OutFile,line; ": ";
  0118   FOR j:=1 TO i-1
  012C     PRINT #OutFile USING "H2",Buffer(j);
  013F     IF MOD(j,2)=0 THEN
  014E       PRINT #OutFile," ";
  0159     ENDIF
  015B     Sum:=Sum*2+Buffer(j)
  016F   NEXT j
  017A   PRINT #OutFile,TAB(31); Sum
  0188   RETURN
  018A 50 REM End of file or read error
  01A9   ON ERROR
  01AC   GOSUB 30
  01B0   CLOSE #InFile,#OutFile
```

```

01BB      END "Dump finished"
01CC 100  REM Error Opening the file
01E8      PRINT "Error "; ERR; " opening file: ",FileName
020A      END "CDump ended with an error"
0227 110  REM Error Opening the output file
024A      PRINT "Error: "; ERR; " opening CDump.output"
026F      END "CDump ended with an error"

```

**Listing 2: csave**

```

PROCEDURE CSave
0000      DIM FileName:STRING[100]
000C      DIM Buffer:STRING[25]
0018      DIM c:STRING[1]
0024      DIM OutputBuffer(10):BYTE
0030      DIM FileNo:BYTE
0037      DIM i,j:INTEGER
0042      DIM OutputSize:INTEGER
0049      DIM line:INTEGER
0050      DIM Sum:REAL
0057      DIM ok:BOOLEAN
005E
005F      INPUT "What file name do you want: ",FileName
0083      ON ERROR GOTO 100
0089      CREATE #FileNo,FileName:WRITE
0095
0096      ON ERROR GOTO 200
009C      line:=1
00A3

```

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```

ØØA4      WHILE NOT(EOF(#Ø)) DO
ØØAE      PRINT "Enter line "; line; ":";
ØØC6      READ #Ø,Buffer
ØØCF      GOSUB 2Ø \REM digest the input buffer
ØØED      GOSUB 25 \REM Confirm checksum
Ø1Ø4      IF ok THEN
Ø1ØD      GOSUB 3Ø \REM write the buffer to the output file
Ø137      line:=line+1
Ø142      ENDIF
Ø144      ENDWHILE
Ø148      CLOSE #FileNo
Ø14E      END "CSave done"
Ø15C
Ø15D 2Ø   REM Digest the input buffer
Ø17A      DIM acc:INTEGER
Ø181      DIM half:BOOLEAN
Ø188      OutputSize:=Ø
Ø18F      half:=FALSE
Ø195      acc:=Ø
Ø19C      FOR i:=1 TO LEN(Buffer)
Ø1AE      c=MID$(Buffer,i,1)
Ø1BC      IF c<>" " THEN
Ø1C9      IF half THEN
Ø1D2      acc:=acc*16
Ø1DD      GOSUB 22
Ø1E1      OutputSize:=OutputSize+1
Ø1EC      OutputBuffer(OutputSize):=acc
Ø1F8      acc:=Ø

```

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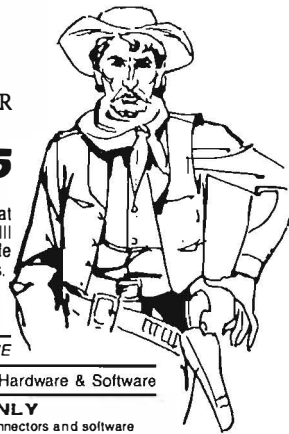
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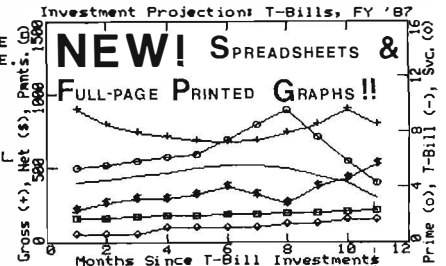
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```

01FF          half:=FALSE
0205          ELSE
0209          GOSUB 22
020D          half:=TRUE
0213          ENDIF
0215          ENDIF
0217          NEXT i
0222          RETURN
0224 22       REM Add a nyble in c to acc
0241          IF c>="0" AND c<="9" THEN
0256              acc:=acc+VAL(c)
0265          ELSE IF c>="A" AND c<="F" THEN
027D              acc:=acc+(ASC(c)-ASC("A")+10)
0292              ELSE IF c>="a" AND c<="f" THEN
02AA                  acc:=acc+(ASC(c)-ASC("a")+10)
02BF              ENDIF
02C1          ENDIF
02C3          ENDIF
02C5          RETURN
02C7 25       REM Confirm the checksum
02E1          Sum:=0
02E9          FOR i:=1 TO OutputSize
02FA              Sum:=Sum*2+OutputBuffer(i)
030E          NEXT i
0319          PRINT "Checksum is: "; Sum
032E          INPUT "Right? ",ok
033D          RETURN
033F 30       REM Write the buffer to the output file
0368          FOR i:=1 TO OutputSize
0379              PUT #FileNo,OutputBuffer(i)
0387          NEXT i
0392          RETURN
0394 100      REM Can't create a file
03AD          PRINT "Error: "; ERR; "creating file: "; FileName
03D0          END "Couldn't create the output file"
03F3 200     REM Error in main loop
040B          PRINT "Error: "; ERR
0418          CLOSE #FileNo
041E          END "Csave done"

```

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*Trivia hysteria hits our national pastime*

# Batter Up!

By T.C. Taulli

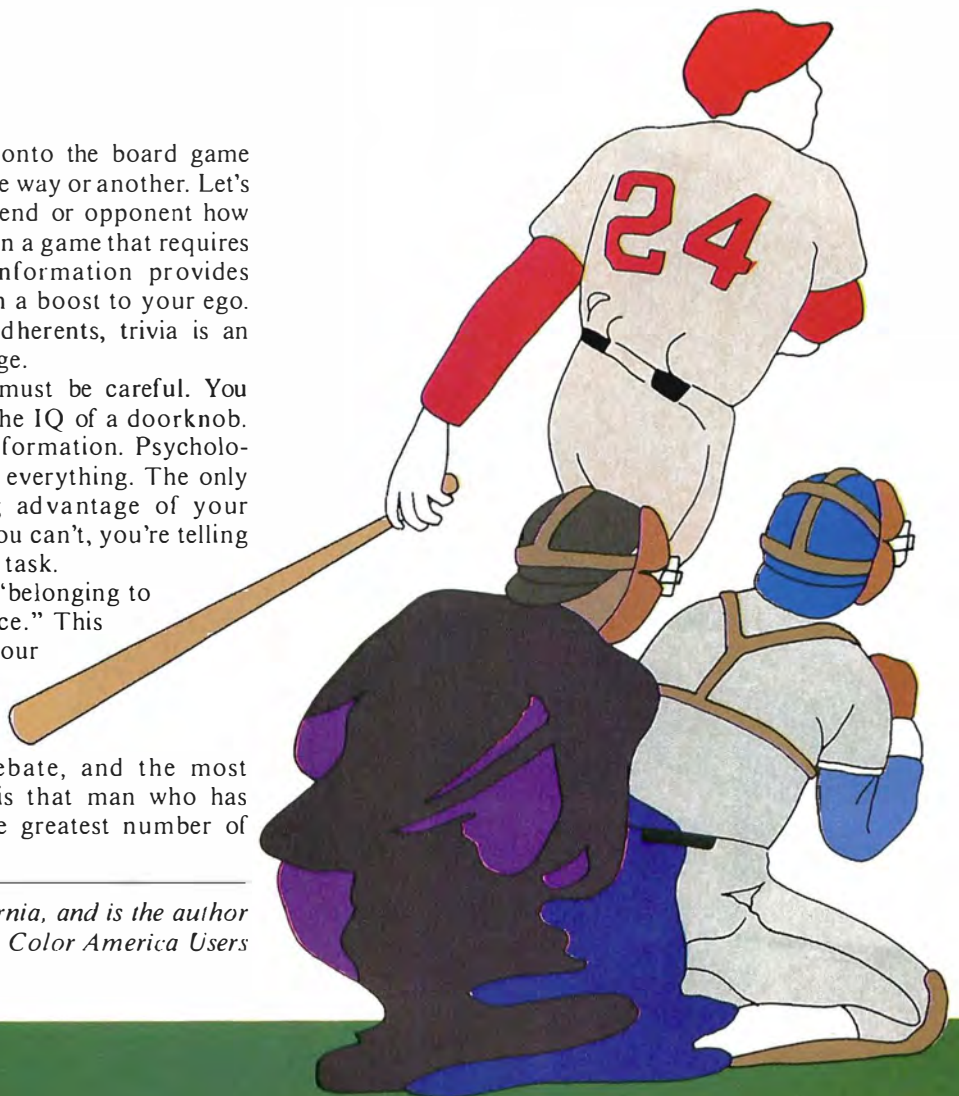
**E**ver since Trivial Pursuit burst onto the board game scene, trivia has affected us in one way or another. Let's face it, it's fun to show your friend or opponent how intelligent you are. Beating someone in a game that requires your ability to think and recall information provides immense satisfaction, not to mention a boost to your ego. For those who are Machiavellian adherents, trivia is an excellent, nonviolent means of revenge.

When playing trivia games, you must be careful. You don't want to be known for having the IQ of a doorknob. Relax and let your mind fetch the information. Psychologists have proven that we remember everything. The only thing preventing you from taking advantage of your memory is your attitude. If you say you can't, you're telling your subconscious to accomplish the task.

In Latin, the word "trivia" means "belonging to the crossroads," hence "commonplace." This seems inaccurate. Trivia exercises your mind, builds up that hunk of gray mass while providing fun. It was Edmund Burke who said that "the wisest in council, the ablest in debate, and the most agreeable in the commerce of life, is that man who has assimilated to his understanding the greatest number of facts."

---

*T.C. Taulli lives in Monrovia, California, and is the author of Do or Die. T.C. is a member of the Color America Users Group.*



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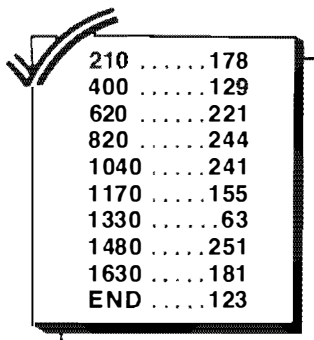


Since baseball is our national pastime, what would be more appropriate than having a program that tests your ability to answer questions about the game? But, beware! It's not as easy as you might think. The questions I've included cover many years, from Ty Cobb to Nolan Ryan — all the greats who fill the Hall of Fame.

My questions are fair. For example: Who was called the Bambino? And, of course, the answer is Babe Ruth. The questions are not like this: At what time in the day did Babe Ruth tie his shoes on October 2, 1930?

The program has several questions to fill your mind, to force you to concentrate and to learn. You don't have to worry about typing in the answer. The program is joystick controlled. I've also used Hi-Res graphics to make the program more attractive. We can't have anything but the best for baseball trivia. □

**Editor's Note: While the original program includes 120 questions, the following listing only includes 30. This is due to magazine space considerations. However, the 120-question version will be included on RAINBOW ON DISK and RAINBOW ON TAPE.**



210	.....	178
400	.....	129
620	.....	221
820	.....	244
1040	.....	241
1170	.....	155
1330	.....	63
1480	.....	251
1630	.....	181
END	.....	123

The listing: TRIVIA

```

1Ø CLEAR 5ØØ:CLS:DIMH$(12Ø,2),Y$(
(12Ø,4),QI(12Ø),I$(12Ø),MV(12Ø),
O$(12Ø)
2Ø H=RND(-TIMER)
3Ø H=Ø:P=1
4Ø TU=Ø:GH=Ø
5Ø FOR X=1 TO 41:READ I$(X):NEXT
:X=Ø
6Ø X=X+1:READH$(X,1):IFH$(X,1)="

```

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```

-1"THENZ5=X-1:X=Ø:GOTO5ØØ
7Ø READH$(X,2)
8Ø READY$(X,1),Y$(X,2),Y$(X,3),Y
$(X,4),QI(X):GOTO6Ø
9Ø DATA U8;R4;D4;L4;R4;D4;BR4
1ØØ DATA U8;R4;D3;L4;R4;D5;L4;R4
;BR4
11Ø DATA U8;R4;L4;D8;R4;BR4
12Ø DATA U8;R2;BR2;BD1;D6;BD1;BL
2;L1;R1;BR6
13Ø DATA U8;R4;L4;D4;R3;L3;D4;R4
;BR4
14Ø DATA U8;R4;L4;D4;R3;L3;D4;BR
8
15Ø DATA U8;R4;L4;D8;R4;U3;BD3;B
R4
16Ø DATA U8;D4;R4;U4;D8;BR4
17Ø DATA R2;U8;L2;R4;L2;D8;R2;BR
4
18Ø DATA U2;D2;R4;U8;D8;BR4
19Ø DATA U8;D4;R2;U2;R2;U2;D2;L2
;D2;L2;R2;D2;R2;D2;BR4
2ØØ DATA U8;D8;R4;BR4
21Ø DATA U8;F2;E2;D8;BR4
22Ø DATA U8;R4;D8;BR4
23Ø DATA U8;R4;D8;L4;R4;BR4
24Ø DATA U8;R4;D4;L4;D4;BR8
25Ø DATA U8;R4;D7;G1;L3;R3;E1;H2
;F3;BR4
26Ø DATA U4;R2;L2;R2;BR2;BD1;
D2;BD2;D3;BR4
27Ø DATA U2;D2;R3;E1;U2;H1;L2;H1
;U2;BU1;BR2;R2;D2;BD6;BR4
28Ø DATA BR2;L2;R4;BD8;BR4
29Ø DATA U8;D8;R4;U8;D8;BR4
3ØØ DATA BR2;U4;L2;U4;D4;R2;D4;R
2;U4;R2;U4;D4;L2;D4;BR6
31Ø DATA U8;D8;E2;F2;U8;D8;BR4
32Ø DATA U3;BU2;U3;BR4;D3;BD2;D3
;U3;BU1;BL2;L1;BD4;BR7
33Ø DATA BR2;U4;R2;U4;D4;L4;U4;D
4;BD4;BR8
34Ø DATAR4;L4;U2;R2;U3;R2;U3;L4;
R4;BD8;BR4
35Ø DATA BR4
36Ø DATA U8;R4;L4;D8;R4;BR4
37Ø DATA R4;U8;L4;R4;D8;BR4
38Ø DATA BR1;R2;BR6
39Ø DATA U8;R4;D8;L4;R4;BR4
4ØØ DATA R2;U8;L2;R2;D8;R2;BR4
41Ø DATA R4;L4;U4;R4;U4;L4;R4;BD
8;BR4
42Ø DATA R4;U4;L4;R4;L4;R4;D8
;BR4
43Ø DATA BR4;U8;D4;L4;U4;D4;R4;D
4;BR4
44Ø DATA R4;U4;L4;U4;R4;BD8;BR4

```

```

45Ø DATA U8;R4;L4;D8;R4;U4;L4;R4
;D4;BR4
46Ø DATA BR4;U8;L4;R4;D8;BR4
47Ø DATA U8;R4;D4;L4;D4;R4;U4;D4
;BR4
48Ø DATA BR4;U8;L4;D4;R4;D4;BR4
49Ø DATA BU8;R4;D3;L4;D2;BD2;D1;
BR8
50Ø PMODE3,1:SCREEN1,1:PCLS 5
51Ø CIRCLE(35,5Ø),3Ø,4,1,.16,.84
52Ø CIRCLE(95,5Ø),3Ø,4
53Ø CIRCLE(165,5Ø),3Ø,4,1,.16,.8
4
54Ø CIRCLE(225,5Ø),3Ø,4
55Ø DRAW"BM68,1ØØ;C3":P$="BASEBA
LL TRIVIA":GOSUB6ØØ
56Ø DRAW"BM75,124;C3":P$="BY T.C
.TAULLI":GOSUB6ØØ
57Ø DRAW"BM1ØØ,15Ø":P$="(C) 1985
":GOSUB6ØØ
58Ø DRAW"BM45,19Ø":P$="PUSH THE
JOYSTICK BUTTON":GOSUB6ØØ
59Ø GOTO 72Ø
60Ø FOR X=1 TO LEN(P$):U$=MID$(P
$,X,1):IFP$=""THENRETURN
61Ø U=ASC(U$)
62Ø IF U=46 THEN U=3Ø:GOTO 69Ø
63Ø IF U=32 THEN U=27:GOTO 69Ø
64Ø IF U=4Ø THEN U=28:GOTO 69Ø
65Ø IF U=41 THEN U=29:GOTO 69Ø
66Ø IF U=63 THEN U=41:GOTO69Ø
67Ø IF U=<57 THEN U=U-17:GOTO 69
Ø
68Ø U=U-64
69Ø DRAW I$(U)
70Ø NEXT
71Ø RETURN
72Ø B=PEEK(6528Ø):IFB=254ORB=126
THENPLAY"L802B":GOTO87Ø
73Ø GOTO 72Ø
74Ø J1=INT(JOYSTK(Ø)/15.75):JY=I
NT(JOYSTK(1)/15.75)
75Ø P=R:K=U:B=PEEK(6528Ø):IFB=25
4ORB=126THENQS=R:PLAY"L802B":GOT
096Ø
76Ø IF J=JY THEN 74Ø
77Ø IFJY=ØTHENR=13Ø:J=JY:GOTO82Ø
78Ø IFJY=2THENR=15Ø:J=JY:GOTO82Ø
79Ø IFJY=3THENR=17Ø:J=JY:GOTO82Ø
80Ø IFJY=4THENR=19Ø:J=JY:GOTO82Ø
81Ø GOTO74Ø
82Ø LINE(K,P)-(K+5,P-5),PSET,B
F
83Ø LINE(U,R)-(U+5,R-5),PSET,BF
84Ø B=PEEK(6528Ø):IFB=254ORB=126
THENQS=R:PLAY"L802B":GOTO96Ø
85Ø GOTO74Ø
86Ø U=1:R=13Ø:K=1:P=13Ø:LINE(U,R
)-(U+5,R-5),PSET,BF:GOTO74Ø

```

◆

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```

87Ø PCLS:A=Ø:X=Ø:H=RND(Z5):T1=T1
+1:IFT1>15THEN1Ø8Ø
88Ø MV(T1)=H:IFO$(H)="NO"THENH=R
ND(Z5):GOTO88ØELSE89Ø
89Ø O$(H)="NO"
9ØØ DRAW"BM2,1Ø":P$=H$(H,1):GOSU
B6ØØ
91Ø DRAW"BM2,25":P$=H$(H,2):GOSU
B6ØØ
92Ø J1=1:JY=1
93Ø FORM=1TO4:A=A+2Ø
94Ø P$=Y$(H,M):LINE(1,1ØØ)-(15,1
1Ø+A),PRESET:GOSUB6ØØ
95Ø NEXT:GOTO86Ø
96Ø IFR=13ØTHENQS=1
97Ø IFR=15ØTHENQS=2
98Ø IFR=17ØTHENQS=3
99Ø IFR=19ØTHENQS=4
1ØØØ IFQS=QI(H) THENP$="RIGHT":R
I=RI+1:ELSEP$="WRONG":WR=WR+1
1Ø1Ø PCLS:DRAW"BM1Ø,5Ø":GOSUB6ØØ
1Ø2Ø IFP$="WRONG"THENDRAW"BM1Ø,8
Ø":P$="THE CORRECT ANSWER IS ":G
OSUB6ØØ
1Ø3Ø IFLEFT$(P$,1)="T"THENDRAW"B
M1Ø,1ØØ":J1=QI(H):P$=Y$(H,J1):GO
SUB6ØØ
1Ø4Ø IFP$="RIGHT"THENPLAY"T4Ø1L8
CCCCBB"
1Ø5Ø DRAW"BM1Ø,12Ø":P$="PRESS JO
YSTICK BUTTON":GOSUB6ØØ
1Ø6Ø B=PEEK(6528Ø):IFB=254ORB=12
6THEN87Ø
1Ø7Ø GOTO1Ø6Ø
1Ø8Ø P$="SCORE":DRAW"BM9Ø,1Ø":GO
SUB6ØØ
1Ø9Ø P$=STR$(RI):P$=P$+" RIGHT":
DRAW"BM1Ø,5Ø":GOSUB6ØØ:RI=Ø
11ØØ P$="":P$=STR$(WR):P$=P$+" W
RONG":DRAW"BM1Ø,7Ø":GOSUB6ØØ:P$=
"":WR=Ø
111Ø P$="PRESS JOYSTICK BUTTON":
DRAW"BM2Ø,9Ø":GOSUB6ØØ:T1=Ø
112Ø FORX=1TO15:KL=MV(X):O$(KL)=
"":NEXT
113Ø B=PEEK(6528Ø):IFB=254ORB=12
6THEN87Ø
114Ø GOTO113Ø
115Ø DATAWHO HAD AN OVER 8ØØ BAT
TING,AVERAGE IN ONE SEASON?
116Ø DATATED WILLIAMS,BABE RUTH,
LOU GEHRIG,HANK AARON,2
117Ø DATAWHO STOLE 5Ø OR MORE BA
SES FOR,12 CONSECUTIVE SEASONS?
118Ø DATAPETE ROSE,MAURY WILLS,L
OU BROCK,TY COBB,3
119Ø DATAWHO SWIPED 27 CONSECUTI
VE BASES,WITHOUT BEING THROWN OU

```

```

T?
12ØØ DATATY COBB,JOE MORGAN,LOU
BROCK,RON LEFLORE,4
121Ø DATAWHO PITCHED TWO CONSECU
TIVE NO,HITTERS?
122Ø DATANOLAN RYAN,CY YOUNG,JOH
NNY VANDERMEER,SANDY KOUFAX,3
123Ø DATAWHO HIT A FAIR BALL OUT
OF,YANKEE STADIUM?
124Ø DATAMICKEY MANTLE,JOE DIMAG
GIO,ROGER MARIS,NO ONE HAS HIT O
NE OUT,4
125Ø DATAHOW MANY CONSECUTIVE GA
MES DID,LOU GEHRIG PLAY?
126Ø DATA2ØØØ,2Ø13,213Ø,3ØØØ,3
127Ø DATAWHO PITCHED THE MOST NO
HITTERS?,
128Ø DATANOLAN RYAN,SANDY KOUFAX
,JOHNNY VANDERMEER,BOB GIBSON,1
129Ø DATAWHO HIT THE MOST HOME R
UNS IN,A CAREER?
13ØØ DATAROGER MARIS,BABE RUTH,H
ENRY AARON,MICKEY MANTLE,3
131Ø DATAWHO HIT THE MOST HOME R
UNS IN A,SINGLE SEASON?
132Ø DATABABE RUTH,HENRY AARON,R
OGER MARIS,MICKEY MANTLE,3
133Ø DATAHOW MANY HOME RUNS DID
ROGER,MARIS HIT IN 1961?
134Ø DATA4Ø,3Ø,45,61,4
135Ø DATAHIT THE MOST HOME RUNS
FOR TIMES,AT BAT IN HIS CAREER.
136Ø DATAROGER MARIS,HENRY AARON
,BABE RUTH,MICKEY MANTLE,3
137Ø DATAWHO HAD THE GREATEST NU
MBER OF,CONSECUTIVE ERRORLESS GA
MES?
138Ø DATAMIKE HEGAN,RON CEY,GRAI
G NETTLES,STEVE SAX,1
139Ø DATAWHEN WAS THE FIRST BASE
BALL,GAME TELEVISED?
14ØØ DATA1937,1938,1939,194Ø,3
141Ø DATAWHEN WAS THE FIRST WORL
D SERIES,TELEVISED?
142Ø DATA1939,1946,1947,1948,3
143Ø DATAWHAT STATION TELEVISED
THE 1947,WORLD SERIES?
144Ø DATANBC,ABC,CBS,RKO,1
145Ø DATAWHO PLAYED IN THE 1947
WORLD,SERIES?
146Ø DATADODGERS VS YANKEES,DODG
ERS VS REDS,REDS VS YANKEES,YANK
EES VS CUBS,1
147Ø DATAWHO PLAYED IN THE FIRST
MAJOR,LEAGUE GAME ON TV?
148Ø DATACUBS VS DODGERS,REDS VS
DODGERS,CUBS VS REDS,YANKEES VS
DODGERS,2

```



149Ø DATAWHO DID JOE DIMAGGIO MARRY?,  
 15ØØ DATAMARILYN MONROW, JANE RUSSELL, LARAINÉ DAY, ELYSE KNOX, 1  
 151Ø DATAWHAT IS A FULL COUNT?,  
 152Ø DATA2 BALLS AND 2 STRIKES, 1 BALL AND NO STRIKES, 3 BALLS AND 2 STRIKES, 3 BALLS AND 3 STRIKES, 3  
 153Ø DATAWHO HAS HAD 9 SHUT OUTS IN A SEASON?  
 154Ø DATABOB GIBSON, RON GUIDRY, NOLAN RYAN, CY YOUNG, 2  
 155Ø DATAIN 198Ø WHO DID WILLIE RANDOLPH, PLAY FOR?  
 156Ø DATADODGERS, YANKEES, REDS, CUBS, 2  
 157Ø DATAWHAT IS THE DISTANCE BETWEEN THE, THREE BASES?  
 158Ø DATA8Ø FEET, 5Ø FEET, 6Ø FEET, 9Ø FEET, 4  
 159Ø DATAWHO DID DIZZY DEAN PLAY FOR?,  
 16ØØ DATAST LOUIS, REDS, CUBS, YANKEES, 1  
 161Ø DATAWHO DID DAFFY DEAN PLAY FOR?,  
 162Ø DATAST LOUIS, REDS, CUBS, YANK

EES, 1  
 163Ø DATAHOW LONG DID HENRY ARRON PLAY, FOR?  
 164Ø DATA2Ø YEARS, 21 YEARS, 22 YEARS, 23 YEARS, 4  
 165Ø DATAWHO HIT 5 HOMERUNS IN ONE DAY?,  
 166Ø DATASTAN MUSIAL, BABE RUTH, ROGER MARIS, MICKEY MANTLE, 1  
 167Ø DATAWHO DID ROD CAREW PLAY FOR IN, 1977?  
 168Ø DATACUBS, RED SOXS, TIGERS, TWINS, 4  
 169Ø DATAWHO WAS THE MANAGER OF THE YEAR, IN 198Ø IN THE AMERICAN LEAGUE?  
 17ØØ DATAYOGI BERRA, TOM LASORDA, BILLY MARTIN, WALTER ALSTON, 3  
 171Ø DATAWHO THREW A SHUT OUT IN THEIR, FIRST GAME?  
 172Ø DATAMIKE MORRIS, NOLAN RYAN, LEFV GROVE, SANDY KOUFAX, 1  
 173Ø DATAWHO WON THE 198Ø MOST VALUABLE, PLAYER AMERICAN LEAGUE AWARD?  
 174Ø DATAGEORGE BRETT, ROD CAREW, RON CEY, CECIL COOPER, 1  
 175Ø DATA -1

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## CORRECTIONS (Also, see Page 137)

"Charting the Ups and Downs of Life" (March 1987, Page 86): Michael Sims has written to alert us to a few minor errors in his program, *Graphit*. While the program appears to work normally, some of the output will be incorrect. To correct these errors, alter the following lines accordingly:

```
411Ø S=24Ø/RNUM
```

```
4175 IF A$="L" THEN IF R5=RNUM+2
      THEN 42ØØ ELSE IF R5=RNUM+1 THE
      N 42ØØ
```

```
9Ø5Ø PRINT#B, NAME$: PRINT#B, STRIN
G$(LEN(NA$), "-"): FORX=1TORNUM: PR
INT#B, TEST(X): NEXTX
```

Also, Mr. Sims has offered a little hint for program execution. He suggests you not use lowercase letters in the titles or labels. Otherwise, the program will crash.

**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.**



# Keying Into CoCo's Power

By Fred B. Scerbo  
Rainbow Contributing Editor

*Editor's Note: 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 that this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.*

I hope that you all enjoyed our little graphics experiments in the last two issues of THE RAINBOW. Both programs were the direct result of suggestions sent in by readers who use the Color Computer to educationally motivate their children. In recent months, I have received even more letters along the same line. We will take a look at what a few of these readers have had to say and then launch into another wish that took a little time to develop but will satisfy those of you who want to introduce the very young to computer skills. The program is called *CoCo Keys* and can be used with or without the Radio Shack Sound/Speech Cartridge.

*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.*



## What Readers Say

Sometimes I spend a great deal of time developing an educational program only to have one of my students dismiss it with a wise-guy remark like, "Couldn't you come up with anything better than that?" I am often tempted to dare them to come up with something better, but that would be a rather cheap way of soothing my bruised ego. Instead, I can counteract their remarks by turning to the reader mail, which arrives every few days. Since it is impossible to respond to these letters individually, I will take a crack at a few of them here.

Several readers have commented that they have had difficulty getting some of these talking programs to work, especially on the CoCo 3. Since I haven't made the jump to CoCo 3 yet, I am not sure whether any changes are needed to make speech programs work when the CoCo 3 is in its CoCo 2 mode. Shirley Moncrief of Hayward, California, ran into this problem. The program works perfectly with no error messages, but it just won't speak. There are two possible fixes for this.

First, sometimes the Voice Pak can be reactivated by pressing the reset button several times. I have run into this problem on my CoCo 1 and 2 every so often. For some reason, sometimes the Pak just seems to not engage.

Second, recheck the listing directly after the title card at the section where you select talking or non-talking. It is possible that the non-talking variable may have been accidentally typed into both lines. Naturally, there is a different

value for each, so it is possible that if the wrong value were typed into the talking line, it might make the program ignore the talking subroutines when the program is running. Again, to be safe, subscribe to RAINBOW ON TAPE and you will get a bug-free version every time. (No, the magazine listings do not have bugs in them. Those seem to creep into your CoCo somewhere between the pages and your typing fingers. A program need not show an error message to have a typo in it!)

Mae R. Hipp of Sun Valley, Nevada, had a little problem with our understanding relationships between fractions, decimals and whole numbers program in the January 1987 column. The caret, or little upward pointing sign, in Line 210 after the variable  $A=10$  is actually the up arrow on your keyboard. My lineprinter (an Okidata 82A) prints that figure as an arrow, but apparently the RAINBOW's professional lineprinter uses the up caret instead. If you see an up caret in any of these listings, be sure to use the up arrow when you type in the program. (Also, be sure to type it in correctly the first time, since if you try to edit it into the line using the EDIT command, you will not be able to. Using the up arrow exits the EDIT mode in Extended Color BASIC.)

## This Month's Idea

Sonya Hurst of Richmond, California, wrote a letter that served as the inspiration for this month's program. On a very colorful letterhead she ob-

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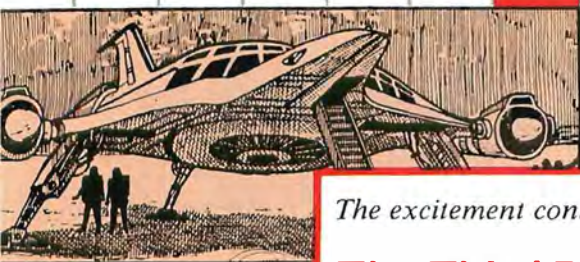
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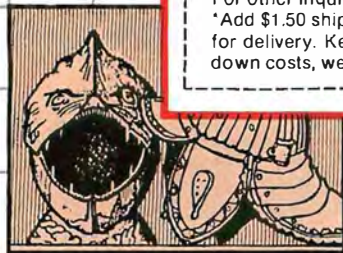
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viously created with her CoCo and Color Ink Printer, she wrote:

I have been trying to write a program that will draw a picture of the computer keyboard on the screen and put the letters and numbers on the keys. This was to be part of a spelling program for my 5-year-old daughter. I wanted to have the Speech/Sound Cartridge ask her to spell a word. If she spelled it incorrectly, I wanted the proper letters to be highlighted on the screen so she could see them, one at a time . . . I can get the picture of the keyboard, but not the letters.

She then included a short listing that would draw the keys on the screen. Rather than take this idea all by itself, I decided to write an entirely new routine that would draw a very precise keyboard with all the little details that I could cram into the resolution of PMODE4.

If you recall, my last two programs included a new graphics text routine that helped do the explaining about the blood and your heart. I tried this with our Speech Pak and even managed to get the results displayed in PMODE2/1, rather than PMODE 4/3. However, using PMODE2/1 would not give me enough detail to display the text for our double-duty keys on our CoCo keyboard (such as those that have shift characters). Therefore, it was necessary to make a few changes in this routine to get it to work in PMODE4. Even the DATA statements had to be changed.

The resulting program, *CoCo Keys*, is not the spelling program that Ms. Hurst was trying to write but, instead, is a very elementary (but classy looking) keyboarding program that introduces the user to the workings of the CoCo keyboard. It is not a typing tutor program. Rather, it is a program that will help the very young or very inexperienced to become more familiar with where to find specific keys on the keyboard.

Before we wrap up, I will also show you how to merge my graphics keyboard into your own BASIC keyboard program. With that in mind, let's launch into how to use *CoCo Keys*.

### Using the Program

*CoCo Keys* uses the PCLEARB command, so some older CoCo 1 models may give a syntax error when the program is first run. Simply re-run the program to proceed, or type PCLEAR B before running or loading the program.

To start the program, enter RUN. If a



red screen appears, press ENTER to continue. If the screen is blue, press reset and run it until the screen appears red. Then you may proceed with a full-scale running of the listing.

On running the program, you get our very familiar "Wishing Well" title screen. You are asked to choose between (T)alking or (N)ot by pressing the appropriate key. *CoCo Keys* does not need speech to be run effectively. If you choose non-talking, you may read the text to a child who is using the program. It can be just as effective when used this way. In fact, it can be more effective if the child cannot understand the computer's artificial speech.

The screen will make a slight pause while it is jumbling the order of the keys. The screen will then display 58 different keys for the user to find and press when prompted. Pressing the correct key will cause that key to be highlighted on the screen. Another choice will then be displayed quickly.

Granted, it may not seem to be much, but creating the keyboard was quite time-consuming. It will be put to use in other programs in later issues. Besides, you may want to use it yourself.

In any case, *CoCo Keys* can be a good introduction to coordinating keystrokes with visual and speech prompts. When using the Speech Pak, the computer will say which key it wants pressed. If you press the correct key, the key flashes on the screen and the com-

puter speaks a correct response to you. If you press the wrong key, the screen flashes green and waits for you to try again.

A few warnings: Do not press the keys too quickly because your CoCo holds a number of keystrokes in its buffer. You may press several keys and end up with several incorrect responses. Also, be sure to shift for the shifted characters on the keyboard. If you press without the SHIFT, the response is wrong. If you want to check your progress, press SHIFT-CLEAR to go to the scorecard. You will see how well you have done and may choose to either start over, end or press C to continue where you left off.

### Using the Graphic Keyboard

There is a very simple way to remove the graphic of the keyboard from this program if you have a disk. Run the program up to the point where the keyboard is drawn and then press BREAK before the text is printed at the bottom of the screen. With a disk in the drive, type:

```
SAVE"KEYBRD",3584,9227,0
```

and press ENTER. The graphic of the keyboard will now be saved to disk. You may reload it into your own program by including a line with:

```
PMODE4,1:SCREEN1,1:LOADM"KEYBRD"
```

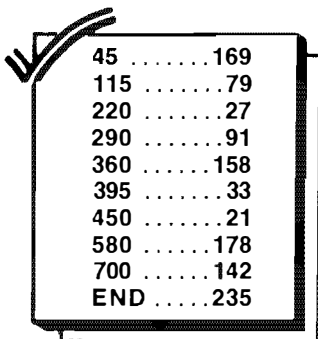
This will reload the keyboard to your screen. The DATA statements include the locations of each key and character.

If you do not have a disk drive, you would have to use most of the program lines listed here. Anyone wanting to use the keyboard graphic in their own home

programs is free to do so. However, please do not ask me if you may use it in a commercial program. The answer is no.

While this program may seem almost pre-school, believe me, older users will not get a perfect score the first time. It

can be very valuable for learning where things are on your keyboard. In fact, very soon you may see this graphic included in an educational game I am working on. Until then, keep your letters and requests coming in. They are getting better all the time. □



The listing: COCKEYS

```

Ø PCLEAR8
1 REM *****
2 REM *      CO CO KEYS      *
5 REM *      BY FRED B.SCERBO *
6 REM *      6Ø HARDING AVE. *
7 REM *      NORTH ADAMS,MA Ø1247 *
8 REM *      COPYRIGHT (C) 1987 *
9 REM *****
1Ø PMODE4,1:PCLS1:SCREEN1,1:PMOD
E3:PCLS2
15 X$=INKEY$:IFX$<>CHR$(13)THEN1
5
2Ø CLSØ:PRINTSTRING$(32,156);:FO
RI=1TO256:READA:PRINTCHR$(A+128)
;:NEXT:PRINTSTRING$(32,156);
25 DATA46,44,44,44,42,46,44,44,4
5,116,126,,,112,126,12Ø,126,124,
124,124,122,122,,,112,122,117,12
4,124,124,124,125
3Ø DATA42,,,,,42,,,,37,,122,,112,
118,,,122,,,,12Ø,122,,,112,122,1
17,,,,,
35 DATA42,,,,,34,42,,,,37,,122,112
,118,,,122,,,,,122,,112,122,11
7,,,,,
4Ø DATA44,44,44,44,4Ø,44,44,44,4
4,,123,118,,,,,123,115,115,119,,
121,112,,113,12Ø,117,115,115,115
,115,115
45 DATA11Ø,1Ø8,1Ø8,1Ø8,1Ø6,11Ø,1
Ø8,1Ø8,1Ø9,112,122,116,114,,,,12
2,,,116,112,,121,115,12Ø,,,,,1
17
5Ø DATA1Ø6,,,,,1Ø6,,,1Ø1,,122,,1
16,114,,112,122,,,,,122,,,,,
,117

```

```

55 DATA1Ø6,,,,,98,1Ø6,96,96,1Ø1,,
122,,,116,114,,122,,,112,114,,11
2,122,,,113,112,,,,,117
6Ø DATA1Ø8,1Ø8,1Ø8,1Ø8,1Ø4,1Ø8,1
Ø8,1Ø8,1Ø8,116,124,,,,,116,12Ø,12
4,124,124,124,12Ø,,116,124,,116
,124,124,124,124,124
65 PRINT@357," KNOWING THE KEYBO
ARD ";;:PRINT@389," (T)ALKING OR
(N)OT ? ";
7Ø PRINT@421,"      BY FRED B.SCERB
O ";
75 PRINT@453,"      COPYRIGHT (C) 19
87 ";
8Ø X$=INKEY$:IFX$="T"THEN1ØØ
85 IFX$="N"THEN95
9Ø GOTO8Ø
95 NT=1
1ØØ CLSØ:PRINT@264," PLEASE STAN
D BY ";
1Ø5 XX=&HFFØØ:YY=&HFF7E
11Ø POKEXX+1,52:POKEXX+3,63
115 POKEXX+35,6Ø
12Ø DIMR(23),L$(26),Y(4Ø),A(58,2
),K$(58),G$(58),K(58),L(58):C$(1
)="C1":C$(2)="C2":C$(3)="C3":C$(
4)="C4"
125 FORI=1TO58
13Ø K(I)=RND(58):IFL(K(I))=1THEN
13Ø
135 L(K(I))=1:NEXTI
14Ø FORI=1TO26:READL$(I):NEXT
145 GOTO275
15Ø AA$=JK$
155 A$=STR$(A):B$=STR$(B)
16Ø DRAW"BM"+A$+",""+B$+C$(CL)
165 IF LEN(JK$)<=24THEN185
17Ø FOR T=24TOØSTEP-1:IF MID$(JK
$,T,1)=" "THEN18Ø
175 NEXT T:GOTO185
18Ø L$=LEFT$(JK$,T):W$=L$:GOSUB1
9Ø:JK$=" "+RIGHT$(JK$, (LEN(JK$))
-T):GOTO155
185 W$=JK$:B=B+14:GOSUB19Ø:RETUR
N
19Ø SL=LEN(W$):FORI=1TOSL:BB$=MI
D$(W$,I,1):C=ASC(BB$)-64:IF C=-3
2THEN DRAW"BR6":GOTO21Ø
195 IF C=-18THENDRAW"BR2RBR9":GO
TO21Ø
2ØØ IFC=-2ØTHENDRAW"BR2R2D2G2E4B

```

```

R7":GOTO21Ø
2Ø5 DRAWL$(C)
21Ø NEXTI:B=B+14:RETURN
215 IFNT=1THENRETURN
22Ø FORII=1TOLEN(AA$)
225 IF PEEK(YY)AND 128=Ø THEN225
23Ø POKEYY,ASC(MID$(AA$,II,1))
235 NEXTII
24Ø IFPEEK(YY)AND128=ØTHEN24Ø
245 POKEYY,13
25Ø FORHH=1TO6ØØ:NEXTHH:RETURN
255 RETURN
26Ø DATA U6E2R2F2D2NL4D4BR6,U8R4
F2G2NL4F2G2NL4BR8,U8R6ND2BD8NU2N
L6BR6,U8R4F2D4G2NL4BR8,U8NR4D4NR
4D4R4BR6,U8NR4D4NR4D4BR1Ø,U8R6BD
4NL2D4NL4BR6,U4NU4R6U4D8BR6
265 DATA R2U8L2R4L2D8R2BR6,NU4R4
U8L4R6BD8BR6,U8D4R2NE4F4BR6,NU8R
4BR6,U8F4E4D8BR6,U8F6NU6D2BR6,U8
R6D8NL6BR6,U8R6D4L6D4BR12,U8R6D8
NL6NH4NF2BR6
27Ø DATA U8R6D4L4F4BR6,R6U4L6U4R
6BD8BR6,BR4U8L4R8BD8BR6,NU8R6NU8
BR6,BU8D4F4E4U4BD8BR6,NU8R4NU6R4
NU8BR6,E8G4H4F8BR6,BU8D2F4ND2E4U
2BD8BR6,NR8E8NL8BD8BR6
275 GOTO28Ø
28Ø PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3
285 LINE(Ø,Ø)-(256,92),PRESET,BF
29Ø DRAW"BM1Ø,16":FORI=1TO13:GOS
UB465:PAINT(4+(I*18),12),3,3:NEX
T
295 DRAW"BM2,34":FORI=1TO14:GOSU
B465:PAINT((I*18)-6,28),3,3:NEXT
3ØØ DRAW"BM4,52":FORI=1TO11:GOSU
B465:PAINT((I*18)-2,42),3,3:NEXT
:DRAW"C4U14R32D14NL32BR4":PAINT(
(I*18)-2,42),4,4:GOSUB465:PAINT(
242,42),3,3:PAINT(242,42),4,1
3Ø5 DRAW"BM4,7ØU14R28D14NL28BR4"
:FORI=1TO1Ø:GOSUB465:PAINT((I*18
)+6,6Ø),3,3:NEXT:DRAW"U14R28D14L
28":PAINT((I*18)+6,6Ø),3,3:PAINT
(236,6Ø),3,3:PAINT(236,6Ø),4,1
31Ø PAINT(24,6Ø),4,1:PAINT(1Ø,32
),4,1:PAINT(1Ø,48),4,1:PAINT(248
,32),4,1:PAINT(218,32),4,1
315 CL=1:A=6:FORF=1TO1Ø:READJK$:
A=A+18:B=32:GOSUB155:NEXT
32Ø DATA Q,W,E,R,T,Y,U,I,O,P
325 A=8:FORF=1TO9:READJK$:A=A+18
:B=5Ø:GOSUB155:NEXT
33Ø DATA A,S,D,F,G,H,J,K,L
335 A=22:FORF=1TO7:READJK$:A=A+1
8:B=68:GOSUB155:NEXT
34Ø DATA Z,X,C,V,B,N,M
345 COLOR1,4:LINE(6Ø,74)-(196,88

```

