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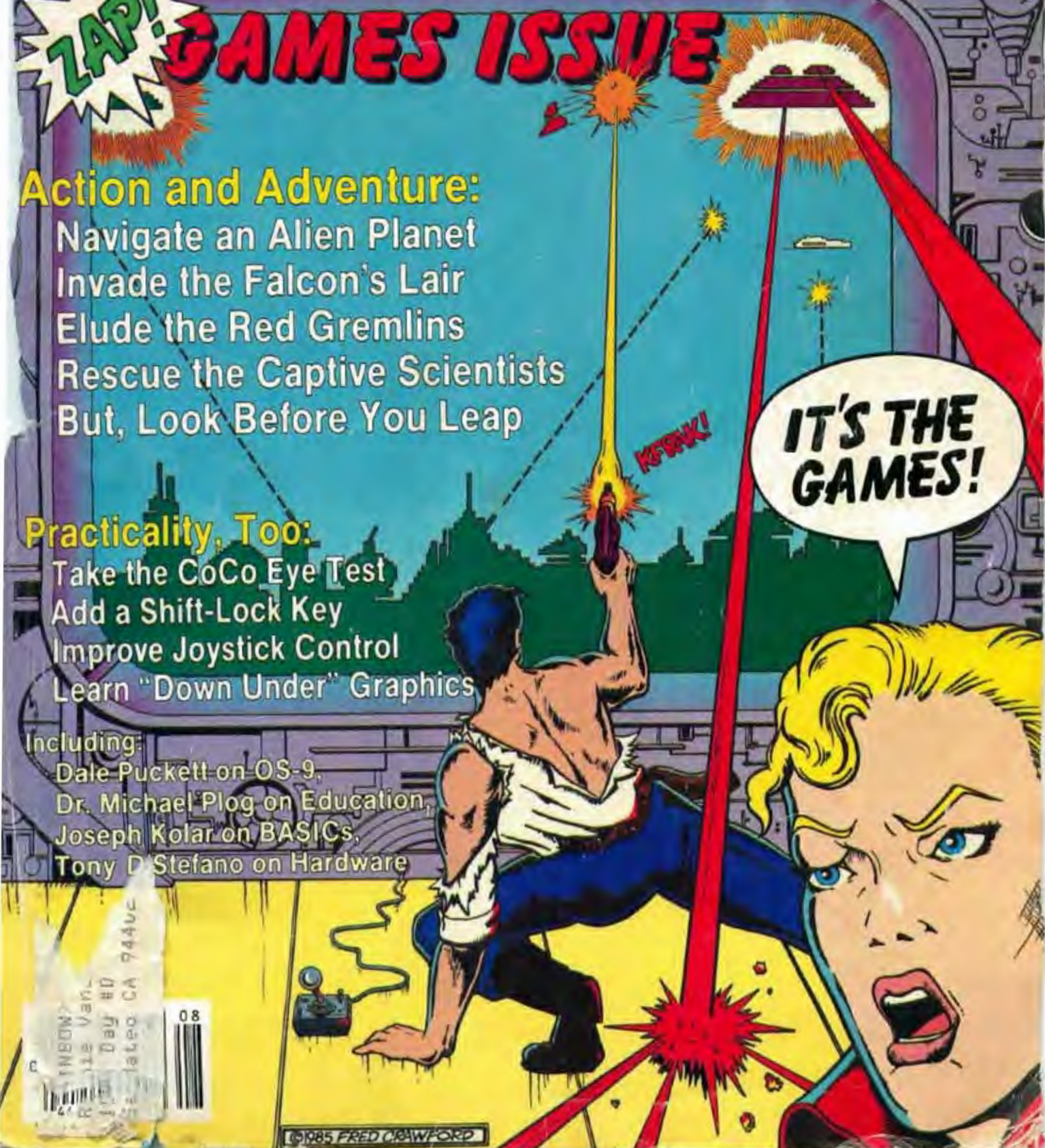
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18




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 The small cassette tape symbols beside features and regular columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE, ready to LOAD and RUN. For full details, check our RAINBOW ON TAPE ad on Page 97

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Even if you're a Rhodes scholar, you'll find something to interest and intrigue you with all of THE RAINBOW's regular columns, utilities, games and reviews. For a wealth of CoCo knowledge, don't miss us in September!

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RAINBOW

August 1985 Vol. V No. 1

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LETTERS TO THE RAINBOW

Postalcommunications?

Editor:

I am a victim of the world of telecommunications. I live in a small town in southeast New Mexico where most people don't even know what a modem is. I am interested in meeting people through telecommunications. If anybody is interested, please write me at P.O. Box 502, 88119.

*Kenny Berard
Ft. Sumner, NM*

On the Air

Editor:

I would like to contact other amateur radio operators who are using *Graphicom's* SSTV mode or the *WEFAX* facsimile program [February 1985, Page 42] for transmission of pictures on the HF ham bands.

Please contact me at P.O. Box 32215, 95152 or on the air at 00:00 GMT on Monday (Sunday local) on 7.260 MHz during the SPEEDX net. Thank you and 73!

*J. Michael Nowicki
San Jose, CA*

A Good Companion

Editor:

I would like to begin by saying how much I enjoy your magazine. I find it very interesting and a very good companion.

I am a quadriplegic and have just started to find enjoyment from your magazine. A very good friend of mine has made it possible for me to operate my own computer by designing a table that fits on my wheelchair so the computer is stabilized. It has a wooden handle that enables me to hold down the SHIFT key which allows me to use the different functions of the computer keyboard by holding a pencil in my mouth.