```

),PRESET,BF
35Ø PAINT(236,6),2,1
355 PMODE4:DRAW"CØBM12,48NE3NH3U
8BU1ØBL2U8NF3G3"
36Ø PMODE4:DRAW"BM6,64CØ":FORI=1
TO2:DRAW"R4U2L4U2R4BR2D4U2R4U2D4
BR4U4BR4ND4NR2D2NR2U2BR4R2ND4R2B
D4BR186":NEXT
365 DRAW"BM2Ø4,46CØNR4U2NR4U2R4B
R2ND4F4U4BR2R2ND4R2BR2NR4D2NR4D2
R4BR2U4R4D2L4R2F2BR1ØNR2U4R2BR4D
4NR2BU2ØNH2NG2L8BL1ØL8NE2NF2"
37Ø PMODE3:DRAW"C1BD7BL14L2H2U6E
2R4F2D4G2L2H2U4R2BG14BL2BDD2NR2N
L2D2BD2DBD2DG2"
375 DRAW"BL19BD5G3F3BLBD2D2G2BR1
8BU2BU3E3H3BR16R4D2L2D2BD2DBD5E
4
38Ø PMODE3:DRAW"BM18,15C1U5NGBU2
UBU2U2BR14ND2BR4D2BD4NL4D3L4D3R4
BR14R4U3NL2U3L4BU2U2NL2NR6U2NL2N
U2R6L2U2D6BR14R4U3L4U3R4L2NU2D8B
L3D4R8U4D6"
385 DRAW"BR12R4U3L4U3R4BU3NEBL4E
4BL4LBR18R3DG2DR4H4BD7NR4D6R4U4N
L4BU2BR14R6M-4,+6BU1ØU2BR2ØBUG2D
F2BD2BL2R4D3L4U3D6R4NU3BR14R4U3L
4U3R4ND3BU2BL2E2UH2BR14BD7D6NE4B
RR4U6NL4BR14BD2NRBD2NRBU8NE2NH2N

```



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```

F2NG2NU2ND2BR16BDR4BU2L4BD8R4C4B
R14U6NL2R4D3NL4D3NL6BR4U6
390 REM
395 FORI=1TO58:READA(I,1),A(I,2)
,K$(I),G$(I):NEXT:G$(49)=CHR$(34
)
400 PCOPY1TO5:PCOPY2TO6:PCOPY1TO
7:PCOPY2TO8
405 LINE(0,96)-(256,134),PRESET,
B:JK$=" FIND THIS CHARACTER
ON YOUR KEYBOARD." :A=0:B=112
:CL=2:GOSUB150
410 AA$="FIND THIS KARRECTER ON
YOUR KEY BOARD":GOSUB215
415 FORZZ=1TO58:COLOR1,4:PMODE4,
1:LINE(0,140)-(256,192),PSET,BF:
PMODE3:Z=K(ZZ):QW=LEN(K$(Z)):QR=
INT((26-QW)/2)+2:JK$=STRING$(QR,
32)+K$(Z):CL=3:B=160:GOSUB150:GO
SUB215
420 X$=INKEY$:IFX$=CHR$(3)THEN42
0
425 IFX$=CHR$(92)THEN760
430 IFX$=G$(Z)THEN440ELSEIFX$=""
THEN420
435 AA$="SORRY. YOU ARE WRONG":G
OSUB215:FORJL=1TO6:PMODE4,1:SCRE
EN1,0:FORJM=1TO90:NEXTJM:SCREEN1
,1:FORJM=1TO90:NEXTJM,JL:NW=NW+1
:GOTO420
440 AA$="THAT IS CORRECT":GOSUB
215:PCOPY7TO5:PCOPY8TO6:PMODE3,5
:LINE(A(Z,1),A(Z,2))-(A(Z,1)+14,
A(Z,2)+14),PSET,BF
445 FORW=1TO10
450 PCOPY5TO1:PCOPY6TO2
455 PCOPY7TO1:PCOPY8TO2:NEXTW:NR
=NR+1:NEXTZZ
460 FORWW=1TO500:NEXT:GOTO760
465 DRAW"C3U14R14D14NL14BR4":RET
URN
470 DATA10,2,THE NUMBER ONE,1
475 DATA28,2,THE NUMBER TWO,2
480 DATA46,2,THE NUMBER THREE,3
485 DATA64,2,THE NUMBER FOUR,4
490 DATA82,2,THE NUMBER FIVE,5
495 DATA100,2,THE NUMBER SIX,6
500 DATA118,2,THE NUMBER SEVEN,7
505 DATA136,2,THE NUMBER EIGHT,8
510 DATA154,2,THE NUMBER NINE,9
515 DATA172,2,ZERO,0
520 DATA190,2,A COLON,":"
525 DATA208,2,A DASH OR MINUS,-
530 DATA20,20,THE LETTER Q,Q
535 DATA38,20,THE LETTER W,W
540 DATA56,20,THE LETTER E,E
545 DATA74,20,THE LETTER R,R
550 DATA92,20,THE LETTER T,T
555 DATA110,20,THE LETTER Y,Y

```

```

560 DATA128,20,THE LETTER U,U
565 DATA146,20,THE LETTER I,I
570 DATA164,20,THE LETTER O,O
575 DATA182,20,THE LETTER P,P
580 DATA200,20,THE AT SIGN,@
585 DATA22,38,THE LETTER A,A
590 DATA40,38,THE LETTER S,S
595 DATA58,38,THE LETTER D,D
600 DATA76,38,THE LETTER F,F
605 DATA94,38,THE LETTER G,G
610 DATA112,38,THE LETTER H,H
615 DATA130,38,THE LETTER J,J
620 DATA148,38,THE LETTER K,K
625 DATA166,38,THE LETTER L,L
630 DATA184,38,A SEMICOLON,;
635 DATA184,38,A PLUS SIGN,+
640 DATA36,56,THE LETTER Z,Z
645 DATA54,56,THE LETTER X,X
650 DATA72,56,THE LETTER C,C
655 DATA90,56,THE LETTER V,V
660 DATA108,56,THE LETTER B,B
665 DATA126,56,THE LETTER N,N
670 DATA144,56,THE LETTER M,M
675 DATA162,56,A COMMA,","
680 DATA180,56,A PERIOD, "."
685 DATA198,56,A SLASH,/
690 DATA162,56,LESS THAN SIGN,<
695 DATA180,56,GREATER THAN SIGN
,>
700 DATA198,56,QUESTION MARK,?
705 DATA10,2,EXCLAMATION POINT,!
710 DATA28,2,QUOTATION MARKS,
715 DATA46,2,THE NUMBER SIGN,#
720 DATA64,2,A DOLLAR SIGN,$
725 DATA82,2,A PERCENT SIGN,%
730 DATA100,2,THE AND SIGN,&
735 DATA118,2,AN APOSTROPHE,'
740 DATA136,2,OPEN PARENTHESIS,(
745 DATA154,2,CLOSE PARENTHESIS,
)
750 DATA190,2,AN ASTERISK,*
755 DATA208,2,AN EQUAL SIGN,=
760 CLS
765 CLS:PRINT@101,"YOU TRIED"NR+
NW"PROBLEMS &":PRINT@165,"ANSWER
ED"NR"CORRECTLY"
770 PRINT@229,"WHILE DOING"NW"WR
ONG."
775 NQ=NR+NW:IFNQ=0THEN NQ=1
780 MS=INT(NR/NQ*100)
785 PRINT@293,"YOUR SCORE IS"MS"
%."
790 PRINT@357,"ANOTHER TRY (Y/N/
C) ?";
795 X$=INKEY$:IFX$="Y"THENRUN
800 IFX$="N"THENCLS:END
805 IFX$="C"THENPMODE4,1:SCREEN1
,1:PMODE3:GOTO420
810 GOTO795

```



**NEW TRIG ATTACK** - (100% ML) In this educational game, enemy *trigs* with names like sine, cosine and tangent, travel along math curves. Players learn important mathematical concepts as they destroy the *trigs* with their *rotating slope*. Trig Attack is filled with sound effects and colorful graphics. The game features 11 challenging levels and 7 different *trig* enemies. First class mathematical entertainment for ages 9 and up. Excellent manual includes an introduction to trigonometry. Tape 16K CB/Disk 32K ECB; CoCo 1, 2, 3; \$19.95.

## CALLIGRAPHER

**CoCo Calligrapher** - (Hybrid BASIC/ML) 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 1/2 inch high and variably spaced. Works with many printers including Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter. Additional fonts are available (see below). Tape/Disk; \$24.95.

**OS9 Calligrapher** - (C) Although a different program from the CoCo Calligrapher, the OS9 Calligrapher prints all the same fonts. It reads a standard text file which contains text and formatting directives. You may specify the font to use, change fonts at any time, centering left, right or full justification, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX (tm) systems. Includes *Gay Nineties*, *Old English* and *Cartoon* fonts. Additional fonts are available (see below). Disk only; OS9; \$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, reversed and reduced-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*;

**Economy Font Packages** on disk; specify RSDOS or OS9; 20.95: **Font Package #1** - Above font sets 1, 2 and 3 (25 fonts) on one disk. **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts) on one disk.

## UTILITIES

**Auto Run 04** - (Hybrid BASIC/ML) Utility to allow your own *tape-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Includes a graphics editor to create professional looking title screens. Tape only; 16K ECB; \$19.95.

**Piratecor** - (100% ML) Utility to allow your own *disk-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Adds copy protection to your programs but still allows users to create *non-executable* backups! Includes *Semigraf*. Disk only; CoCo 1, 2, 3 (except *Semigraf*); \$30.95.

A complete catalog of other sweet Sugar Software products is available.

**Semigraf Graphics Editor** - (100% ML) Use 8 colors and standard text characters to draw graphics pictures and screens in high resolution *semigraphics* mode. Includes sample pictures. Tape/Disk; 16K CB; \$19.95.

**Super Screen Machine** - (100% ML) Put your CoCo into high resolution mode for your own BASIC or ML programs. Smooth scroll, key click, lower case with colored characters, many other features. Tape/Disk; 32K CB; CoCo 1, 2, 3 (except 64K mode); \$19.95.

**Color Disk Manager** - (100% ML) Disk utility with these features: Disk repair, selective track initialization, verify sectors, backups, tape to disk transfer, ROM Pak execution from disk, much more! Tape/Disk; CoCo 1, 2, 3 (except for 64K mode); \$24.95.

**Color Tape Manager** - (100% ML) Tape utility with these features: display start, end and exec address of ML programs convert ML programs into BASIC DATA statements, append ML to BASIC, load, display/modify and save tape file, handles missing EOF and filename blocks, much more! Tape/Disk; 16K ECB; CoCo 1, 2, 3 (except for 64K mode); \$19.95.

## INFORMATION MGT.

**TIMS (The Information Management System)** - (Hybrid BASIC/ML) 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 (see combo pkg below).

**TIMS Mail** - (Hybrid BASIC/ML) 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, 2 1/4 to 4 inches wide. Tape/Disk; \$19.95 (see combo pkg below).

**TIMS Utility** - (Hybrid BASIC/ML) Utility companion for TIMS and TIMS Mail to allow multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; \$14.95 (see combo pkg below).

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

## SPORTS STATISTICS

Statistics programs for the coach, team manager or avid fan who wants to keep accurate team and opponent records. Printer output supported. The following are available: *Baseball*, *Basketball*, *Football* and *Soccer*. Disk only; \$19.95 each.

## EDUCATIONAL

**Silly Syntax** - (Hybrid BASIC/ML) Ages 5 and up. Story creation game; output to screen or printer; includes 2 stories or create your own. Tape/Disk; \$10.95 or disk with 62 stories for \$20.95. Sets of 10 stories on tape/disk for \$4.95: *Fairy Tales*, *Current Events*, *X-Rated*, *Sing-Along*, *Adventure*, *Potpourri*.

**Bible Stories Adventure** - (Hybrid BASIC/ML) Ages 4 & up. A graphics adventure game for young children & their families. Old testament. Tape/Disk; \$19.95.

**The Presidents of the USA** - (100% ML) Ages 10 and up. Two trivia games, user modifiable, printer output supported. Tape/Disk; 16K ECB; \$10.95.

**The Great USA** - Ages 9 and up. Trivia game of the 50 states. Capitals, nicknames, abbreviations, flowers, trees and birds. Tape/Disk; 16K ECB; \$19.95.

**Galactic Hangman** - Ages 7 and up. Exciting new twist to the popular word game. Outstanding graphics; 700 word vocabulary. Tape/Disk; 16K ECB; \$19.95.

**PreReader** - (Hybrid BASIC/ML) Ages 3-5 (level 1); Ages 5-7 (level 2); Great graphics and music. Level 1: match colors, shapes, letters and numbers; Level 2: match letters and consonant blends with their sounds. Tape/Disk; Joystick; \$10.95.

**Statgraf** - High school and college level; Linear regression analysis program combined with a plotting and line graphing system. Up to 250 x/y pairs; data transformation; residuals; regression line; print graph with screen print program (not supplied); Tape/Disk; \$19.95.

## SPECIAL INTEREST

**Rental Property Income and Expense Management Package** - Maintain your rental property income and expense records. Print output supported. 28 expense categories. *This program may be tax deductible*. Disk only; \$20.95.

**Radio Systems Design Calculations** - Performs 14 different calculations commonly used in design or evaluation of land mobile radio systems, satellite TV, etc. Tape/Disk; \$19.95.

**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 or yarn; 8 sizes from baby to man. Tape/Disk; \$19.95.

**Flying Tigers** - (100% ML) *Fast Defenders* style arcade game. 5 levels of difficulty; Great graphics and sound effects. Tape/Disk; Joystick; \$19.95.



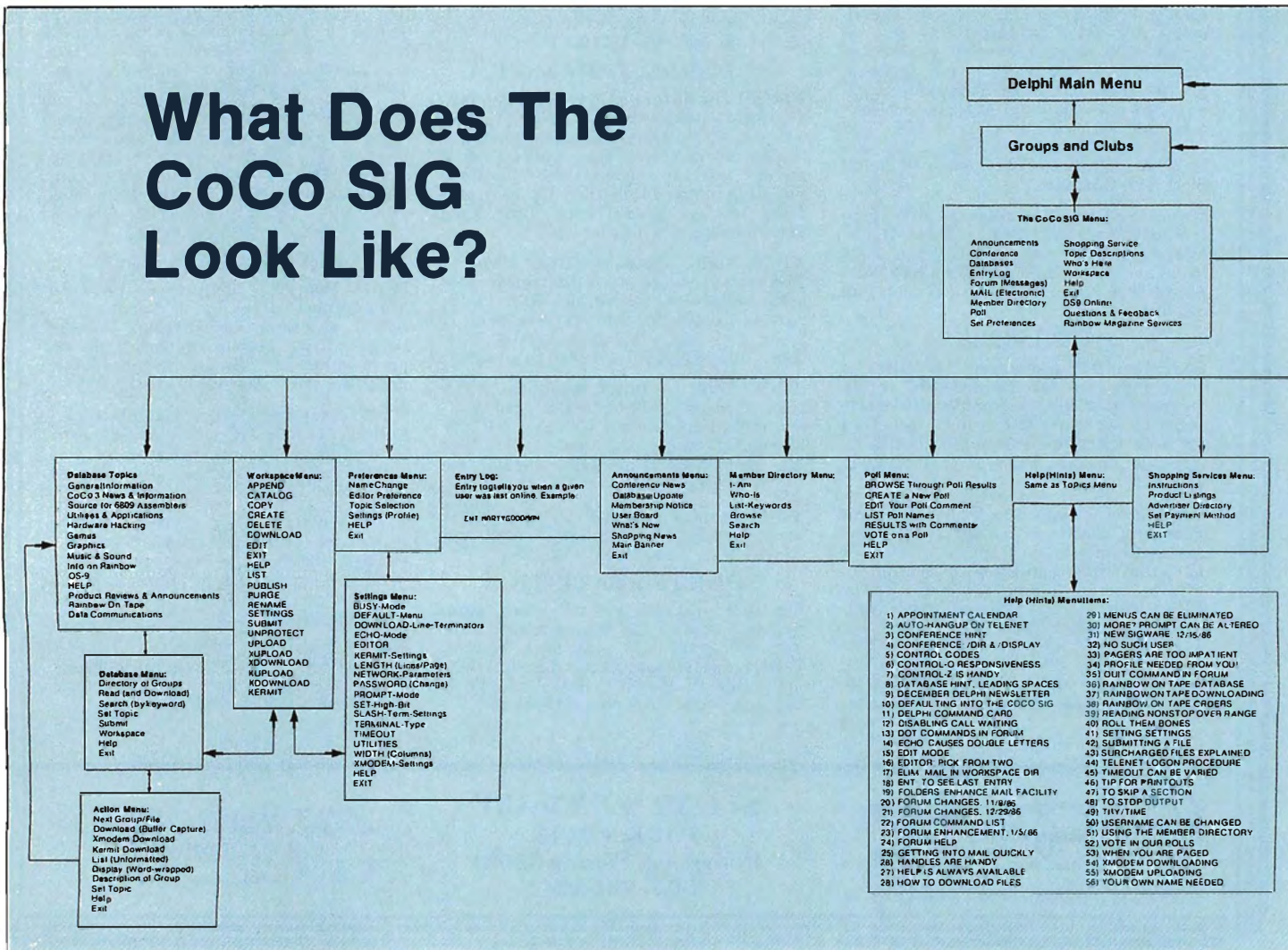
**SUGAR SOFTWARE**  
P.O. Box 7446  
Hollywood, Florida 33081  
(305) 981-1241

All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add \$1.50 per tape or disk for postage and handling. Florida residents add 6% sales tax. COD orders add \$4. Dealer inquiries invited.

# All Roads Lead to The CoCo-SIG

By Cray Augsburg  
Rainbow Technical Editor

## What Does The CoCo SIG Look Like?



Some of you may have been wondering about recent changes in the opening banners for the CoCo and OS9 Online SIGs. Because of my ever-increasing duties here at RAINBOW, and also because of the type of work **Marty Goodman** (MARTYGOODMAN) has been doing in the CoCo SIG, Marty has officially been named SIGop of the CoCo SIG. For some time now **Don Hutchison** (DONHUTCHISON) has been doing quite a bit of work in the database areas and, therefore, when Marty was named SIGop, Don is placed in charge of the CoCo SIG databases. I will continue to write "Delphi Bureau" each month and serve as RAINBOW's "technical liaison" to the CoCo SIG. However, to reflect the change in database managers, Don is also taking over Marty's duties in writing the Database Manager's report.

In the OS9 Online SIG, **Greg Law** (GREGLAW) has been spending greater amounts of online time handling "staff" matters. At the same time, **Dale Lear** (DALELEAR) has found that he has been unable to be online as much as he would

like due to work and family. To reflect this, Greg has been officially named the SIGop of the OS-9 Online SIG. Dale has agreed to stay with the SIG and, along with **Rick Adams** (RICKADAMS), serve in the capacity of OS-9 Consultant.

**Jim Reed** (JIMREED) remains the Group manager for both SIGs as well as for the Aviation SIG recently formed for NEW PILOT by Falsoft.

These changes more accurately reflect the work actually being done by the various staff members. We believe they

are in the best interest of all concerned and believe you will agree. Please take a moment online to welcome these people to their new positions and show them your support.

This month's "Delphi Bureau" will run rather short so that we can bring you the map of the CoCo SIG. Actually, we created this map for the "Intro to the Delphi SIGs" seminar at the recent Chicago RAINBOWfest. It seemed to be a great help to people there, so we decided to publish it here.

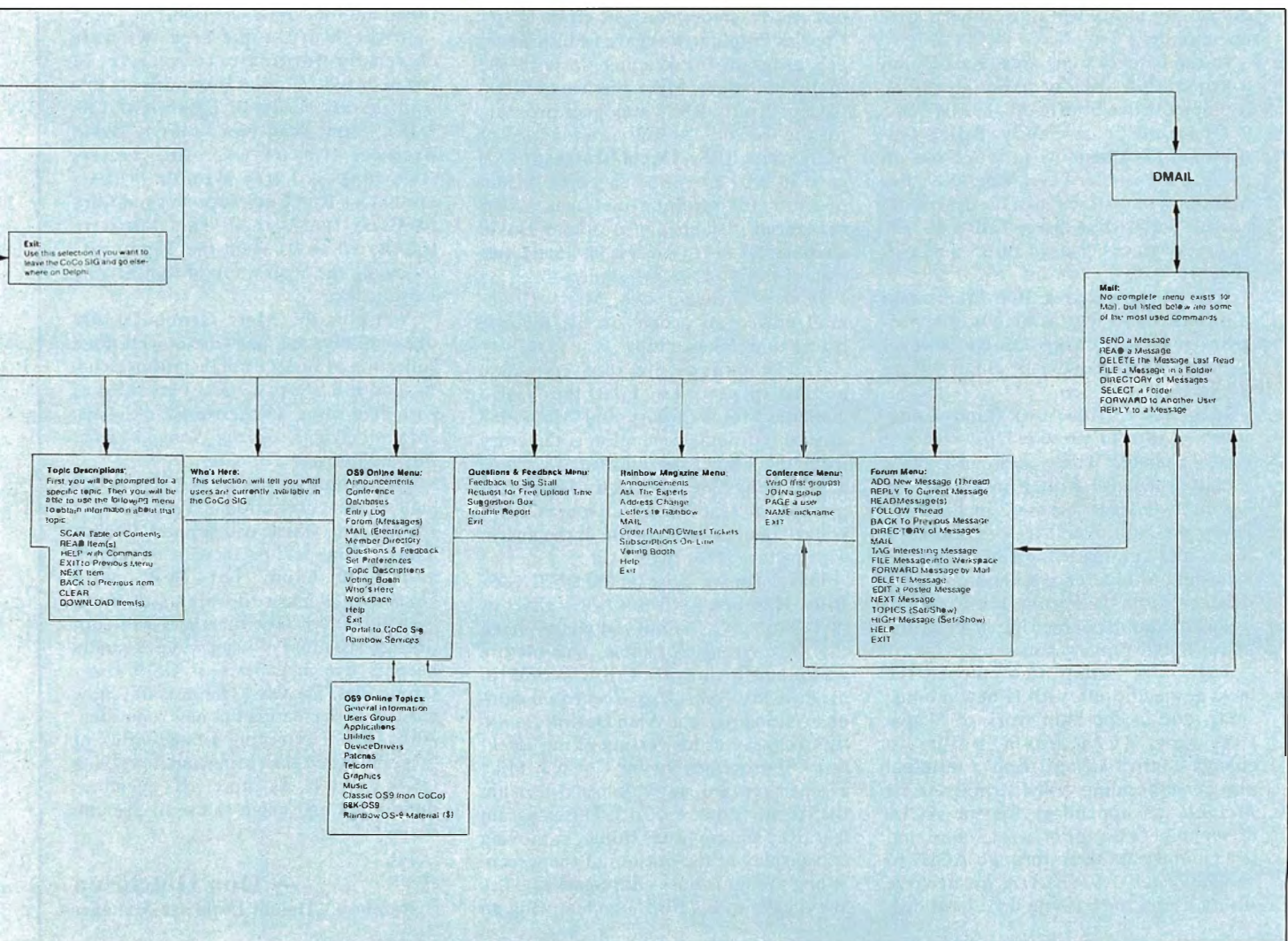
## DATABASE REPORT

The latest Chicago RAINBOWfest was a huge success!

Our Delphi booth was manned by **Rusty Williams** (RUSTY) of Delphi's marketing division and **Marty Goodman** (MARTYGOODMAN) from the SIGs. Visitors to RAINBOWfest noted that Marty added his usual color and pageantry to the booth, while Rusty provided a professional touch to the operation. **Roger Bouchard** (HARBIE), **Steve Bjork** (6809ER), **Erik Gavruluk** (ERIKGAV) and

**Greg Miller** (GREGMILLER) also spent considerable time at the Delphi booth and helped to make it a success.

Several CoCo SIG and OS-9 Online staff members contributed time, providing online demonstrations to prospective Delphi members during the show. At various times, **Rick Adams** (RICKADAMS), **Greg Law** (GREGL), **Richard Esposito** (DOCTORASCH) and I, **Don Hutchison** (DONHUTCHISON), were found online from different areas of the country



demonstrating the instantaneous communications that Delphi offers. The conference area of the CoCo SIG featured a nearly continuous online conversation entitled "Live from RAINBOWfest." Rick Adams amused the online crowd continuously by demonstrating the humorous macros he uses with *Rickeyterm*, the CoCo 3 terminal program he authored.

Other Delphi regulars present were **Kevin Darling** (KDARLING), **Roy Cosby** (UNCLE) and **Art Flexser** (ARTFLEXSER). Of course, most of the RAINBOW staff was present, including **Lonnie Falk** (LFALK), **Jim Reed** (JIMREED), **Dan Downard** (DANDOWNARD) and **Cray Augsburg** (CRAY).

#### OS-9 Online

We are getting a good number of uploads, as more and more of our members acquire OS-9 Level II and begin to spend their time learning about it.

In the General Information section of the OS-9 Online service, **Bill Brady** (WBRADY) gave us a file called WIZ. PRD, which describes his new terminal program *The Wiz*, to be marketed by Frank Hogg.

In the Utilities section, **Dennis Weldy** (OS9ER) gave us his BASIC09 alarm program. This utility will cause a beep after one minute.

In the Patches topic area, **Karl Quinn** (KQK) sent us a file for fixing *DynaCalc* to eliminate two bugs in off-the-shelf OS-9 *DynaCalc* from Tandy. **Bruce Ondersma** (BEO) sent us instructions on using *Profile* under Level II of OS-9. **Jim Manning** (JIMBM) sent us a file describing how to patch your drives /D0 and /D1 to use 40 tracks instead of 35 on OS-9 Level II.

In the Graphics area, **Bob Montowski** (GRAPHICSPUB) sent us his *SHOW09* program set for viewing DS-69 16-level digitized pictures under OS-9 Level II on the CoCo 3.

In the Telcom topic area, **Randy Longshore** (RANDYE) provided us with the *COM09* package. These files constitute a terminal package written in BASIC09. It has many useful features, including a keystroke-multiplier file for automatic logins and automatic logging to disk for recording a conference session or saving messages from the Forum. It was written by **Jason Shouler** of the United Kingdom and is public domain software.

The Users Group area enjoyed the most new additions, with 11 new submissions, due to the hard work of SysOp Greg Law; *ACIA Mapin*, a filter to change control strings from a terminal into corresponding ANSI strings; *ACIA Mapout*, an appendage for the ACIA driver to get control of `init`, `read` and `write` and pass them through ACIA to the physical device; *Arc*, an archive utility useful for backing up a hard disk

to multiple floppies; *XCOM9*, a terminal program for OS-9 that supports Xmodem file transfers and has an extremely high throughput; *Append* and *AP*, file append utilities; *Antenna*, which designs amateur radio VHF long yagi antennas; *Amort*, which prints a complete amortization schedule to screen or printer; *Alias*, which creates a program in the current execution directory with the name `newname`; *Advent*, which is an Adventure game for OS-9; and *ADJ*, which limits maximum line length in a text file without splitting words.

#### CoCo SIG

In the General Information topic area, Marty Goodman posted a report on the 1987 Chicago RAINBOWfest. **David Kay** (PEASHOOTER) furnished us with an amusing article concerning IBM compatibility.

Medical articles increased this month, starting with *COC03CPR.BAS* by **Dave Schaefer** (DAVESCHAEFER). **Joe Carney** (JOECARNEY) posted his response to Marty Goodman's article concerning the "war on drugs." Soon thereafter, Marty Goodman posted his reply to Joe Carney.

In the Utilities section, **Roger Krupski** (HARDWAREHACK) provided us with *ERRDRV.BIN*, a utility for printing more descriptive error messages from BASIC. **Charles Pippin** (CWP) gave us his *Checkpro* program for keeping up with the monthly budget. **Mike Fischer** (MIKE88) gave us a nifty BBS catalogue program for the CoCo 3, as well as a long list of his favorite BBSs. **David Brown** (NASAI) gave us *SCRDLL.BAS*, an experimental program for scrolling messages across the screen of your CoCo 3, and **David Ferreira** (SKEEVE) posted his latest version of the *OMGUTL* programs.

In the Hardware area, Marty Goodman posted an article on his favorite places to purchase chips.

The Graphics section received a large number of new files. First, the "CoCo Galleries" for February and May 1987 arrived. Of notable mention is the entry from the May issue entitled *Seascape*, drawn using CoCo BASIC by James Upperman. It features an animated night scene of a man beside a fire at the beach. This picture is for the CoCo 3.

David Brown gave us *PALETTE.BAS*. **Billy Hambric** (SNOOPYDOG) gave us *MAXHDRM.PIX*, a digitized picture from the *Max Headroom* show. This picture was used, in turn, by Erik Gavriluk to produce his *Color Max Headroom* demonstration program. **Alan DeKok** (ALANDEKOK) gave us his version of the *Rockfest 1+2* programs for the CoCo 3. Mike Fischer pleased us with his Spectrum BBS demo for the CoCo 3. This program features, among other things, a moving text display at the bottom of the screen. Along the same lines, **Jim Sparks** (ESCOMAN) gave us his BBS logo featuring an

animated, old-fashioned buckboard wagon.

For those interested in exercise, Rick Adams donated an interesting sight 'n' sound *Jumping Jacks* program, which features a young woman performing her exercises in time with the background music. **Bob Wharton** (BOBWHARTON) sent us a great collection of Garfield pictures drawn for the CoCo 3.

Greg Miller donated two utilities for use with *Color Max 3* pictures: *BSCTOOL* and *Gallery*. *Gallery* is a stand-alone program that lets you load and view *Color Max 3* pictures, while *BSCTOOL* is a BASIC "tool" that allows you to load and view the pictures from within a BASIC program; it is intended to be used as a subroutine. Greg also generously gave us *F4E.MGE*, one of the first pictures ever drawn with *Color Max 3*. Drawn by Jeff Shane, it is a picture of a camouflaged jet fighter plane.

In the Games topic area, **Steven Macri** (DRACMAN) posted a revision to his popular *Kelly* checkers program. **Daryl Kent** (DJKENT) gave us his *Color Kismet* game, and **Michael Brant** (MBRANT) favored us with a set of "chronology" files. While intended for use in a trivia game, these files also serve as an educational aid for school children.

In the Music topic area, we were extremely fortunate to receive 71 *Orchestra-90/CC* files from such notable contributors as **Bryan Eggers** (SOFTAFFAIR), **Jerry Bradshaw** (JOB45), **David Browder** (DBROWDER), **Bill Teeters** (CLAMBAKE), **Larry Wimble** (THEASSEMBLER), **Ron Cook** (COOKY) and **Gary McCarty** (BANDMAN). The files were transferred to us from the Tandy SIG following the acquisition of that SIG by Falsoft, Inc.

Additionally, **Marc Genois** (MARGENOIS) favored us with a well-done collection of songs from the group Genesis, and **Bill Starr** (WSTARR) provided us with five more *Orchestra-90/CC* files: *Ragtime Night*, *Spring Song*, *Cradle*, *Bossa Nova* and *Top Gun*.

The coming month on the CoCo SIG may see the publication of Version 2.0 of *Rickeyterm*, which will support the bit-banger serial port on the CoCo 3 at 300 and 1200 baud. For sure, more *Orchestra-90* music files are on the way.

In the OS-9 SIG, members will continue to see more of what will eventually become five megabytes of OS-9 Users Group files. The OS-9 Online staff is now hard at work creating this new topic area. Also, we are expecting a huge influx of files concerned with using and modifying OS-9 Level II, as more SIG members purchase it and begin to use it. See you online!

— Don Hutchison  
Rainbow's Delphi Database Manager

## What you can and can't do with someone else's program

**Y**ou've purchased a computer program on tape or disk, typed it in from *THE RAINBOW*, downloaded it from a bulletin board, or borrowed it from a friend. Now you'd like to make copies of the program, alter it, send copies to your friends, or adapt certain subroutines or programming techniques for use in your own programs. Under the copyright law, which of these things are you allowed to do?

Copyright law, in a nutshell, provides that a person who owns the copyright of a computer program has the "exclusive" rights to copy the program, distribute copies of the program or to make adaptations that are substantially similar to the program. Anyone else who copies or distributes copies of the program beyond the exceptions provided in the copyright law infringes the copyright, unless the owner grants permission, which will usually be conditional upon payment of a royalty fee or purchase of an authorized copy of the program.

I want to discuss the exceptions to this rule: the limited rights of the person who has a copy of a computer program to use the program, to sell or give away the copy, to make backup copies and adaptations, or to use the "idea" of the program. I will also consider programs that are in the public domain.

### Using the Computer Program

If you obtained an authorized copy of the computer program from a magazine or a bulletin board, or by purchase, then you most certainly have the right to use the program — that is, to load it into

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*Edward Samuels, a professor of law at New York Law School, has taught copyright and other legal subjects for more than 10 years. An avid reader of RAINBOW, Professor Samuels enjoys sharing his CoCo with his children, 8-year-old Richard and 4-year-old Claire.*

# Who's Gonna Know?

By  
**Edward  
Samuels**

your CoCo and run it. By making the work available to you, the author has granted you a license to use it for its intended purpose.

If, however, you obtained an unauthorized copy of a program — from a friend or from a bulletin board, or by purchase from someone who made an unauthorized copy — then there is no implied license from the copyright owner to use it. When you load the program into your CoCo to run it, you are making a further unauthorized copy and infringe the copyright owner's rights.

### Selling, Giving Away, or Lending Your Copy of the Program

If you obtained an authorized copy of a program, you may clearly sell *that particular copy* or give it away to a friend. For example, if you buy a game contained in a ROM pack, or on a disk, and you want to give away that particular ROM pack or disk, you may do so, and neither you nor your friend will infringe the copyright owner's copyright. The legal principle that allows this is called the "first sale doctrine." The presumption is that the copyright owner was paid a royalty when the copy of the work was originally sold and is not entitled to a second payment for the resale of that particular copy. However, this theory would *not* allow you to make copies of the program to distribute to friends, whether for a fee, for free, or as part of a trade. Similarly, if you make a copy for yourself and give the original to a friend, the copy that you made is probably an infringing copy and subjects you to suit under the copyright act.

Under the first sale doctrine, you are allowed to lend the authorized copy you obtained or to rent it out, as well as to sell it. This is what videotape stores are doing when they buy a popular videotape and then rent it to others without paying any further royalty fees to the copyright owners.

## Making Backup Copies and Adaptations

Under a 1980 amendment to the copyright law, if you obtained an authorized copy of a copyrighted computer program, you are allowed to make another copy of that program "for archival purposes only." This means that you may make a backup of the program to use in case anything disastrous should befall your original, but you may not distribute your backup copy to others.

In addition, the 1980 amendment provides that you may make an adaptation of the program "as an essential step in the utilization of the computer program in conjunction with a machine" if the adaptation "is used in no other manner." At the very least, this means that you may make minor modifications to a program to make it run on your particular machine, with your particular configuration. For example, you may certainly delete the speed-up poke to make a program run on a CoCo that can't handle it or make minor alterations to make a CoCo 2 program run on your CoCo 3. Although arguments have been made that this right of adaptation can be fairly broad, I think that the intent of the amendment is fairly narrow, and the amendment should not be used as an excuse for making extensive alterations in a program to suit the whim of the user.

If you make a backup of the program, you may sell the backup or give it away to others in conjunction with the sale or lease of the original from which you made the copy. However, if you adapted a program to make it work on your machine, you are theoretically not allowed to sell or give away that adaptation when you dispose of the original program, except by permission of the copyright owner.

## Using the "Idea" of a Copyrighted Program

If you write computer programs, you may well get some of your best ideas by studying programs written by others. In copyright law, under a principle known as the "idea-expression dichotomy," you are free to create programs that *accomplish the same results* as programs you have studied, so long as you don't take so much of those programs as to constitute the "expression" of them. In practice, trying to distinguish between unprotected idea and protected expression is one of the most difficult problems in all of copyright law.

In a 1986 case decided by a federal court of appeals, the court found copyright infringement even though there was no verbatim copying, but only copying of "the structure, sequence and organization" of the files, screen outputs and five particularly significant subroutines. The court emphasized that it takes a great deal of time to develop a sophisticated design of a computer program and that "the coding process is a comparatively small part of programming." This and other recent cases make it clear that the scope of copyright protection is broad and that even non-literal copying can infringe. To play it safe, you should try not to copy the structure, display or subroutines of copyrighted programs, particularly if you intend to sell your programs commercially.

This discussion of the idea-expression dichotomy assumes you are copying a program you are able to view. If you play an arcade game without seeing the program listing, or merely read a description of a program, then you probably don't infringe the copyright by making another program that accomplishes a similar result. Even if it should turn out that your program is similar, if you had no "access" to the original program — if you independently created it without directly copying either particular coding or structure — then your work doesn't infringe.

However, you should be aware that the audiovisual display, particularly of arcade games, may be separately protected. For example, the PAC-MAN character is both copyrighted in its visual presentation and protected by a trademark in the particular name. You should not commercially use the PAC-MAN character, or misleadingly use the PAC-MAN name, to describe your product. You may say your game plays *like* PAC-MAN, if that is a true statement, but you should not sell the program claiming that it is the PAC-MAN game.

## Using Public Domain Materials

The discussion up to now has assumed that the computer program you intend to copy is copyrighted. However, this is not always the case; the program might be in the "public domain." If it is, you need have no fear of infringing the copyright in the work, because there is no copyright in a public domain work. You can make copies, adapt the program, or even incorporate it into your own programs, to your heart's content. You need not even give credit

to the author of the program, although it is obviously more courteous to do so.

Since so much depends upon whether the work is copyrighted or is in the public domain, it is obviously important to be able to tell the difference between a copyrighted program and a public domain program. Sometimes this is easy. If the program contains a copyright notice, in the form "Copyright © 1987 by Edward Samuels," then someone claims copyright to it, and you are not free to make copies of the work except as already discussed. (For a magazine or newsletter, a general copyright notice at the beginning of the issue, as is contained in all issues of THE RAINBOW, will protect all of the contents of the issue, including individual programs.)

What if you don't find such a notice? I can think of several reasons why the lack of notice doesn't necessarily mean that the work is in the public domain. For example, if the copy you obtained was not authorized by the copyright owner, then the lack of notice has no effect in placing the work into the public domain.

Another example is if the work is not "published." If a friend who wrote a program gives you a copy and asks for your comments, then the work is still protected by copyright, even though no notice appears on it. On the other hand, if the work was published by the author in a newsletter, or on a general bulletin board to which the public had access, or if the work was sold by the author to anyone who wanted a copy, then it would probably be considered to have been published, and lack of notice *may* place the work into the public domain.

There are, however, some "savings" provisions in the copyright law that may still save the work from going into the public domain. For example, if the notice was omitted from "no more than a relatively small number of copies," then the copyright in the work will not have been lost. Also, if the author published the work and omitted notice inadvertently, then the author has five years to register the work with the copyright office and affix notice to all subsequently published copies, thereby saving the work from going into the public domain.

As you may gather from this brief description, there are some cases in which it is practically impossible to ascertain whether a program that omits the copyright notice is in the public domain or is still subject to copyright,

particularly within the first five years after publication of the work. If you plan to distribute copies of such a program commercially, you put yourself at risk if you do not or cannot contact the author to obtain permission. However, if you rely upon the absence of notice on an authorized copy of the program, the recovery that a copyright owner will be able to obtain against you will be reduced, in some cases, to nothing at all. The result represents a compromise, on the one hand protecting copyright owners who may inadvertently omit notice from some copies, and on the other hand giving some protection to copyright users who may innocently infringe a work, not knowing that it is still subject to copyright.

### But Who's Gonna Know?

Despite what I may say about what you are "allowed" to do and what you are "not allowed" to do, people do in fact copy computer programs. People share their copies with friends by exchange, by gift, through computer clubs and through computer bulletin boards. What happens to them when they do so? Generally nothing.

It is a *criminal offense* to infringe a copyright willfully and for purposes of commercial gain, so don't knowingly copy computer programs to sell them. The potential gain is not worth the risk, however small, of getting convicted, fined and jailed. But even if you do copy to exchange or give away software, there is the possibility that you can, and may, be sued by the copyright owner.

As a lawyer, I have to point out that if you infringe, you may be liable for "statutory damages," that is, between \$250 and \$10,000, even if the copyright owner cannot prove specific injury, and even if you have made no profit from your infringement. If you have infringed "willfully," the judge may grant damages up to \$50,000.

Some companies adopt copy-protection schemes that are supposed to prevent, or at least reduce, unauthorized copying. Do you infringe the copyright if you "break" the protection scheme to make a copy? Presumably so, since you clearly make an unauthorized copy, and you may even create a "derivative work" that omits the copy-protection scheme from your copy of the work. Some people argue that this activity is authorized by the 1980 amendment to the copyright act if you use the copy "for archival purposes only," but you certainly infringe if you distribute the copy or use it in any other way than as a backup.

Some software companies print "software license agreements" in their documentation, describing what the user may or may not do with the program. There is some debate as to whether these so-called agreements have any validity. Under traditional principles of contract law, an "agreement" requires the knowing consent of both parties. Conditions that are not disclosed until after the purchaser buys the product are not knowingly consented to. Some states have passed laws that specifically approve such software license agreements. However, I remain skeptical about the validity of such laws

and such agreements, particularly to the extent that they may exceed the rights already allowed under the copyright law. Of course, the copyright law is still applicable.

I'm afraid I don't have the ultimate answer to the computer copyright dilemma. Computer programs sometimes cost a lot of money to develop, but a user can usually, with little or no difficulty, make an unauthorized copy. If too many users make their own copies, the programmer's profits are undercut, and the programmer is less likely to make the effort to develop programs in the future. I can only add my voice to those who have urged that we must respect the rights of copyright owners. Otherwise, we will put more good programmers out of business and ultimately have fewer quality programs. OK, make your backup copies. But please, don't copy programs for others — even if you think it unlikely you'll get caught — because doing so will destroy something that is valuable to all of us!

*(Questions about this article and the companion article, "Computer Program Copyrights: A How-to Guide," published in the April 1987 issue of THE RAINBOW, may be addressed to Prof. Samuels at New York Law School, 57 Worth Street, New York, NY 10013. Although he is interested in discussing copyright matters of general interest to computer programmers and users, he is not currently engaged in the practice of law and will not give specific legal advice. If you have a serious copyright problem, you should consult an attorney who specializes in the field.)* ☺



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# What's the Address?


By Richard E. Esposito  
Rainbow Contributing Editor  
with Richard W. Libra

 How can I find the starting, ending and execution addresses of a tape machine language program?

Larry Vorhee  
Laurel, MD

**R<sub>x</sub>** To find the start address, use `PEEK(487)*256+PEEK(488)`. To find the end address, use `PEEK(126)*256+PEEK(127)-1`. To find the EXEC address, use `PEEK(157)*256+PEEK(158)`.

## MC-10 Defended

 Regarding my letter to you in your April 1987 column: I agree with you that the MC-10 owners' best choice is to upgrade to a CoCo 3, but there are many out there who cannot (or will not)



Richard Esposito (left) is a senior project engineer with Northrop Corp. 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.




do so, and I appreciate your allowing me the chance to share what information we have with them.

Larry Allen  
Owensville, IN

**R<sub>x</sub>** I see what you mean (see next letter).

## The Controversy Continues

 Here we go again. Your comment to Larry Allen (April, 1987) was completely unnecessary. It's an insult to listen to you "pros" condemn and judge the MC-10. Unless you used one, you wouldn't know that it has 192-by-128, four-color graphics, the enhanced ROM, RAM disk capabilities, and an outstanding 80-column word processor.

At a recent CoCo show in Spokane, it was the MC-10 that got the publicity, not the CoCo. You might not be aware of this, but when you advise someone to dump their MC-10 for a CoCo 3, you are giving them very bad advice. Drives, multipacks, OS-9 Speech Paks, modem packs, cables and an RGBA Composite monitor cost more than many people can afford. I try to help tape users through your magazine because I was a frustrated CoCo user for two years. The CoCo 3 is extremely touchy and is filled with "bugs." You should report the HPRINT, EDIT, LIST, LPOKE, LPEEK and Hi-Res screen bugs. Maybe you don't do enough programming to experience lost programs and crashed disks. Now the cure is to patch the CoCo 3's ROM and LOADM DOS on power up. The CoCo isn't an Atari or Apple, and LOADMing DOS is inexcusable! At this time I have given up all work on the CoCo 3 and am concentrating wholeheartedly on my Atari XL (which, by the way, is a super computer) and my CoCo 2 and MC-10. If it came down to brass tacks, I'd sell all my CoCo hardware/software and buy a 1040ST with which the CoCo can never compete. Try accessing a BBS with an ST running it! Don't condemn my XL because the CoCo will never have its software; Koronis Rift and Rescue on Fractulus are old games I've had for two years! Have you checked the specs on the Atari PC? Have you heard of the BLITTER chip in the ST's 32000-by-32000 resolution? Atari execs never lost one minute of sleep over the CoCo 3.

Jay Thomas  
Great Falls, MT



**R**x Apparently, Larry Allen disagrees with you (see his letter above). I still stand by my recommendation: Don't waste money upgrading an "orphan" computer of which the MC-10 is one. Everything you mentioned — drives, multipacks, OS-9 Speech Paks, cables, and RGB monitors — are optional. The CoCo 3 works fine with tape. A stock, out-of-the-box CoCo 3 will blow away an MC-10, an Atari XL, an Apple II/e or any other eight-bit micro on the market. In fact, in some ways the CoCo 3 is even superior to IBM PCs, Atari STs and Amigas. It has a far superior operating system. IBM liked it so much that they are cloning it for their new Personal System 2. If you don't believe me, compare the specs: multitasking, multiuser, windows, UNIXlike — sound familiar? This isn't the first time IBM cloned CoCo software. IBM's BASICA has its roots in Extended Color BASIC. The ST is a nice piece of hardware, but it's saddled with TOS. The AMIGA is stuck with Amiga DOS. Sure, there are some OS-9 ports to these machines, but the CoCo 3 is the only one of the bunch with an OS-9 that is officially supported by its manufacturer.

Why is it OK to have to load a DOS into other machines but not the CoCo? Not that you need to; Disk BASIC 1.1 has been around for quite a while, and it is the same DOS used with the CoCo 3. Sloppy programming can get you into trouble quicker on the CoCo 3 than with the CoCos 1 and 2 because with it, BASIC is in RAM and you can modify this code, either intentionally or by mistake.

### CoCo 3 Pascal

**I** have a CoCo 3 and want to know if it is possible to get the DEFT Pascal Compiler and DEFT Linker to work with it. Programs that I created using my CoCo 2, which worked just fine, now result in a screen full of errors on my 3. Everything works until I try to link a program. Can you tell me if a new version will be available for the new CoCo and how much it will cost?

Joe S. Alderman  
(JSA)  
Newington, CT

**R**x DEFT Systems, at this writing, has not yet announced a CoCo 3

version, and copy protection increases the problem of patching the old version; however, the PASCAL of choice on the CoCo 3 will be the OS-9 version, for the CoCo 3 was designed specifically with that OS in mind (128K to 512K, 80-column display).

### Ink Jet Graphics

**I** have an Olivetti PR2300 Ink Jet Printer that presents a problem. When I wrote a small screen dump program and used it with my printer, the pictures came out with 32 vertical bars over them. I believe they are a type of binary code to identify the character as a number or as a letter for the device. I have had this problem for a year now and would appreciate any help you can give.

Rick Hamilton  
Jacksonville, FL

**R**x The only explanation I can offer for this phenomenon, since I do not have access to such a printer and you supplied neither copies of the code nor the documentation, is that somehow not enough graphics information is being sent by your program to be processed by the printer. I base this on the fact that there are 32 bytes per line of graphics information, and there are 32 bars being printed by your printer. I assume your program has three loops where loop one controls the number of times loop two is executed to process an entire screen in steps of L. Loop two loops from lines L through L+N-1 where L is the starting line of a particular sweep and N is the number of pins or jets on your print head that are used for bit image graphics. Loop three extracts the appropriate bit from each of the N lines and fills a byte(s) to be passed to the printer. In this third loop is where I suspect that you are not supplying the value for the final bit of each byte.

### Beginning With Assembly Language

**I** have been using a spreadsheet program for home management purposes. It is not a commercial version and is written in BASIC. When I first began using it, I realized it had many shortcomings, all of which I have overcome except one; it is horrendously slow. Interpretation and manipulation of the cells require a lot of string operations. With the additions I have made, mostly in the size of the spreadsheet,

execution time is greatly increased. The obvious solution was to rewrite the program in assembly language. Everything progressed well until I got to the arithmetic. My programming so far has only dealt with integers; now I am confronted with fractions. If I understand my texts, fractions must be dealt with in floating point notation. William Barden recommends his book Microcomputer Math in Color Computer Assembly Language Programming, but I have not been able to find it anywhere. Surprisingly, Lance Leventhal's 6809 Assembly Language Programming does not even mention floating point notation or fractions. The only information I have gotten so far explains what floating point notation is, nothing more. I understand what it is, I just don't understand how to use it. My question is this: Where do I start?

Curt Roberts  
Prospect, KY

**R**x The MC6809, like most microprocessors, including the 8088 and the 80286 used in IBM's PC-XT and PC-AT, does not have any direct floating point capabilities. Floating point arithmetic must be done via subroutines. You can get help on this by disassembling some of the CoCo's ROM routines. The CoCo uses two floating point accumulators for BASIC: FPAC1, exponent at \$4F, mantissa at \$50 - \$53, sign at \$54. The corresponding addresses for FPAC2 are \$5C, \$5D - \$60, and \$61. The following ROM routines should be of interest: subtract at \$B9B9, add at \$B9C2, multiply at \$BACA and divide at \$BB8F.

### Getting the Sign-On Screen

**W**hen I load DOS 1.1 over the top of my DOS 1.0 on my CoCo 3, I get all the commands but I don't get the sign-on screen for the CoCo 3. How can I get the sign-on screen?

Carl Lutz  
(CARLLUTZ)  
Jacksonville, NC

**R**x Assuming that you correctly patched all of the hooks when you loaded it in, just type EXEC &HC000.

### Romfix Problems

**I** now have a CoCo 3 and have found that your program from HOT CoCo magazine called Romfix doesn't work on the CoCo 3. What patch or

patches do I need to make it work? Any help would be greatly appreciated.

Jim Shoop  
(BAZAR)  
Salt Lake City, UT

**R**x Tandy did not follow their own rules with some of their ROM packs. Some ROM packs that have been fixed with Romfix do indeed run on the CoCo 3.

### Boot's Hidden Code

I read with great interest David Johnson's letter regarding the boot program. I have (and use) the same program myself and have yet to chase

it all down. A machine language program does in fact exist, but as far as I can tell, it is inherent in the Disk BASIC operating system. If you run the program exactly as it is written (lines 10-90) on a newly powered up machine, you will get 16 lines of directory listing, which you may scroll up and can select and run any program with the push of a button! My guess is that this is something that Microsoft left in the coding. If you can find out anything else on this, please let me know because I'm baffled myself!

Mark G. Miller  
(MGMILLER)  
San Leandro, CA

**R**x There is hidden code, but it's right in front of your eyes, a very clever machine language program embedded in the tokenized BASIC commands by the author Marty Goodman. This code that is buried inside the BOOT.BAS program is what provides the up/down scroll for the directory display. Consequently, if the code is not typed exactly as it was originally written, it will not work. Jerry Dill of Fabyan, Conn., reports that David Johnson's version contained a typo. Line 20 should read:

```
20 A=PEEK(&H1B)*256+PEEK
    (&H1C)-6
```

He added that lines 30 to 70 can be left out if desired.

### A Problem Drive

I own an FD500 disk drive that is constantly needing realignment. Would you have any ideas why? Also, is there any product available that will allow me to perform my own alignments?

Timothy Volk  
(TRV)  
Aiken, SC

**R**x You must have one of the old "problem" TEK drives. The program *Memory Minder* and the necessary precision alignment disk are both marketed by J&M system, (505) 292-4182.

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.



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<b>A Guide to CoCo 3 Basics and Graphics</b>	Help With Expanded Graphics Capabilities/ <i>Moreton Bay Software</i> .....	136
<b>Mapper</b>	A Dynamite Debugging Tool/ <i>CMD Micro Computer Services</i> .....	132
<b>Multi-Label III</b>	Produces Professional Mailing Labels/ <i>Gimmesoft</i> .....	135
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# RECEIVED & CERTIFIED

*The following products have recently been received by THE RAINBOW, examined by our magazine staff and approved for the Rainbow Seal of Certification, your assurance that we have seen the product and have ascertained that it is what it purports to be.*

*This month the Seal of Certification has been issued to:*

**Better Graphics on Your CoCo 3**, a guide to using the expanded capabilities of the CoCo 3. Topics include memory management, new graphics modes, moving video memory and adding animation to graphics. The package also includes two disks containing the BASIC routines discussed. For the CoCo 3. *Moreton Bay Software, 316 Castillo Street, Santa Barbara, CA 93101; (805) 962-3127, \$24.95 plus \$2 S/H.*

**Bug Buster**, a 32K Hi-Res game that frees the various parts of your computer system from the dreaded "computer bugs." For the CoCo 1, 2 and 3 with a disk drive and one joystick. *Tothian Software, Inc., Box 663, Rimersburg, PA 16248; \$19.95.*

**Caladuril Flame of Light**, a 64K graphics Adventure game that lets you use the arrow keys to scroll your player around the countryside. Features include listing the current inventory on the right side of the screen, displaying the names of objects on the screen and the use of full sentence commands. For the CoCo 1, 2 and 3. *Diecom Products, Inc., 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8; (416) 878-8358, \$38.95 U.S.; \$52.95 Cdn.*

**The Crossword Puzzler**, a 32K program featuring a collection of puzzles. For the CoCo 1, 2 and 3. *Dellray Software Company, 360 North San Antonio Avenue, Suite #1, Upland, CA 91786; (714) 985-0026.*

**DYPRINT**, a collection of programs that allows graphics pictures and banners to be printed sideways. *Banner* prints banners and continuous signs in four sizes. *MaxPrint* prints any PMODE 4 graphics picture up to eight pages. For the CoCo 1, 2 and 3. *Dynamic Electronics, Inc., P.O. Box 896, Hartselle, AL 35640; (205) 773-2758, \$19.95 plus \$2 S/H.*

**Gates of Delirium**, a 64K game that lets you travel through towns and explore strange lands in a fantasy role-playing game. For the CoCo 1, 2 and 3. *Diecom Products, Inc., 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8; (416) 878-8358, \$38.95 U.S.; \$52.95 Cdn.*

**Lansford Mansion**, a 64K graphics Adventure. The secret to the knowledge and wealth of Robert Lansford lies hidden in and around his mansion. Avoid the traps that have guarded the treasures for years as you face the challenge of solving the puzzle. For the CoCo 1, 2 and 3. *Diecom Products, Inc., 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8; (416) 878-8358, \$38.95 U.S.; \$52.95 Cdn.*

**Master Disk**, a 32K cataloging program for your collection of disks. Catalog up to 250 program names in each directory and up to 18 different directories. For the CoCo 1, 2 and 3. *Bob's Software, P.O. Box 391, Cleveland, OH 44107; (216) 871-8858, \$15 plus \$2.50 S/H.*

**Mini Ledger**, a 32K accounting program that allows the user to keep a general ledger for home or business. For the CoCo 1, 2 and 3. *Drayon Software, P.O. Box 2516, Renton, WA 98056; \$6.*

**Restorit and Scan**, two utility programs for the Color Computer. *Restorit* restores a BASIC program lost to an I/O Error. *Scan* lets you scan any program for ASCII characters that may be helpful while playing an Adventure game. For the CoCo 1, 2 and 3. *Semmesoft, Inc., 10 Strawhat Road, #2A, Owings Mills, MD 21117; \$21.95.*

**Rickeyterm 2.0**, a commercial edition of the popular shareware terminal program. For the CoCo 3. *Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; (718) 835-1344, \$39.95 plus \$3 S/H.*

**S.B. Inventory III**, a 128K program designed for small-business inventory control. For the CoCo 3. *SECA, P.O. Box 3134, Gulfport, MS 39505; (601) 832-8236.*

**Sixdrive**, a machine language DOS utility that modifies Disk Extended BASIC 1.0, 1.1 or *FKEYS III* to allow the use of three double-sided drives. For the CoCo 1, 2 and 3. *Gimmesoft, 4 Hallfield Court, Baltimore, MD 21236; (301) 256-7558, \$16.95; with FKEYS III, \$12.95.*

**Stock Market Portfolio**, an investment program that lets you keep track of stocks, profits, losses and dividends. For the CoCo 1, 2 and 3. *Paparis Enterprises, Inc., 700 Young Street, Williamsburg, VA 23185, \$22 plus \$3 S/H.*

**Vegas Slots**, a 128K package that features seven different slot machine games: three one-line multipliers, two three-line pays and two five-line pays. For the CoCo 3. *Tom Mix Software, 4285 Bradford NE, Grand Rapids, MI 49506; (616) 957-0444, \$34.95.*

**Video Draw Poker**, a 32K ECB program that simulates some of the casino video draw poker slot machines. For the CoCo 1, 2 and 3. *Prometheus, 14684 Joshua Tree Avenue, Moreno Valley, CA 92388; (213) 606-1021, \$15.*

The *Seal of Certification* program 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 product 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.

— Judi Hutchinson

# Mapper — A Dynamite Debugging Tool

Here is a fine utility for CoCo programmers. *Mapper* is a machine language cross-reference tool for BASIC programs. It will generate listings to screen or printer of all line number references like GOTO, GOSUB, THEN and ELSE commands. It also generates listings for variable occurrences. The output to screen or printer is formatted and fills the screen or printer one page at a time. All you need is a minimum of 16K and any level of BASIC. The program is simple to use. Just LOADM "MAPPER" and type EXEC. You are greeted with a title page with credits and asked for a title to use for printer output. If you don't have a printer or don't want a hard-copy printout, just press ENTER. A second screen appears with the menu of options.

The first thing you will want to do is make a backup copy of the program for your protection. Instructions are provided for both tape and disk systems.

Once the BASIC program has been loaded, call *Mapper* by typing EXEC and pressing ENTER. Then it's a simple matter of choosing any of the menu options to locate the commands, variables or cross-referenced line numbers that you are looking for. It's a dynamite debugging tool!

Another nice feature is a built-in screen dump option. By pressing the SHIFT and @ keys, the information displayed on the screen goes to the printer. This is useful when you don't want or need the entire listing.

The menu includes five options. The first, Occurrence Count, scans the program in memory for all the variables and then lists them in the order of their frequency. The listing is shown in two parts — simple and array-type variables. This feature is really valuable for programmers since it not only shows all of the variables used, but you can speed up program operation if you initialize variables in the order in which they are used most.

Option 2, Line-X-Reference, scans the program for all line number references appearing after a GOTO, GOSUB, THEN or ELSE. The output shows the line numbers in the left column, and the numbers in the right columns are those that reference that line. This can be invaluable and very time saving in debugging and modifying programs.

The next option, Variable-X-Reference, scans the program for all the variables used and then lists them in alphabetical order with the line numbers they appear in. Four categories are shown: Numeric, String, Numeric Arrays and String Arrays. Imagine how easily you can locate and modify variables scattered throughout a large BASIC program!

Option 4 is the Command Reference. Here you can type in the command or string you want to find. All of the line numbers that it occurs in will be listed. This is a very powerful option and one that debuggers will love.

The last option, Exit to Basic, lets you select when you are ready to load your BASIC program for debugging or to use BASIC to test your program. Re-enter *Mapper* at any time by typing EXEC.

I found *Mapper* to be an excellent utility and one that any CoCo user will get a lot of benefit from. It's easy to use and user-friendly, typical of other programs from Bob van der Poel. In my opinion *Mapper* represents another hit. The price is right and you will be delighted to see what it can do!

(CMD Micro Computer Services, LTD., 10447 124th St.,  
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— Jerry Semones

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### One-Liner Contest Winner . . .

A few minutes' study on this one is all it takes to see that trigonometry can actually be interesting (sometimes) and useful when programming graphics.

#### The listing:

```
1Ø PMODE3, 1: SCREEN1, Ø: PCLS: B=RND
(1Ø): C=RND(1Ø): D=RND(6Ø): FORA=Ø
TO 36Ø STEP 2: TH=A/D: X=125+9Ø*SI
N(TH*B): Y=1ØØ+9Ø*COS(TH*C): FCOL=
RND(3)+1: COLOR FCOL, 1: LINE-(X, Y)
, PSET: NEXT: RUN
```

*Bernard Florence  
Croyden, NSW, Australia*

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

## Checkbook III Helps Battle the Big Bank Blues

*Checkbook III* is a program aimed at tracking money quickly and efficiently. It is designed to help you manage your checkbook, from daily transactions right through the monthly balancing act when your statement arrives. To run this program, you need a CoCo 3, at least one disk drive, and, to utilize the program's complete potential, a printer.

What the program does is deceptively simple: You enter checks, deposits and withdrawals; it tells you your balance. It stores that information on a disk and lets you look it over later. But the program does far more than that. It also lets you define up to nine expense areas, and keeps track of all expenses incurred in each area. It displays information in a variety of ways, allowing you to view only the data you need to see — or all of it, if you want.

When running *Checkbook III* for the very first time, you are prompted for some basic information on your account: name, beginning balance, date opened, and account number. Here, I discovered one of only two minor flaws in the program. The account number is stored in a numeric variable, as opposed to a string variable. Thus, if your account number is longer than eight digits, it appears as an exponential equation; my account number is 10 digits long (1505504351), but it appears in the file as 15055043E10.

After the account number prompt, you are asked to define up to nine different expense categories. You may use as many (or few) as you like. This feature is designed to help track expenses like rent, groceries, etc. I could have used more than nine categories (I tend to get very detailed in this sort of thing), but nine is more than adequate for the average person. All the data you enter is written on your disk, and you are now ready to enter checking account transactions.

The main menu gives a variety of options for entering, correcting and viewing account transactions. Your options key off five different types of transactions: checks, ATM withdrawals, deposits, interest earned and service charges. You can select any of the above for entering, correcting and viewing. In addition, you can also view all transactions on the account within a selected time frame, as well.

Anything you can view on screen is supported in the print menu, too. But here is the second minor problem. The program uses the faster clock speed of the CoCo 3 for everything except disk I/O. This makes all functions run very fast — including print. If you use the standard 600 baud printer rate, the data will be coming out the serial port at 1200 baud (thanks to the speed-up poke). I spoke with Darryl Hawkins, president of SECA, and he tells me there is a version of the program in development that allow users to select their own baud rate within the program. Here is the fix to get the old version to run with your printer:

Insert POKE150,xx at beginning of Line 230  
(xx is the baud rate you use).

Insert POKE65496,0 just before the RETURN statement  
in lines 3400 and 3410.

Another nice thing about this program is that it makes extensive use of the CoCo 3's new features — without trying to squeeze an example of each into the program. The new ON BRK GOTO function is utilized as the way out of any selected function. The screen is a very pleasant white with blue lettering, and features the inverse and blinking text when telling you how to proceed. The two function keys are used in various places to select options (most notably, in the printer routines).

Normally, I don't like to suggest editing commercial products. I will make an exception in this case. I feel that the program has enough merit to justify the little bit of fine tuning you need to do. I am also encouraged that Mr. Hawkins has the program's author, B.J. Anderson, working on improving an already excellent piece of work.

In short, if you are looking for a financial guru to make you fabulously wealthy, keep looking. If you need a good program to help you understand what the bank hath wrought on your checkbook, and to help you keep track of where that hard-earned paycheck goes, I don't think you could do much better than this. The price and features make this program a very good buy.

(SECA, P.O.Box 3134, Gulfport MS, 39505; 601-832-8236;  
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— D.A. Ferreira



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## Spectrum DOS — A Bag Full of Treats for the CoCo

(This program was originally reviewed in the August 1984 issue of THE RAINBOW, but we're taking this "second look" for the benefit of new readers.)

There have been a number of attempts to add features to the CoCo in the form of a modified or replaced operating system. I tried a few of the earliest ones, but I always ended up back with my own collection of programs and patches to correct various deficiencies. With the possible exception of a system or two where I have 10-Meg disks operating, *Spectrum DOS* could supply all the things I feel were lacking in the CoCo. These include a built-in Hi-Res screen, error trapping, reset trapping, access to double-sided disks and more tracks per disk. This is just the beginning of the list of goodies offered.

*Spectrum DOS* has gone a long way beyond putting together some of my early most desperate needs into one package. How many times have you typed `NEW` and immediately regretted it? Well, now there is `OLD`, and you have that destroyed program right back. How about those several long lines of pokes that have the wrong line number on them? No problem, *Spectrum DOS* will let you move them to the correct line (`LMove` feature) or simply copy them to another spot where they are needed (`LCopy`, which is non-destructive).

There are many such programmer aids. For example, `PPeek` and `PPoke` deal with the full, 16-bit value you generally want to deal with in peeking and poking. `FKey` lets you easily define keys as function keys. `Auto` generates line numbers (giving you the choice of start number and increment). `Load` will look on all disks for the program you

want. All keys repeat if held (a slight problem for my heavy-handed keyboard approach). If you happen to interrupt a program you are debugging and it is functioning in upper/lowercase at the time, you can still enter commands in lowercase, and the system will understand them. There's nothing earthshaking about this feature, but it exemplifies the fine thought put into this piece of software. Bob Colin is certainly to be congratulated for a truly professional product. It contains some features that I still find missing in the high priced micros.

"True upper- and lowercase letters" is among the claims that I did not find to be true. Perhaps there is a definition problem here, but I used the Hi-Res option extensively, which has options of 32, 51 and 64 for screen widths. They work simply and are very readable (even the 64 width that I used most of the time), but the letters such as 'p' and 'q' do not go below the line, which is my definition of "true lowercase." The quality and spacing is good, so I could certainly compromise on this deficiency to gain all the other goodies in the package. There is even a `Memo` feature, which permits you to write a one page memo and then dump it to the printer. It uses the four arrow keys for editing your text (though there apparently is no delete function). I was disappointed that I could not get this `Memo` feature to work in conjunction with Hi-Res 64, since this would permit a much longer memo, but nevertheless, I found it an interesting and useful system feature.

The documentation is a simple six-page manual that is well-written and well-organized. The system features work so simply, and the system installs so easily that long explanations are not necessary. The system can be used by many as it is delivered, but the install program lets you modify parameters to fit your system (number of disks, disk types, prompt character, printer speed, cursor type, etc.). Defaults are taken simply by pressing the return key, and the whole install should not take much over a minute.

*Spectrum DOS* can also be burned into a regular EPROM after customizing it to your setup, but do get a 128K EPROM, or you will lose Hi-Res Help and Flex — two features you would *not* want to lose.

Best of all, it works! I have by no means exhausted the list of all the features, but I think I did try most everything, and I found no bugs, nor even spots, where I wasn't quite sure what to do next. *Spectrum DOS* is well-protected from accidental blowout. I did manage to load a program of mine that had its own On Error system poked into memory, and that sure did some strange things to the Inverse screen and Normal functions, but one can hardly fault the *Spectrum DOS* operating system when you start poking code randomly into memory. I used the system with a rather large word processing program of my own design, and it worked fine, so little or no memory is consumed and operational speed is not sacrificed to any degree that I could notice.

I love computer power with simplicity. That's what brought me to CoCo in the first place, even though I have been a professional in the computer field for more than 25 years and worked on many multi-million dollar machines. *Spectrum DOS* carries on the CoCo tradition in fine style, with value, power and simplicity.

(Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; 718-835-1344, \$24.95)

— Tom Carl

### Hint . . .

## Put 'Call Waiting' on Hold

If you have a modem and have call waiting on your telephone line, there is a good chance you have been bumped offline by an incoming phone call. (Actually, the problem is not the tone you hear to announce the call, but during the tone the connection is broken momentarily.)

In many areas, you can temporarily disable call waiting by dialing 1170 (or \*70 if you have tone dialing), waiting for the dial tone to return, then dialing the number just as you normally would. When you hang up, call waiting is restored, so you will need to dial 1170 (\*70) before every modem call.

If you get a recording instead of a dial tone, this usually means the switching office serving your area hasn't been upgraded to add the disable feature. Check with the phone company to make sure your call waiting is actually working. If it is, find out when "equal access" long distance service starts because the change will usually be made at that time.



## Professional Mailing Labels With *Multi-label III*

If you are responsible for your church, club or business mailing list, you will find *Multi-label III* a valuable tool. It stores your mailing lists and prints them in one of 13 styles you select. You can mail notices, bills, and correspondence with business-like labels using your CoCo and printer.

We've all been looking for programs for our shiny new CoCo 3 computers, and *Multi-label III* is a good example of what to expect. It uses the super colors, speed and error-trapping commands to provide a very well put together program. Written in BASIC, it requires a CoCo 3, single disk drive (or multiple), and a printer. It is user-friendly and foolproof, as far as I could tell.

The specific CoCo 3 features built into this program include either a 40-by-24, or 80-by-24 high resolution screen. It uses the F1 key as an upper/lowercase toggle and the F2 key to toggle between the screens. *Multi-label III* uses the ON ERROR GOTO command to trap errors such as DISK I/O and FILE NOT FOUND preventing program crashing. It also uses the ON BREAK GOTO command to return to its main menu should the BREAK key be pressed. The program uses the CoCo 3 high speed poke and escape poke to provide high speed operation.

*Multi-label III* is supplied with the PALETTE command for an RGB monitor. However, the manual provides three simple editing changes to convert it for a composite monitor or TV. Using a TV, I was very impressed with the colors but, as with other CoCo 3 programs, some were faded, and some screen instructions difficult to read.

This did not seriously detract from the program; however, I think programmers should select colors with an eye on TV and composite monitor users, as well as those with RGB equipment. A little experimentation with my color control helped, too.

The program worked perfectly for me on my first attempt. I was able to input, store and print labels easily. *Multi-label III* requires the use of the standard 3½-by-15/16-inch, single-column, gummed labels, readily available at computer stores. The print menu provides 13 combinations of printing, including Elite, Pica, Italic, Expanded, Condensed, Double Strike and Emphasized. The manual lists the printer codes used, and it would be easy to change the codes in the program to fit any printer or to select other combinations.

The menu provides 11 choices that involve entering information, editing, saving to disk, loading, printing and reading the files saved. It also has a Help command that explains each menu command. The User's Manual is well-written, complete and easily understood.

In summary, *Multi-label III* is a very useful program for producing professional mailing labels. It takes advantage of the best features of the CoCo 3 to provide speed, error-trapping, and beautiful high resolution screens.

(Gimmesoft, 4 Hallfield Court, Baltimore, MD 21236; 301-256-7558, \$16.95 plus \$2.50 S/H)

— Mel Siegel

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## A Guide to CoCo 3 Basics and Graphics

Now that the CoCo 3 is here, we all find ourselves wondering how to best use its expanded graphics features. *A Guide to CoCo 3 Basics and Graphics* is a 54-page booklet and disk for the graphics enthusiast. As powerful as the CoCo 3 is, many of you have no doubt been dismayed at the lack of information contained in Tandy's manual, *Color Computer 3 Extended BASIC*, that comes with each machine. This recent offering by Linda Nielson goes into the depth and detail that Tandy didn't cover. If you are serious about graphics on the CoCo 3, you will find useful information in this package. The book is written in a friendly and understandable manner and is sprinkled with programming aids and tips. Lots of sample programs are included in the book and on the disk that are used to demonstrate the various subjects discussed. An early chapter deals with a novel approach to understanding how the CoCo 3 uses 512K of RAM with its Memory Management Unit. Other detailed discussions are provided on the following:

- Faster clock speeds
- Built-in error trapping and error codes
- FUNCTION, ALTERNATE and CONTROL keys
- Button function
- Added colors and commands including artifacting
- Monochrome displays
- Palette command
- High and low resolution text screens
- High and low resolution graphics
- Graphics editing
- Patterns and shading

One noteworthy program on the disk is called *Drawback* and is quite powerful. With it you can draw lines, circles, rectangles, enter text, paint and stamp areas with images picked from the screen. A demo picture showing a man holding a hawk is one of the best CoCo 3 images I've seen and can be used with *Drawback* to develop your graphics editing skills. Other programs on the disk are used to illustrate color codes, palette slots and artifacting.

I believe that this book and disk are worthy of your consideration if you are into graphics programming. If graphics is not your bag, I suggest you look elsewhere for CoCo 3 programs. All of the information in this package is supportive in nature and is meant to be a tutorial on capitalizing on the CoCo 3's graphics potential.

(Moreton Bay Software, 316 Castillo St., Santa Barbara, CA 93101; 805-962-3127, \$21.95)

— Jerry Semones

## Checkerboard Filesort — A Refreshing Change

When I received *Checkerboard Filesort* to review, I thought it was just another filesort program! But when I sat down and started going through the instruction manual, I got very interested in the program.

As the developer states in his introduction, this program can only be used with a cassette-based system. I have to say that this was a refreshing change because so much of today's software is for disk systems and, in increasing numbers, for the CoCo 3. Sometimes it seems as if those of us with cassette-based systems are rapidly becoming orphans.

*Checkerboard Filesort* was written for a 32K or 64K cassette-based CoCo. I was really impressed by all of the different options that are included in the program. Machine language routines handle record entry, editing, reviewing, search and sorting. You can number records from one to 9,999; in this way, you can append (join together) different records.

You can have a minimum of 40 records, each containing 240 characters, or a maximum of 200 records containing 42 characters in the 32K version. In the 64K version, you can have a minimum of 86 records, containing 240 characters, or a maximum of 400 records that contain 46 characters. You can use this program to keep an address file, mailing lists, inventories, recipes, etc. The only constraint to what you can do is that you have a limit of 240 characters per record.

You also have the option of using a printer to get a hard copy of your records. Although this program was written for use with an 80-column printer, I have been using my DMP-105, which is a 32-column printer, with no problems at all. I called Dave Siebold, the program developer, to see if I would have to change any of the printer codes. He was very helpful, and sent me all the information that I needed. Dave also told me that if anyone wanted to purchase the program, and they are not using the Radio Shack printer, he will make the needed modifications to the program at no additional charge.

After loading *Checkerboard Filesort*, you are prompted to enter the printer codes. If you are not using a printer, you can enter any number for each prompt. After the printer codes are entered, the main menu appears. You can choose one of the following options:

- 1) Create file
- 2) Edit record data
- 3) Add/Delete record
- 4) Search/Review records
- 5) Hard copy options
- 6) File tape load/append
- 7) Save to tape
- 8) Display/Rename fields
- 9) End program

The first option allows you to create your files. The second allows you to edit any of the records you have

created. You do this by entering the number of the record you want to edit or, if you don't know the number, you have the option of using the search routine to find a particular record. You can also use the review section to find the record and then edit it. The third option allows you to add or delete records.

The fourth section allows you to review all records, a single record, or a group of records. The second part of this option allows you to search for a particular record using partial data or a set of records that contain similar data.

The fifth section allows you to choose many different ways to get a hard copy of your records. You can have them displayed in one of the following ways:

- 1) Single column
- 2) Two columns
- 3) Three columns (can only be used with the condensed => 16.7 cpi)
- 4) Mailing labels
- 5) Envelope labeler

The sixth section allows you to load or append a file from cassette. The seventh option allows you to save a file to tape. After the file is saved, you are prompted to verify the save. The eighth option allows you to display or rename the fields. The fields are used for your information and are not displayed while you are creating a record. The ninth option allows you to end the program. If you choose to end the program, you will be returned to the normal power-up configuration. The instruction manual included with the program is very well-written and provides an in-depth discussion of each of the above options.

There is a BASIC program called *Convert* that follows the machine language portion of this program. The program is used to convert *Filesort* programs to a format that is acceptable to most word processors. So you can convert a file and then load it into your word processor. I have Color Scripset on a ROM pack, and I tried the convert program. I had no trouble loading the converted file into the program.

After using this program on numerous occasions, I am impressed by the program and its ease of operations. It is completely menu-driven and user-friendly. The options that are included make it very nice to have around. I especially like all of the hard-copy options.

I have been very happy in my dealing with Dave, and I would not hesitate to buy *Checkerboard Filesort* from him.

(Seibyte Software, P.O. Box 6464, Bakersfield, CA 93386;  
805-366-4540, \$16.95)

— John H. Appel

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## CORRECTIONS (Also, see Page 111)

In the May 1987 issue of the *THE RAINBOW*®, a work and computer program entitled *The Rhythm of Life* was published as being the work and computer program of Steve Tenney. Subsequently, it has been learned that the work and computer program were published previously by Tom Rugg and Phil Feldman and appear in *TRS-80 Color Computer Programs*®, a book published by delithium Press. Our apologies to delithium Press and Messrs. Rugg and Feldman.

## Discover the Benefits of ADOS-3

By Dale Shell

Well, it is finally here. ADOS-3 — for all of you who have a new CoCo 3 and really miss all the enhancements of ADOS that you grew so used to and thought you could never do without. The best news is that ADOS-3 really is more than just a modified version of the original ADOS. It offers a lot more enhancements.

Of course, the bad news is that since ADOS-3 is almost a new program, and it is bigger and better, it is not offered as an upgrade to current ADOS owners. It must be purchased separately. However, I do think that when you get it, you will not be disappointed that you put out the money. It adds so much to the CoCo 3 that I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine.

There are so many good things about it, I am not sure where to start. Since versions of ADOS have been reviewed in two previous issues of RAINBOW (December 1984 and

June 1987), I will not cover in detail every enhancement the new ADOS-3 adds to the Radio Shack DOS. I will, however, list some of the features of the original ADOS that are still supported, just in case someone out there is not familiar with ADOS.

These features include repeat and edit of the last direct-mode command; CONTROL key abbreviated entry of BASIC commands; automatic line-number prompts; upper- or lowercase command entry; DOS command for OS-9; one- or two-column directory with free granules (to screen or printer); COPY *filename* TO *drive number* alternate form of COPY command; AE Error ("file already exists") override option; RUNM command to load and execute machine language programs; SCAN command, which will list ASCII files to the screen or printer and give the start, end and execute addresses for binary files; PRT ON/OFF to enable/disable routing text output to printer as well as screen; MON, a mini-monitor command that provides hexadecimal memory examine-and-change capability; the ability to use 35- or 40-track, single- or double-sided drives; and the option to change the start-up logo. Instead of seeing the familiar Radio Shack logo come up every time you turn on your CoCo, you can have whatever message you want (limited to 63 characters). This is a good place to put your name for a type of theft protection.

All these features are great just as they are, but ADOS-3 adds even more and improves on a few of these. First of all, two new commands, FAST and SLOW, have been added. These two commands control the processor speed. FAST sets the processor speed to the double-speed (1.8 MHz) mode. Of course SLOW sets the speed back to the .9 MHz mode. You must be aware that while these two commands automatically adjust the printer baud rate constant to take into account the processor speed, this may cause a problem if you have a program that changes the baud rate constant. This was the case while I was using *VIP Writer*. I always set the baud rate to 7, which is 9600 baud. My printer went bonkers. I had to set baud to 6 (4800 baud) so at the FAST speed, it would print at 9600 baud. This can definitely be a concern with communications software.

The safest thing to do if you start to have problems is to go to the SLOW mode, see if things work normally and proceed from there. This is no big concern if you are aware of the possible symptoms and remember to enter the SLOW command, adjust the program accordingly or just enter a line in the BASIC loader that contains the SLOW command. I had no problems with disk I/O using the FAST mode.

ADOS-3 adds some very powerful editing features. When a BASIC program is in memory, the up and down arrow keys can list the program forward and backward, a line at a time. If held down, these keys will repeat. This is a very convenient way of controlling the scrolling of the program, especially when you are editing a program. Once you have listed the line you want to edit, you simply press the right arrow key. This puts you in the edit mode and you may edit the line as usual. This also becomes a very powerful debugging feature if you get dumped out of a BASIC program by an error; pressing the right arrow puts you in the edit mode for the line that caused the error.

The slash command (/), which repeats the last direct-mode command, has also been modified. It will allow you to list a line of BASIC code and edit even the line numbers. This is good for copying lines of code to other parts of the BASIC program.

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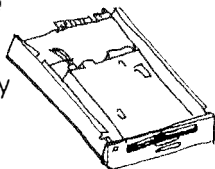


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## Ultra Editor — A Timesaver for Programmers

If you use a monochrome monitor, you will be very interested in ADOS-3's option to kill the colorburst signal. Pressing **CTRL-F2** while in the direct mode kills the colorburst signal, resulting in a monochrome display if you are using a composite or TV output. This greatly enhances the signal if you are using a monochrome monitor.

When you start to customize ADOS-3 to be burned into an EPROM, there are many options you can include. While ADOS-3 will run as a disk utility, to get the full benefit from ADOS-3, you need to eventually get it into an EPROM. One of the options that can be selected when customizing ADOS-3 is the default screen display. ADOS-3 allows the equivalent of a **WIDTH** command, a **PALETTE RGB** command, four **PALETTE** color assignment commands and an **ATTR** command to be selected for automatic execution when the computer is turned on or on a cold start.

The default borders for the 32-, 40- or 80-column screens can also be configured, so you can have the default screen be just about any color or width you desire. Even the 32-column screen uses real lowercase letters rather than the old inverse characters. Once these are in the EPROM, the screen setup, with the exception of **WIDTH**, will also be re-established on a warm reset. The documentation gives some good tips on setting up the screen display the way you like it.

When you are finished with the screen, you can decide at what speed you want the processor to run when the computer is turned on. This will allow you to have the equivalent of a **FAST** command executed on a cold start. Also configured in the customizing is the repeat rate of the up and down arrow keys. The up and down arrow keys are also used to control the display when using the **MON** command.

While the original ADOS allowed you to have 35- or 40-track drives, ADOS-3 adds the option of having 80-track drives. All 158 granules of an 80-track drive are usable under the 80-track option. ADOS demands that all drives be configured to the same number of tracks. You may have a 40-track drive connected to a system configured for 80 tracks, but be careful not to try to access any nonexistent tracks.

ADOS-3 has also redefined which key will be used to clear the screen. **F2** is used instead of the **CLEAR** key because many users accustomed to the CoCo 1 or 2 keyboard might find themselves clearing the screen when they intended to hit the backspace key. **F2** is also used instead of the very awkward **SHIFT-up** arrow for exiting the insert mode when line editing. Both of these redefinitions are optional and can be configured back to the original use if desired.

If you are like some people I know, you only read the last paragraph of a review. So, the bottom line is: If you have a CoCo 3, go out immediately and buy ADOS-3 for your CoCo: your CoCo will not be complete without it. If you have a CoCo 1 or 2 and will be getting a CoCo 3 in the near future, ADOS-3 will work in your controller now. You just won't have access to all its benefits until your CoCo 3 arrives. On a scale of 1 to 10, I rate ADOS-3 a solid 15. Buy it; you and your CoCo 3 need it.

*Ultra Editor* is the first Color Computer 3 program written by Bob van der Poel and is certain to be a hit with his followers. Bob consistently turns out excellent software for the CoCo, and his latest effort is no exception.

*Ultra Editor* is a full-featured, 40- or 80-column screen line editor. It's designed to edit lines of text such as **BASIC**, assembly language and **PASCAL** programs. It incorporates a host of commands that allow virtually any manipulation and modification to any program or word processor file. Its main purpose is not for use as a word processor, but the editing features are similar and the program is handy for editing such files if needed.

The software is supplied on disk, but the I/O can be modified to use with cassette. The disk contains a short **BASIC** loader, but the main program is written in 6809 machine language. Documentation is ample. Sixteen pages are packed with explanations of the many commands.

This is the kind of software that will please programmers since it provides many valuable, timesaving methods to edit programs.

Full cursor movement is available using the arrow keys. Rapid movement from beginning to end of file is provided with the **ALT** key and a combination of either the '-' or ';' keys. Using the **ALT** key in combination with other keys provides some very powerful editing commands such as Find, Jump, Change, Global Change, Kill Line, Unkill Line, Hack Line, Yank Character, Backspace and Insert. You can also insert or delete blocks, move blocks, copy blocks and transfer blocks. An excellent feature is that *Ultra Editor* maintains two separate buffers. The main buffer is approximately 50K bytes long, while the second one is about 16K bytes long. Using the Transfer command allows data to be transferred between the buffers. Macro commands are also supported. These are great timesaving commands that can be set up to duplicate any sequence of keystrokes that you desire. The only limitation is that the macros cannot exceed 49 characters, and no more than nine macros are available. They can be saved as part of the program that you are editing so you can have different macros for different situations.

Onscreen help is also available at the tap of a key. Hitting **F1** displays multiple pages of the various commands available so you won't have to thumb through the documentation if you forgot how to do something.

This program is very well done, and I am convinced that it offers the software hacker some real opportunities. Many hints, tips and examples are used throughout the documentation to help the user understand the concepts presented. It's not difficult to use and, while a bit sophisticated in terms of what it does, it is not a program that novice programmers would want or need. But as programming skills are sharpened and programs become more complex, *Ultra Editor* will become a well-used utility.

(SpectroSystems, 11111 N. Kendall Dr., Suite A108, Miami, FL 33176; 305-274-3899, \$34.95 plus \$2 S/H)

(CMD Micro Computer Services Ltd., 10447 124th St., Edmonton, Alberta, Canada T6M 1E1; 403-488-7109, \$19.95 plus \$2 S/H)

— David Gerald

## Disk Manager Helps Control and Modify Files

Looking for a program that will help you manage your CoCo 3 disks? Look no more — *Disk Manager* will come to your rescue! The functions this BASIC program provides are plentiful and just what I needed to help control my CoCo 3 disk directories. I use it primarily for my TCBBS Bulletin Board disks, but you can use it for any application of your own.

The program requires a 128K CoCo 3 (it is written specifically for this machine and will not work on a CoCo 1 or 2). A choice of using either the 40- or 80-column character screens is provided. A 32-column screen is not supported, so a monitor may be necessary in order to see the full screen (most TVs will cut off the first couple of characters on the left side of the screen). Colors are used and can be changed from within the program, although it is rather confusing to figure out how to modify the code if you're not familiar with the new Enhanced Extended BASIC commands.

Several different commands are available. Files can be copied, killed, moved or renamed. These functions can be done with individual files or by groups of them. One can also print directories or sort them. Options to turn the verify on and off are also provided. Complete documentation is provided with the package and explains all the different commands in detail.

One disadvantage with this program is that you must have the documentation in front of you, since there aren't any menus. The time it takes to look through the documentation is frustrating. But in the long run, you'll eventually memorize most of the functions, since the small abbreviations coincide with the function you want to perform (e.g., 'C' stands for Copy).

This is a nice utility, and I recommend it to anyone wanting to quickly modify their files without having to type in the full BASIC commands that would otherwise be required.

(Bangert Software Systems, P.O. Box 21056, Indianapolis, IN 46221; 317-262-8865, \$14.95 plus \$2 S/H)

— Darren Nye

## Dress Up Programs and Design Title Screens With Title

*Title* is a program written in BASIC that helps program authors design title screens without spending large amounts of time figuring out how to make them. Once the title screen is drawn, *Title* creates a subroutine that can be merged with a BASIC program in order to recreate the title screen just drawn. A simple GOSUB will recreate the title screen, and multiple title screens may be included in a BASIC program subject only to memory restrictions.

*Title* is supplied in unprotected form on disk, and the user is cautioned to operate from a backup of the disk at all times. *Title* is available for 32K disk-based Color Computers, including a version for the CoCo 3.

The *Title* characters are four lines high by three spaces wide. Any printable character entered from the keyboard may be used in the title screen, except for the lowercase alphabet. A full screen of characters requires about six minutes to process into a subroutine.

Foreground and background colors are available, but are limited to the capabilities of the low resolution text screen. Letters may be green, yellow, blue, red, buff, cyan, magenta, or orange on a black background, as well as black letters on each of these background colors in turn.

The documentation for *Title* deserves some comment. The documentation is in the form of a 4-by-5 booklet and is printed in elite type. The author also wrote the program (called *Book*) that produced the documentation. I found this format to be an interesting and novel approach to documenting.

I found *Title* to be a well-behaved utility program and one that can be of use to program authors or those who simply want to "dress up" their programs a bit. The price may be considered a bit high by some for a BASIC utility program, but *Title* works well and has no quirks in operation.

(B. Erickson Software, P.O. Box 11099, Chicago, IL 60611, \$30)

— Don Hutchison

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## Backup and Backup III Lots of Promise

I received my first original CoCo utility, and it has a lot of promise. I unwrapped the package from BrainChild Software and actually found two products, *Backup* and *Backup III*. *Backup* is for CoCo 1s and 2s, and *Backup III* takes advantage of the 128K of the CoCo 3.

As you can tell from the name, these are backup utilities. But unlike Disk BASIC, which only copies five tracks at a time, *Backup* copies 10 and *Backup III* copies 19 tracks at a time. This cuts disk swaps from seven (eight if 40 tracks) down to four and two. Another advantage is that if an I/O Error is encountered, the procedure is not aborted as in Disk BASIC but, instead, the tracks, sector numbers and errors encountered are reported onscreen. This allows you to salvage data from disks that have bad sectors. The error messages are displayed on the bottom half of the screen in the following format:

```
0214 DRIVE NOT READY
```

The first two digits designate the track number, and the last two represent the sector. You can note these and work on restoring the data in these sectors later with another utility.

Both *Backup* programs support 35-, 36-, 40- and 80-track drives. The documentation goes even further and states that if you have really non-standard drives, you can select any number between one and 99 for the number of tracks. The *Backup* programs also perform a much faster verify than Disk BASIC's. All this sounds really good, but I would like to see a modification. I only have one big complaint. While the *Backups* reduce the number of disk swaps, I normally use a two-drive backup. Therefore, I do not do any "disk swaps." I would like to see an option added that would allow a two-drive backup. It seems it would be easy to add to the programs.

Along with the main backup utility on each disk, a utility named ZAP.BAS is also included on the disk. This program, *Zap*, can be used to copy single sectors from one disk to another. You are prompted to enter the track and sector. Enter it in the same format as the errors are reported in either *Backup* or *Backup III*, e.g., 0214. This program can help salvage data from a disk with bad sectors. While it will not help on some really bad sectors, successive attempts on some sectors may result in restored data.

Overall, I believe *Backup* and *Backup III* are useful utilities. For the price, they are very reasonable. While I would really like to see an option for multiple drive backups, these utilities will be extremely useful for those who only have one disk drive.

(BrainChild Software, Rt #5, Calhoun, GA 30701; *Backup*, \$8.95; *Backup III*, \$10.95 plus \$2 S/H)

— Dale Shell

## RGB Patch Brings PMODE4 to Life on CoCo 3

From what I gather, a lot of CoCo 3 users are having somewhat mixed emotions about the switch to analog RGB output; it's very nice and a worthwhile improvement, but the many programs that use PMODE4 artifact colors just display gray lines instead of red and blue. There are several ways around this; one is to use a color TV set, tuned to channel 3 or 4, to receive the CoCo RF output, while another is to buy a monitor that has both RGB and composite inputs. Both of these are hardware approaches and work reasonably well, but some are no doubt looking for a software patch.

*RGB Patch* is a short machine language routine that loads from disk into the CoCo 3, tucks itself away and stands by, almost invisibly, to do its work when called upon. When a machine language program switches the system to PMODE4 with a black/buff screen (the mode used for artifact colors), *RGB Patch* re-switches the CoCo 3 to its 320-by-200 Hi-Res screen instead. As the program writes to the PMODE4 screen, *RGB Patch* updates the 320-by-200 screen by checking where the dots are, analyzing the dot patterns to determine what color they are — in effect approximating the NTSC color decoding process — and then putting the corresponding dots on the 320-by-200 screen in the proper colors. The color quality is quite good. The results I saw were sharper and clearer than composite displays. I was initially afraid that *RGB Patch* would mis-identify some white areas as color, as do some boards that are used to display Apple II graphics on RGB monitors. I didn't see any trace of this effect. *RGB Patch* apparently is able to determine white with some degree of intelligence, performing a task somewhat akin to that of the comb filters used to separate color and luminance in the better color TV sets.

*RGB Patch* is said to be compatible with 90 percent of the ML programs that need it, but is not compatible with BASIC programs, OS-9 or with ROM packs. I don't have any way to tell if that percentage is accurate without testing a lot of programs, but the first two programs I tried did not work; one gave no color and the second never got past the color test screen, possibly because of an incompatibility with the CoCo 3. Once I got a program that did run in color, all was well.

As for those color test screens, it should be noted that *RGB Patch* does not have a normal method of switching the red and blue artifacts to conform with different programs. If, however, you find that the colors are wrong, you can poke in new palette values for "red" and "blue" to fix it; you can also change them, and "black" and "white" as well, to whatever CoCo 3 colors you desire.

If you have an RGB monitor, and want PMODE4 colors, *RGB Patch* just might be the best way to get them.

(Spectrum Projects, P.O. Box 264, Howard Beach, NY 11414; 718-835-1344, \$29.95 plus \$3 S/H)

— Ed Ellers



# COCO-3 ONLY PRODUCTS

## TEXTPRO III-3

### "The Advanced Word Processing System"

- 8 Displays from 32/40/64/80 columns by 24 lines 192 or 225 Resolution.
- Three Programmable Header lines that can be re-defined at anytime.
- Programmable Footer line & Automatic Footnote System.
- 10 Programmable Tab stops & 7 Powerful Tab Function Commands.
- Completely Automatic Justification, Centering, Flush left and right.
- On screen display of underline and Double size characters.
- Change indents, margins, line length, etc. parameters anytime in the text.
- Create and Edit files larger than memory, up to the size of a full disk (156K).
- Easily imbed any number of format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO III is an advanced word processing system 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, 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 III is what you're looking for. TEXTPRO 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 50 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. The formatted output can be displayed directly on the screen, showing you exactly what your printed document will look like before a single word is ever printed. This includes margins, headers, footers, page numbers, page breaks, underlining, column formatting and full justification.

Requires 128/512K & 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 similar to our EDT/ASM 640 for the COCO 1 & 2 but designed to take advantage of the new features of the COCO 3. It has 8 Display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you can 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 and background colors or even color or monochrome display modes. It even supports 512K by adding an automatic 2 drive Ultra Fast RAMDISK for lightning fast assembly of program source code larger than memory. The disk also contains a free standing ML Debug Monitor, to help you debug your assembled programs. See our other Advertisement for information on some of the advanced features supported in the Editor, Assembler and Debugger.

Requires 128/512K & Disk \$59.95

## 512K RAM UPGRADE

### Assembled & Tested w/120 nsec RAM

Give your COCO 3 all the power it deserves with this easy to install (no soldering/plug in) 100% Tandy compatible 512K memory upgrade. Completely assembled and tested (in a COCO-3), not like some upgrades that give you a bare board and a set of ram chips to assemble & test yourself. (upgrade without RAM \$49.95)

Now only \$99.95 Assembled & Tested

## Ultra Hi-Speed 512K RAMDISK and MEMORY Tester

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in your 512K COCO III. 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 512K COCO-3 to run at double speed all the time even for floppy disk access!!! The MEMORY Tester is a fast Machine Language program to test the 512K COCO-3. 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

## COMING SOON

Maybe even by the time you read this!!!

**TEXTPRO IV** - Word Processor with ON Screen Underlining, Italics, Bold and Double Width display. What you see is what you get.  
**THE SOURCE-3** - Disassembler Source Generator better than ever.  
**CBASIC3** - With Enhanced Graphics & 512K RAM support plus more!

## DataPack III Plus V1.1 SUPER SMART TERMINAL PROGRAM AUTOPILOT and AUTO-LOG Command 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 Selectable Display Formats, 32/40/64/80 columns at 192 or 225 Resolution.
  - 50K Text Buffer when using the Hi-Res Text Display and Disk.
  - ASCII & BINARY disk file transfer support via XMODEM.
  - Directly record receive data to a disk file while online (Data Logging).
  - VT-100 Terminal emulation for VAX, UNIX and other systems.
  - VT-100/52 cursor keys & position, insert/delete, PF & Alt. Kbd. keys.
  - Programmable Word Length, Parity, Stop Bits and baud rates 300 to 9600.
  - Complete Full and Half Duplex operation, with no garbled data.
  - Send full 128 character set from Keyboard with control codes.
  - Complete Editor, Insert, Delete, Change or Add to Buffer.
  - 9 Variable length, Programmable Macro Key buffers.
  - Programmable Printer rates from 110 to 9600 Baud.
  - Send Files directly from the Buffer, Macro Key Buffers or Disk.
  - Display on Screen or Print the contents of the Buffer.
  - Freeze Display & Review information On line with no loss of data.
  - 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 128/512K & Disk, Only \$59.95

## HI RES III Screen Commander

Now you can have up to 54 different character sizes on your COCO-3 screen at the same time!!!

- 54 Different Character Sizes available 14 to 212 cpl.
- Bold, *Italic* or Plain character styles.
- Double Width, Double Height and Quad Width characters.
- Full 96 Upper/Lower case characters.
- Continuous or Individual Character Highlighting.
- Scroll Protect from 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN3 mode.
- PRINT  $\otimes$  available in all character sizes.
- Programmable Automatic Key repeat.
- Full Control Code Keyboard supported.
- Full Cursor Control command support.
- Selectable Character & Background color.
- Color or Monochrome Display modes.
- Uses only 4K of Extended or Basic ram.
- Written in Ultra Fast Machine Language.

HI-RES III was designed to 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  $\otimes$  or have different character sizes on the same screen, even mixing text and graphics with the HPRINT command leaves a lot to be desired. HI-RES III can give you the kind of display capabilities you always dreamed about having on your color computer but didn't get with your COCO-3. Well now it's here and 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. It also overcomes some of the disadvantages found when using the width 40 & 80 screens. You can use the Print  $\otimes$  function on any line length with HI-RES III. It also gives you a programmable automatic key repeat that can be very handy for editing your Basic programs. Automatic key repeat can be adjusted from ultra fast to super slow and can be disabled entirely if desired. You also get a full control code keyboard using the 'CTRL' key. So many of HI-RES III's extended functions can be controlled directly from the keyboard easily. With just a couple of simple keystrokes you can change character sizes and styles at any time. You can even switch back and forth between the standard COCO-3 display and HI-RES III with a simple keyboard entry or under program control. But, after you use HI-RES III, you most likely won't want to do without it again.

HI-RES III can be used for a wide variety of applications, with its many different character sizes and styles. You can make your program really look professional, with protected menus, Bold or Italic emphasis, Double or Quad characters for easy to read displays & menus. It can be ideally suited for Video Titles or Store Displays. Printing Signs or Fliers in conjunction with a Hi-res Screen dump program. The visually impaired will especially appreciate the extra large character sizes available.

Requires 128/512K Tape or Disk \$34.95

To order products by mail, send check or money order for the amount of purchase, plus \$3.00 for shipping & handling to the address below.  
To order by VISA, MASTERCARD or COO call us at (702) 452-0632  
(Monday thru Saturday, 8am to 5pm PST).

CER-COMP  
5566 Ricochet Avenue  
Las Vegas, Nevada 89110  
702-452-0632

# PIPELINE

**COCO 3 DRIVES** J & M Systems, Ltd. has introduced its 3½-inch floppy drive subsystem for the Color Computer 3. The user-installable subsystems are available in two basic configurations. An external, stand-alone model with case, power supply and cable is available for \$250. Users wanting to add a drive to their current case/power supply unit can purchase a 3½-inch drive mounted on an adapter bracket, which will fit in place of a 5¼-inch floppy, for \$199.

Both subsystems are 80-track units with 720K formatted capacity under OS-9 Level II. The drives may be used with Disk Extended Color BASIC and will yield 160K capacity. For additional information and details, contact J & M Systems, Ltd., 15100A Central S.E., Albuquerque, NM 87123, (505) 292-4182.

**uP DEVELOPMENT SYSTEM** The P68000 uLAB microprocessor development system with an educational price of \$197.50 has just been announced by University Research and Development Associates, Inc. (URDA, Inc.) and is being manufactured by Quasitronics, Inc. The P68000 uLAB is a 68000 microprocessor and support chips with keypad, LED display, 4K bytes SRAM, 8K bytes of EPROM, cassette interface, software operating system, power supply, User's Manual and Programmer's Reference Manual completely packaged in a three-ring binder, i.e., a Notebook Computer.

The uLAB is engineered to be low cost, providing a complete microprocessor development system for hands-on experience for engineers, technicians and students. Because of its size, the uLAB can be carried to the home, dormitory, or

other work or study location for experimentation at the user's convenience. It is also suitable for use in conjunction with lecture-type courses.

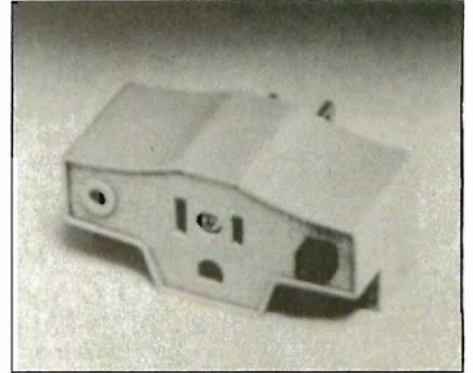
The uLAB comes complete with a listing of the software monitor, including comments and documentation, and a schematic including every component. The P68000 uLAB lists for \$295 with discounts to \$197.50 for educational institutions, faculty and students. To order, contact Quasitronics, Inc., 211 Vandale Drive, Houston, PA 15342, (800) 245-4192. For technical information, contact URDA, Inc. (412) 683-8732.

**GROUND COVERAGE** Pilgrim Electric Company has announced a new grounding device for antistatic equipment. The Model GAM-1 Smart Static Ground Monitor provides two Fail-Safe discharge ports and monitors the quality of the building ground.

When the GAM-1 is plugged into a standard 15- or 20-amp 120 VAC receptacle, it continuously checks the outlet circuit wiring and its Go-No-Go light turns on if the outlet is correctly wired and the building ground is adequate for draining static charges.

The new GAM-1 provides two "Fail-Safe" ESD ground connections, a standard Banana Jack and an Apple Jack. The Banana Jack accepts a standard banana plug. The Apple Jack accepts a stranded or solid wire of 18 to 22 gauge, and alligator clip adapter, a ring terminal, fork lug or quick disconnect -- without using tools. Its quick insertion and retention method facilitates wiring and maintains electrical contact integrity. Both jacks have integral 1-megohm current limiting resistors to safeguard users from shock hazard.

The GAM-1 carries a list price of \$24.95. For more information, contact Pilgrim Electric Company, 105 Newtown Road, Plainview, NY 11803.



*The GAM-1 offers fail-safe monitoring of your building's ground connection.*

## LOOPHOLES IN COMPUTER FRAUD ACT

Computer crime is not a youthful prank by teenage "hackers," as it is often portrayed in movies. Each year, economic losses due to computer crime are estimated in the multimillion dollar range. Many of those losses go undetected or unreported.

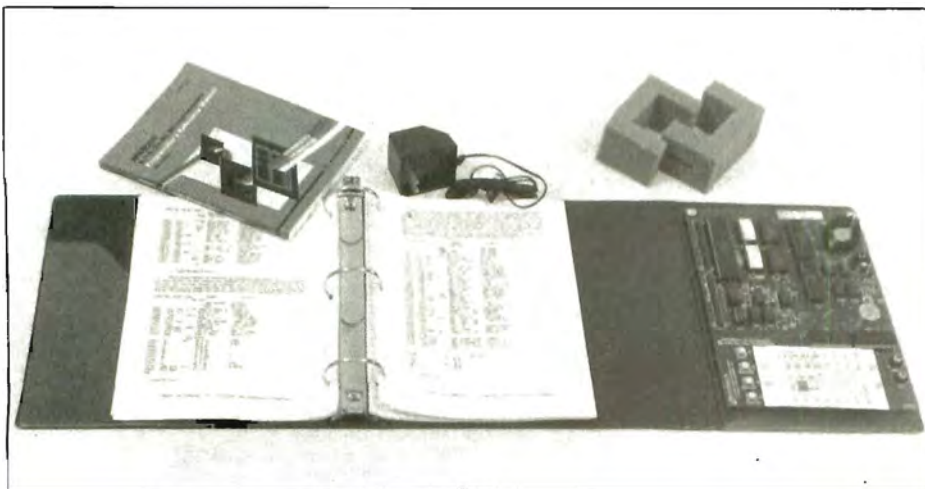
The recently enacted Computer Fraud and Abuse Act of 1986 remedies many of the shortcomings of a previous bill passed in 1984. But, some of the earlier bill's deficiencies remain uncorrected, and the new statute adds difficulties in criminal prosecution, according to an article in the current issue of *Criminal Justice*, published by the American Bar Association's Criminal Justice Section.

Some important terms, particularly "access," "use," "affects" and "without authorization," remain undefined by the new law, according to the authors of the article, Joseph B. Tompkins, Jr. and Federick S. Ansell.

Under the new law, even if someone accesses a financial institution's computer without authorization, no crime is committed unless he obtains information or causes damage totaling \$1,000.

Additionally, the statute concerns only crimes against data, but does not protect software.

Tompkins and Ansell call for increased prosecution of computer crimes. Although many computer owners are reluctant to report crime — banks, for instance, may not want their depositors to know that their institution is vulnerable — everyone would be better off if computer crime were prosecuted, both to obtain restitution for victims and to deter future criminal activity.



*The P68000 uLAB — computer in a notebook.*

# The Sixth Year Of Rainbow

An index to the  
articles, reviews and  
authors appearing  
in THE RAINBOW  
from July 1986  
through June 1987.

Compiled and Edited  
by Leslie A. Foster

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## AN INDEX TO THE RAINBOW JULY 1986 - JUNE 1987

TOTAL NUMBER OF ARTICLES  
(July 1981 to June 1987) — 3518

This is the fourth index to the *Rainbow*. Changes in this year's index include:

- editorial comments are indexed
- hints and one - (or two-) liner programs are indexed
- names of Rainbow on Tape/Disk programs are included with each citation
- question and answer citations include a sample of question topics
- in "The CoCo gallery," titles of graphic art are noted

Previous indexes to the *Rainbow* are available as follows:

- July 1981 to June 1984—July 1984 issue
- July 1984 to June 1985—July 1985 issue
- July 1985 to June 1986—July 1986 issue

The subject breakdown, and number of items per heading are shown below. The number following in brackets is the total number of articles published since 1981 in that topic (where indexed).

- ASSEMBLY LANGUAGE — 3 (43)
- BUSINESS — 1 (30)
- CASSETTE — 1 (6)
- CLUBS — 5 (12)
- COMMUNICATIONS — 21 (65)
- DATABASE MANAGEMENT — 0 (9)
- DISK — 5 (58)
- DRAGON COMPUTER — 0 (3)
- EDITORIAL COMMENT — 24 (not indexed)
- EDUCATION - ELEMENTARY — 11 (52)
- EDUCATION - GENERAL — 34 (178)
- EDUCATION - LOGO — 0 (4)
- GAME — 45 (248)
- GAME - ACTION — 0 (12)
- GAME - ADVENTURE — 3 (25)
- GAME - SIMULATION — 1 (18)
- GENERAL — 31 (164)
- GRAPHICS — 56 (216)
- HARDWARE — 0 (18)
- HARDWARE PROJECT — 18 (45)
- HARDWARE TUTORIAL — 11 (18)
- HINT — 31 (not indexed)
- HOME APPLICATION — 18 (94)
- HOME FINANCE — 9 (30)
- MC-10 MICRO COLOR COMPUTER — 0 (6)
- MUSIC — 13 (51)
- ONE OR TWO LINER PROGRAMS — 65 (not indexed)
- OPERATING SYSTEMS — 0 (3)
- OPERATING SYSTEMS - OS9 — 26 (81)
- PASCAL — 0 (13)
- PRINTER — 8 (64)
- QUESTIONS AND ANSWERS — 32 (74)
- SOUND SYNTHESIS — 0 (4)
- TUTORIAL — 12 (52)
- UTILITY — 16 (138)
- WORD PROCESSING — 3 (13)

TOTAL NUMBER OF ARTICLES — 699 (3516)

AUTHORS — 472 (1836)

PRODUCT REVIEWS — 196 (1549)

Leslie A. Foster is a librarian with Dalhousie Law Library in Halifax, Nova Scotia, Canada, and has recently been appointed System Manager for the implementation of an integrated library system for the universities in the Halifax area.



## ASSEMBLY LANGUAGE

- Barden, William, Jr. "Interfacing tricks for BASIC and Assembly Language." (*July 1986*) 216  
WORDCNT1; WORDCNT2 EXPLODE1;  
EXPLODE2
- Barden, William, Jr. "More interfacing tricks for Assembly Language and BASIC." (*August 1986*) 188 CHARGEN
- Barden, William, Jr. "Presenting a quiz for Color Computer Assembly Language." (*November 1986*) 192

## BUSINESS

- Dettmann, Harvey. "The bookkeeper's helper." (*March 1987*) 97 PAYROLL

## CASSETTE

- Nelson, Mark. "Fast relief for tape-loading headaches." (*February 1987*) 182 — Correction, June 1987, p.116. TAPE DOC

## CLUBS

- "Clubs, clubs, clubs." (*January 1987*) 70 — Quarterly list of CoCo clubs.
- "Clubs, clubs, clubs." (*April 1987*) 149
- "CoCo community." (*July 1986*) 204
- "CoCo community." (*October 1986*) 189
- Haverstock, Mark. "The care and feeding of a CoCo club." (*January 1987*) 67

## COMMUNICATIONS

- Adams, Rick ; and Lear, Dale. "Coming to terms with the CoCo 3." (*November 1986*) 93 — Terminal program for CoCo 3. Corrections to Rainbow on tape/disk January 1987, p.164. TERM3BAS; TERM3
- Augsburg, Cray. "Building an OS-9 support network." (*July 1986*) 88 — News from Delphi.
- Augsburg, Cray. "Changes make Delphi even easier to use." (*March 1987*) 92 — Includes a Delphi command card.
- Augsburg, Cray. "Checking into conference." (*April 1987*) 94
- Augsburg, Cray. "Command options in the workspace." (*October 1986*) 154 — About Delphi.
- Augsburg, Cray. "A follow-up on SIG mail." (*December 1986*) 169
- Augsburg, Cray. "Help is just a SIG away." (*May 1987*) 120
- Augsburg, Cray. "Help one, help all." (*June 1987*) 126
- Augsburg, Cray. "A look at workspace." (*September 1986*) 172 — Delphi hints.
- Augsburg, Cray. "A review of the personal settings profile." (*January 1987*) 168
- Augsburg, Cray. "SIG changes include new selections, new sections." (*February 1987*) 68 — Delphi information.
- Augsburg, Cray. "Using mail in the SIG." (*November 1986*) 102 — Delphi news.
- Augsburg, Cray. "Using the CoCo SIG." (*August 1986*) 174
- Bailey, Eric. "Graphically speaking: The artistic BBS." (*November 1986*) 108 — Correction, February 1987, p. 160. LRWSEEDIT
- Crosby, Mark. "The evolving REMOTE." (*November 1986*) 70 REMOT232
- Duncan, Richard. "CoBBS message editor." (*November 1986*) 80 SMH
- Goodman, Marty. "Database report." (*September 1986*) 173 — Delphi news.
- Goodman, Marty. "RTTY for the Color Computer." (*November 1986*) 36 RTTY
- Kyte, Ted. "Two CoCo BBS system." (*November 1986*) 86
- Miller, Eric ; and Gavriluk, Erik. "Long distance draughts." (*November 1986*) 114 — Checkers by modem. MCLOAD; MCDRAW
- Popyack, Len. "Hamming it up." (*November 1986*) 43 — Packet radio discussion.

## DISK

- Armstrong, Kerry M. "Transplant surgery for the disk controller." (*July 1986*) 68 — Upgrade the disk controller.
- Goodman, Marty. "Transfer CoCo text files to MS-DOS disks." (*July 1986*) 176 MS19GEN; MSFORMAT ADOLF COCO2MS
- Jorgenson, Michael N. "Take command of CoCo 3 drives." (*February 1987*) 94 — Disk utility for the CoCo 3. DU-3
- Perevosnik, Joe. "Double duty." (*May 1987*) 92 — Print hard copies of disk directory. DISK DIR
- Schrag, Roger. "The limousine utility: A tape-to-disk transfer vehicle." (*February 1987*) 73 — Reprint from January 1984, p. 48. TPTODSK

## EDITORIAL COMMENT

- Arnott, Jo Anna. "Building April's Rainbow." (*April 1987*) 16 — Introduction to home help issue
- Falk, Lawrence C. "Print#-2." (*July 1986*) 12 — Fifth anniversary memories.
- Falk, Lawrence C. "Print#-2." (*August 1986*) 12 — Come visit Falsoft: Chicago RAINBOWfest.
- Falk, Lawrence C. "Print#-2." (*September 1986*) 12 — All about CoCo 3.
- Falk, Lawrence C. "Print#-2." (*October 1986*) 12 — Comments on CoCo 3.
- Falk, Lawrence C. "Print#-2." (*November 1986*) 12 — "Tandy's got it."
- Falk, Lawrence C. "Print#-2." (*December 1986*) 12 — CoCo 3 comments.
- Falk, Lawrence C. "Print#-2." (*January 1987*) 12 — Comments on availability of CoCo 3 software.
- Falk, Lawrence C. "Print#-2." (*February 1987*) 12 — How to promote the CoCo.
- Falk, Lawrence C. "Print#-2." (*March 1987*) 12 — Availability of software for CoCo 3.
- Falk, Lawrence C. "Print#-2." (*April 1987*) 12 — Comments about software piracy.
- Falk, Lawrence C. "Print#-2." (*May 1987*) 12 — Comments about adventure contest.
- Falk, Lawrence C. "Print#-2." (*June 1987*) 12 — Discussion of Chicago RAINBOWfest.
- Reed, James E. "Building August's Rainbow." (*August 1986*) 16 — Assorted commentary.
- Reed, James E. "Building December's Rainbow." (*December 1986*) 16 — CoCo 3 comments.
- Reed, James E. "Building February's Rainbow." (*February 1987*) 16 — Just can't retire the old CoCo 1!
- Reed, James E. "Building January's Rainbow." (*January 1987*) 16 — Introduction to beginner's issue.
- Reed, James E. "Building July's Rainbow." (*July 1986*) 16 — Notes for beginners.
- Reed, James E. "Building June's Rainbow." (*June 1987*) 16 — Discussion of Chicago RAINBOWfest.
- Reed, James E. "Building March's Rainbow." (*March 1987*) 16
- Reed, James E. "Building May's Rainbow." (*May 1987*) 16 — Attach a CoCo to your exercise bike!
- Reed, James E. "Building November's Rainbow." (*November 1986*) 16 — Comments on copyright issues.
- Reed, James E. "Building October's Rainbow." (*October 1986*) 16 — All about Rainbow on Disk.
- Reed, James E. "Building September's Rainbow." (*September 1986*) 16 — All about CoCo 3.

## EDUCATION - ELEMENTARY

- Blyn, Steve. "Let the little ones learn by counting on CoCo." (*January 1987*) 76 CARCOUNT
- Blyn, Steve. "Mystery word puzzles." (*September 1986*) 74 — Help learn spelling or vocabulary lists. SPELPUZL
- Blyn, Steve. "Word fun: The three bears come of age." (*November 1986*) 74 FUNWORDS
- Plog, Michael. "The role of teachers in educational software development." (*June 1987*) 32
- Rigsby, Mike. "Your face or mine?" (*September 1986*) 88 FACE BASND SOUND

Scerbo, Fred B. "The challenge returns: Driller II is a thriller, too." (October 1986) 173 DRILLER2  
 Scerbo, Fred B. "Understanding relationships between fractions, decimals and whole numbers." (January 1987) 78 MATHQUIZ  
 Scerbo, Fred B. "Updating the Color Change quiz." (September 1986) 98 CHNGQUIZ  
 Schneider, Harold. "The odd man out." (October 1986) 125 — Rainbow on tape program also on September tape. NOTLIKE  
 Turner, Del. "Is it a fish, or a phish, or a pheish?" (June 1987) 148 — BASIC09 helps with phoneme recognition. SOUNDPUZ (BASIC09)  
 Turowski, Donald. "I before E except after C..." (September 1986) 78 SPELDRL

#### EDUCATION - GENERAL

Bennett, Jim. "The vocabulary tightrope." (July 1986) 188 — Match synonyms. TITEROPE  
 Blyn, Steve. "Developing logical reasoning skills." (July 1986) 132 — Development of reasoning powers. TRUEFALS  
 Blyn, Steve. "Exploring the card catalog." (August 1986) 94 — Training in library skills. CARD LOG  
 Blyn, Steve. "A flexible program for teaching line graphs." (April 1987) 46 GRAPHS  
 Blyn, Steve. "It's back to basics with an adjective review." (October 1986) 152 ADJECTIV  
 Blyn, Steve. "Learning about scales: Key to understanding maps." (May 1987) 112 MAPSCALE  
 Blyn, Steve. "Making the Dewey Decimal system user-friendly." (March 1987) 74 DEWEY  
 Blyn, Steve. "Presidents take Precedence." (February 1987) 46 — Presidential quiz. PRESIDENTS  
 Blyn, Steve. "A square deal for teaching math." (June 1987) 47 MATHPLAY  
 Blyn, Steve. "Understanding the computer with binary dice conversions." (December 1986) 88 BINARY  
 Collicot, John. "Cipher fun for CoCo kids." (April 1987) 166 ADDITION  
 Hood, Thomas. "Counting with Caesar." (April 1987) 172 — Roman numeral drill. ROMANS  
 Kenny, Keiran. "Rational thinking." (September 1986) 38 — Conversion of fractions to ratios and percentages. RATIOS  
 Kolar, Joseph. "Translation sensation." (July 1986) 93 LANGTUTR  
 Kolar, Joseph. "Uncomplicating translating." (August 1986) 48 — Second part of translation demo. LANGTUT1; LANGTUT2  
 Norton, Dennis. "Chronologist in CoCo land." (September 1986) 58 — Teach children how to read a clock. CLOCK  
 Plog, Michael. "Do teachers like computers?" (February 1987) 65  
 Plog, Michael. "Finding resources for computer learning." (March 1987) 90  
 Plog, Michael. "The 'hidden' computers." (August 1986) 97 — Use of the CoCo in videotape editing.  
 Plog, Michael. "The most important educators of all." (November 1986) 166  
 Plog, Michael. "Programming the LOGO turtle: Studies in learning transfer." (April 1987) 86  
 Plog, Michael. "The question of assessment." (January 1987) 176  
 Plog, Michael. "S-P analysis: Comparing the curves." (May 1987) 82 — Aid in curriculum improvements.  
 Plog, Michael. "Special education and the computer." (July 1986) 135  
 Plog, Michael. "Tandy grants and the status of educational computers." (September 1986) 76  
 Powers, Ron. "CoCo testmaker revisited." (September 1986) 160 — Make multiple choice tests updated (from Sept. 1985, p.30). TESTMAKR  
 Powers, Ron. "The teacher's pet." (September 1986) 47 — Computerized grade book. GRADCALC  
 Scerbo, Fred B. "CoCo conquers the metric system." (April 1987) 76 LIFESKL6

Scerbo, Fred B. "Computer-paced learning." (August 1986) 167 LIFESKL4  
 Scerbo, Fred B. "Graphics, education and speech come together." (May 1987) 38 — Graphic simulation of blood flow. BLOOD  
 Scerbo, Fred B. "More graphics, speech and education." (June 1987) 106 — Simulation of the heart. HEART  
 Scerbo, Fred B. "A spelling program that speaks for itself." (February 1987) 166 H&SPELL  
 Terrio, Christine. "Teacher's pet." (January 1987) 32 — Spelling practice lists.  
 White, Edward A. "Hail to the Chief." (September 1986) 153 — Presidential quiz. PRESIDENT

#### GAME

Baumgardt, Kent. "Explosive word fun." (April 1987) 59 — Hangman game WORDGUES  
 Behrmann, Darrel. "Alien raiders blitz." (November 1986) 52 RAIDERS  
 Bell, Bruce K. "The eyes have it." (January 1987) 52 — Visual memory games. DISCRIM  
 Bell, Bruce K. "Hint." (June 1987) 81 — Modification to Discrimination (January 1987 p.52).  
 Bernico, Bill. "Double whammy." (October 1986) 101 — Based on dice game, Skunk. WHAMMY  
 Bernico, Bill. "Laying down the chips." (August 1986) 80 — Bingo caller. BINGO  
 Blound, Andy. "Masonry madness." (August 1986) 83 — Lo-res puzzle game. BRICKS  
 Branigan, Arron. "Fortune wheel." (August 1986) 156 — Modification, December 1986, p.50, and March 1987, p.182. WHEEL CREATOR  
 Brimmer, Robert. "Joker poker." (March 1987) 99 — Correction, May 1987, p.128. POKER  
 Brunotte, Benjamin W. "This one's a puzzler." (May 1987) 152 — Construct word search puzzles. WDSEARCH  
 Buttacavoli, Paul D. "CoCo 3 gets you over a barrel." (March 1987) 52 — Similar to Rubik's cube. BARREL  
 Camirand, Rene. "Save the astronauts!" (September 1986) 33 ASTRONAT  
 Collins, Dale R. "Life of the party for \$200, please." (March 1987) 58 — Similar to TV's Jeopardy. Correction, May 1987, p.128. GPARTY  
 Coty, Curt. "Let the laser battle begin." (January 1987) 36 — Correction, May 1987, p.128. DEF MOV  
 Dash, Raju. "The evil tyrant star lord." (August 1986) 58 STARLORD  
 Dick, Brien. "Which Nym is Witch?" (August 1986) 40 — Educational game. Correction, October 1986, p. 92. NYMATCH  
 Drennan, Allen. "Bombs away!" (October 1986) 18 BOMBAWAY  
 Drennan, Allen. "A Visit to the past." (January 1987) 28 — New version of Breakout. BACKSTAB  
 Farris, Charles. "Mission: hold the bridge." (December 1986) 29 MORTAR  
 Galibois, Michel. "Paramission: Fast and dangerous!" (May 1987) 114 PARAMISS  
 German, J. D. "Up on the rooftop." (December 1986) 124 — Christmas theme game. SANTA  
 Goldwyn, Ira. "Perplexing picture puzzles." (September 1986) 108 SCRAMBLE LATECOCO  
 Hoggins, Jay R. "Vigilance is vital for victory over vicious Vic." (July 1986) 74 VIC  
 Huang, David. "Calling to mind." (August 1986) 81 — Memory game. REPEATIT  
 Hutchinson, David. "Hand-me-downs." (February 1987) 120 HAND OFF  
 Jensen, Paul. "The evictor." (July 1986) 62 EVICTOR  
 Jones, Tim. "The eye of the tiger." (August 1986) 122 — Boxing game. BOXING  
 Jones, Tudor P. "The Solitary endeavor." (December 1986) 76 — Solitaire on the CoCo. Correction, March 1987, p.182. SOLTAIRE  
 Kenny, Keiran. "Mastering the gates." (August 1986) 79 GATES  
 Keyes, Charles. "Air rescue." (June 1987) 26 — Balloon attack game. POKE1; POKE2

Kromeke, Michael B. "Tricks of the trade." (March 1987) 76 — Puzzle type game SWITCH  
 Lear, Dale. "There's evil doings afoot at the Hotel CoCo." (February 1987) 27 SETUP (OS9) HOTEL (OS9)  
 Meyers, Peter. "The menace of the SandWorm." (August 1986) 18 SANDWORM  
 Noble, James A. "Battlin' blue Bert." (April 1987) 105 BLUEBERT  
 Petit, Laura ; and Petit, Chris. "Hippity hopptly down the bunny trail." (April 1987) 99 — Pattern discrimination game. EASTER  
 Powers, Courtney. "Instant graphics and Hogs in Space." (February 1987) 106 — Correction, May 1987, p.128. HOGSPACE  
 Rittenhouse, James E. "Wet 'n wild." (January 1987) 27 — Leaky roof game. LEAKY  
 Scerbo, Fred B. "Achieving arcade game speed in BASIC." (July 1986) 98 — Advanced Star-Trench Warfare (see also November 1982, p.8) Corrections, August 1986, p.98, and October 1986, p.92 TRENCH  
 Scerbo, Fred B. "Creating designer arcade games." (December 1986) 163 — Updated snail invaders. CRTVADER  
 Scerbo, Fred B. "Roboflip: Anatomy of a game." (March 1987) 168 ROBOFLIP  
 Tucker, Eric. "Treasure quest: The golden adventure." (November 1986) 18 TREASURE  
 Wells, John T. "Saucer, saucer, in the sky." (April 1987) 116 SAUCER  
 White, Eric. "CoCo-nect-a-dot." (January 1987) 60 COCONNECT  
 Wood, James W. "Tic-tac-CoCo." (August 1986) 36 — Polar version of game. TICTACTO  
 Wright, Anchor. "Fly off the handle." (August 1986) 81 — Flight simulator. FLIGHT

#### GAME - ADVENTURE

Cook, Bill. "The adventure processor." (August 1986) 26 — Help in writing adventure games. Correction, November 1986, p.78. ADV-PRO  
 Duerig, Jean ; and Duerig, Al. "The goblins'll getcha if you don't watch out!" (October 1986) 26 HALOWEEN  
 Ruby, Paul, Jr. "Success mansion." (January 1987) 108 — Correction, April 1987, p.128. SUCCESS

#### GAME - SIMULATION

Kromeke, Michael B. "Rattle rattle thunder clatter boom boom boom." (September 1986) 49 — A model of a car engine. ENGINE

#### GENERAL

Adams, Rick ; and Lear, Dale. "Color chart for the CoCo 3." (January 1987) 20 COLOR3  
 Augsburg, Cray. "The RAINBOWfest reporter." (February 1987) 83 — Princeton, October 1986.  
 Barden, William, Jr. "How does the CoCo stack up?" (August 1986) 90 — Rating of CoCo with other micros.  
 Bernico, Bill. "Get chart smart with mileage mapper." (May 1987) 30 — Calculate distances on a map. DISTANCE  
 Bernico, Bill. "Songwriter's word rhymers." (January 1987) 32 — Add endings to words. RHYMER  
 Biggs, Brian. "Where is it?" (December 1986) 93 — Disc label program. LABELER  
 Bjork, Steve. "The Color Computer 3: A programmer's dream." (September 1986) 26  
 Bouchard, Roger. "Date tracking through the ages." (January 1987) 46 — Generate calendars for any year. Correction, April 1987, p.128. CALENDAR; CALMOD  
 "CoCo 3 is born!" (September 1986) 30  
 "The faces of Falsoft: The Rainbow makers." (July 1986) 37 — Staff pictures.  
 Falk, Lawrence C. "CoCo better again? Impressions of the new CoCo 3." (September 1986) 18  
 Foster, Leslie A. "The fifth year of Rainbow." (July 1986) 193 — Index July 1985 - June 1986.

Hyre, Leonard. "The key to success." (*March 1987*) 66 — Typing tutor. Correction, May 1987, p.128. COCOTYPE

Laun, Robert E. "Enter the fifth dimension." (*April 1987*) 20 — Five dimensional arrays explained. FIFTHDIM

McGrath, Dick. "The envelope please." (*November 1986*) 125 — Crossword puzzle contest winner.

Montowski, Robert C. "July fashion forecast: Classic clothes by CoCo." (*July 1986*) 115 — Make iron-on transfers. BOOTFLIP FLIP-L2R; FLIPPOKE

Parker, Jeffrey. "The RAINBOWest reporter." (*October 1986*) 83 — Chicago, May 23-25, 1986.

Plog, Michael. "Computers and our English vocabulary." (*December 1986*) 173

Plog, Michael. "A discussion about sexism in the computer industry." (*October 1986*) 164

Samuels, Edward. "Computer program copyrights: A how-to guide." (*April 1987*) 82

Scerbo, Fred B. "Prepare for Thanksgiving cooking with liquid measure." (*November 1986*) 62 — Gallons to ounces, etc. LIQUID

Schuster, Tobin. "The 8088 sounds off." (*March 1987*) 40 — Unusual use for the 8088 microprocessor.

Siegel, Mark. "The third one's the charm." (*November 1986*) 30 — More details on CoCo 3.

Staff, "Rainbow's holiday shopping guide." (*December 1986*) 25 — Christmas gift suggestions.

Steinbrueck, Richard. "The tournament master." (*April 1987*) 120 — Keep track of round robin games. Correction, June 1987, p.116. RNDROBIN INPUT

Tenney, Steve. "The rhythm of life." (*May 1987*) 20 — Chart your biorhythms. BIOCHART

White, Richard A. "Exploring the CoCo 3 color system." (*March 1987*) 112 CO3COLOR

White, Richard A. "The first days with CoCo 3: Experimentation and discovery." (*January 1987*) 188

White, Richard A. "Making the most of CoCo 3 features without overdoing it." (*April 1987*) 194 LISTER

Williamson, H. G. "Tracking the tempest." (*April 1987*) 26 — Predict a hurricane landfall. Correction, June 1987, p.116. HURRTRAK

Zumwalt, Greg L. "Tandy Color Computer 3 does windows, and a whole lot more." (*September 1986*) 20

## GRAPHICS

Adams, Rick, and Lear, Dale. "The power of the palette: Graphics on the Color Computer 3." (*October 1986*) 37 — Corrections to Rainbow on tape/disk January 1987, p.164. TUNNEL WHEEL

Barden, William, Jr. "More on PSET, PRESET and graphics speed." (*January 1987*) 181 LINEBAS; LINEBIN RADARBAS; RADARBIN

Benway, Patrick J. "Space attack." (*October 1986*) 113 — Demonstrate graphics commands. RAID

Berenz, Michael. "The boogie box." (*October 1986*) 113 — Print jam box on printer. RADIO

Bernico, Bill. "The case of the shifty-eyed animation tutor." (*January 1987*) 82 FACE ONE; FACE TWO; FACETEST

Bernico, Bill. "Colors of the spectrum." (*October 1986*) 112 — Combine colors on screen. SPECTRUM

Bernico, Bill. "A Thanksgiving pizza party." (*November 1986*) 28 PIZZA

Billen, David C. "CoCo bright." (*February 1987*) 49 — Give colored text on screen. BOOT CHARLOAD PROGLOAD DEFINE

Brown, Chris W. "Get the picture." (*February 1987*) 88 — Graphic printout directory. GRADIR

Cassel, Randy. "Graphics trio." (*April 1987*) 66 — Graphics demos. SPINNER CIRCLES IPOPPER

"The CoCo gallery." (*July 1986*) 18 — Pictures: Uncle Sam; America; 4th of July; Abraham Lincoln; Chapel.

"The CoCo gallery." (*August 1986*) 114 — Pictures: Where worlds meet; Pioneer 1837; Basketball zone; Saturn; Comet; Beginning golfer.

"The CoCo gallery." (*September 1986*) 122 — Pictures: Oratory; Beyond; Truck; Independence Hall; The Knight; Robot.

"The CoCo gallery." (*October 1986*) 122 — Pictures: Spaceship earth; Co Covilla; Serpent; Halloween; Scorpion; Center.

"The CoCo gallery." (*November 1986*) 26 — Pictures: Summer; Orbital drag race; P51 Mustang; Editor; CoCo Cat; Wolf.

"The CoCo gallery." (*December 1986*) 114 — Pictures: Strictly CoCo; Cowboy; X-Mas; Christmas morning; Waterfall; Football.

"The CoCo gallery." (*January 1987*) 18 — Pictures: Castle; The Staff; Rainbow; The Enchantment of Crashk; Townhall; Space Dome.

"The CoCo gallery." (*February 1987*) 18 — Pictures: Jenny Grist Mill; Mountain; Maison; Pete Rose; Ape; Birds.

"The CoCo gallery." (*March 1987*) 18 — Pictures: Telecoco; The super computer; Lighthouse; Haupt's mill bridge; O! Smokey.

"The CoCo gallery." (*April 1987*) 18 — Pictures: Sugar house; USA; World; Downtown Columbus; Eagle.

"The CoCo gallery." (*May 1987*) 18 — Pictures: Seascape; Gettysburg Battlefield; Boat, Emily; Something fishy.

"The CoCo gallery." (*June 1987*) 18 — Pictures: Ship; Saturn; White Mill Creek; Old Mill; Mountain.

Curtis, H. Allen. "Festive CoCo: Ready to PAINT the town." (*July 1986*) 46 — Expanded PAINT command. Correction, February 1987, p. 160. PAINT 1 TO PAINT 4

Curtis, H. Allen. "Our highfalutin' feline does a CoCo 3 fandago." (*May 1987*) 52 — Dancing CoCo cat. CATDANCE; RECTANGL

Curtis, H. Allen. "PUT speedy GETzales to work." (*November 1986*) 158 GETPUT1 TO GETPUT4

DiZazzo, Ernie. "CoCo can play cupid, too." (*February 1987*) 36 — Make a Valentine's card. LOVECARD

Fortin, Ilene. "From our house to yours." (*December 1986*) 62 — Dot matrix Christmas cards. CARDSHOP

Golias, Ruth. "A public service message." (*February 1987*) 124 — Graphics demo on safety theme. MESSAGE

Harper, Jeff. "Graph-o-matic." (*September 1986*) 82 — Plot 3-D functions. 3DFNCPLT

Herr, Darin. "CoCoDraw concoctions." (*October 1986*) 59 MENUGEN COCODRAW

Jones, Edward. "Two-tone text." (*May 1987*) 89 — Experiment with different combinations. COLORS

Kenny, Keiran. "The electronic marquee." (*September 1986*) 41 DISPLAY

Kenny, Keiran. "PEEKasso prints." (*January 1987*) 30 — Drawing program PEEKASSO

Kolar, Joseph. "Exploring CoCo graphics." (*April 1987*) 112

Kressman, Robie. "Astronomer's heaven." (*January 1987*) 30 — Display the night sky. BIGDIPPR

Kyle, Ted. "That's the way the ball bounces." (*May 1987*) 88 — CoCo 3 graphics demo. BALDEMO

LaBonville, Helen. "Halloween foolery." (*October 1986*) 108 — Talking pumpkin PUMPKIN

Matthews, Becky F. "A cycle-delic palette." (*February 1987*) 60 — Graphics demo for CoCo 3. CYCLDRAW

Matthews, Becky F. "O. Tannenbaum." (*December 1986*) 116 — Christmas graphics. TRIMTREE

Mayeux, Ann B. "Portraits by BASIC." (*October 1986*) 49 DRAWFAITS

Montowski, Robert C. "Picture perfect graphics commands." (*March 1987*) 156 — For OS-9 only. GSAVE (OS9) GLOAD (OS9) MAKEPIX (OS9)

Polsz, Steven R. "Optimum animation." (*October 1986*) 116

Ropson, Ronald T. "The shifting, reducing, stretching, enlarging transfiguration band." (*October 1986*) 44 ZOOM1 TO ZOOM4

Salvail, Pierre. "Four shades of gray." (*May 1987*) 90 — Prints graphics screens. COLRDUMP

Sims, Michael. "Charting the ups and downs of life." (*March 1987*) 86 — Draw graphs of data. GRAPHIT

Snook, Allen. "The spit and image." (*May 1987*) 36 — Screen dump program. GRAPHGEN

Thomas, Carmie A. "Happy new year!" (*January 1987*) 29 — Graphics demo. NEW YEAR

Vasconi, Eugene. "Holiday hearth." (*December 1986*) 108 — Christmas fireplace XMASFIRE; XMASDRVR

Vasconi, Eugene. "Season's greetings." (*December 1986*) 18 — Graphics Christmas messages. GREETING

Ventling, James. "Keycad/Keyflow: CoCoad and CoCoflow modifications." (*November 1986*) 126 COCOMOD1 TO COCOMOD3

White, Eric. "Esch-a-sketch." (*August 1986*) 75 — Correction, December 1986, p.101. ESCHER PRINT200

White, Jeff. "The great picture show." (*July 1986*) 26 — Display graphics files. MAGICIAN WIZARDLATECOCO MERLIN LOADER SHOW

White, Jeff. "Picture file extension changer." (*October 1986*) 182 EXTCHNGR

White, Richard A. "The CoCo 3 color palette from a BASIC program." (*February 1987*) 200 BASICPAL

Womack, Wayne. "The CoCo scaler." (*October 1986*) 166 SCALER

Wright, Archor. "Amnotron animation." (*July 1986*) 54 — Animation program. AMNOTRON

## HARDWARE PROJECT

DiStefano, Tony. "The CoCo is music to the ears." (*February 1987*) 176 — Digital to analog converter.

DiStefano, Tony. "An expandable relay project." (*June 1987*) 84

DiStefano, Tony. "The hardware project basics review." (*May 1987*) 156

DiStefano, Tony. "The No-switch VDG." (*December 1986*) 98

DiStefano, Tony. "Some hardware fixes for the video display generator." (*October 1986*) 161

Goodman, Marty. "A PAL for your CoCo 3." (*January 1987*) 98 — Upgrade Multi-Pak Interface. See note February 1987, p. 160.

Goodman, Marty. "Remote control CoCo." (*July 1986*) 71 — Make a detachable keyboard.

Goodman, Marty. "The shock absorber." (*October 1986*) 158 — Protect from power spikes.

Goshorn, Bruce W. "The quick joystick fix." (*August 1986*) 116 — How to modify the deluxe joystick.

Haverstock, Mark. "The old switcheroo." (*August 1986*) 108 — Joystick port switchbox. Correction, October 1986, p. 92.

Lewis, Emmett J. "Presenting the smarter-than-average printer buffer." (*May 1987*) 160 PRINTBUF

McIntosh, Tim. "Do-it-yourself video output board." (*September 1986*) 171 — Correction, November 1986, p.78.

Merryman, Robert C. "The super switcher." (*November 1986*) 168

Ward, Logan. "LED power indicator." (*December 1986*) 160 — LED for the disk drive.

Weide, Dennis H. "The CoCo ROS, part 1." (*December 1986*) 85 — Build a robot operating system.

Weide, Dennis H. "The CoCo ROS, part 2: Building the ROS circuit." (*January 1987*) 153 ROS TEST

Weide, Dennis H. "The CoCo ROS, part 3: The Robotics program and interfacing." (*February 1987*) 152 ROBOT RBT2SRC

Wolff, Harold L. "Look what they've done to my CoCos." (*March 1987*) 46 — Battery backup for the CoCo.

## HARDWARE TUTORIAL

Augsburg, Cray. "Dissecting the CoCo 3." (*October 1986*) 94

DiStefano, Tony. "Investigating the PIA." (*July 1986*) 108

DiStefano, Tony. "Let's take a look at the CoCo2B." (*September 1986*) 125

DiStefano, Tony. "More on the new video display generator." (*November 1986*) 88

DiStefano, Tony. "Taking a look at how monitors work." (*January 1987*) 94 — Correction, March 1987, p.182.

DiStefano, Tony. "Timing and the SAM chip." (*August 1986*) 101

DiStefano, Tony. "Transistor buffers for stereo application." (*April 1987*) 88

Ellers, Ed. "What's an analog RGB monitor anyway." (*September 1986*) 27

Goodman, Marty. "Fixing CoCo and Multipak power supplies." (*December 1986*) 54

Goodman, Marty. "Inside the CoCo 3." (*October 1986*) 90

Goodman, Marty. "A recipe to fix CoCo fried chips." (*August 1986*) 24 — See retraction October 1986, p. 92.

#### HINTS

Beshere, Bernie. "Hint." (*April 1987*) 147 — Increase the line delay if printer communication problems.

Cooke, H. D. "Hint." (*April 1987*) 142 — Conversion from hex to decimal to octal.

Daniels, Randy. "Hint." (*December 1986*) 96 — DMP-105 large letters.

Deich, Donald E. "Hint." (*February 1987*) 183 — Cassette loading tip.

Demaree, Jack. "Hint." (*February 1987*) 142 — Inexpensive bulk tape eraser.

Devlin, Paul. "Hint." (*June 1987*) 164 — How to lock the keyboard.

Dillon, John. "Hint." (*June 1987*) 52 — Put in sound prompts.

Forbes, Jason. "Hint." (*February 1987*) 92 — CoCo 3 custom colors.

Gagnon, Marc. "Hint." (*April 1987*) 147 — Interesting addresses in the CoCo 3.

Haughey, Stephen A. "Hint." (*February 1987*) 144 — Inexpensive racks for computer equipment.

"Hint." (*August 1986*) 136 — Disk directory printout.

"Hint." (*August 1986*) 139 — What's your ROM version?

"Hint." (*January 1987*) 83 — Enter Hi-Res screen without clearing it.

"Hint." (*January 1987*) 134 — May be necessary to turn cassette recorder upside down.

"Hint." (*January 1987*) 148 — Printout disk directory.

"Hint." (*January 1987*) 150 — Cassette loading tip.

"Hint." (*January 1987*) 166 — Printer baud rates.

"Hint." (*April 1987*) 24 — Printer baud rate table.

"Hint." (*June 1987*) 112 — Hints on debugging a program.

Knoppow, Jim. "Hint." (*November 1986*) 54 — Alter the cursor.

Law, Greg. "Hint." (*April 1987*) 47 — Rainbow CHEK plus fix.

Mattia, Frank. "Hint." (*March 1987*) 171 — Use cassette port to get sound to a monitor.

Mills, David. "Hint." (*May 1987*) 125 — RGB shortcut.

Nash, Jon. "Hint." (*February 1987*) 72 — Use cassette relay command to make interesting sounds.

Nellis, Michael. "Hint." (*May 1987*) 97 — Cassette I/O errors.

Rosen, Bob. "Hint." (*January 1987*) 146 — CoCo 3 lowercase in 32 columns.

Rosen, Bob. "Hint." (*March 1987*) 160 — CoCo 3 tips.

Schmidt, Fred. "Hint." (*December 1986*) 133 — Make an RS-232 "Y" cable.

Strike, Thomas J., Jr. "Hint." (*March 1987*) 142 — Avoid burn-in of monitor.

Valentine, John. "X marks the spot." (*May 1987*) 125 — Utility.

Wilson, Stephen R. "Hint." (*November 1986*) 73 — Multi-Pak tips.

#### HOME APPLICATION

Allen, David M. "Seal it with a CoCo kiss" (*March 1987*) 80 — Make an envelope on printer.

ENVELOPE

Andrews, Alan L. "Library labeler." (*May 1987*) 91 — Prints labels for cassettes. CASBXLBL

Bell, Bruce K. "Finger sprints." (*January 1987*) 26 — Typing practice. HOME ROW

Bell, Bruce K. "Interiors by CoCo." (*May 1987*) 58 — Graphics editor that allows one to draw and design floor plans. ARCHIE; ARC

Borger, J. E. "Auto economy." (*April 1987*) 73 — Figure out miles/gallon. MGP

Carrigan, Bill. "It all adds up." (*April 1987*) 90 — Convert computer to calculator. COCOCALC

Fugh, John, Jr. "Who's on first?" (*April 1987*) 70 — Produce baseball score card. BASEBALL

Gonce, Burt, Jr. "CoCo yields." (*April 1987*) 74 — Calculate amount of cement needed to fill a form. CEMENT

Griffard, Robert. "Banishing the freezer burn blues." (*April 1987*) 37 — Freezer inventory control. FREEZER

Kenny, Keiran. "It figures." (*March 1987*) 78 — Calculate total of list of figures. TOTAL

Lake, Robert C. "Ma Bell gets personalized." (*May 1987*) 74 — Vanity phone numbers for fun. VANIPHON

Large, Donald. "Grocery" (*April 1987*) 68 — Make grocery lists. GROCERY

March, Keith. "Recipe printer." (*April 1987*) 72 RECIPE

Reed, Bill. "Plottin' and Plannin'." (*April 1987*) 174 — Spreadsheet program. SPREAD

Rittenhouse, James E. "Cassette organization." (*February 1987*) 125 TAPEMENU

Rocci, Kathryn. "That's the ticket." (*May 1987*) 26 — Print tickets for parties, dances, etc. TICKET

Rogers, Robert. "Decisions, decisions." (*February 1987*) 122 — Help you decide alternative choices. DECISION

White, Eric. "CoCo presents the well-behaved yard sale." (*April 1987*) 52 YARDSALE

#### HOME FINANCE

Bernico, Bill. "Planning ahead." (*February 1987*) 127 — How long to save up for a purchase. SAVINFOR

Evans, Mark. "See how your stocks stack up." (*March 1987*) 122 STOCK GRAPH

Gallagher, John. "Payday pal." (*March 1987*) 77 — Calculate pay increases. WAGECALC

Green, Robert A. "Check it out." (*March 1987*) 20 — Check writer. CHECKRTR

Haas, David V. "The budget master's companion." (*March 1987*) 172 BUDGET

Miller, Ralph D. "A matter of principal." (*March 1987*) 82 — Print amortization schedules. AMORTIZE

Musumeci, John. "Checks and balances." (*April 1987*) 75 — Check book balancer CHECKS

Phillips, Jim A. "The private accounting wizard." (*March 1987*) 26 — Keep track of personal records. ACCOUNT TAPEUSER

Zanger, Murray. "Thrifty CoCo handles what-if calculations." (*March 1987*) 36 FNANPLAN

#### MUSIC

Bernico, Bill. "Sgt. CoCo's only starters club band." (*June 1987*) 44 — Guitar help. STRUMMER

Bernico, Bill. "Up with the beat." (*June 1987*) 80 — A metronome. METRNome

Branigan, Arron. "Go tell it on the CoCo." (*December 1986*) 66 — Christmas music and graphics. WINTER

Burke, Val. "Singing with the bird." (*June 1987*) 20 — A tribute to jazz legend Charlie Parker. YARDBIRD

Camp, Mark S. "Pick and choose from the music menu." (*June 1987*) 49 — Menu selection for MUSIC+. MUSXMENU HYMN

Josue Vigil, Julian. "New Mexican folk dances." (*June 1987*) 76 FOLKSONG

Mueller, John E. "Uncovering the MIDI section." (*June 1987*) 36 — Digital interface for CoCo music.

Nickel, Harold. "The CoCo composer." (*June 1987*) 114 — Play the CoCo like a two-level organ. PIANO

Plaster, Gip W., II. "Sound off." (*June 1987*) 81 — Music and sound effects. SOUNDOff

Platt, Joseph D. "The sweet strains of CoCo." (*June 1987*) 94 — Upgrade to Music+. MUSIC+TR OLD100TH HOWGREAT JESU JOY

Schuff, David. "The color conductor." (*June 1987*) 78 — Various popular songs. GAVOTTE TEXAS CHIEF FOLLOWME JETPLANE COUNTRY

Thompson, Matthew. "Steppin' out with my CoCo." (*June 1987*) 58 — Music synthesizer. BW2: BW2C3FIX AXEL F ENTRTANR

Woods, Rick. "Deck the halls." (*December 1986*) 42 — Songs for Musica II. DECKHALL MUSCLOAD TAPELOAD

#### ONE-LINER AND TWO-LINER PROGRAMS

Barnett, Calvin. "One-liner." (*June 1987*) 144 — Graphics demo.

Baylie, Tom. "One-liner." (*September 1986*) 149 — Average out grades.

Beck, John. "One-liner." (*January 1987*) 144 — Graphics demo.

Bentley, Jonathan. "Two-liner." (*March 1987*) 141 — Type on computer, immediate output to printer.

Biasillo, Keith. "One-liner." (*January 1987*) 136 — Draw a grid on the screen.

Bisbee, Daniel. "One-liner." (*September 1986*) 141 — PRINT demo.

Bolle, Francois. "One-liner." (*September 1986*) 134 — Looks and sounds like rain.

Breznai, Mark M. "One-liner." (*September 1986*) 132 — Typing practice.

Buck, Tim. "Two-liner." (*August 1986*) 148 — Pick me is rather interesting—you'll have to type it in.

Butterworth, James, III. "One-liner." (*October 1986*) 148 — Draw a rainbow.

Carroll, Gerald. "One-liner." (*March 1987*) 143 — Exchange rate conversion.

Coenen, Matthew. "Two-liner." (*June 1987*) 143 — Sound demo.

Cooney, Mike. "Two-liner." (*September 1986*) 137 — Horse race.

Cross, David. "One-liner." (*December 1986*) 143 — Display characters in ROM/RAM.

David, Eddie. "Two-liner." (*March 1987*) 143 — Print out a bill of sale.

Derby, Kevin. "Two-liner." (*August 1986*) (*September 1986*) 54 — Game with joysticks.

Edmonds, Philip. "Two-liner." (*July 1986*) 150 — Draw line between two points.

Ferullo, Joseph. "One-liner." (*December 1986*) 199 — Calculate equivalent resistance.

Frerking, Anthony. "One-liner." (*April 1987*) 148 — Calculate grade percentages.

Goicuria, Eddie. "Two-liner." (*June 1987*) 145 — Music demo.

Goodman, Richard. "One-liner." (*October 1986*) 143 — Calculate pi.

Greene, Bobby. "Two-liner." (*May 1987*) 198 — Print out PRINT work sheets.

Halko, Steve. "One-liner." (*October 1986*) 153 — Graphics demo.

Hall, Mike. "One-liner." (*October 1986*) 153 — Flip a picture upside down.

Harper, Jeff. "One-liner." (*December 1986*) 139 — Graphics and sound demo.

Hazard, Matt. "Two-liner." (*May 1987*) 106 — Make up a scrambled word.

Hiatt, Stan. "Two-liner." (*July 1986*) 182 — Simulate Etch-a-Sketch.

Hughes, Blake C. "One-liner." (*July 1986*) 157 — Draw face of clock.

Johnson, David. "Two-liner." (*May 1987*) 79 — Print labels for disks.

Johnson, Timothy. "One-liner." (*December 1986*) 144 — Calculate antenna lengths for a HAM.

Kenny, Keiran. "One-liner." (*February 1987*) 138 — Miniature monitor program.

Kim, Joon Y. "One-liner." (*May 1987*) 28 — Print out disk directory.

Kimmel, Tony. "One-liner." (*July 1986*) 155 — Reverse 4 digit number.

Kromeke, Michael B. "Two-liner." (*July 1986*) 232 — Print out a calendar.

Kromeke, Michael. "Two-liner." (*May 1987*) 198 — Set baud rate for printer.

Lammers, Charles. "One-liner." (*July 1986*) 165 — Yin and Yang symbol.

Marino, Frank. "One-liner." (*September 1986*) 184 — Count vowels in sentence.

Maulick, Charles P. "One-liner." (*October 1986*) 149 — Graphics demo.

McClusky, Lonnie. "One-liner." (*August 1986*) 140 — Use joystick to move racing car.

McCullough, Erik. "Two-liner." (*July 1986*) 207 — Basic alarm.

McDowell, Jim. "One-liner." (*May 1987*) 146 — Label print program.

McGinnis, Matthew. "Two-liner." (*June 1987*) 145 — Sound demo.

Mishra, Vick. "Two-liner." (*October 1986*) 69 — Hit the white balloons with your arrows.

Murphy, Craig. "Two-liner." (*June 1987*) 45 — Graphics demo.

Newell, Aaron. "Two-liner." (*August 1986*) 135 — Electronic dice.

Noyle, Jeff. "One-liner." (*August 1986*) 150 — Maneuver racer through course.

Pritchett, Steven D. "One-liner." (*January 1987*) 141 — Light show.

Pullen, Walter. "One-liner." (*September 1986*) 135 — Moving sine wave.

Quellhorst, George. "Two-liner." (*March 1987*) 144 — Screen printer

Rogers, Robert. "One-liner." (*October 1986*) 147 — Graphics demo.

Rosen, Russ. "One-liner." (*December 1986*) 126 — Create a cash register.

Ruangchotvit, Chinarut. "One-liner." (*July 1986*) 64 — Produce integer factors.

Satir, Gregory. "One-liner." (*February 1987*) 66 — Convert integer to binary.

Selbee, Keith. "Two-liner." (*April 1987*) 176 — Create cassette index cards on printer.

Sipos, Anton. "One-liner." (*August 1986*) 151 — Disk utility.

Small, Ric. "One-liner." (*September 1986*) 54 — Shoot-'em-up game.

"Two-liner." (*May 1987*) 140 — List your BBS numbers.

"Two-liner." (*May 1987*) 144 — Prevent lock-up if printer not turned on.

Walter, Rick A. "One-liner." (*April 1987*) 47 — Monthly payments on a loan.

Walton, Byron. "One-liner." (*February 1987*) 166 — 2 programs to list ASCII from disk.

Weinberg, Rob. "One-liner." (*August 1986*) 153 — Interesting graphics.

Wells, John T. "One-liner." (*February 1987*) 143 — Hexadecimal dump.

Wiedman, Barry. "One-liner." (*April 1987*) 170 — Vacation planning helper.

Wigowsky, Paul. "Two-liner." (*July 1986*) 168 — Play tune from popular movie.

Wilkes, Ernest. "One-liner." (*February 1987*) 138 — Disk utility.

#### OPERATING SYSTEMS - OS9

Adams, Rick. "Exploring Level II's new features from BASIC09." (*June 1987*) 154

**DEMONSTRATION**

Barden, William, Jr. "Sailing off to C." (*March 1987*) 186 ADDNUM (OS9) PRIMENUM (OS9)

Dibble, Peter. "The advantage of processes." (*May 1987*) 191 — Slicing programs for more memory. EDITOR (OS9) PRINTER (OS9)

Dibble, Peter. "Finding your way with OS-9 level II." (*March 1987*) 194

Dibble, Peter. "Understanding how OS-9 manages memory." (*April 1987*) 192

Dodge, Calvin. "Readable equivalents to C." (*November 1986*) 191

Ewart, Nancy. "Taming the beast: Get comfortable with OS-9." (*January 1987*) 160

Goldberg, Stephen B. "OS-9 spooler: print a file as a background task." (*December 1986*) 183 SPOOLER (OS9)

Ladouceur, Paul. "A pause for thought." (*May 1987*) 194 — Avoid mistake lock-ups. PAUSE (OS9)

Puckett, Dale L. "Bootstrapping many systems." (*March 1987*) 196 BINARY (OS9) SPLIT (OS9)

COL (OS9) PROMPT (OS9) MODCRC (OS9) DATE (OS9)

Puckett, Dale L. "A bundle of holiday goodies." (*December 1986*) 198 DEL (OS9) DNAME (OS9) EXIT (OS9) TIME (OS9)

Puckett, Dale L. "Choices: The reason for modularity." (*July 1986*) 224

Puckett, Dale L. "Debunking the myth of OS-9 user hostility." (*January 1987*) 193 FIXTIME (OS9) REBOOT (OS9)

Puckett, Dale L. "Experimenting with RAM disks." (*August 1986*) 197

Puckett, Dale L. "Frank Hogg sees the light and a Level II report." (*February 1987*) 190 FILESIZE (OS9) FILEPIR (OS9) DEMOTEST (OS9) UNLOAD (OS9) SYSGO (OS9)

Puckett, Dale L. "Getting revved up for fall fun." (*October 1986*) 196 GOTOXY (OS9) HGRAPH.C (OS9) CLS (OS9) PRINTAT (OS9) TGGLE (OS9) BOX (OS9) FILLBOX (OS9) PIXSAVER; PIXSHOW (OS9) CALC (OS9) MAKE — SCRATCHPAD (OS9)

Puckett, Dale L. "Good times with OS-9 on the hard disk." (*September 1986*) 200

Puckett, Dale L. "Looking at blue sky for OS-9 level II." (*November 1986*) 199 SYSGO (OS9) CLS (OS9) ALTERNAT.CLS (OS9)

Puckett, Dale L. "Rambo takes us all back to the beginning." (*April 1987*) 197 DRIVEOFF; DRIVEOFF.LISTING IOMAN.PATCH TERMINAL.ASM MDIR.C STRIP.C

Puckett, Dale L. "Setting the stage for OS-9 level II." (*May 1987*) 196 WIZDRAW (OS9) XMODE (OS9) HEXDUMP (OS9)

Puckett, Dale L. "Shooting for a standard." (*June 1987*) 162 AT; ATRUN

Warner, Bruce N. "Pipes and filters for the masses." (*February 1987*) 204

White, Richard A. "BASIC09 on the CoCo 3." (*November 1986*) 188 SIEVE (OS9)

White, Richard A. "Dealing with variables in BASIC09." (*December 1986*) 195

White, Richard A. "Getting started with BASIC09." (*June 1987*) 158

Zumwalt, Greg L. "Living on Rainbow time." (*November 1986*) 170 CLOCK1; CLOCK2 (OS9)

#### PRINTER

Barden, William, Jr. "The adventure of the too many printers." (*September 1986*) 193 — Discussion of screen dumps. BASPRINT MLPRINT

Glaberson, Aryeh. "Hebrew writer." (*December 1986*) 36 — Print Hebrew characters on dot matrix printer. HEBWRITE

Hughes, Blake C. "Printing with style." (*May 1987*) 93 — Set up for DMP-105 printer. PRNTFONT

Jenkins, David R. "The printer that came in from the code." (*May 1987*) 108 — Set up the SG-10. SG10SET

King, David. "The DMP-105 takes a bow." (*May 1987*) 104 — Screen dump. DUMP105

Quellhorst, George. "Pretty little listings, all in a row." (*May 1987*) 178 — Print listings in two columns. LLISTER

Vaughn, Horace D. "The old-time fix." (*November 1986*) 55 — Disk fix to May 1986, p.150. SHORTEN

White, Forrest K. "Sized to fit." (*May 1987*) 91 — Set up for Gemini 10X printer. FORMATTR

#### QUESTIONS AND ANSWERS

Downard, Dan. "Downloads." (*July 1986*) 210 — Upgrade problems; BBS setup; printer problems; joysticks, etc.

Downard, Dan. "Downloads." (*August 1986*) 166 — Disk drive problems; I/O errors; New VD; 64K explained.

Downard, Dan. "Downloads." (*September 1986*) 186 — Teletwriter problems; OS-9 hints; Ham radio software; EDTASM+ corrections.

Downard, Dan. "Downloads." (*October 1986*) 194 — OS-9; Monitors; Printer interface problem, etc.

Downard, Dan. "Downloads." (*November 1986*) 186 — Add Extended BASIC; BBS; Printer; Multipak, etc.

Downard, Dan. "Downloads." (*December 1986*) 178 — Modem; RGB monitor; Reset; Machine language, etc.

Downard, Dan. "Downloads." (*January 1987*) 178 — Assembly language; RS-232; Screen dump, etc.

Downard, Dan. "Downloads." (*February 1987*) 186 — DSKCON with 128K; Disk directories; Program merging, etc.

Downard, Dan. "Downloads." (*March 1987*) 184 — Cooling fan; Modem problems; Downloading from Delphi, etc.

Downard, Dan. "Downloads." (*April 1987*) 189 — RS-232 problems; BBS; Disk I/O; Machine language, etc.

Downard, Dan. "Downloads." (*May 1987*) 188 — Telecommunicatons; Artifact colors; VIP problem, etc.

Downard, Dan. "Downloads." (*June 1987*) 152 — Disk drives; Delphi hint; Printer; Multi-Pak, etc.

Esposito, Richard E. "Dr. ASCII." (*November 1986*) 154 — New Rainbow column—INKEY\$; Printer repair; disk to tape copy, etc.

Esposito, Richard E. "Dr. ASCII." (*December 1986*) 156 — PCOPY; Bar codes; Merge programs; Hard disk; Screen dump, etc.

Esposito, Richard E. "Dr. ASCII." (*January 1987*) 162 — Animation; Printer decision; OS-9; TV interference; hard disk, etc.

Esposito, Richard E. "Dr. ASCII." (*February 1987*) 178 — Screen colors; Error tracing; CoCo2 upgrade; File transfer, etc.

Esposito, Richard E. "Dr. ASCII." (*March 1987*) 164 — New keyboard; ZBUG; DOS determination; Bar code reader etc.

Esposito, Richard E. "Dr. ASCII." (*April 1987*) 161 — CoCo 3; MC-10; 9600 baud; OS-9 patches, etc.

Esposito, Richard E. "Dr. ASCII." (*May 1987*) 94 — Remote terminals; Artifact colors; Spectaculator; Model 100 to CoCo.

Esposito, Richard E. "Dr. ASCII." (*June 1987*) 90 — Disk drives; RAM disk; Artifact colors; Commodore compatibility, etc.

Goodman, Marty. "CoCo consultations." (*August 1986*) 178 — Color monitor; 64K upgrade; Brother printer, etc.

Goodman, Marty. "CoCo consultations." (*September 1986*) 178 — Y cable; Multipaks; Serial port; Auto answer modem.

Goodman, Marty. "CoCo consultations." (*October 1986*) 180 — EPROMs; Keyboard problem; Reserve power; correction to August column.

Goodman, Marty. "CoCo consultations." (*November 1986*) 182 — Upgrade CoCo 2; offset ML programs; transfer to MS-DOS, etc.

Goodman, Marty. "CoCo consultations." (*December 1986*) 102 — Processor chips; Disk controller; Multipak, etc.

Goodman, Marty. "CoCo consultations." (*January 1987*) 92 — PMODE 4 on CoCo 3; Monitor recommendation, Modem, etc.

Goodman, Marty. "CoCo consultations." (*February 1987*) 150 — CoCo 2 upgrade; Multipak extension; RGB monitors; J&M controller fix, etc.

Goodman, Marty. "CoCo consultations." (*March 1987*) 150 — CoCo 3; RS-232; Disk drive addition; Null modem cable.

Goodman, Marty. "CoCo consultations." (*April 1987*) 186 — Print quotation mark; RGB monitor; Atari; CoCo 3, etc.

Goodman, Marty. "CoCo consultations." (*May 1987*) 174 — Fix disk controller; GIME chip; Monitor adapter; RS-232, etc.

Goodman, Marty. "CoCo consultations." (*June 1987*) 53 — Disk drives; Joystick interface; 64 color display; Hard disk, etc.

Goodman, Marty. "Getting to the details of the CoCo 3." (*October 1986*) 104

#### TUTORIAL

Barden, William, Jr. "The BASIC PSET and graphics display speeds." (*December 1986*) 190

Bernico, Bill. "The menu selector." (*January 1987*) 158 MENUTUTR



Kolar, Joseph. "Creating a review program." (*February 1987*) 101 — Tutorial with educational example. LANGTRAN

Kolar, Joseph. "The creative muse: How to dredge up those ideas." (*June 1987*) 96

Kolar, Joseph. "Doing the program shuffle." (*March 1987*) 108 PART 1 ALT; ALT1; ALT2 PROBLEM

Kolar, Joseph. "The formatting review: MID\$ struts its stuff." (*January 1987*) 86 MAJUNGA ROMAN ANGLO MODIFIED

Kolar, Joseph. "Formatting text presentations to suit yourself." (*December 1986*) 80 DEMO

Kolar, Joseph. "Learning how to function in BASIC." (*October 1986*) 77 STRINGS1; STRINGS2

Kolar, Joseph. "One character space at a time." (*November 1986*) 46 — Tutorial on LEFT\$ etc. HEADING HOMEWORK

Kolar, Joseph. "Real-life uses for the seven-value CIRCLE statement." (*May 1987*) 77

Kolar, Joseph. "Using inverse characters." (*September 1986*) 165 INVERSE STUTTER1; STUTTER2

Vasconi, Eugene. "Escape from the bug zone." (*January 1987*) 59

#### UTILITY

Aftamonow, Ellen, and Aftamonow, George. "Don't string me along." (*October 1986*) 100 — Track down FC errors.

Atwater, Dale. "Joystick directory." (*February 1987*) 126 — Use joystick to load and execute programs. DIRECTORY

Babich, Tio. "Settle a score." (*August 1986*) 83 — Use joysticks for scoring. JOYSCORE

Bjork, Steve. "CoCo mouse: The final chapter." (*September 1986*) 180

Bjork, Steve. "CoCo mouse!" (*July 1986*) 121 — Use a mouse/joystick to give commands. MOUSE LINES DISKTIME

Bjork, Steve. "What's inside a mouse?" (*August 1986*) 180 — Correction, October 1986, p. 92.

Dahlgren, Glen. "InvisiList." (*February 1987*) 20 LOADMASK; LOADER

Gault, Robert. "Disabling the CoCo 3 color burst signal." (*April 1987*) 64

Harrison, Eric. "Break key disable." (*August 1986*) 82 BREAKDIS

Jenkins, David R. "A simple font creator for the Hi-Res screen." (*May 1987*) 99 — For CoCo 3. FONT GEN

Kocourek, Thomas; and Rockwell, Kenneth. "Thanks for the memory." (*May 1987*) 186 — Use the full 64K. NEWBOOTS

Kooser, Lindsay. "The digital dimension." (*June 1987*) 38 — Utility for Speech/Sound pak. NUMBTEXT

Lengel, Dave. "Sound off." (*February 1987*) 125 KEY BEEP

Stewart, John. "Echo." (*February 1987*) 126 — Send screen output to printer. ECHO

Sundberg, Lynn. "I can see clearly now." (*July 1986*) 20 — Formatted printer listings of programs. SRLIST

White, Eric. "Tips on the CoCo 3." (*March 1987*) 78 COLORCHEK

#### WORD PROCESSING

Cook, Bill. "The write stuff." (*April 1987*) 156 — Word processor on the CoCo 3. WRITER

Millard, Ian. "Writer-zap." (*September 1986*) 116 — Utility for VIP writer. WRITRZAP

White, Richard A. "CoCo word processing." (*July 1986*) 212

### AUTHORS

Adams, Rick; and Lear, Dale. "Color chart for the CoCo 3." (*January 1987*) 20 COLOR3

Adams, Rick; and Lear, Dale. "Coming to terms with the CoCo 3." (*November 1986*) 93 — Terminal program for CoCo 3. Corrections to Rainbow on tape/disk January 1987, p.164.

TERM3BAS; TERM3

Adams, Rick; and Lear, Dale. "The power of the palette: Graphics on the Color Computer 3." (*October 1986*) 37 — Corrections to Rainbow on tape/disk January 1987, p.164. TUNNEL WHEEL

Adams, Rick. "Exploring Level II's new features from BASIC09." (*June 1987*) 154 DEMONSTRATION

Aftamonow, Ellen, and Aftamonow, George. "Don't string me along." (*October 1986*) 100 — Track down FC errors

Allen, David M. "Seal it with a CoCo kiss." (*March 1987*) 80 — Make an envelope on printer. ENVELOPE

Andrews, Alan L. "Library labeler." (*May 1987*) 91 — Prints labels for cassettes. CASBXLBL

Armstrong, Kerry M. "Transplant surgery for the disk controller." (*July 1986*) 68 — Upgrade the disk controller.

Arnott, Jo Anna. "Building April's Rainbow." (*April 1987*) 16 — Introduction to home help issue.

Atwater, Dale. "Joystick directory." (*February 1987*) 126 — Use joystick to load and execute programs. DIRECTORY

Augsburg, Cray. "Building an OS-9 support network." (*July 1986*) 88 — News from Delphi.

Augsburg, Cray. "Changes make Delphi even easier to use." (*March 1987*) 92 — includes a Delphi command card.

Augsburg, Cray. "Checking out conference." (*April 1987*) 94

Augsburg, Cray. "Command options in the workspace." (*October 1986*) 154 — About Delphi.

Augsburg, Cray. "Dissecting the CoCo 3." (*October 1986*) 94

Augsburg, Cray. "A follow-up on SIG mail." (*December 1986*) 169

Augsburg, Cray. "Help is just a SIG away." (*May 1987*) 120

Augsburg, Cray. "Help one, help all." (*June 1987*) 126

Augsburg, Cray. "A look at workspace." (*September 1986*) 172 — Delphi hints.

Augsburg, Cray. "The RAINBOWfest reporter." (*February 1987*) 83 — Princeton, October 1986.

Augsburg, Cray. "A review of the personal 'settings profile.'" (*January 1987*) 168

Augsburg, Cray. "SIG changes include new selections, new sections." (*February 1987*) 68 — Delphi information.

Augsburg, Cray. "Using mail in the SIG." (*November 1986*) 102 — Delphi news.

Augsburg, Cray. "Using the CoCo SIG." (*August 1986*) 174

Babich, Tio. "Settle a score." (*August 1986*) 83 — Use joysticks for scoring. JOYSCORE

Bailey, Eric. "Graphically speaking: The artistic BBS." (*November 1986*) 108 — Correction, February 1987, p. 160. LRWSEEDIT

Barden, William, Jr. "The adventure of the too many printers." (*September 1986*) 193 — Discussion of screen dumps. BASPRINT MLPRINT

Barden, William, Jr. "The BASIC PSET and graphics display speeds." (*December 1986*) 190

Barden, William, Jr. "How does the CoCo stack up?" (*August 1986*) 90 — Rating of CoCo with other micros.

Barden, William, Jr. "Interfacing tricks for BASIC and Assembly Language." (*July 1986*) 216 WORDCNT1; WORDCNT2 EXPLODE1; EXPLODE2

Barden, William, Jr. "More interfacing tricks for Assembly Language and BASIC." (*August 1986*) 188 CHARGEN

Barden, William, Jr. "More on PSET, PRESET and graphics speed." (*January 1987*) 181 LINEBAS; LINEBIN RADARBAS; RADARBIN

Barden, William, Jr. "Presenting a quiz for Color Computer Assembly Language." (*November 1986*) 192

Barden, William, Jr. "Sailing off to C." (*March 1987*) 186 ADDNUM (OS9) PRIMENUM (OS9)

Barnett, Calvin. "One-liner." (*June 1987*) 144 — Graphics demo.

Baumgardt, Kent. "Explosive word fun." (*April 1987*) 59 — Hangman game WORDGUES

Baylie, Tom. "One-liner." (*September 1986*) 149 — Average out grades.

Beck, John. "One-liner." (*January 1987*) 144 — Graphics demo.

Behrmann, Darrel. "Alien raiders blitz." (*November 1986*) 52 RAIDERS

Bell, Bruce K. "Finger sprints." (*January 1987*) 26 — Typing practice. HOME ROW

Bell, Bruce K. "The eyes have it." (*January 1987*) 52 — Visual memory games. DISCRIM

Bell, Bruce K. "Hint." (*June 1987*) 81 — Modification to Discrimination (January 1987 p.52).

Bell, Bruce K. "Interiors by CoCo." (*May 1987*) 58 — Graphics editor that allows one to draw and design floor plans. ARCHIE; ARC

Bennett, Jim. "The vocabulary tightrope." (*July 1986*) 188 — Match synonyms. TITEROPE

Bentley, Jonathan. "Two-liner." (*March 1987*) 141 — Type on computer, immediate output to printer.

Benway, Patrick J. "Space attack." (*October 1986*) 113 — Demonstrate graphics commands. RAID

Berez, Michael. "The boogie box." (*October 1986*) 113 — Print jam box on printer. RADIO

Bernico, Bill. "The case of the shifty-eyed animation tutor." (*January 1987*) 82 FACE ONE; FACE TWO; FACETEST

Bernico, Bill. "Colors of the spectrum." (*October 1986*) 112 — Combine colors on screen. SPECTRUM

Bernico, Bill. "Double whammy." (*October 1986*) 101 — Based on dice game. Skunk. WHAMMY

Bernico, Bill. "Get chart smart with mileage mapper." (*May 1987*) 30 — Calculate distances on a map. DISTANCE

Bernico, Bill. "Laying down the chips." (*August 1986*) 80 — Bingo caller. BINGO

Bernico, Bill. "The menu selector." (*January 1987*) 158 MENUTUTR

Bernico, Bill. "Planning ahead." (*February 1987*) 127 — How long to save up for a purchase. SAVINFOR

Bernico, Bill. "Sgt. CoCo's only starters club band." (*June 1987*) 44 — Guitar help. STRUMMER

Bernico, Bill. "Songwriter's word rhymers." (*January 1987*) 32 — Add endings to words. RHYMER

Bernico, Bill. "A Thanksgiving pizza party." (*November 1986*) 28 PIZZA

Bernico, Bill. "Up with the beat." (*June 1987*) 80 — A metronome. METRNome

Beshere, Bernie. "Hint." (*April 1987*) 147 — Increase the line delay if printer communication problems.

Biasillo, Keith. "One-liner." (*January 1987*) 136 — Draw a grid on the screen.

Biggs, Brian. "Where is it?" (*December 1986*) 93 — Disc label program. LABELER

Billen, David C. "CoCo bright." (*February 1987*) 49 — Give colored text on screen. BOOT CHARLOAD PROLOAD DEFINE

Bisbee, Daniel. "One-liner." (*September 1986*) 141 — PRINT demo.

Bjork, Steve. "CoCo mouse: The final chapter." (*September 1986*) 180

Bjork, Steve. "CoCo mouse!" (*July 1986*) 121 — Use a mouse/joystick to give commands. MOUSE LINES DISKTIME

Bjork, Steve. "The Color Computer 3: A programmer's dream." (*September 1986*) 26

Bjork, Steve. "What's inside a mouse?" (*August 1986*) 180 — Correction, October 1986, p. 92.

Blound, Andy. "Masonry madness." (*August 1986*) 83 — Lo-Res puzzle game. BRICKS

Blyn, Steve. "Developing logical reasoning skills." (*July 1986*) 132 — Development of reasoning powers. TRUEFALS

Blyn, Steve. "Exploring the card catalog." (*August 1986*) 94 — Training in library skills. CARD LOG

Blyn, Steve. "A flexible program for teaching line graphs." (*April 1987*) 46 GRAPHS

Blyn, Steve. "It's back to basics with an adjective review." (*October 1986*) 152 ADJECTIV

Blyn, Steve. "Learning about scales: Key to understanding maps." (*May 1987*) 112 MAPSCALE

- Blyn, Steve. "Let the little ones learn by counting on CoCo." (*January 1987*) 76 CARCOUNT
- Blyn, Steve. "Making the Dewey Decimal system user-friendly." (*March 1987*) 74 DEWEY
- Blyn, Steve. "Mystery word puzzles." (*September 1986*) 74 — Help learn spelling or vocabulary lists. SPELLPUZL
- Blyn, Steve. "Presidents take Precedence." (*February 1987*) 46 — Presidential quiz. PRESIDENTS
- Blyn, Steve. "A square deal for teaching math." (*June 1987*) 47 MATHPLAY
- Blyn, Steve. "Understanding the computer with binary dice conversions." (*December 1986*) 88 BINARY
- Blyn, Steve. "Word fun: The three bears come of age." (*November 1986*) 74 FUNWORDS
- Bolle, Francois. "One-liner." (*September 1986*) 134 — Looks and sounds like rain.
- Borger, J. E. "Auto economy." (*April 1987*) 73 — Figure out miles/gallon. MGP
- Bouchard, Roger. "Date tracking through the ages." (*January 1987*) 46 — Generate calendars for any year. Correction, April 1987, p.128. CALENDAR; CALMOD
- Branigan, Arron. "Fortune wheel." (*August 1986*) 156 — Modification, December 1986, p.50, and March 1987, p.182. WHEEL CREATOR
- Branigan, Arron. "Go tell it on the CoCo." (*December 1986*) 66 — Christmas music and graphics. WINTER
- Breznan, Mark M. "One-liner." (*September 1986*) 132 — Typing practice.
- Brimner, Robert. "Joker poker." (*March 1987*) 99 — Correction, May 1987, p.128. POKER
- Brown, Chris W. "Get the picture." (*February 1987*) 88 — Graphic printout directory. GRADIR
- Brunotte, Benjamin W. "This one's a puzzler." (*May 1987*) 152 — Construct word search puzzles. WDSEARCH
- Buck, Tim. "Two-liner." (*August 1986*) 148 — Pick me is rather interesting — you'll have to type it in.
- Burke, Val. "Singing with the bird." (*June 1987*) 20 — A tribute to jazz legend Charlie Parker. YARDBIRD
- Buttacavoli, Paul D. "CoCo 3 gets you over a barrel." (*March 1987*) 52 — Similar to Rubik's cube. BARREL
- Butterworth, James, III. "One-liner." (*October 1986*) 148 — Draw a rainbow.
- Camirand, Rene. "Save the astronauts!" (*September 1986*) 33 ASTRONAT
- Camp, Mark S. "Pick and choose from the music menu." (*June 1987*) 49 — Menu selection for MUSIC+. MUSXMENU HYMN
- Carrigan, Bill. "It all adds up." (*April 1987*) 90 — Convert computer to calculator. COCOCALC
- Carroll, Gerald. "One-liner." (*March 1987*) 143 — Exchange rate conversion.
- Cassel, Randy. "Graphics trio." (*April 1987*) 66 — Graphics demos. SPINNER CIRCLES IPOPPER
- Coenen, Matthew. "Two-liner." (*June 1987*) 143 — Sound demo.
- Collicot, John. "Cipher fun for CoCo kids." (*April 1987*) 166 ADDITION
- Collins, Dale R. "Life of the party for \$200, please." (*March 1987*) 58 — Similar to TV's Jeopardy. Correction, May 1987, p.128. GPARTY
- Cook, Bill. "The adventure processor." (*August 1986*) 26 — Help in writing adventure games. Correction, November 1986, p.78. ADV-PRO
- Cook, Bill. "The write stuff." (*April 1987*) 156 — Word processor on the CoCo 3. WRITER
- Cooke, H. D. "Hint." (*April 1987*) 142 — Conversion from hex to decimal to octal.
- Cooney, Mike. "Two-liner." (*September 1986*) 137 — Horse race.
- Coty, Curt. "Let the laser battle begin." (*January 1987*) 36 — Correction, May 1987, p.128. DEF MOV
- Crosby, Mark. "The evolving REMOTE." (*November 1986*) 70 REMOT232
- Cross, David. "One-liner." (*December 1986*) 143 — Display characters in ROM/RAM.
- Curtis, H. Allen. "Festive CoCo: Ready to PAINT the town." (*July 1986*) 46 — Expanded PAINT command. Correction, February 1987, p. 160. PAINT 1 TO PAINT 4
- Curtis, H. Allen. "Our highfalutin' feline does a CoCo3 fandango." (*May 1987*) 52 — Dancing CoCo cat. CATDANCE; RECTANGL
- Curtis, H. Allen. "PUT speedy GETzales to work." (*November 1986*) 158 GETPUT1 TO GETPUT4
- Dahlgren, Glen. "InvisiList." (*February 1987*) 20 LOADMASK; LOADER
- Daniels, Randy. "Hint." (*December 1986*) 96 — DMP-105 large letters.
- Dash, Raju. "The evil tyrant star lord." (*August 1986*) 58 STARLORD
- David, Eddie. "Two-liner." (*March 1987*) 143 — Print out a bill of sale.
- Deich, Donald E. "Hint." (*February 1987*) 183 — Cassette loading tip.
- Demaree, Jack. "Hint." (*February 1987*) 142 — Inexpensive bulk tape eraser.
- Derby, Kevin. "Two-liner." (*August 1986*) (*September 1986*) 54 — Game with joysticks.
- Dettman, Harvey. "The bookkeeper's helper." (*March 1987*) 97 PAYROLL
- Devlin, Paul. "Hint." (*June 1987*) 164 — How to lock the keyboard.
- Dibble, Peter. "The advantage of processes." (*May 1987*) 181 — Slicing programs for more memory. EDITOR (OS9) PRINTER (OS9)
- Dibble, Peter. "Finding your way with OS-9 level II." (*March 1987*) 194
- Dibble, Peter. "Understanding how OS-9 manages memory." (*April 1987*) 192
- Dick, Brien. "Which Nym is Witch?" (*August 1986*) 40 — Educational game. Correction, October 1986, p. 92. NYMATCH
- Dillon, John. "Hint." (*June 1987*) 52 — Put in sound prompts.
- DiStefano, Tony. "The CoCo is music to the ears." (*February 1987*) 176 — Digital to analog converter.
- DiStefano, Tony. "An expandable relay project." (*June 1987*) 84
- DiStefano, Tony. "The hardware project basics review." (*May 1987*) 156
- DiStefano, Tony. "Investigating the PIA." (*July 1986*) 108
- DiStefano, Tony. "Let's take a look at the CoCo2B." (*September 1986*) 125
- DiStefano, Tony. "More on the new video display generator." (*November 1986*) 88
- DiStefano, Tony. "The No-switch VDG." (*December 1986*) 98
- DiStefano, Tony. "Some hardware fixes for the video display generator." (*October 1986*) 161
- DiStefano, Tony. "Taking a look at how monitors work." (*January 1987*) 94 — Correction, March 1987, p.182.
- DiStefano, Tony. "Timing and the SAM chip." (*August 1986*) 101
- DiStefano, Tony. "Transistor buffers for stereo application." (*April 1987*) 88
- DiZazzo, Ernie. "CoCo can play cupid, too." (*February 1987*) 36 — Make a Valentine's card. LOVECARD
- Dodge, Calvin. "Readable equivalents to C." (*November 1986*) 191
- Downard, Dan. "Downloads." (*July 1986*) 210 — Upgrade problems; BBS setup; printer problems; joysticks, etc.
- Downard, Dan. "Downloads." (*August 1986*) 186 — Disk drive problems; I/O errors. New VDG; 64K explained.
- Downard, Dan. "Downloads." (*September 1986*) 186 — Telewriter problems; OS-9 hints; Ham radio software; EDTASM+ corrections.
- Downard, Dan. "Downloads." (*October 1986*) 194 — OS-9; Monitors; Printer interface problem, etc.
- Downard, Dan. "Downloads." (*November 1986*) 186 — Add Extended BASIC; BBS; Printer; Multipak, etc.
- Downard, Dan. "Downloads." (*December 1986*) 178 — Modem; RGB monitor; Reset; Machine language, etc.
- Downard, Dan. "Downloads." (*January 1987*) 178 — Assembly language; RS-232; Screen dump, etc.
- Downard, Dan. "Downloads." (*February 1987*) 186 — DSKCON with 128K; Disk directories; Program merging, etc.
- Downard, Dan. "Downloads." (*March 1987*) 184 — Cooling fan; Modem problems; Downloading from Delphi, etc.
- Downard, Dan. "Downloads." (*April 1987*) 189 — RS-232 problems; BBS; Disk I/O; Machine language, etc.
- Downard, Dan. "Downloads." (*May 1987*) 188 — Telecommunications; Artifact colors; VIP problem, etc.
- Downard, Dan. "Downloads." (*June 1987*) 152 — Disk drives; Delphi hint; Printer; Multi-Pak, etc.
- Drennan, Allen. "Bombs away!" (*October 1986*) 18 BOMBAWAY
- Drennan, Allen. "A Visit to the past." (*January 1987*) 28 — New version of Breakout. BACKSTAB
- Duerig, Jean, and Duerig, Al. "The goblins'll getcha if you don't watch out!" (*October 1986*) 26 HALOWEEN
- Duncan, Richard. "CoBBS message editor." (*November 1986*) 80 SMH
- Edmonds, Philip. "Two-liner." (*July 1986*) 150 — Draw line between two points.
- Ellers, Ed. "What's an analog RGB monitor anyway." (*September 1986*) 27
- Esposito, Richard E. "Dr. ASCII." (*November 1986*) 154 — New Rainbow column—INKEY\$; printer repair; disk to tape copy, etc.
- Esposito, Richard E. "Dr. ASCII." (*December 1986*) 156 — PCOPY; Bar codes; Merge programs; Hard disk; Screen dump, etc.
- Esposito, Richard E. "Dr. ASCII." (*January 1987*) 162 — Animation; Printer decision; OS-9; TV interference; hard disk, etc.
- Esposito, Richard E. "Dr. ASCII." (*February 1987*) 178 — Screen colors; Error tracing; CoCo 2 upgrade; File transfer, etc.
- Esposito, Richard E. "Dr. ASCII." (*March 1987*) 164 — New keyboard; ZBUG; DOS determination; Bar code reader etc.
- Esposito, Richard E. "Dr. ASCII." (*April 1987*) 161 — CoCo 3; MC-10; 9600 baud; OS-9 patches, etc.
- Esposito, Richard E. "Dr. ASCII." (*May 1987*) 94 — Remote terminals; Artifact colors; Spectaculator; Model 100 to CoCo.
- Esposito, Richard E. "Dr. ASCII." (*June 1987*) 90 — Disk drives; RAM disk; Artifact colors; Commodore compatibility, etc.
- Evans, Mark. "See how your stocks stack up." (*March 1987*) 122 STOCK GRAPH
- Ewart, Nancy. "Taming the beast: Get comfortable with OS-9." (*January 1987*) 160
- Falk, Lawrence C. "CoCo better again?" Impressions of the new CoCo 3. (*September 1986*) 18
- Falk, Lawrence C. "Print#-2." (*July 1986*) 12 — Fifth anniversary memories.
- Falk, Lawrence C. "Print#-2." (*August 1986*) 12 — Come visit Falsoft; Chicago RAINBOWfest.
- Falk, Lawrence C. "Print#-2." (*September 1986*) 12 — All about CoCo 3.
- Falk, Lawrence C. "Print#-2." (*October 1986*) 12 — Comments on CoCo 3.
- Falk, Lawrence C. "Print#-2." (*November 1986*) 12 — 'Tandy's got IT'
- Falk, Lawrence C. "Print#-2." (*December 1986*) 12 — CoCo 3 comments.
- Falk, Lawrence C. "Print#-2." (*January 1987*) 12 — Comments on availability of CoCo 3 software.
- Falk, Lawrence C. "Print#-2." (*February 1987*) 12 — How to promote the CoCo.
- Falk, Lawrence C. "Print#-2." (*March 1987*) 12 — Availability of software for CoCo 3.
- Falk, Lawrence C. "Print#-2." (*April 1987*) 12 — Comments about software piracy.
- Falk, Lawrence C. "Print#-2." (*May 1987*) 12 — Comments about adventure contest.
- Falk, Lawrence C. "Print#-2." (*June 1987*) 12 — Discussion of Chicago RAINBOWfest.
- Farris, Charles. "Mission: hold the bridge." (*December 1986*) 29 MORTAR
- Ferullo, Joseph. "One-liner." (*December 1986*) 199 — Calculate equivalent resistance.

- Forbes, Jason. "Hint." (*February 1987*) 92 — CoCo 3 custom colors.
- Fortin, Ilene. "From our house to yours." (*December 1986*) 62 — Dot matrix Christmas cards. CARDSHOP
- Foster, Leslie A. "The fifth year of Rainbow." (*July 1986*) 193 — Index July 1985 - June 1986.
- Frerking, Anthony. "One-liner." (*April 1987*) 148 — Calculate grade percentages.
- Fugh, John, Jr. "Who's on first?" (*April 1987*) 70 — Produce baseball score card. BASEBALL
- Gagnon, Marc. "Hint." (*April 1987*) 147 — Interesting addresses in the CoCo 3.
- Galibois, Michel. "Paramission: Fast and dangerous!" (*May 1987*) 114 PARAMISS
- Gallagher, John. "Payday pal." (*March 1987*) 77 — Calculate pay increases. WAGECALC
- Gault, Robert. "Disabling the CoCo 3 color burst signal." (*April 1987*) 64
- German, J. D. "Up on the rooftop." (*December 1986*) 124 — Christmas theme game. SANTA
- Glaberson, Aryeh. "Hebrew writer." (*December 1986*) 36 — Print Hebrew characters on dot matrix printer. HEBWRITE
- Goicuria, Eddie. "Two-liner." (*June 1987*) 145 — Music demo.
- Goldberg, Stephen B. "OS-9 spooler: print a file as a background task." (*December 1986*) 183 SPOOLER (OS9)
- Goldwyn, Ira. "Perplexing picture puzzles." (*September 1986*) 108 SCRAMBLE LATTECOCO
- Gollas, Ruth. "A public service message." (*February 1987*) 124 — Graphics demo on safety theme. MESSAGE
- Gonce, Burt, Jr. "CoCo yields." (*April 1987*) 74 — Calculate amount of cement needed to fill a form. CEMENT
- Goodman, Marty. "CoCo consultations." (*August 1986*) 178 — Color monitor; 64K upgrade; Brother printer, etc.
- Goodman, Marty. "CoCo consultations." (*September 1986*) 178 — Y cable; Multipaks; Serial port; Auto answer modem.
- Goodman, Marty. "CoCo consultations." (*October 1986*) 180 — EPROMs; keyboard problem; Reserve power; correction to August column.
- Goodman, Marty. "CoCo consultations." (*November 1986*) 182 — Upgrade CoCo 2; offset ML programs; transfer to MS-DOS, etc.
- Goodman, Marty. "CoCo consultations." (*December 1986*) 102 — Processor chips; Disk controller; Multipak, etc.
- Goodman, Marty. "CoCo consultations." (*January 1987*) 92 — PMODE 4 on CoCo 3; Monitor recommendation; Modem, etc.
- Goodman, Marty. "CoCo consultations." (*February 1987*) 150 — Coco 2 upgrade; Multipak extension; RGB monitors; J&M controller fix, etc.
- Goodman, Marty. "CoCo consultations." (*March 1987*) 150 — CoCo 3; RS-232; Disk drive addition; Null modem cable.
- Goodman, Marty. "CoCo consultations." (*April 1987*) 186 — Print quotation mark; RGB monitor; Atari; CoCo 3, etc.
- Goodman, Marty. "CoCo consultations." (*May 1987*) 174 — Fix disk controller; GIME chip; Monitor adapter; RS-232, etc.
- Goodman, Marty. "CoCo consultations." (*June 1987*) 53 — Disk drives; Joystick interface; 64 color display; Hard disk, etc.
- Goodman, Marty. "Database report." (*September 1986*) 173 — Delphi news.
- Goodman, Marty. "Fixing CoCo and Multipak power supplies." (*December 1986*) 54
- Goodman, Marty. "Getting to the details of the CoCo 3." (*October 1986*) 104
- Goodman, Marty. "Inside the CoCo 3." (*October 1986*) 90
- Goodman, Marty. "A PAL for your CoCo 3." (*January 1987*) 98 — Upgrade Multi-Pak Interface. See note February 1987, p. 160.
- Goodman, Marty. "A recipe to fix CoCo fried chips." (*August 1986*) 24 — See retraction October 1986, p. 92.
- Goodman, Marty. "Remote control CoCo." (*July 1986*) 71 — Make a detachable keyboard.
- Goodman, Marty. "RTTY for the Color Computer." (*November 1986*) 36 RTTY
- Goodman, Marty. "The shock absorber." (*October 1986*) 158 — Protect from power spikes.
- Goodman, Marty. "Transfer CoCo text files to MS-DOS disks." (*July 1986*) 176 MS19GEN; MSFORMAT ADOLF COCO2MS
- Goodman, Richard. "One-liner." (*October 1986*) 143 — Calculate pi.
- Goshorn, Bruce W. "The quick joystick fix." (*August 1986*) 116 — How to modify the deluxe joystick.
- Green, Robert A. "Check it out." (*March 1987*) 20 — Check writer. CHEKRITR
- Greene, Bobby. "Two-liner." (*May 1987*) 198 — Print out PRINT work sheets.
- Griffard, Robert. "Banishing the freezer burn blues." (*April 1987*) 37 — Freezer inventory control. FREEZER
- Haas, David V. "The budget master's companion." (*March 1987*) 172 BUDGET
- Halko, Steve. "One-liner." (*October 1986*) 153 — Graphics demo.
- Hall, Mike. "One-liner." (*October 1986*) 153 — Flip a picture upside down.
- Harper, Jeff. "Graph-o-matic." (*September 1986*) 82 — Plot 3-D functions. 3DFNCPLT
- Harper, Jeff. "One-liner." (*December 1986*) 139 — Graphics and sound demo.
- Harrison, Eric. "Break key disable." (*August 1986*) 82 BREAKDIS
- Haughey, Stephen A. "Hint." (*February 1987*) 144 — Inexpensive racks for computer equipment.
- Haverstock, Mark. "The care and feeding of a CoCo club." (*January 1987*) 67
- Haverstock, Mark. "The old switcheroo." (*August 1986*) 108 — Joystick port switchbox. Correction, October 1986, p. 92.
- Hazard, Matt. "Two-liner." (*May 1987*) 106 — Make up a scrambled word.
- Herr, Darin. "CoCoDraw concoctions." (*October 1986*) 59 MENUGEN COCODRAW
- Hiatt, Stan. "Two-liner." (*July 1986*) 182 — Simulate Etch-a-Sketch.
- Hoggins, Jay R. "Vigilance is vital for victory over vicious Vic." (*July 1986*) 74 VIC
- Hood, Thomas. "Counting with Caesar." (*April 1987*) 172 — Roman numeral drill. ROMANS
- Huang, David. "Calling to mind." (*August 1986*) 81 — Memory game. REPEATIT
- Hughes, Blake C. "One-liner." (*July 1986*) 157 — Draw face of clock.
- Hughes, Blake C. "Printing with style." (*May 1987*) 93 — Set up for DMP-105 printer. PRNTFONT
- Hutchinson, David. "Hand-me-downs." (*February 1987*) 120 HAND OFF
- Hyre, Leonard. "The key to success." (*March 1987*) 66 — Typing tutor. Correction, May 1987, p. 128. COCOTYPE
- Jenkins, David R. "The printer that came in from the code." (*May 1987*) 108 — Set up the SG-10. SG10SET
- Jenkins, David R. "A simple font creator for the Hi-Res screen." (*May 1987*) 99 — For CoCo 3. FONT GEN
- Jensen, Paul. "The evictor." (*July 1986*) 62 EVICTOR
- Johnson, David. "Two-liner." (*May 1987*) 79 — Print labels for disks.
- Johnson, Timothy. "One-liner." (*December 1986*) 144 — Calculate antenna lengths for a HAM.
- Jones, Edward. "Two-tone text." (*May 1987*) 89 — Experiment with different combinations. COLORS
- Jones, Tim. "The eye of the tiger." (*August 1986*) 122 — Boxing game. BOXING
- Jones, Tudor P. "The Solitary endeavor." (*December 1986*) 76 — Solitaire on the CoCo. Correction, March 1987, p. 182. SOLTAIRE
- Jorgenson, Michael N. "Take command of CoCo 3 drives." (*February 1987*) 94 — Disk utility for the CoCo 3. DU-3
- Josue Vigil, Julian. "New Mexican folk dances." (*June 1987*) 76 FOLKSONG
- Kenny, Keiran. "The electronic marquee." (*September 1986*) 41 DISPLAY
- Kenny, Keiran. "It figures." (*March 1987*) 78 — Calculate total of list of figures. TOTAL
- Kenny, Keiran. "Mastering the gates." (*August 1986*) 79 GATES
- Kenny, Keiran. "One-liner." (*February 1987*) 138 — Miniature monitor program.
- Kenny, Keiran. "PEEKasso prints." (*January 1987*) 30 — Drawing program PEEKASSO
- Kenny, Keiran. "Rational thinking." (*September 1986*) 38 — Conversion of fractions to ratios and percentages. RATIOS
- Keys, Chris. "Air rescue." (*June 1987*) 26 — Balloon attack game. POKE1; POKE2
- Kim, Joon Y. "One-liner." (*May 1987*) 28 — Print out disk directory.
- Kimmel, Tony. "One-liner." (*July 1986*) 155 — Reverse 4 digit number.
- King, David. "The DMP-105 takes a bow." (*May 1987*) 104 — Screen dump. DUMP105
- Knoppow, Jim. "Hint." (*November 1986*) 54 — Alter the cursor.
- Kocourek, Thomas; and Rockwell, Kenneth. "Thanks for the memory." (*May 1987*) 186 — Use the full 64K. NEWBOOTS
- Kolar, Joseph. "Creating a review program." (*February 1987*) 101 — Tutorial with educational example. LANGTRAN
- Kolar, Joseph. "The creative muse: How to dredge up those ideas." (*June 1987*) 96
- Kolar, Joseph. "Doing the program shuffle." (*March 1987*) 108 PART 1 ALT; ALT1; ALT2 PROBLEM
- Kolar, Joseph. "Exploring CoCo graphics." (*April 1987*) 112
- Kolar, Joseph. "The formatting review: MID\$ struts its stuff." (*January 1987*) 86 MAJUNGA ROMAN ANGL0 MODIFIED
- Kolar, Joseph. "Formatting text presentations to suit yourself." (*December 1986*) 80 DEMO
- Kolar, Joseph. "Learning how to function in BASIC." (*October 1986*) 77 STRINGS1; STRINGS2
- Kolar, Joseph. "One character space at a time." (*November 1986*) 46 — Tutorial on LEFT\$ etc. HEADING HOMEWORK
- Kolar, Joseph. "Real-life uses for the seven-value CIRCLE statement." (*May 1987*) 77
- Kolar, Joseph. "Translation sensation." (*July 1986*) 93 LANGTUTR
- Kolar, Joseph. "Uncomplicating translating." (*August 1986*) 48 — Second part of translation demo. LANGTUT1; LANGTUT2
- Kolar, Joseph. "Using inverse characters." (*September 1986*) 165 INVERSE STUTTER1; STUTTER2
- Kooser, Lindsay. "The digital dimension." (*June 1987*) 38 — Utility for Speech/Sound pak. NUMBTEXT
- Kressman, Robie. "Astronomer's heaven." (*January 1987*) 30 — Display the night sky. BIGDIPPR
- Kromeke, Michael B. "Rattle rattle thunder clatter boom boom boom." (*September 1986*) 49 — A model of a car engine. ENGINE
- Kromeke, Michael B. "Tricks of the trade." (*March 1987*) 76 — Puzzle type game SWITCH
- Kromeke, Michael B. "Two-liner." (*July 1986*) 232 — Print out a calendar.
- Kromeke, Michael. "Two-liner." (*May 1987*) 198 — Set baud rate for printer.
- Kyte, Ted. "That's the way the ball bounces." (*May 1987*) 88 — CoCo 3 graphics demo. BALLEMO
- Kyte, Ted. "Two CoCo BBS system." (*November 1986*) 86
- LaBonville, Helen. "Halloween foolery." (*October 1986*) 108 — Talking pumpkin PUMPKIN
- Ladouceur, Paul. "A pause for thought." (*May 1987*) 194 — Avoid mistake lock-ups. PAUSE (OS9)
- Lake, Robert C. "Ma Bell gets personalized." (*May 1987*) 74 — Vanity phone numbers for fun. VANIPHON
- Lammers, Charles. "One-liner." (*July 1986*) 165 — Yin and Yang symbol.
- Large, Donald. "Grocery." (*April 1987*) 68 — Make grocery lists. GROCERY

- Laun, Robert E. "Enter the fifth dimension." (*April 1987*) 20 — Five dimensional arrays explained. FIFTHDIM
- Law, Greg. "Hint." (*April 1987*) 47 — Rainbow CHEK plus fix.
- Lear, Dale. "There's evil doings afoot at the Hotel CoCo." (*February 1987*) 27 SETUP (OS9) HOTEL (OS9)
- Lengel, Dave. "Sound off." (*February 1987*) 125 KEY BEEP
- Lewis, Emmett J. "Presenting the smarter-than-average printer buffer." (*May 1987*) 160 PRINTBUF
- March, Keith. "Recipe printer." (*April 1987*) 72 RECIPE
- Marino, Frank. "One-liner." (*September 1986*) 184 — Count vowels in sentence.
- Matthews, Becky F. "A cyclo-delic palette." (*February 1987*) 60 — Graphics demo for CoCo 3. CYCLDRAW
- Matthews, Becky F. "O, Tannenbaum." (*December 1986*) 116 — Christmas graphics. TRIMTREE
- Mattia, Frank. "Hint." (*March 1987*) 171 — Use cassette port to get sound to a monitor.
- Maulick, Charles P. "One-liner." (*October 1986*) 149 — Graphics demo.
- Mayeux, Ann B. "Portraits by BASIC." (*October 1986*) 49 DRAWFACE
- McClusky, Lonnie. "One-liner." (*August 1986*) 140 — Use joystick to move racing car.
- McCullough, Erik. "Two-liner." (*July 1986*) 207 — Basic alarm.
- McDowell, Jim. "One-liner." (*May 1987*) 146 — Label print program.
- McGinnis, Matthew. "Two-liner." (*June 1987*) 145 — Sound demo.
- McGrath, Dick. "The envelope please." (*November 1986*) 125 — Crossword puzzle contest winner.
- McIntosh, Tim. "Do-it-yourself video output board." (*September 1986*) 171 — Correction, November 1986, p.78.
- Merryman, Robert C. "The super switcher." (*November 1986*) 168
- Meyers, Peter. "The menace of the SandWorm." (*August 1986*) 18 SANDWORM
- Miliard, Ian. "Writer-zap." (*September 1986*) 116 — Utility for VIP writer. WRITRZAP
- Miller, Eric; and Gavriluk, Erik. "Long distance draughts." (*November 1986*) 114 — Checkers by modem. MLOAD; MCDRAW
- Miller, Ralph D. "A matter of principal." (*March 1987*) 82 — Print amortization schedules. AMORTIZE
- Mills, David. "Hint." (*May 1987*) 125 — RGB shortcut.
- Mishra, Vick. "Two-liner." (*October 1986*) 69 — Hit the white balloons with your arrows.
- Montowski, Robert C. "July fashion forecast: Classic clothes by CoCo." (*July 1986*) 115 — Make iron-on transfers. BOOTFLIP FLIP-L2R; FLIPPOKE
- Montowski, Robert C. "Picture perfect graphics commands." (*March 1987*) 156 — For OS-9 only. GSAVE (OS9) GLOAD (OS9) MAKEPIX (OS9)
- Mueller, John E. "Uncovering the MIDI section." (*June 1987*) 36 — Digital interface for CoCo music.
- Murphy, Craig. "Two-liner." (*June 1987*) 45 — Graphics demo.
- Musumeci, John. "Checks and balances." (*April 1987*) 75 — Check book balancer CHECKS
- Nash, Jon. "Hint." (*February 1987*) 72 — Use cassette relay command to make interesting sounds.
- Nellis, Michael. "Hint." (*May 1987*) 97 — Cassette I/O errors.
- Nelson, Mark. "Fast relief for tape-loading headaches." (*February 1987*) 182 — Correction, June 1987, p.116. TAPE DOC
- Newell, Aaron. "Two-liner." (*August 1986*) 135 — Electronic dice.
- Nickel, Harold. "The CoCo composer." (*June 1987*) 114 — Play lHe CoCo like a two-level organ. PIANO
- Noble, James A. "Battlin' blue Bert." (*April 1987*) 105 BLUEBERT
- Norton, Dennis. "Chronologist in CoCo land." (*September 1986*) 58 — Teach children how to read a clock. CLOCK
- Noyle, Jeff. "One-liner." (*August 1986*) 150 — Maneuver racer through course.
- Parker, Jeffrey. "The RAINBOWfest reporter." (*October 1986*) 83 — Chicago, May 23-25, 1986.
- Perevosnik, Joe. "Double duty." (*May 1987*) 92 — Print hard copies of disk directory. DISK DIR
- Petit, Laura, and Petit, Chris. "Hippity hoppity down the bunny trail." (*April 1987*) 99 — Pattern discrimination game. EASTER
- Phillips, Jim A. "The private accounting wizard." (*March 1987*) 26 — Keep track of personal records. ACCOUNT TAPEUSER
- Plaster, Gip W., II. "Sound off." (*June 1987*) 81 — Music and sound effects. SOUNDOFF
- Platt, Joseph D. "The sweet strains of CoCo." (*June 1987*) 94 — Upgrade to Music+. MUSIC+TR OLD100TH HOWGREAT JESU JOY
- Plog, Michael. "Computers and our English vocabulary." (*December 1986*) 173
- Plog, Michael. "A discussion about sexism in the computer industry." (*October 1986*) 164
- Plog, Michael. "Do teachers like computers?" (*February 1987*) 65
- Plog, Michael. "Finding resources for computer learning." (*March 1987*) 90
- Plog, Michael. "The 'hidden' computers." (*August 1986*) 97 — Use of the CoCo in videotape editing.
- Plog, Michael. "The most important educators of all." (*November 1986*) 166
- Plog, Michael. "Programming the LOGO turtle: Studies in learning transfer." (*April 1987*) 86
- Plog, Michael. "The question of assessment." (*January 1987*) 176
- Plog, Michael. "The role of teachers in educational software development." (*June 1987*) 32
- Plog, Michael. "S-P analysis: Comparing the curves." (*May 1987*) 82 — Aid in curriculum improvements.
- Plog, Michael. "Special education and the computer." (*July 1986*) 135
- Plog, Michael. "Tandy grants and the status of educational computers." (*September 1986*) 76
- Polisz, Steven R. "Optimum animation." (*October 1986*) 116
- Popyaek, Len. "Hamming it up." (*November 1986*) 43 — Packet radio discussion.
- Powers, Courtney. "Instant graphics and Hogs in Space." (*February 1987*) 106 — Correction, May 1987, p.128. HOGSPACE
- Powers, Ron. "CoCo testmaker revisited." (*September 1986*) 160 — Make multiple choice tests updated (from Sept. 1985, p.30). TESTMAKR
- Powers, Ron. "The teacher's pet." (*September 1986*) 47 — Computerized grade book. GRADCALC
- Pritchett, Steven D. "One-liner." (*January 1987*) 141 — Light show.
- Puckett, Dale L. "Bootstrapping many systems." (*March 1987*) 196 BINARY (OS9) SPLIT (OS9) COL (OS9) PROMPT (OS9) MODCRC (OS9) DATE (OS9)
- Puckett, Dale L. "A bundle of holiday goodies." (*December 1986*) 198 DEL (OS9) DNAME (OS9) EXIT (OS9) TIME (OS9)
- Puckett, Dale L. "Choices: The reason for modularity." (*July 1986*) 224
- Puckett, Dale L. "Debunking the myth of OS-9 user hostility." (*January 1987*) 193 FIXTIME (OS9) REBOOT (OS9)
- Puckett, Dale L. "Experimenting with RAM disks." (*August 1986*) 197
- Puckett, Dale L. "Frank Hogg sees the light and a level III report." (*February 1987*) 190 FILESIZE (OS9) FILEPIR (OS9) DEMOTEST (OS9) UNLOAD (OS9) SYSGO (OS9)
- Puckett, Dale L. "Getting revved up for fall fun." (*October 1986*) 196 GOTOXY (OS9) HGRAPH.C (OS9) CLS (OS9) PRINTAT (OS9) TOGGLE (OS9) BOX (OS9) FILLBOX (OS9) PIXSAVER; PIXSHOW (OS9) CALC (OS9) MAKE—SCRATCHPAD (OS9)
- Puckett, Dale L. "Good times with OS-9 on the hard disk." (*September 1986*) 200
- Puckett, Dale L. "Looking at blue sky for OS-9 level II." (*November 1986*) 199 SYSGO (OS9) CLS (OS9) ALTERNAT.CLS (OS9)
- Puckett, Dale L. "Rambo takes us all back to the beginning." (*April 1987*) 197 DRIVEOFF; DRIVEOFF.LISTING IOMAN.PATCH TERMINAL.ASM MDIR.C STRIP.C
- Puckett, Dale L. "Setting the stage for OS-9 level II." (*May 1987*) 196 WIZDRAW (OS9) XMODE (OS9) HEXDUMP (OS9)
- Puckett, Dale L. "Shooting for a standard." (*June 1987*) 162 AT; ATRUN
- Pullen, Walter. "One-liner." (*September 1986*) 135 — Moving sine wave.
- Quellhorst, George. "Pretty little listings, all in a row." (*May 1987*) 178 — Print listings in two columns. LLISTER
- Quellhorst, George. "Two-liner." (*March 1987*) 144 — Screen printer
- Reed, Bill. "Plottin' and Plannin'." (*April 1987*) 174 — Spreadsheet program. SPREAD
- Reed, James E. "Building August's Rainbow." (*August 1986*) 16 — Assorted commentary.
- Reed, James E. "Building December's Rainbow." (*December 1986*) 16 — CoCo 3 comments.
- Reed, James E. "Building February's Rainbow." (*February 1987*) 16 — Just can't retire the old CoCo!
- Reed, James E. "Building January's Rainbow." (*January 1987*) 16 — Introduction to beginner's issue.
- Reed, James E. "Building July's Rainbow." (*July 1986*) 16 — Notes for beginners.
- Reed, James E. "Building June's Rainbow." (*June 1987*) 16 — Discussion of Chicago RAINBOWfest.
- Reed, James E. "Building March's Rainbow." (*March 1987*) 16
- Reed, James E. "Building May's Rainbow." (*May 1987*) 16 — Attach a CoCo to your exercise bike!
- Reed, James E. "Building November's Rainbow." (*November 1986*) 16 — Comments on copyright issues.
- Reed, James E. "Building October's Rainbow." (*October 1986*) 16 — All about Rainbow on Disk.
- Reed, James E. "Building September's Rainbow." (*September 1986*) 16 — All about CoCo 3.
- Rigsby, Mike. "Your face or mine?" (*September 1986*) 88 FACE BASND SOUND
- Rittenhouse, James E. "Cassette organization." (*February 1987*) 125 TAPEMENU
- Rittenhouse, James E. "Wet'n wild." (*January 1987*) 27 — Leaky roof game. LEAKY
- Rocci, Kathryn. "That's the ticket." (*May 1987*) 26 — Print tickets for parties, dances, etc. TICKET
- Rogers, Robert. "Decisions, decisions." (*February 1987*) 122 — Help you decide alternative choices. DECISION
- Rogers, Robert. "One-liner." (*October 1986*) 147 — Graphics demo.
- Ropson, Ronald T. "The shifting, reducing, stretching, enlarging transfiguration band." (*October 1986*) 44 ZOOM1 TO ZOOM4
- Rosen, Bob. "Hint." (*January 1987*) 146 — CoCo 3 lowercase in 32 columns.
- Rosen, Bob. "Hint." (*March 1987*) 160 — CoCo 3 tips.
- Rosen, Russ. "One-liner." (*December 1986*) 126 — Create a cash register.
- Ruangchotvit, Chinarut. "One-liner." (*July 1986*) 64 — Produce integer factors.
- Ruby, Paul, Jr. "Success mansion." (*January 1987*) 108 — Correction, April 1987, p.128. SUCCESS
- Salvail, Pierre. "Four shades of gray." (*May 1987*) 90 — Prints graphics screens. COLRDUMP
- Samuels, Edward. "Computer program copyrights: A how-to guide." (*April 1987*) 82
- Satir, Gregory. "One-liner." (*February 1987*) 66 — Convert integer to binary.
- Scerbo, Fred B. "Achieving arcade game speed in BASIC." (*July 1986*) 98 — Advanced Star-Trench Warfare (see also November 1982, p.8) Corrections, August 1986, p.98, and October 1986, p.92 TRENCH
- Scerbo, Fred B. "The challenge returns: Driller II is a thriller, too." (*October 1986*) 173 DRILLER2

Scerbo, Fred B. "CoCo conquers the metric system." (*April 1987*) 76 LIFESKL6

Scerbo, Fred B. "Computer-paced learning." (*August 1986*) 167 LIFESKL4

Scerbo, Fred B. "Creating designer arcade games." (*December 1986*) 163 — Updated snail invaders. CRTVADER

Scerbo, Fred B. "Graphics, education and speech come together." (*May 1987*) 38 — Graphic simulation of blood flow. BLOOD

Scerbo, Fred B. "More graphics, speech and education." (*June 1987*) 106 — Simulation of the heart. HEART

Scerbo, Fred B. "Prepare for Thanksgiving cooking with liquid measure." (*November 1986*) 62 — Gallons to ounces, etc. LIQUID

Scerbo, Fred B. "Roboflip: Anatomy of a game." (*March 1987*) 168 ROBFLIP

Scerbo, Fred B. "A spelling program that speaks for itself." (*February 1987*) 166 H&SPELL

Scerbo, Fred B. "Understanding relationships between fractions, decimals and whole numbers." (*January 1987*) 78 MATHQUIZ

Scerbo, Fred B. "Updating the Color Change quiz." (*September 1986*) 98 CHNGQUIZ

Schmidt, Fred. "Hint." (*December 1986*) 133 — Make an RS-232 "Y" cable.

Schneider, Harold. "The odd man out." (*October 1986*) 125 — Rainbow on tape program also on September tape. NOTLIKE

Schrag, Roger. "The limousine utility: A tape-to-disk transfer vehicle." (*February 1987*) 73 — Reprint from January 1984, p. 48. TPTODSK

Schuff, David. "The color conductor." (*June 1987*) 78 — Various popular songs. GAVOTTE TEXAS CHIEF FOLLOWME JETPLANE COUNTRY

Schuster, Tobin. "The 8088 sounds off." (*March 1987*) 40 — Unusual use for the 8088 microprocessor.

Selbee, Keith. "Two-liner." (*April 1987*) 176 — Create cassette index cards on printer.

Siegel, Mark. "The third one's the charm." (*November 1986*) 30 — More details on CoCo 3.

Sims, Michael. "Charting the ups and downs of life." (*March 1987*) 86 — Draw graphs of data. GRAPHIT

Sipos, Anlon. "One-liner." (*August 1986*) 151 — Disk utility.

Small, Ric. "One-liner." (*September 1986*) 54 — Shoot-'em-up game.

Snook, Allen. "The spit and image." (*May 1987*) 36 — Screen dump program. GRAPHGEN

Staff. "Rainbow's holiday shopping guide." (*December 1986*) 25 — Christmas gift suggestions.

Steinbrueck, Richard. "The tournament master." (*April 1987*) 120 — Keep track of round robin games. Correction, June 1987, p.116. RNDROBIN INPUT

Stewart, John. "Echo." (*February 1987*) 126 — Send screen output to printer. ECHO

Strike, Thomas J., Jr. "Hint." (*March 1987*) 142 — Avoid burn-in of monitor.

Sundberg, Lynn. "I can see clearly now." (*July 1986*) 20 — Formatted printer listings of programs. SRLIST

Tenney, Steve. "The rhythm of life." (*May 1987*) 20 — Chart your biorythms. BIOCHART

Terrio, Christine. "Teacher's pet." (*January 1987*) 32 — Spelling practice lists.

Thomas, Carmie A. "Happy new year!" (*January 1987*) 29 — Graphics demo. NEW YEAR

Thompson, Matthew. "Steppin' out with my CoCo." (*June 1987*) 58 — Music synthesizer. BW2; BW2C3FIX AXEL F ENTRTANR

Tucker, Eric. "Treasure quest: The golden adventure." (*November 1986*) 18 TREASURE

Turner, Del. "Is it a fish, or a phish, or a pheish?" (*June 1987*) 148 — BASIC09 helps with phoneme recognition. SOUNDPUZ (BASIC09)

Turowski, Donald. "I before E except after C..." (*September 1986*) 78 SPELDRL

Valentine, John. "X marks the spot." (*May 1987*) 125 — Utility.

Vasconi, Eugene. "Holiday hearth." (*December 1986*) 108 — Christmas fireplace XMASFIRE; XMASDRVR

Vasconi, Eugene. "Season's greetings."

(*December 1986*) 18 — Graphics Christmas messages. GREETING

Vasconi, Eugene. "Escape from the bug zone." (*January 1987*) 59

Vaughn, Horace D. "The old-time fix." (*November 1986*) 55 — Disk fix to May 1986, p.150. SHORTEN

Ventling, James. "Keycad/Keyflow: CoCoad and CoCoflow modifications." (*November 1986*) 126 COCOMOD1 TO COCOMOD3

Waiter, Rick A. "One-liner." (*April 1987*) 47 — Monthly payments on a loan.

Wallon, Byron. "One-liner." (*February 1987*) 166 — 2 programs to list ASCII from disk.

Ward, Logan. "LED power indicator." (*December 1986*) 160 — LED for the disk drive.

Warner, Bruce N. "Pipes and filters for the masses." (*February 1987*) 204

Weide, Dennis H. "The CoCo ROS, part 1" (*December 1986*) 85 — Build a robot operating system.

Weide, Dennis H. "The CoCo ROS, part 2: Building the ROS circuit." (*January 1987*) 153 ROS TEST

Weide, Dennis H. "The CoCo ROS, part 3: The Robotics program and interfacing." (*February 1987*) 152 ROBOT RBT2XSRC

Weinberg, Rob. "One-liner." (*August 1986*) 153 — Interesting graphics.

Wells, John T. "One-liner." (*February 1987*) 143 — Hexadecimal dump.

Wells, John T. "Saucer, saucer, in the sky." (*April 1987*) 116 SAUCER

White, Edward A. "Hail to the Chief." (*September 1986*) 153 — Presidential quiz. PRESIDENT

White, Eric. "CoCo presents the well-behaved yard sale." (*April 1987*) 52 YARDSALE

White, Eric. "CoCo-nect-a-dot." (*January 1987*) 60 COCONNECT

White, Eric. "Esch-a-sketch." (*August 1986*) 75 — Correction, December 1986, p.101. ESCHER PRINT200

White, Eric. "Tips on the CoCo 3." (*March 1987*) 78 COLORCHEK

White, Forrest K. "Sized to fit." (*May 1987*) 91 — Set up for Gemini 10X printer. FORMATTR

White, Jeff. "The great picture show." (*July 1986*) 26 — Display graphics files. MAGICIAN WIZARD LATECOCO MERLIN LOADER SHOW

White, Jeff. "Picture file extension changer." (*October 1986*) 182 EXCHNGR

White, Richard A. "BASIC09 on the CoCo 3." (*November 1986*) 188 SIEVE {OS9}

White, Richard A. "CoCo word processing." (*July 1986*) 212

White, Richard A. "The CoCo 3 color palette from a BASIC program." (*February 1987*) 200 BASICPAL

White, Richard A. "Dealing with variables in BASIC09." (*December 1986*) 195

White, Richard A. "Exploring the CoCo 3 color system." (*March 1987*) 112 CO3COLOR

White, Richard A. "The first days with CoCo 3: Experimentation and discovery." (*January 1987*) 188

White, Richard A. "Getting started with BASIC09." (*June 1987*) 158

White, Richard A. "Making the most of CoCo 3 features without overdoing it." (*April 1987*) 194 LISTER

Wiedman, Barry. "One-liner." (*April 1987*) 170 — Vacation planning helper.

Wigowsky, Paul. "Two-liner." (*July 1986*) 168 — Play tune from popular movie.

Wilkes, Ernest. "One-liner." (*February 1987*) 138 — Disk utility.

Williamson, H. G. "Tracking the tempest." (*April 1987*) 26 — Predict a hurricane landfall. Correction, June 1987, p.116. HURRTRAK

Wilson, Stephen R. "Hint." (*November 1986*) 73 — Multi-Pak tips.

Wolff, Harold L. "Look what they've done to my CoCos." (*March 1987*) 46 — Battery backup for the CoCo.

Womack, Wayne. "The CoCo scaler." (*October 1986*) 166 SCALER

Wood, James W. "Tic-tac-CoCo." (*August 1986*) 36 — Polar version of game. TICTACTO

Woods, Rick. "Deck the halls." (*December 1986*) 42 — Songs for Musica II. DECKHALL MUSCLOAD TAPLOAD

Wright, Archor. "Amnotron animation." (*July 1986*) 54 — Animation program. AMNOTRON

Wright, Archor. "Fly off the handle." (*August 1986*) 81 — Flight simulator. FLIGHT

Zanger, Murray. "Thrifty CoCo handles what-if calculations." (*March 1987*) 36 FNANPLAN

Zumwalt, Greg L. "Living on Rainbow time." (*November 1986*) 170 CLOCK1; CLOCK2 {OS9}

Zumwalt, Greg L. "Tandy Color Computer 3 does windows, and a whole lot more." (*September 1986*) 20

## PRODUCT REVIEWS

"ADOS version 1.02." (*June 1987*) 146

"Advanced BASIC programming aid." (*July 1986*) 158

"Adventure in mythology." (*August 1986*) 139

"Alphabetizing." (*September 1986*) 135

"The amazin' maze game." (*June 1987*) 137

"Art gallery." (*April 1987*) 135

"Assembly language programming for the TRS-80 Color Computer (book)." (*December 1986*) 142

"Avatex 1200 modem." (*December 1986*) 132

"A2D deluxe joystick." (*August 1986*) 150

"Banner." (*January 1987*) 146

"Battle hymn." (*December 1986*) 144

"Bouncing boulders." (*April 1987*) 139

"Bowling league secretary." (*September 1986*) 141

"Bowling league secretary." (*April 1987*) 140

"Business bankbook." (*August 1986*) 144

"C Compiler." (*October 1986*) 143

"Car dealer assistant." (*October 1986*) 142

"Casper CoCo quick assembler." (*September 1986*) 137

"Cave walker." (*June 1987*) 135

"CC3 draw." (*December 1986*) 148 — Correction, February 1987, p. 160.

"Champion." (*May 1987*) 141

"Citizen 120D printer." (*March 1987*) 147

"CM-8 extender cable." (*May 1987*) 140

"CMOS conversion kit." (*April 1987*) 138

"CoCo Base I." (*August 1986*) 152

"CoCo diskzap utility." (*October 1986*) 147

"CoCo guru." (*February 1987*) 134

"CoCo hymnal." (*March 1987*) 143

"CoCo III font bonanza." (*April 1987*) 148

"CoCo III secrets revealed (book)." (*February 1987*) 140

"CoCo III 512K upgrade." (*March 1987*) 145

"CoCo-util II." (*November 1986*) 136

"CoCoachiver." (*November 1986*) 146

"CoCoSize." (*April 1987*) 143

"Code practice." (*November 1986*) 134

"Color connection." (*April 1987*) 134

"Color scribe III." (*June 1987*) 136

"Colorchestra." (*October 1986*) 135

"Colorscan." (*January 1987*) 136

"COMM-4." (*December 1986*) 134

"Computer bankbook." (*August 1986*) 144

"Computer hammer." (*February 1987*) 141

"The computer phone book." (*November 1986*) 135

"CyberTank." (*November 1986*) 149

"D.L. Logo." (*January 1987*) 147

"Darkroom hold." (*August 1986*) 135

"Datapack II Plus; Datapack III Plus." (*May 1987*) 142

"DDAY." (*February 1987*) 138

"Digisector DS-69A." (*November 1986*) 140

"Disk BASIC unraveled (book)." (*October 1986*) 146

"Disk programming package." (*January 1987*) 144

"Diskman." (*May 1987*) 134

"Disto super RAM 3." (*May 1987*) 144

"DMS-3B digital memory scope." (*December 1986*) 146

"Dragon blade." (*November 1986*) 151

"Dragon slayer." (*January 1987*) 135

"The Dragon's castle." (*June 1987*) 143

- "Dragon's temple." (December 1986) 136  
 "Drive 1 upgrade." (November 1986) 150  
 "DSKUtil." (July 1986) 153  
 "Dual DOS switcher." (February 1987) 138  
 "Eagle lander." (September 1986) 134  
 "Easy gradebook / Easy testwriter." (July 1986) 154  
 "The electronic robot dog." (January 1987) 139  
 "Elite word/80." (March 1987) 134  
 "Enhanced racing analysis package." (July 1986) 167  
 "Filesafe." (April 1987) 145  
 "FKEYS III." (April 1987) 142  
 "Flash card drill." (November 1986) 148  
 "Fourcube." (May 1987) 139  
 "Full screen editor & varisave." (April 1987) 144  
 "Gantelet." (February 1987) 135  
 "Gold finder." (May 1987) 137  
 "Graphic echo." (October 1986) 138  
 "The guidebook for winning adventures (book)." (February 1987) 146  
 "Hall of the king II: The inner chamber." (September 1986) 140  
 "Homeware." (July 1986) 169  
 "Infomania: The guide to essential electronic services." (July 1986) 157  
 "Inside information (book)." (December 1986) 138  
 "Interbank incident." (March 1987) 139  
 "An introduction to the doctrines of grace." (July 1986) 165  
 "Introductory Spanish courses." (April 1987) 146  
 "JramR." (June 1987) 134  
 "Kameleon." (September 1986) 133  
 "Kamelion." (March 1987) 141  
 "Karate." (September 1986) 145  
 "Keep-trak." (July 1986) 162  
 "Keeping track." (March 1987) 142  
 "Language arts software." (March 1987) 146  
 "The Learning Company software." (June 1987) 142  
 "LEO." (November 1986) 145  
 "Llistaid." (July 1986) 165  
 "LISTER." (November 1986) 139  
 "Little letters." (December 1986) 144  
 "Lockout." (June 1987) 140  
 "The lottery player." (February 1987) 143  
 "Lyra." (December 1986) 133  
 "The magic of Zanth." (March 1987) 140  
 "Mailing list/data information." (August 1986) 149  
 "Map 'n zap." (January 1987) 148  
 "Master disk." (August 1986) 150  
 "Mathpack." (September 1986) 132  
 "Max fonts." (October 1986) 144  
 "The memory game." (October 1986) 146  
 "Memory manager." (October 1986) 139  
 "Memory minder." (September 1986) 144  
 "Micro fire." (October 1986) 149  
 "Mikeydial." (December 1986) 143  
 "MiniDOS9." (February 1987) 149  
 "Miscellaneous writings." (January 1987) 141  
 "Mission F-16 Assault." (October 1986) 136  
 "Modem pak (Radio Shack)." (August 1986) 146  
 "Mouse top." (January 1987) 140  
 "Music libraries." (February 1987) 137  
 "MYDOS." (June 1987) 144  
 "OS-9 utilities." (September 1986) 146  
 "OS-9 version 2.00." (July 1986) 166  
 "OTERM." (July 1986) 148  
 "Packer." (December 1986) 139  
 "PAL switcher." (June 1987) 138  
 "Paper route." (November 1986) 147  
 "PBH-64 print buffer." (November 1986) 144  
 "PenPal." (August 1986) 194  
 "PenPal." (September 1986) 188  
 "Pinball factory." (August 1986) 134  
 "Plateau of the past." (September 1986) 139  
 "Pony express 24A modem." (January 1987) 148  
 "Portraits of Christ." (August 1986) 141  
 "The presidential decisions of George Washington." (April 1987) 147  
 "Probaloto version 2.0." (November 1986) 143  
 "Psycho I." (September 1986) 138  
 "OS-9 level II." (May 1987) 148  
 "Pump man." (October 1986) 134  
 "Puzzle math." (February 1987) 145  
 "The quest for reality." (November 1986) 150  
 "Quotes." (April 1987) 137  
 "The return of junior's revenge." (May 1987) 135  
 "River crossing." (March 1987) 135  
 "Rocky's boots." (April 1987) 135  
 "Roller controller." (May 1987) 150  
 "Rommel 3-D." (August 1986) 138  
 "Rules of writing." (April 1987) 142  
 "Salvdisk." (August 1986) 137  
 "SC68008 RAMdisk." (March 1987) 137  
 "SECA coupon filer." (June 1987) 139  
 "The SECA fraction review." (May 1987) 136  
 "Seikosha SP-1000A printer." (October 1986) 148  
 "ShockTrooper." (July 1986) 157  
 "Sigword." (May 1987) 147  
 "Skance." (August 1986) 140  
 "Snap study system." (July 1986) 164  
 "Softreader." (March 1987) 144  
 "Software bonanza package." (July 1986) 149  
 "Soundscope." (June 1987) 133  
 "Spectrum keyboard." (August 1986) 151  
 "State the facts game." (May 1987) 146  
 "StopBurn." (June 1987) 140  
 "Studies in the parables." (February 1987) 142  
 "Super collection of super games." (June 1987) 145  
 "Super programming aid version 2." (January 1987) 138  
 "Super programming aid." (July 1986) 158  
 "Super programming aid." (April 1987) 136  
 "Survey programs." (May 1987) 138  
 "A synopsis of books of the Holy Bible." (March 1987) 143  
 "Teacher pak plus." (March 1987) 138  
 "Telepatch II." (July 1986) 168  
 "TX." (December 1986) 136  
 "TXD." (July 1986) 151  
 "U.S. stamp inventory management system." (July 1986) 156  
 "U-buff." (August 1986) 151  
 "Ultra label maker." (February 1987) 144  
 "Ultra telepatch." (November 1986) 138  
 "UNDERWARE." (February 1987) 136  
 "Uninterrupted power source." (September 1986) 149  
 "Unkill." (October 1986) 144  
 "VIP write enhancer." (February 1987) 148  
 "Vortex factor." (July 1986) 152  
 "Wall Street." (October 1986) 137  
 "White fire of eternity." (December 1986) 135  
 "Wico command control trackball." (September 1986) 136  
 "Wishbringer." (August 1986) 148  
 "The witness." (July 1986) 163  
 "Wizard's castle." (August 1986) 136  
 "Wizard." (July 1986) 168  
 "The Word Factory's word meaning." (March 1987) 136  
 "The Word Factory—synonyms and antonyms." (June 1987) 132  
 "The word search game." (April 1987) 140  
 "WordPak-RS." (October 1986) 149  
 "Writest." (January 1987) 150  
 "XWord, XSpell, XMerge." (July 1986) 170  
 "York 10 educational software." (January 1987) 134  
 "York 10 Educational Software." (May 1987) 144  
 "York 10 Software Library—physics." (February 1987) 140  
 "Zork I." (July 1986) 150  
 "1986 tax estimate." (September 1986) 148  
 "3-D graphics." (January 1987) 145

Hint . . .

## I Screen, You Screen

The PALETTE command is used to easily change the colors of the screen you are working on. The following table indicates the slots used for various screen parameters.

Mode	Foreground Slot	Background Slot
32-column	Slot 12	Slot 13
40/80-column	Slot 0	Slot 8

As an example, in the 32-column mode, PALETTE12,63:PALETTE13,0 will give white letters on a black background. In the 40- or 80-column mode, PALETTE0,0:PALETTE8,63:CLS1 will accomplish the same thing. Note that the CLS1 is used to make the border color the same as the background.

Bertrand Dugre  
Quebec, Canada

Hint . . .

## Neat Little Modification

The following is intended mostly for those who have some experience in hardware alterations. You can easily mount a DB-25 connector on the side of your CoCo and hook it to the existing keyboard connections on the bottom of the board. Then take an old CoCo keyboard (or buy a new one) and an old CoCo case (or build your own) and make a stand-alone keyboard. Just wire the keyboard to a DB-25 connector that will mate with the one mounted on the CoCo. Nine of the conductors on a 25-conductor cable are not needed. However, they open up the possibility for remote reset, power-on indicator, etc. Once you have worked out the particulars and constructed your remote keyboard, move the CoCo and Multi-Pak Interface and other accessories off your desk. You will be surprised at the neat appearance this little modification offers.

Fred Schmidt  
Englewood, CA

# Graphics Experience You Can Draw From

By Joseph Kolar  
Rainbow Contributing Editor

The purpose of this and next month's tutorial is to teach the newcomer how to correct or modify a lengthy DRAW statement that may contain up to the maximum allowed number of characters.

Why bother? One of the chief obstacles that frustrates CoConauts is that a well-stuffed DRAW statement is complex and confusing. After creating a picture/display and finding an error or wanting to alter the drawing, the newcomer is at a loss. He has difficulty identifying the offending portion of the program line. He is leery of making corrections that may destroy or distort his masterpiece. This can be a baffling problem. In order to make corrections and changes, we shall first draw a stylized head. (See Figure 1.)

A picture was drawn on graph paper. Each corner of a square is equal to one unit from an adjacent corner or neighboring intersection. The picture is drawn in pencil. Then the straight-line segments are guided to the nearest intersection. Dots are placed at these intersections and straight lines are drawn connecting the dots. (Think of a child's "connect the dots" puzzle.) After all the lines in the drawing are connected, go over them in some color, say red. The end points of every straight line

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segment are tick-marked in a contrasting color (black).

Figure 1 is ready to be reproduced on CoCo's screen. This drawing looks fairly neat, but when it is translated into DRAW statements and viewed on the screen, it may look distorted.

One reason is that the 256-by-192 Hi-Res screen squares are not true squares. The horizontal lines are shorter than the vertical ones. To verify this, type:

```
10 PMODE4,1:PCLS:SCREEN1,0
20 DRAW"S16U10R10D10L10"
100 GOTO 100
```

Now run. With a ruler, measure each side of the square.

Another reason the picture may not translate well from graph paper to the screen is that the drawing may be sloppily created and not follow the intended lines closely. CoCo pinpoints and locates every instruction exactly, without distracting deviations.

BM12B,96U10 makes a straight line from 128,96 to 128,86. You get what you ordered in the DRAW statement. Nothing freehand here!

Study Figure 1. Where to begin? At any convenient point that suits your fancy. You might choose to start at the left shoulder, then follow the hairline above the right eye, working around the head to the other side and then skipping up to finish the hairlines. You could begin at an eye and do all the facial features; start at the neck and do one side or the other of the shirt. You could do one side of the jaw line and work around to the other side.

Truly, you can begin anywhere and go in any direction, skipping and back-

tracking at will. This being the case, you can easily understand why, since each programmer has his druthers, it is difficult to follow his train of thought as he programs his DRAW lines. You can easily get lost and throw up your hands in disgust. To keep you off balance, I am not going to tell you where I am beginning the drawing and in what direction I am traveling.

Look at the right shoulder. You will see a line that moves three boxes to the right and one box up. If you started at the second point, the line would go three

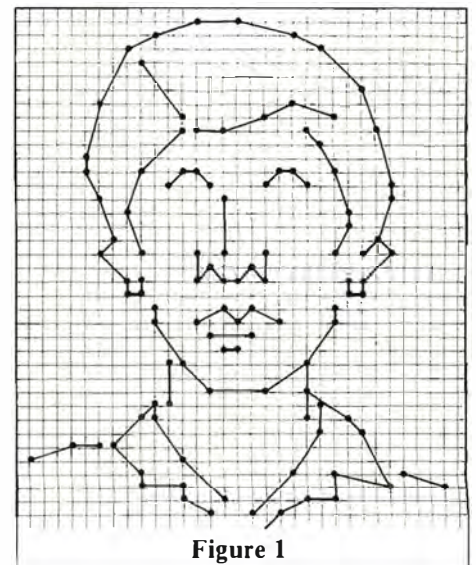


Figure 1

boxes to the left and one box down. It is all how you look at it and where your starting point is.

In the DRAW statement, this particular line segment can be drawn using M, plus or minus a numeral, and a comma (,), plus or minus a second numeral.

Rule: From the starting point, a move

to the right or down is plus. A move up or to the left is minus. The first value must be the one that indicates motion to either the left or right separated by a comma; the second value will reflect whether or not it moves up or down.

Type NEW and key in SQUARE if you need to get an overview of the M option. Otherwise, continue with this tutorial.

Beginning at the right shoulder (Figure 1), we move three spaces to the right (+3) and one space up (-1). The movement would be interpreted by CoCo as M+3,-1. If you started at the second point and moved the line to the first point, the line would go three spaces to the left (-3) and one space down (+1) or M-3,+1. You may omit the + from the second value. To see your handiwork, type NEW.

Rekey lines 10 and 100. Type 20 DRAW"S16M+3,-1" and run. From the last end point, you now move three spaces further to the right and one space down. This translates to M+3,1. Insert it in front of the closing quote and run. You have the raw material for a zigzag line.

Add Line 15 and rekey Line 20:

```
15 A$="M+3,-1M+3,1"
20 DRAW"SB~+A$+A$+A$
```

Now run it. We placed our zigzag into a string and assigned it the variable, A\$. Now it looks like a wave. To make a long wave and avoid the bother of tacking on all those +A\$s, type:

```
16 B$=A$+A$+A$
20 DRAW"SBBM2,96"+B$+B$
```

and run.

Out of String Space Error! Correct by reserving adequate space: 5 CLEAR 500, then run.

You can concatenate up to seven +B\$s before CoCo gets upset and protests with an LS Error. If we get an LS Error, simply knock off enough +B\$s so the line functions and put them into a fresh DRAW statement.

```
21 DRAWB$+B$
```

Check Line 20 to make sure you have seven +B\$s, then run.

To make an attractive chain add:

```
17 C$="M+3,1M+3,-1"
18 D$=C$+C$+C$
```

and rekey Line 21:

```
21 DRAW"SBBM2,96"+D$+D$+D$+
D$+D$+D$+D$
```

and run.

If you offset the horizontal locator value in Line 21 from 2 to 5, you get a variant chain that looks like a pair of twisted ropes. Run this, then restore 2.

Let us make a vertical rope so it crosses in the center. To make it go down three boxes and right one box, we get M+1,3, and to go in the opposite direction, we get M-1,3. Note: Horizontal value is the first element!

```
30 E$="M+1,3M-1,3"
31 F$=E$+E$+E$
35 DRAW"SBBM129,6"+F$+F$+
F$+F$+F$.
```

Now run.

To make the strand another way, type:

```
36 DRAW"SBBM128,6"+F$+F$+
F$+F$+F$
```

Two things stand out. First, the links are slightly larger, and second, we have a mismatched pair of strands. This can be repaired. The strand in Line 36 must have M-1,3 inserted in front of the closing quote. Line 35 must have +M+1,3 added after the final +F\$. Run this.

Note the horizontal values in lines 35 and 36. This was done to maintain a shape as close as possible to the horizontal rope.

Problem to solve! Notice the vertical strand is off-center. It crosses the horizontal rope neatly, but overflows off the screen at the bottom. Can you center it better? Try to work it out.

First, drop one +F\$ from both lines 35 and 36, and run. We could use about 2½ links on each vertical strand. One link equals +E\$. Let us insert +E\$ in both lines 35 and 36. Caution: Not at the beginning or the end! Now run.

Let us add another link, +E\$, right next to the +E\$ we injected into the two

#### Listing 1:

```
Ø '<LISTING1>
5 CLEAR600
1Ø PMODE4,1:PCLS:SCREEN1,Ø
15 A$="M+3,-1M+3,1"
16 B$=A$+A$+A$
17 C$="M+3,1M+3,-1"
18 D$=C$+C$+C$
2Ø DRAW"S24BM35,99"+B$+B$
21 DRAW"BM26,95"+D$+D$
22 DRAW"BM24,1Ø1"+B$+B$
3Ø E$="M+1,3M-1,3"
31 F$=E$+E$+E$
35 'DRAW"S8BM129,6"+F$+F$+E$+E$+
F$+F$+E$
36 'DRAW"S8BM128,6M-1,3"+F$+F$+E
$+E$+F$+F$+"M+1,3"
4Ø LINE(2Ø,94)-(34,1Ø2),PRESET,B
F
41 LINE(218,93)-(256,1Ø2),PRESET
,BF
1ØØ GOTO1ØØ
```

#### Listing 2:

```
Ø '<SQUARE>
1 GOTO2ØØ
1Ø PMODE4,1:PCLS:SCREEN1,Ø
16 FOR X=35 TO 18Ø STEP2Ø
19 A$="U1ØR1ØND1ØR1ØND1ØR1ØND1ØR
1ØD1Ø"
2Ø DRAW"S8BM28,=X;"+A$+A$+"U1ØR1
ØND1ØR1ØD1Ø"
25 NEXTX
3Ø LINE(28,175)-(228,175),PSET
31 LINE(Ø,95)-(255,97),PSET,BF
32 LINE(127,Ø)-(129,191),PSET,BF
33 CIRCLE(128,96),5,1
34 LINE(Ø,96)-(255,96),PRESET
35 LINE(128,Ø)-(128,191),PRESET
4Ø B$="U6F3E3D6BR3NU6BR3U5NUF4NU
5DBR3NU6R4U6BR3NR4D3R4D3NL4"
41 C$="U6R4D3NL4BE3D6R4BR3NU6R4U
6BR3NR4D3R4D3NL4"
42 D$="NE3NF3R2Ø":E$="R2ØNH3G3"
43 F$="U6F3E3D6BG3D6BG3BRDND5F4N
```



lines. Run this. In Line 35, delete the final +M+1,3" and tack on +E\$ and run it. That leaves one piece missing at the end of Line 36. Add +M+1,3" and run. It isn't perfect, but it will do.

By the way, what was this tutorial supposed to cover? It seems I wandered off down some primrose path. Even though it was difficult to create the vertical rope, wasn't it a fun challenge? Now, you know two ways to make a rope.

Suppose we wanted to make a three-strand rope? First, mask lines 35 and 36 with REM markers to get them out of the road. Re-size lines 20 and 21. Change Line 20 to S16 and delete SB from Line 21. Since both lines will be the same size, a second S16 would be redundant. Run this.

Lop off four each +B\$s and +D\$s from lines 20 and 21, and run. Re-center by inserting 0 in lines 20 and 21 to make the horizontal value 20. Now run.

The size must be enlarged to S24. Make the change and run. To make the third strand, type:

```
22 DRAW"BM12,101"+B$+B$
```

Rekey lines 20 and 21, then type:

```
20 DRAW"S24BM23,99"+B$+B$
21 DRAW"BM15,95"+D$+D$
```

and run.

The starting locations (H,V) were an exercise in trial and error. They were

adjusted, this way and that, until the strands looked moderately twisted.

We now have staggered strands. Re-center by adding +12 to each horizontal value in lines 20 through 22. Now run. All we have to do is tie up the loose ends. I will have to ask CoCo to cheat and resort to LINE statements to do the trick:

```
40 LINE(20,94)-(34,102),
   PRESET,BF
41 LINE(210,93)-(256,102),
   PRESET,BF
```

Now run it.

Incidentally, there are better, more complex ways to tie the ends of the braided, three-strand rope. That would send us further down another primrose path. Suffice to say, using LINE was good practice. How did I come up with the values in the two LINE statements? I used PSET,BF. This allowed me to see what was being zapped because little windows overlaid the dangling ends. Merely adjusting the values to encompass the desired portions indicated vividly what was being blanked out. The mission was finalized by changing the PSET to PRESET.

Save it as Listing 1 and type NEW. Here is a problem! Using lines 10 and 100, create a DRAW LINE 20 and using M-2,4, manipulate the pluses and minuses to create a diamond shape in size S16.

Using the A option, make a diamond-shaped cross. Going further, an optical illusion was created, using the same

game plan. Type NEW. Quickly, key in OPTICAL and run. If you stare at the display, it seems as if the diamond tends to rotate on its vertical axis, sometimes clockwise and sometimes counterclockwise.

Your homework assignment is to make a small program using 10 PMODE4,1:PCLS:SCREEN1,0 and create the eyeless wonder in Figure 1 using the DRAW statement. Think of it as if all of the tick marks at the end of each straight segment are dots. You must connect all the dots to make the lines flesh out the face. Begin anywhere you like. When you must jump to a new area to connect up with another group of lines, use B in front of one of the eight normal directions, UDLREFGH, or before M, when you must move at some angle that is less than 90 degrees.

For example, from the end of the figure's right jaw, up to the outer edge of the right eye, BR2BU9 will bridge the gap by making a 90-degree angle; to the right two units and then up nine units. If you are really into the M option, BM+2,-9 will do the same thing more directly and draws an invisible line linking the two areas.

Save your "face" program. Next month, we shall continue. I will make the official drawing for the tutorial. When you compare my rendition with your version, you may be shocked to realize that even though we created the exact same figure, our program lines are as different as the two sides of the moon. □

```
U5DBD3BL4D6R4NU6BD3BL4NR4D3R4D4L
4 "
44 G$="R4D3L4NU3D3BD3D6NR4BD3D6R
4NU6BD3BL4NR4D3R4D4L4 "
45 H$="E3NF3D20"
46 I$="D20NH3E3"
50 DRAW"S4BM90,10"+B$:DRAW"BM135
,10"+C$
51 DRAW"BM90,185"+B$:DRAW"BM135,
185"+C$
52 DRAW"BM65,7"+D$:DRAW"BM165,7"
+E$
53 DRAW"BM64,182"+D$:DRAW"BM165,
182"+E$
54 DRAW"BM10,52"+F$:DRAW"BM240,5
2"+F$
55 DRAW"BM11,102"+G$:DRAW"BM241,
102"+G$
56 DRAW"BM10,25"+H$:DRAW"BM240,2
5"+H$
57 DRAW"BM13,140"+I$:DRAW"BM243,
140"+I$
```

```
60 CIRCLE(48,55),3,1:CIRCLE(28,1
35),3,1:CIRCLE(148,35),3,1:CIRCL
E(188,115),3,1
70 'LINE(48,55)-(128,96),PSET'
M-4,-2
71 'LINE(28,135)-(128,96),PSET'
M-5,+2 OR M-5,2
72 'LINE(148,35)-(128,96),PSET'
M+1,-3
73 'LINE(188,115)-(128,96),PSET'
M+3,+1 OR M+3,1
100 GOTO100
191 PRINT:PRINT
200 CLS:PRINT:PRINT" FROM A STA
RTING POINT, (CEN- TER), THE FI
RST M VALUE IS A NUMBER DERIV
ED FROM EITHER TO THE LEFT OR
THE RIGHT OF THE VERTICAL LIN
E. IF IT IS TO THE LEFT, IT IS
A MINUS VALUE, ELSE IT IS A PLUS
VALUE."
201 PRINT:PRINT" THE SECOND IS
```

EITHER ABOVE OR BELOW THE HORIZONTAL LINE. IF IT IS ABOVE THE LINE, IT IS A MINUS VALUE, IF IT IS BELOW THE LINE IT IS A PLUS VALUE.

202 LINEINPUT" TO CONTINUE, PRESS <ENTER>";OAS\$  
 210 CLS:PRINT" THE DISPLAY WILL SHOW A START-ING POINT AND AN ENDING POINT IN EACH OF THE FOUR QUADRANTS. FROM THE LEGEND AROUND THE DISPLAY, FIGURE OUT WHAT THE TWO M VALUES ARE.

211 PRINT:PRINT" THEN TAKE THE REMARKER FROM LINES 70-73 AND YOU WILL SEE THE LENGTH OF THE LINE. AT THE END OF THE PROGRAM LINE, THE CORRECT M VALUES ARE LISTED.

212 PRINT:LINEINPUT" TO CONTINUE, PRESS <ENTER>";OAS\$

213 CLS:PRINT:PRINT" THE PROBLEM IN THE UPPER LEFT QUADRANT, IS IN LINE 70. THE PROBLEM IN THE LOWER LEFT QUADRANT IS FOUND IN LINE 71. THE PROBLEM IN THE UPPER RIGHT QUADRANT IS FOUND IN LINE 72. THE PROBLEM IN THE LOWER

214 PRINT"RIGHT QUADRANT IS FOUND IN LINE 73.

215 PRINT:LINEINPUT" TO SEE THE PROBLEMS AND STUDY THE FORMAT OF THE M VALUES PRESS <ENTER>";OAS\$

216 GOTO10  
 217 GOTO217

**Listing 3:**

```
Ø '<OPTICAL>
1Ø PMODE4,1:PCLS:SCREEN1,1
15 FOR X=4 TO 4Ø STEP3
2Ø DRAW"S=X;BM128,46M+2,4M-2,4M-2,-4M+2,-4"
35 NEXT
1ØØ GOTO1ØØ
```

**Listing 4:**

```
Ø '<REFERENCE FOR CROSSED CHAIN
5 CLEAR6ØØ
1Ø PMODE4,1:PCLS:SCREEN1,Ø
15 A$="M+3,-1M+3,1"
16 B$=A$+A$+A$
17 C$="M+3,1M+3,-1"
18 D$=C$+C$+C$
2Ø DRAW"S8BM2,96"+B$+B$+B$+B$+B$+B$+B$
21 DRAW"S8BM2,96"+D$+D$+D$+D$+D$+D$+D$
3Ø E$="M+1,3M-1,3"
31 F$=E$+E$+E$
35 'DRAW"S8BM129,6"+F$+F$+E$+E$+F$+F$+E$
36 DRAW"S8BM128,6M-1,3"+F$+F$+E$+E$+F$+F$+"M+1,3"
1ØØ GOTO1ØØ
```

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## DOWNLOADS

# You Need to Know When to Stop

By Dan Downard  
Rainbow Technical Consultant

*I am having problems with my new printer. It's a Brother M-1109. The problem is when printing out a fair amount of data, it loses part of the data and resumes somewhere down the line. Here is how I have it connected:*

DIN	Printer DB-25
1	Unconnected
2	to 4
3	to 1
4	to 3

*I am running at 9600 baud and used the line delay pokes to slow it down. I am now using 151=128, 152=64. It still loses data in the middle of the printed page or close to the end. I have slowed the printer all the way down to 600 baud with no luck.*

Mike Tolbert  
(MIKEGT)  
Greenville, SC

Mike, we haven't touched the subject of printers for a while, so let's get down to the basics. Your CoCo uses three of four pins on the DIN plug, better known as the serial I/O connector, to communicate with the printer. The pinouts are as follows:

Pin 1	Not used	N/A
Pin 2	Handshake/busy	Input
Pin 3	Signal ground	Common
Pin 4	Data	Output

*Dan Downard is an electrical engineer and has been involved in electronics for 27 years through Ham radio (K4KWT). His interest in computers began about eight years ago, and he has built several 68XX systems.*



The industry standard for serial communications is called RS-232. RS-232 uses a 25-pin connector called a DB-25. RS-232 calls for the following connections to a DB-25 connector at the printer:

Pin 1-	Chassis ground	Common
Pin 2-	TxD transmit data	Output
Pin 3-	RxD receive data	Input
Pin 4-	RTS request to send	Output
Pin 5-	CTS clear to send	Input
Pin 6-	DSR data set ready	Input
Pin 7-	SG signal ground	Common
Pin 8-	DCD data carrier detect	Input
Pin 20-	DTR data terminal ready	Output

At least we know what the pinouts are on the CoCo. The problem is at the DB-25 end of the cable. First of all, let's assume we are dealing with serial I/O. Your printer manual should give the pinouts for the RS-232/DB-25 connection. Even though it's an industry standard, some printer manufacturers use different pins for the handshake signal. Use the RS-232 pinouts above to identify your printer signals. If you don't have a DB-25 connector, match the signal descriptions with those given.

The following connections should work:

DIN	DB-25/Printer
Pin 1	No Connection
Pin 2	Pin 20
Pin 3	Pin 7
Pin 4	Pin 3

In most cases you must connect a jumper between Pins 4,5,6 and 8 on the DB-25 connector.

If the handshake signal is properly connected, you shouldn't have to worry about line delays, etc. This is accomplished by a hardware signal between the printer and the computer. Just as an explanation of your problem, your printer has a buffer. The buffer is accepting characters at a faster rate than it can print. When the buffer is full, your CoCo is still sending, because no signal has told it to stop. As a rule of thumb, baud rate = characters per second x 10. In other words, if you have a 120-cps printer you should be able to print 1200 baud without any handshake signals. This tidbit assumes that you have no buffer, but it's close enough. Obviously your printer is not capable of 960 cps.

### Leave Out the Spaces

*Regarding the question in your May 1987 column from Bill Hodges, about underlining every word: The computer does exactly what you tell it to do. Most underlining routines are set up to underline only characters, not spaces. The solution? Don't use any spaces. So, use an underline character where spaces should be.*

Marc I. Leavey  
Baltimore, MD

Thanks for the nifty hint, Marc. I have been reading your ham radio

column ("RTTY Loop" in 73 *Amateur Radio*) for a long time and am sure glad to hear from you. 73's de K4KWT.

### The Unpublished Feature

*In replying to a writer concerning a Teac 55B floppy disk drive, you stated that the user's drive was operating normally because "The disk motor is turned on for a few seconds to allow the drive to get up to speed before any operation takes place." This is true. However, your reader's query was "when I either insert or extract the disk, the motor runs for about ten seconds on its own before the lever is engaged. Is this normal?"*

*It is an unpublished feature of the Teac drives (I have one myself) that they turn on the spindle motor when a disk is inserted or removed from the drive. The spindle motor will remain running for about ten seconds, as your reader noted. I'm told that this feature allows for better "clamping and declamping" of the disk hub upon insertion and removal. This is an isolated hardware case, which is peculiar to Teac drives, and is not related to the normal 1 1/2-second, motor-on delay that is part of Radio Shack's normal Disk BASIC.*

*Don Hutchison  
(DONHUTCHISON)  
Atlanta, GA*

Thanks for the info, Don. I am also informed through Delphi and Marty Goodman that Shugart, Panasonic and Matshushita 455 drives all have the same hardware delay built in.

### What's a Control-Z?

*I operate amateur radio and got my CoCo 2 to use on a packet radio station. It works just fine on packet, but in order to use the major BBS, you need to sign your message with a CONTROL-Z. Is it possible to get a CONTROL-Z out of the CoCo 2?*

*Billy R. Thomas  
Streamwood, IL*

You must be using some kind of communications, or terminal, software, Billy. Most of the CoCo 2 terminal programs I have seen use the down arrow as a control key. By pressing the down arrow and the Z key at the same time, a CONTROL-Z will be sent. Read the manual for the software in question to confirm this!

### How Much Memory?

*I just bought my new CoCo 3 and typed PRINT MEM, and it said 22824 with my disk drive plugged in. Is something wrong with it? I thought you got more*

*memory with a new 3. Also, what do you do to disable the reset button?*

*Sean Bishop  
Hazard, KY*

Sean, as long as you are using Disk BASIC, the memory in your CoCo 3 is limited. Keep in mind, though, that CoCo 3 does have the ability to store graphics pages in the extended memory area. So even though the memory available is still about the same, it can be used for programs and variables, and your OM Errors will be fewer.

To take advantage of the extended memory of your CoCo 3, I would recommend programs written in OS-9 Level II. Even though an OS-9 process is limited to 64K, there are ways to take advantage of the full 512K of memory allowed. Dale Puckett and Peter Dibble are writing a new book about OS-9 Level II that will be available later this year.

### Updating the CoCo 2

*I have a 64K CoCo 2, two double-sided disk drives, Epson LX-80, DCM-3 and a Multi-Pak. I have some questions about getting a monitor (non-RGB). Would I need some kind of driver/adaptor to hook it up to my CoCo 2? I would also like to have 80 columns. Do I need an 80-column card or something? I would also like to get a 64K buffer for my printer. How do they work? Does it have a CPU in it?*

*Craig J. Vincek  
Benton, KY*

I would recommend buying a CoCo 3 instead of investing in more hardware for your CoCo 2, Craig. First of all, a video driver is not sufficient to produce readable 80-column text with a CoCo 2. Therefore, we will assume that you will need an 80-column interface, such as those made by Disto and PBJ.

As far as the buffer is concerned, there are three types that come to mind. First, most printer manufacturers offer a buffer as part of the printer. Second, there are hardware printer buffers available. Try the Spectrum Projects ad in this issue. Last, but certainly not least, is software spooling. Using this method, the printer operates as a background task while other programs are running. This is a built-in feature of OS-9. Programs are also available for RS-DOS to do this, but I am not aware of one for the CoCo 3. I'm sure it will be available shortly.

### RS-232 ROM

*In your March 1987 column, you suggested to Vince Falcone to remove*

*the ROM from his RS-232 pack. Would you please show a schematic of the pack so that I will know which chip to remove?*

*Kevin Krug  
Derwood, MD*

Kevin, we cannot publish a schematic here but will give you enough info to pick it out of the Pak. In the RS-232 pack, you will find two large chips. One has 28 pins and is indicated with the symbol U1 on the circuitboard. The other chip has 24 pins and is called U3. This 24-pin chip is the ROM. If the chip is socketed, simply remove it. If it isn't socketed, you will need to desolder Pin 20 and bend it up out of the way.

### Scroll Stopper

*I tried your rewritten version of Disk Directory Lister. There are a few questions I would like to ask. When I try to run it on a disk, I get an NE Error. Is there a way to halt the program when it reaches the bottom of the page so that it doesn't overflow to the next page?*

*Willie E. Turner  
Baldwin Park, CA*

It sounds as if you are trying to read an OS-9 disk, Willie. OS-9 uses a different directory structure. *Direct* was written for RS-DOS directories. Another thing to look for is copy-protected disks. As far as making the listing stop, try inserting the following lines:

```
45 LN=1
305 GOSUB600
600 LN=LN+1
610 IF LN<59 THEN RETURN
620 FOR LX=1 TO 8
630 PRINT#2
640 NEXT LX
650 INPUT "HIT ANT KEY TO CON-
TINUE";IN$
660 LN=1
670 RETURN
```

I'm glad you liked the program. Have fun with it.

**Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.**

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## BITS AND BYTES OF BASIC

# BASIC09 and Level II: Focusing on Modules

By Richard A. White  
Rainbow Contributing Editor

Everything was happening at once. Income tax and this column's deadline were near at hand. Preceding them was the Chicago RAINBOWfest. I decided to get the taxes out of the way and they were getting on well when Level II arrived on a Tuesday. I hurried home to format disks and make backups. Well, I could not even format a disk and had to fall back to Level I to get the backups. The CoCo 3 sometimes "went west" even before the Level II boot was complete. Things like this are totally frustrating. Wednesday evening brought the news that two friends had experienced identical problems, and the search for a solution was on. I felt a tad better knowing it was not just my machine.

A Thursday evening session on the Delphi OS-9 Forum brought an answer: Some old 12-volt disk controllers could not take the 1.8-MHz clock speed. So the disk controller swap began and solved the problem. Our controllers dated from February 1983 when we made a group buy of drives. Some earlier and later 12-volt controllers work as all 5-volt only units do.

Still there was a bit of time to work with Level II and BASIC09, which comes with it. Early on it was apparent that 128K would not cut it. I solved this at RAINBOWfest by purchasing a 512K upgrade, as did many others. BASIC09 is nearly identical with the Level I version except for support for CoCo 3 graphics. This is going to take some careful digestion, all the more reason to focus, for now, on applications common to CoCos 1, 2 and 3.

My first order of business was to get a Level II boot set up to take advantage of windows and the added memory, then work up the program for this article. That done, it was time to sit back and be impressed. Wow, we have been scraping for memory for years. Now I load nearly everything I routinely use in memory at boot and still have half the

available memory left. I start BASIC09 with a nice *big* buffer and still can go to OS-9 and have plenty of memory to do anything I want.

Level II provides two ways to leave BASIC09 to use OS-9 utilities. One is to type `⌘` at the B: prompt. This puts you in OS-9. You get back to BASIC09 by pressing CLEAR-BREAK (CTRL-BREAK on the CoCo 3). However, with a number of windows active on the CoCo 3, pressing the CLEAR key advances one to another window. This can be done from a running BASIC09 program. I discovered some of the protections built into OS-9. For example, it is impossible to change or delete a file in use by a running program.

Documentation for Level II BASIC09 is much improved over the Level I version. Program examples are given for virtually all commands. Unfortunately, some of the early examples use line numbers. Perhaps someone thought people could not go off line numbers cold turkey. Most later examples dispense with line numbers. What is not so apparent in these examples is the importance of modularity in BASIC09.

A good BASIC09 program consists of a number, perhaps a large number, of separate modules. Some will be drawn from a library of modules that have been used in other programs. Others will be written for the application. This simplifies writing the modules and testing them to begin with. It also makes it easier to upgrade programs later. For example, I can quickly write an editing module that may be a simple substitution editor and come back later to write a new more powerful version.

Modules have memory implications. They can be loaded as needed and killed out of memory when they are no longer needed. Parameters allow large blocks of variables to be passed to other modules to be changed and returned to the calling module.

I am focusing on modules since I plan to discuss the beginning modules of a much larger program that will roll out over the next few months. The program now goes under the name *PersonFile*. It's basically an enlarged mailing list and membership program. All such files have common needs, the name and address, telephone numbers, dates and some general note fields. The intent is to provide a generic record structure whose fields can be renamed to meet a variety of

*Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the co-author of the TIMS database management program.*



purposes. As a computer user group membership file, the basic address information is required along with expiration date, perhaps date joined, home and office telephone numbers and miscellaneous interest information. On the other hand, the Christmas list file needs addresses, telephone numbers, birthdays perhaps, names of others in the family, etc. These are the same fields, just different uses for the fields.

I like to start with a "main" module. Basically, it dimensions the record variables, opens and closes files and calls other modules that do most of the work. One has some discretion as to what goes in the main module. Some short routines may be better in the main module because of the memory overhead in passing parameters and defining them in separate modules. Still, almost everything must be considered for its own module.

Rather than start with main, I will first deal with two "library" procedures that I have re-used from previous programs. `isupper` simply converts any lowercase letters to uppercase. This way a user may answer with either a y or a Y, and the program needs only test for a Y.

```
PROCEDURE isupper
  0000 DIM count,line_length:INTEGER
  000B PARAM answer:STRING(40)
  0017 DIM ascii:INTEGER
  001E DIM char:STRING(1)
  002A DIM work_string:STRING(40)
  0036
```

The first section of the program defines the variables. A variable defined with `dim` is local to this procedure. `param answer:string[40]` defines a string variable, up to 40 characters long, that will be provided by the calling procedure. Note that BASIC09 strings are dimensioned with a specified length for which fixed storage is provided. A shorter string of characters may be put into the variable, but any characters in excess of the specified length are lost. BASIC09 supports long variable names, which are a major help in program readability. While these use memory in the source code, they are stripped out when the procedure is packed.

```
0037 count:=1
003E line_length:=LEN(answer)
0047 work_string:=""
004E
```

BASIC09 does not automatically initialize variables. As initially dimensioned, `work_string` contained whatever garbage was in the memory BASIC09 allocated to it. The expression `work_string:=""` sets its length to zero so BASIC09 will disregard everything in its memory space.

```
004F WHILE count<line_length+1 DO
005F   ascii:=ASC(MID$(answer,count,1))
006E   IF ascii<96 THEN
007A     char:=CHR$(ascii)
0083     work_string=work_string+char
008F     count:=count+1
009A   ELSE
009E     char:=CHR$(ascii-32)
00AA     work_string=work_string+char
00B6     count:=count+1
00C1   ENDIF
00C3 ENDWHILE
00C7
```

Now, `isupper` gets the ASCII value of each character in the string `answer` and tests each value. If `ASCII<96`, the character must be uppercase, a number or punctuation mark so ASCII is converted back to a character and added to `work_string`. Characters with ASCII values greater than 96 must be lowercase. Subtracting 32 will make the conversion

to an uppercase number. The new ASCII is converted back to a character and added to `work_string`.

The `while-do-endwhile` keeps the program looping until each character in `answer` has been tested. It and the `if-then-else-endif` are control structures. Each BASIC09 control structure has its own end statement. Above we see `endif` and `endwhile`. Others we will see are `endexit` and `endloop`. Most are familiar with `NEXT` which ends a `for-to-next` structure.

```
00C3 answer:=work_string
00D0 END
```

In passing the string `answer` to `isupper`, BASIC09 really passed the memory location of `answer`. Whatever `isupper` puts into `answer` will be known to the calling procedure when it regains control. So, we can assign the uppercase string in `work_string` to `answer` to get it back to the calling procedure. `end` terminates `isupper` and passes control back. By the way, the numbers to the left are offsets from the beginning of the program in Hex bytes to the beginning of the line.

```
PROCEDURE printat
  0000 PARAM col,row:INTEGER
  000B PRINT CHR$(2); CHR$(col+32); CHR$(row+32);
  0021 END
```

Maybe I should rename `printat` to `locate` to be consistent with CoCo 3 BASIC. It simply receives a column and a row number and uses the `print` statement to move the cursor to that screen location. We will use it frequently.

```
PROCEDURE main
  0000 DIM field_name(15):STRING(6)
  0011 TYPE add_rec=first,last,add1,add2,city:STRING(15);
      zip4:STRING(4); zip5:STRING(5)
  0047 TYPE data_rec=y1,m1,d1,y2,y2,m2,d2:STRING(2);
      ac1,ex1,ac2,ex2:STRING(3); no1,no2,cd1,cd2:STRING(4);
      nt1,nt2,nt3:STRING(24)
  00B0 DIM addrec:add_rec; datarec:data_rec
```

OK, here starts the procedure `main`. Since we have 15 field names, we will need an array to store them in. `field_name(15)` provides this array. Next, things get muddy fast. `type` defines a new variable type that is used in the same way as `integer`, `string[]` and the other atomic variable types. The new type `add_rec` consists of five, 15-character strings named `first`, `last`, `add1`, `add2` and `city`, plus a four-character string named `zip4` and the five-character `zip5`. The names of these strings are descriptive of their uses. The second new type, `data_rec`, provides storage for the remaining data to be in the record. Finally, storage for the records is provided by `dim addrec:add_rec; datarec:data_rec`.

Understanding how BASIC09 stores its variables will help in understanding the `type` statement. `Type add_rec` consists of five, 15-character strings, one of four characters and another of five characters for a total of 84 characters. When the program comes to `dim addrec:add_rec` it allocates 84 contiguous bytes of memory and maps it according to the `type add_rec=` statement. The variable `first` gets the first 15 bytes, `last` gets the next 15 and so on. When BASIC09 sees `addrec.first:="john"`, it knows to look in the map provided by `add_rec` to find the place to put "john". "john" will go in the first four bytes of the 84 bytes allocated to `addrec`.

```
00C1 DIM file_name:STRING(12)
00CD DIM file,path:INTEGER
00D8 DIM count,count1,count2:INTEGER
00E7 DIM answer:STRING(1)
00F3
```

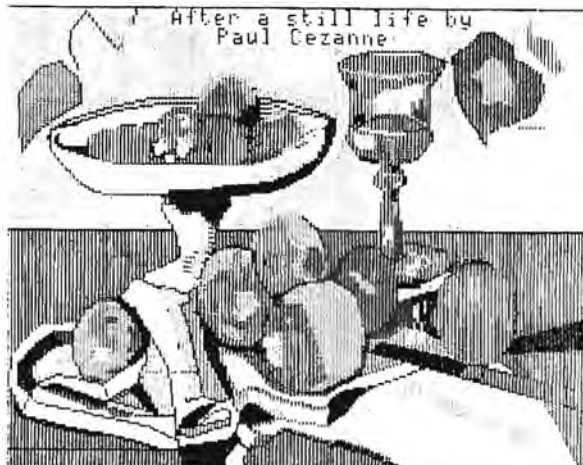
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The remaining dimensioning statements hold no surprises.

```

00F4      PRINT CHR$(12)
00F9      RUN printat(0,8)
0104      INPUT "FILE NAME ",file_name
0117      file:=0
011E

```

`print chr$(12)` is the equivalent of `CLS` in CoCo BASIC and clears the screen. We have discussed the `printat` procedure. Now we see how to call it: `run printat(0,8)`. The `0` and `8` are the column and row parameters we are sending. `run` is quite flexible. It can call a source code procedure in the BASIC09 workspace, a packed code procedure inside or outside the workspace or a machine language procedure line like `inkey` below.

Next we get the filename of our database. The system will use a number of files, but the program will handle naming using this root word. The variable `file` will be used for a file path number, which is assigned when a file is created or opened. The number will always be four or higher. As long as `file=0`, we know that no files have been opened.

```

011F      LOOP
0121
0122      REM Print menu
012F
0130      PRINT CHR$(12)
0135      PRINT TAB(8); "PERSONFILE MENU"
014C      PRINT
014E      IF file=0 THEN
015A          PRINT " 0. CREATE NEW FILE"
0172      ENDIF
0174      PRINT " 1. RENAME FIELDS"
018A      PRINT " 2. ENTER/EDIT DATA"
01A2      PRINT " 3. SORT FILE"
01B4      PRINT " 4. PRINT MAILING LABELS"
01D1      PRINT " 5. PRINT ENTIRE RECORDS"
01EE      PRINT " 6. PRINT CUSTOM REPORT"
020A      PRINT " 7. EXIT TO OS-9"
021F      PRINT
0221      PRINT "KEY NUMBER OF OPERATION ";
023F
0240      answer:=""
0247      WHILE answer="" DO
0253          RUN inkey(answer)
025D      ENDWHILE

```

`loop` is a `goto` killer. Whenever a program comes to an `endloop`, it goes back to `loop` and starts the enclosed code over. This segment of the `loop` prints the menu and gets the response. Note that we offer the Create New File option only when the procedure is first entered, which is the only time `file=0`.

`inkey` looks for an input character and then lets the program continue. If there is no character, there is a problem that the `while answer="" do-endwhile` solves by forcing the program to loop until there is a character to read. Compare this to the now rather inelegant BASIC.

```
10 A$=INKEY$: IF A$="" THEN 10 ELSE RETURN
```

Note that the parameter being sent `inkey` is a variable. It is not passing data to `inkey`, though it could. It is there to return any character that `inkey` finds.

```

0261
0262      REM Process choice
0273
0274      IF answer="0" AND file=0 THEN
0288          RUN init(field_name,addrec,datarec,file_name)
02A1      ENDIF
02A3      IF file=0 THEN
02AF          OPEN #file,file_name+"flds":UPDATE
02C2          OPEN #path,file_name+"recs":UPDATE
02D5      ENDIF
02D7

```

I said that I did not want to go to the `create` routine if files were already open. Here is a dual test where the user had to have entered a `0` and `file` must be `0`. When these conditions are met, `init` is run and sent `field_name`, `addrec`, `datarec` and `file_name` as parameters. These parameters allow `init` to access over 300 bytes of storage, and `init` will change each variable in these records. Now you can see why we did not want to be able to call `init` while some other file was active.

Once having passed the `init` call, there will be a file somewhere to work on. If `init` was used, it will have placed two files on disk. Otherwise, the filename entered should be a path to pre-existing files. In either case, `file_name` has suffixes appended and two files are opened for update. This means BASIC09 may either write to the files or read from them. `#file` and `#path` provide variables `path` and `file` that will hold the path numbers OS-9 assigns when it opens the files.

```

02D8      IF answer="1" THEN
02E5          RUN renamef(field_name,file)
02F4      ENDIF
02F6
02F7      EXITIF answer="7" THEN
0304          CLOSE #file
030A          CLOSE #path
0310      ENDEXIT
0314
0315      ENDOLOOP
0319
031A      END

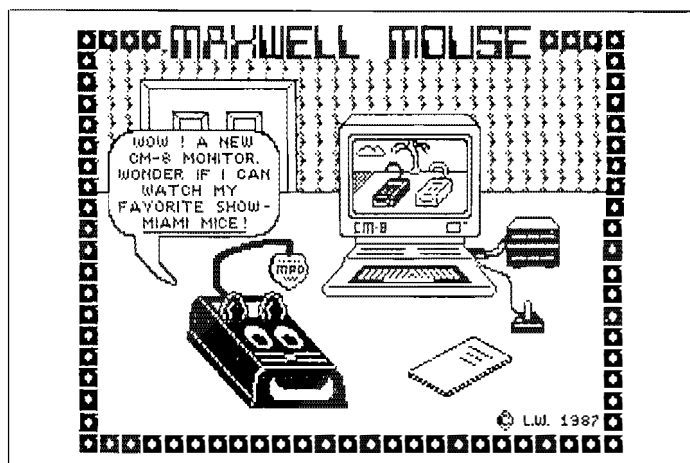
```

With the files open, we go forward to other work. We can rename fields at any time since that does not change the data. The procedure `renamef` does this. All it needs is the field name array and the file path number for the file where it will store the modified array.

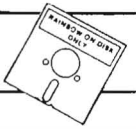
In order to test the `init` and `renamef` procedures, `main` needed to provide some minimum housekeeping. Accordingly, the exit routine was written. Meet `exitif-then-endexit`. This construction provides a way to include all sorts of final housekeeping tasks after the `then` prior to finally leaving the loop. In our case, we close the files. `exitif` is the only way to exit a loop without using a `goto`. It can be put anywhere in the loop, and there can be multiple `exitif-then-endexit` constructs in a given loop. It can be used with any of BASIC09's looping control structures.

After an `exitif-then-endexit`, control goes to the next statement after `endloop`. In our case it's `end`, which terminates the procedure.

At this point, I think I have dispensed sufficient BASIC09 for one sitting. Next month we will take up the `init` and `renamef` procedures and get started on `enter/edit`. ☺







## KISSable OS-9

# An OS-9 Convert Speaks Out

By Dale L. Puckett  
Rainbow Contributing Editor

Steve Bjork first worked with computers while studying electronics during the early 1970s when he enrolled in his programming course at a Los Angeles area college. Before long, Bjork had "put together" his own elaborate calculator — a computer completely built with discrete components. "I used the 7400 series technology to come up with a whopping 64 bytes of memory, four bits or one nibble wide," he said. "It cost me more than \$200 to build this overgrown calculator. Today I can buy a 128K CoCo 3 for the same money."

Bjork continued his education in computer programming and electronics at several colleges in Southern California. "While I was at San Diego, they were developing UCSD PASCAL," he said. "As a student I got to work on a few of the trivial parts of the program and served as a guinea pig to test the rest."

In 1970 Bjork went to work for the

first of several small software companies. By the end of the decade, he wound up at DataSoft and was immediately assigned to develop software for the Color Computer. It was at this time that he grew to know and love the 6809 for all its power and simplicity. While there, he racked up credits for *Sands of Egypt*, *Clowns and Balloons*, *Zaxxon* and many more hit Color Computer games.

In 1983 Bjork left DataSoft and formed his own company, SRB Software. A few months later, Radio Shack named OS-9 as the official operating system for the Color Computer. While it took them nearly a year, with Bjork kicking and screaming all the way, Tandy finally convinced SRB Software that OS-9 was the way to go. How?

"Since Radio Shack was no longer accepting programs that were not developed on OS-9, the choice was simple," Bjork said. "If you wanted to write software for the Color Computer, you had to use OS-9."

While the kicking and screaming made it a bittersweet experience, Bjork's introduction to OS-9 was like a blast from the past.

"After I had a chance — or should I say after I was forced — to sit and look into OS-9, I began to rediscover what computers are all about," Bjork said. "When I was in college, most of the computers I used were mainframes that had elaborate operating systems built in. This cut down the amount of work the programmer had to do. I re-experienced this same phenomenon with OS-9."

How did Bjork learn OS-9? "I must admit I had some help from Tandy and a good friend in Fort Worth who was able to answer my questions," he said. "And even though the OS-9 manuals were technically oriented, I was already familiar with operating systems and what they were supposed to do. Therefore, OS-9 was not foreign to me. But, like most folks, I find that additional reference material is always handy and I bought one of the first copies of the *Complete Rainbow Guide to OS-9*."

When we asked for his advice to first-time OS-9 users, Bjork suggested they talk to other users. He cited Special Interest Groups such as RAINBOW's OS-9 online on Delphi and the OS-9 SIG on CompuServe as excellent sources of both contacts and information for beginners. He also encouraged them to seek help at a local club.

"Talk to these people," Bjork said. "They have run into the same problems and they can help you. Also, don't be afraid to buy extra books on the subject and read them! Most importantly, if you haven't been to school for a while, you may need to relearn how to learn — because you forget."

When Bjork formed SRB, his first projects were Level II products, but he did cut his teeth with Level I. His first Level II product hasn't hit the market yet. What is that program? He can't comment. Why?

"Because specifications change and contracts may be cancelled," Bjork said. "If that happens, a product can become vaporware. And one vaporware pro-

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gram can ruin the reputation generated by 10 excellent products."

We asked Steve to look into his crystal ball and tell us what he sees for the future of OS-9. "Generally, most general software developers feel that we now have, in the CoCo 3, a computer system with the capability of an IBM PC," Bjork said. "In other words, many companies that felt the CoCo didn't have the power of other machines are now in the process of porting their existing programs or developing new ones for OS-9 Level II. *Koronis Rift* — a joint venture by Lucas films and Epyx — is a good example."

Lucas has been developing software for microcomputers, and Epyx has been marketing them for the past few years. What do these companies think about the CoCo 3 and OS-9 Level II?

"They say the OS-9 Level II port of *Koronis Rift* is the best version on any micro," Bjork said. "And this type of response is typical of many developers today."

Bjork feels that we will finally start to see the high quality software that has been missing from the Color Computer. "And it will all be running on OS-9 Level II — no exceptions!" he said.

Could Bjork give us any hints about what we can expect to see? "In addition to games, you should see many home applications and quite a few small business applications as well as productivity software packages like *More* and *SideKick*."

What time frame? Bjork thinks it will be April 1988 before we see what is planned now. "It takes many months to develop hardware and software in a new environment," he said. "For example, it took 13 months to put my high resolution joystick online."

Bjork thinks that most of the products being developed today will be sold through Tandy. "Let's face it, they have a very effective distribution system. Also, most of the software in the future

will use the windowing capability of OS-9 Level II.

### **Multi-Vue Will Make Life Easier**

"We're going to see a new class of software with more power and more sophistication, but the underlying factor will be the greater ease of use of the software," he said. "User-friendly will become real!"

How? "First of all, *Multi-Vue* — a user program that can tie all application programs running under the OS-9 environment together — will make it happen," Bjork said. "*Multi-Vue* will have the same effect on programmers as the Macintosh toolbox. Both environments force a programmer to make his programs user-friendly."

Bjork thinks that most programs developed in the future will be able to run on their own from the shell but will also be able to be run from *Multi-Vue*. "This means *Multi-Vue* will control their operation," he said. "*Multi-Vue* will vary their window sizes, call them into being, put them to sleep or remove them completely."

Is there anything special a software developer must do to make sure his programs are compatible with *Multi-Vue*? "They must be able to receive a signal from *Multi-Vue* that tells them the window size has changed and then be able to use that new window size," Bjork said. "Existing programs — those on the market right now — will simply stay in one window."

What must a programmer do when he receives the signal from *Multi-Vue*? "After you receive the signal, you simply clear the screen and then do a call to find the new window size. After making this call, your program should run within the bounds of the new window," Bjork said. "Programs today check to see if *Multi-Vue* is alive by doing a `gets` `tab` call to see if windows are available."

How can software developers com-

pete in a marketplace driven by users demanding friendly and intuitive software? "Without *Multi-Vue*, you must think about what your customer is going to do with your program and how he is going to use it," Bjork said. "The more intuitive you can make a program, the better!"

"The second step — if you have *Multi-Vue* — use the extended system calls. These calls will let you put up a menu automatically just by doing a system call. When *Multi-Vue* returns control to your program, it will tell you if any of the options on a menu were selected," Bjork said.

*Multi-Vue*'s automation accomplishes two things. First, it saves code. Second, it makes for uniform menus. The people who buy your database program will load or save their data in exactly the same way they load or save their text files when they work with a word processor from another vendor. They will only need to learn how to use their computer once. They can then concentrate on the job they are trying to do.

Tandy hopes the standardization brought about by *Multi-Vue* will force all programmers to provide a friendly user interface. Further standardization can be expected from the *Multi-Vue* clipboard. The clipboard should prove to be a very handy tool because it's always in the system and ready to use. It gives developers a standard way to pass data from one application program to another.

Steve also had comments about the Level II manuals. "They make excellent reading," he said. "But, you must take the initiative to read them. If you are a beginner, it's obvious that you must understand everything in the beginning chapters. Don't skip a page!"

And, if you're an expert? "Don't skip over the beginning chapters," Bjork said. "You'll discover many subtle nuances are covered early in the manual."

With Steve not talking too much, we guessed he must be under contract to develop several products. *Color Computer Artist* is in the catalog. Could it be his?

"The title is a little misleading," Bjork offered. "People really don't realize how powerful the OS-9 Level II windows are! It's not that intuitive. But, you can draw pictures of one size and one color in one window and then re-display them in a different window that is a different size and a different mode. Even though

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you are using the same data, the picture will display properly. When you try this with the different graphics modes while running under Disk Extended BASIC, you lose half the picture or fill only half the screen. And often, you can find no rhyme or reason."

What else will the windows do? "If you shrink the window, your image shrinks accurately," Bjork said. "The scaling algorithm is really accurate."

How will we get a hard copy of these fantastic images? "OS-9 allows many different types of dump programs," Bjork said. "Many will be available. You simply grab a line, put it in a buffer, read it and then send it out. You should be able to dump the active window or the entire screen with some of these programs."

Will we see big companies with big names porting their software to OS-9

Level II? "I can't name names, but most of these companies are very impressed," Bjork said. "In fact, many of them are giving me a run for my money. They've put me under a lot of pressure. I'm a one-man operation. A big company can hire a dozen programmers to do a project."

How can a company afford to invest that much in a single program? "Most companies make most of their money in the first six months following the release of a program," Bjork said. "If they get out there first, they're OK. If they don't get there first, they may be lost because everybody that has to have a copy gets it right away. In a sense, a company can't afford not to hire a dozen programmers and be first."

Come on, Steve, any hints? "You're going to see CAD and integrated packages like Microsoft Works," Bjork said.

"All these things are hot prospects for entrepreneurs looking at OS-9 Level II on the CoCo 3. It's not a function of Level II, or windows, or the CoCo 3 alone! It's what happens when you combine them."

Bjork feels this synergism will be expanded even more by *Multi-View*. But, he doesn't think CDI will have any effect on the CoCo market. "Here's an analogy. You could use your CoCo to control your VCR. But, your VCR already does it better," he said.

Any afterthoughts or advice? "When OS-9 Level II first came out, everybody wanted to patch this, change this, and rearrange that. But, there are already commands available that let you change most of the things you want to change. So many times I've seen people try to patch the window device descriptor when all they had to do was use the

#### Listing 1: prime\_tbl.c

```
char modid[] = "@(#)prime_tbl.c      1.0";

/* ----- OS-9 utility ----- prime_tbl -----
 *
 *          by Dennis J. Duke
 *          Bessemer, Al.
 *          30 October 86
 *
 *      A simple program to print a table of prime numbers.
 */

# include      <stdio.h>

main()
{

    int          i;
    long int     begin, limit, number;

    pflinit(); /* Enable printing of long integers */

    /* Get the lower limit of the table */
    fprintf ( stderr, "\nEnter the beginning number wanted in table\n" );
    scanf ( "%ld", &begin );

    /* Get the upper limit of the table */
    fprintf ( stderr, "\nEnter the highest number wanted in table\n" );
    scanf ( "%ld", &limit );

    putchar ( '\n' );

    /* Catch the number 2 */
    if ( begin == 2 ) {
        printf ( "          2" );
        i = 2;
        begin = 3;
    }

    /* Catch the numbers 0 and 1 */
    else if ( begin <= 1 ) {
```

wcreate command to define the window they wanted. They can do that in their start-up file!"

### Dan Johnson Spotlights Diskmaster at Chicago

*SDisk* author Dan Johnson picked up the small black box with the Diskmaster label and shook it. "It's as solid as a brick," he said. "Not a bit flimsy." Johnson had teamed up with Hemphill

Electronics again. This time the dynamic duo was at RAINBOWfest Chicago selling an integrated hardware and software product designed "to turn the CoCo 3 into the highest performance personal computer available today."

"We wanted to eliminate the need for a Multi-Pak," Johnson said. "Diskmaster gives you two high-density, half-height floppy drives or a high-density drive and a 20-megabyte hard disk

drive. Three serial RS-232 ports, a bidirectional parallel port configured to work like the Centronics printer port on an IBM PC, and a battery-backed up, real-time clock come with the standard package. OS-9 drivers for all of these ports set up to run on the CoCo 3 with OS-9 Level II are also standard."

Johnson's Diskmaster system will boot directly from the hard disk after an initial setup. In fact, it will start up

```

printf ( "          1          2" );
i = 3;
begin = 3;
)
else
    i = 1;

/* Don't start with an even number */
if ( begin % 2 == 0 )
    begin += 1;

for ( number = begin ; number <= limit ; number += 2 ) {

    /* Call function to test 'primeness' of number */
    if ( ! primetest ( number ) ) {
        if ( i <= 5 )
            printf ( "          " );
        else {
            i = 1;
            printf ( "\n          " );
        }

        printf ( "%8ld", number );
        i++;
    }

}

    putchar ( '\n' );
}

/* Sub-function to test 'primeness' of number. If number is not prime, * will return the factor
to main.
*/
primetest( num )
long int      num;

```

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automatically each time you hit the reset button or turn on your CoCo 3.

"One thing needs explaining," Johnson said. "That's the high-performance nature of the floppy disks built into the system. They are high-density drives that hold as much data as an 8-inch floppy. They run at 360 revolutions per minute instead of 300. But, we've made them dual speed so you can read all of the standard OS-9 formats."

Johnson's drives let you store 4,480 sectors on each disk — or just slightly more than 1.1 megabytes. "The throughput is close to that of a hard disk with these floppy drives," Johnson said. They transfer data at twice the rate of a standard drive, plus they step between tracks in 3 milliseconds."

By designing a caching floppy disk controller system that operates independently of the processor, Johnson was able to set up Diskmaster to run without pulling up the halt line on the CoCo 3's 6809. Diskmaster is also partially intelligent, keeping the most recently used sectors in RAM memory. In fact, Johnson's algorithm also considers the frequency of use so your CoCo 3 doesn't need to go out and read the disk very often.

Johnson demonstrated by typing `dir x`. Everything worked normally, albeit very quickly. Then he repeated the command. This time it ran even faster, and the drive light didn't come on. Magic!

The Diskmaster drives are set up to issue a disk change signal so, when you change disks, the buffer is flushed and you start with a fresh read. The software also always does a write through to the disk so you won't get caught with a non-updated disk.

If you are in a real hurry, you can purchase an optional internal RAM disk that holds up to a megabyte and a

```
{
    long int      fact;

    /* Test all odd numbers */
    for ( fact = 3; fact * fact <= num; fact += 2 )
        if ( num % fact == 0 )
            return ( fact );

    /* We got this far so the number must be prime! */
    return ( 0 );
}
```

## Listing 2: maclist

```
PROCEDURE MACLIST
0000
0001      (* By William L. Brady
0002      (* Allows direct transfer of text files from CoCo
0003      (* to Macintosh with minimum of hassle. Handles indented
0004      (* paragraphs by deleting spaces after CR. Strips CR's if
0005      (* they are followed by text.
0006      (* Replaces them with a space
0007      (* Back to Back CR's create new paragraphs on the Mac.
0008      (* Tables end up as a paragraph, but it is easier to space
0009      (* through and add CR's than to try to take them out with a
0010      (* Mac editor.

DIM inpath,outputpath:BYTE
DIM inname,oname:STRING
DIM tt,c,cc,cr,sp:STRING[1]
DIM o:BOOLEAN
tt="$"
count=0
outcount=0
cr=CHR$(13)
sp=" "
0210      ON ERROR GOTO 200
0216 100
021A      PRINT
021C      INPUT "OS-9 File name (<CR> for Directory >>> ",inname
024C      IF inname="" THEN
0258          SHELL "dir"
025F          GOTO 100
0263      ENDIF
0265      OPEN #inpath,inname:READ
0271      PRINT "Create output file (y/<n>)? ";
0292      REPEAT
0294          RUN inkey(a$)
029E          UNTIL a$=""
02A9          IF a$="y" OR a$="Y" THEN
02BE              o=TRUE
02C4          ELSE
02C8              o=FALSE
02CE          ENDIF
02D0          IF o THEN
02D9              oname=inname+".MAC"
02E8 200
02EC          PRINT CHR$(0$C);
02F3          PRINT " ";
030F          PRINT oname
0314          PRINT
0316          CREATE #outputpath,oname:UPDATE
0322          ELSE
0326          SHELL "tmode -echo"
```

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half of RAM disk. Johnson hopes you'll plug in his Diskmaster and forget you ever needed a Multi-Pak interface.

After Johnson demonstrated Diskmaster, we asked him what his update policy was for *SDisk*. "We're rewriting it for the CoCo 3, and OS-9 Level II will have a separate version," he said. "The update price will be about \$15, and we'll make the setup easy."

When we asked Johnson why anyone would want to buy *SDisk* for Level II, since *CC3Disk* has double-sided and quad-density capability built in, he said that *SDisk* will give users a way to format 48-track-per-inch disks on 96-tpi drives. "The standard *CC3Disk* doesn't allow you to do this," he said. "The Level II format command does not give you the option. *SDisk* will! The Level II *SDisk* will do everything the older Level I versions did. Additionally, if you want to use the PC transfer software on the CoCo 3, you will need the new Level II *SDisk*."

On the hardware side of the house, Johnson noted that he would also be updating the *CCRam* disk for OS-9 Level II running on the CoCo 3. You'll receive a replacement PAL chip that lets the unit run at 2 megahertz.

## July Listings

Dennis Duke is back this month with a C program that will generate a table of prime numbers. *Prime\_tbl* prompts for the lowest and highest number you want in the table. To get a hard copy, you redirect your standard output path to your printer: OS9: *prime\_tbl* >/p.

If you are interested in how to write a BASIC09 program that changes the format of a text file, check out *MAC-List* from *WIZ* author Bill Brady. He wrote the program to make OS-9 text files generated by *DynaStar* compatible with text files used by word processors running on his Macintosh Plus.

*DynaStar* puts a carriage return at the end of every line. The Macintosh word processors think that two carriage returns mark the end of a paragraph. They take care of the word wrap automatically. Brady also handled the problem caused by text that has been indented using spaces. He removes all spaces directly following a carriage return. Hopefully, *MACList* will prove to be a useful model you can follow when you need to write a BASIC09 program to manipulate your text files.

That's it for July. Until next month . . . keep on hacking! □

```

0335      PRINT
0337      PRINT " (Set Capture Text Mode) type any character when ready ..."
0375      REPEAT
0377          RUN inkey(a$)
0381          UNTIL a$>"
038C          SHELL "tmode echo"
039A      ENDIF
039C      SEEK #inpath,0
03A5      SHELL "tmode -pause"
03B5 22
03B9      WHILE NOT(EOF(#inpath)) DO
03C4          GET #inpath,c
03CE          count=count+1
03DA          IF c=cr THEN
03E7              REPEAT
03E9                  GET #inpath,cc
03F3                  count=count+1
03FF                  UNTIL cc<>sp
040B                  IF cc=cr THEN
0418                      IF o THEN
0421                          PUT #output,c
042C                          PUT #outputpath,cc
0436                          outcount=outcount+2
0442                      ENDIF
0444
0445                          (* OS-9 deletes second CR, so
0463                          (* put in space
0472
0473                          PUT #1,c
047C                          PUT #1,sp
0485                          PUT #1,cc
048E                          WHILE cc=cr DO
049B                              GET #inpath,cc
04A5
04A6                              count=count+1
04B2                              IF o THEN
04BB                                  PUT #outputpath,cc
04C5                                  ENDIF
04C7                                  IF cc=cr THEN
04D4                                      PRINT " ";
04DA                                      ENDIF
04DC                                      PRINT cc;
04E2                                      outcount=outcount+1
04EE                                  ENDWHILE
04F2                                  ELSE
04F6                                      IF o THEN
04FF                                          PUT #outputpath,sp
0509                                          PUT #outputpath,cc
0513                                          ENDIF
0515                                          PRINT " ";
051B                                          PRINT cc;
0521                                          outcount=outcount+2
052D                                          ENDIF
052F                                  ELSE
0533                                      IF o THEN
053C                                          PUT #outputpath,c
0546                                          ENDIF
0548                                          PRINT c;
054E                                          outcount=outcount+1
055A                                          ENDIF
055C                                  ENDWHILE
0560 100          SHELL "tmode pause"
0564          CLOSE #inpath
0573          IF o THEN
0579              CLOSE #outputpath
0582              PRINT "Filesize = "; outcount; " bytes"
0588          ENDIF
05A4          END
05A6          END
05A8 200          en=ERR
05B3          IF en=218 THEN
05C0              PRINT "File >"; oname; " Already Exists, Replace? ";
05EC              REPEAT
05EE                  RUN inkey(a$)
05F8                  UNTIL a$>"
0603                  IF a$="y" OR a$="Y" THEN
0618                      SHELL "del "+oname
0624                      GOTO 20
0628                  ENDIF
062A                  GOTO 10
062E          ENDIF
0630          IF en=215 OR en=216 THEN
0645              PRINT
0647              PRINT " Bad Pathname"
0658              PRINT
065A              GOTO 10
065E          ENDIF
0660          IF en=2 OR en=3 THEN
0675              GOTO 100
0679          ENDIF
067B          IF en=211 THEN
0688              GOTO 100
068C          ENDIF
068E          END
0690          END

```

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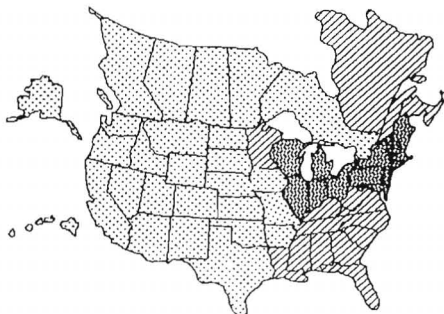
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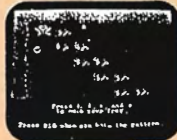
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# Dr. Preble's Programs Striking A Blow For



“... Freedom is nothing else but a chance to be better ...”

— Albert Camus



## \*\*\* Mental Freedom \*\*\*

for CoCo 2 and 3!

(Will not work with CoCo 1)

A Thought-Controlled Video Challenge

We call it The Preble Thoughtware.

DOES GREEN BLOOD flow in your veins like Mr. Spock? Is your mind well ordered? Or is your mind a mass of conflicting emotions like most humans?

THOUGHTWARE may answer these questions and more.

IMAGINE! Some day, a computer so advanced that it responds to your very thoughts and emotions. Imagine, some day, thought-controlled graphics: levitation and materialization!

PLUG IN YOUR MIND and UNHOOK YOUR JOYSTICKS — that day is now! The Radio Shack Color Computer has many advanced capabilities, just waiting to be tapped. Dr. Preble's Programs combines the advanced technology of the CoCo with the amazing Radio Shack BIOFEEDBACK MONITOR to bring you "Preble Thoughtware."

THOUGHT-CONTROLLED VIDEO CHALLENGE? Unlike any video game you have ever played, Thoughtware tests your ability to handle stress, to remain calm under adverse circumstances.

LIGHTNING FAST reflexes will do you no good here, unless you first tame the fickle dragon of your mind.

DO YOU HAVE SELF-CONTROL? Many people can keep a "Poker Face", even when they are worried so that others may not notice; but can you really stop the worry itself? Thoughtware will find out!

AND IT TALKS! Did you know that the CoCo can produce incredibly realistic digital speech without a special speech synthesizer? And I mean really high quality speech! Forget the mechanical robot voice. This voice quality is so good, it sounds human! Honest. Best of all, no extra hardware is needed for speech. None. The CoCo produces this amazing digital speech all by itself (with a wee bit of programming by Dr. Preble).

THOUGHTWARE — Next time your friends ask what your computer can do, show them the Preble Thoughtware!

Requires Radio Shack's Biofeedback Monitor Catalogue #63-675

The Preble Thoughtware — TAPE \$27.95 + s/h, on DISK \$29.95 + s/h

## \*\*\* Basic Freedom \*\*\*

for The Color Computer 3

(with versions for CoCo 1 & 2)

A Full Screen Editor for BASIC Programming

We call it EDITOR 3. Chris Babcock wrote a pure, efficient Machine Language program to open a new dimension of ease and power for anyone typing in a BASIC program.

Here are your BASIC Freedoms!

FULL CURSOR MOVEMENT — Use the arrow keys to move anywhere on a screen. If you are using a Color Computer 3, then even the 40 or 80 column screen is supported!

INSERT, CHANGE or DELETE CHARACTERS anywhere on the screen. Simply move to what you wish to change, change it and continue working!

LOWERCASE COMMANDS are OK! EDITOR 3 lets you type in lowercase any time or all the time. Lowercase command words are automatically translated to uppercase for BASIC. Of course, lowercase text within quotes stays lowercase. This is great when typing with the CoCo 3's 40 or 80 column mode with true lowercase!

MERGE LINES within a program with just a few keystrokes!

AUTO KEY REPEAT — Hold down any key and it will repeat.

INVISIBLE — Once EDITOR 3 has been loaded in, it is activated with a single keystroke! It hides itself out of the way of other programs and can be turned off any any time. Pressing RESET will not hurt EDITOR 3!

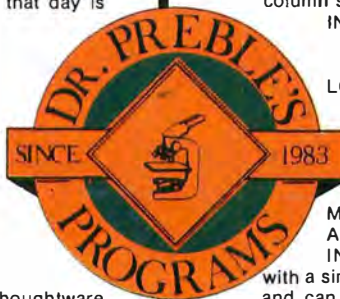
EASY TO USE — Installation takes seconds! Well-written goof-proof manual included.

COCO 1 & 2 — Yes, even though this program was conceived for the powers of the new CoCo 3, we still support the previous Color Computers. They too, need their BASIC Freedom!

EDITOR 3 — So easy and handy, you'll never want to run your CoCo without it!

Available on DISK only for CoCo 3 @ \$29.95 + s/h

CoCo 1/2 version can not support 40 or 80 column screens. CoCo 1/2 version is available on TAPE for \$27.95 + s/h or DISK for \$29.95 + s/h.



## For CoCo 1, 2 and 3!

Disk Directory Dazzler — Dress up your disk directory with colorful messages, notes and graphics — only \$14.95

### Also Available for CoCo 1 & 2 only:

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