Once again I would like to say keep up the good work with helping people to understand computers.

If anyone is interested in the design of my special computer table, I certainly would send the design to them. My address is P.O. Box 901, Canada, N0K 1W0.

*Aff C. Dale
Seaforth, Ontario*

Catering to Cassette Users

Editor:

May I put in a word for those of us who do not have disk drives? We enjoy the CoCo, too, and are always glad to see a program that works with tape. Sometimes a program written for disk can be made to work with tape with just a few minor modifications. Could program authors be encouraged to include these modifications in the documentation?

As I write this letter, it occurs to me that one of your readers may have written the type of program that would convert printer codes. If such is the case, I sure would like to hear from him or her. Write to me at 17212 Brunswick Blvd., Canada, H9J 1K9.

Keep up the good work! I can't wait for a Canadian RAINBOWfest. Why not consider Montreal? CoCo enthusiasts would love this city.

*Gerald Carroll
Kirkland, Quebec*

Going out of 'Style'

Editor:

This is in response to Larry Geiger's letter to THE RAINBOW published in the April 1985 issue [Page 6] concerning Mr. Witham's article "To Pack Or Not To Pack."

Style in programming is what one worries about if one is writing the program for the review and amazement of one's contemporaries. The kernel of good programming is to convert an idea into a machine readable form such that the machine will then produce the desired output in the fastest and most efficient manner possible.

The magical abilities ascribed to C and PASCAL compilers, by Larry Geiger, such that they somehow do not waste either memory or disk space to store unnecessary lines or space-filled lines is wondrous. Of equal wonder is their ability to ignore those extra lines and spaces without using processor cycles to read and decide to ignore them. These mystical qualities, I'm sure, would amaze the programmers who wrote the interpreter sections for the compiler programs.

If enough young people come to believe that compilers work in some magical way and do not strive to train their minds to program in frugal and efficient methods, no matter which machine they are using, someday no one will be able to produce compilers, or for that matter, any other software of value.

The microprocessor industry has already recognized early mistakes that produced horribly time-inefficient processors and are quickly moving to RISC (Reduced Instruction Set Computer) designs to improve cycle efficiency. Soon maybe the firms that are now producing software such as operating systems written in high level languages, such as C and PASCAL, will also mend their ways and stop filling up our disks and memories with slow running trash.

Thanks for the use of your "soapbox."

*D. J. Leffler
Cocoa Beach, FL*

Take Heed!

Editor:

On February 25, 1985, I mailed the United Color Computer Club (10117 S.W. 53 Court, Ft. Lauderdale, FL 33328), later listed in the brochure mailed to me as the "Worldwide Color Computer Club," my check in the amount of \$30 for a one-year membership. Upon receiving no answer, I wrote to them on April 3, and again received no answer. Also, Michael Fahy of Central City, Pa., mailed them a check in the amount of \$30 and has to date received no response. We both have our canceled checks endorsed "United Color Computer Club" and a "#654978 For Deposit Only" to the account of Hollywood Federal Savings & Loan Assoc., teller 202.

I am reporting this to you in the hope that other RAINBOW subscribers would be alerted about this matter. Also I am going to report this to the postal authorities to see if this can be stopped and/or action instituted.

*Joe F. Sobleski
Johnstown, PA*

Programming Cahoots

Editor:

I'm looking for CoCo pen pals who would be interested in co-authoring some original programs with me. I can develop programs easier than I can come up with the ideas for them. I'd like to hear from other programmers who may have ideas, partial programs or completed programs that may need finishing touches. Together, maybe we can come up with a few good programs suitable for submission to THE RAINBOW. BASIC programs only, please. I don't know that much about machine language programming.

Interested parties can contact me at 708 Michigan Avenue, 53081.

Bill Bernico
Sheboygan, WI

INFORMATION PLEASE

Editor:

In your March 1985 issue of RAINBOW magazine I read in "Letters To Rainbow" on Page 6 your advice to a reader whose disk drive was not working to acquire a head alignment kit. Could you advise as to where I could acquire such a kit and, if possible, the price of one? I would appreciate any help you can give me.

John Ganiel, III
Cologne, NJ

Editor's Note: A head alignment kit can be purchased at any Radio Shack store.

Joystick Inventiveness

Editor:

I get a lot out of your magazine. I am getting into electronics and would like to see more hardware articles if possible. Can you tell me in what issue I saw an article on how to build your own joysticks from scratch?

Gilbert T. Allen
Schenectady, NY

Editor's Note: "Cheapstick, A Joy For Under \$10" appears in the February 1984 issue on Page 186.

Editor:

Do you have an article on how to make an adapter for using Atari joysticks on the CoCo?

I love your magazine and look forward to it each month.

Daniel Pardue
Gretna, LA

Editor's Note: Please see "Convert Those Paddles" on Page 131 of the August 1984 issue.

See other articles pertaining to joysticks: "Joystick-to-Itiveness" (shows the advantages of incorporating joysticks into your programs) appears on Page 232 of the March 1985 issue.

Also, "Wireless Joysticks" (play games with no wires attached), June 1985, Page 105.

Revvng Up the CoCo

Editor:

I have a 16K Extended BASIC CoCo and I am into road racing games. Unfortunately, all the racing games I've seen require 32K of memory. Are there any for 16K?

Steve Glezakos
Montreal, Quebec

Editor's Note: "Hi-Res Racer" is a 16K game which appears on Page 124 of the March 1985 issue. Also,

see "The Ultimate Program" (Part 2) *Stock Car*, which is part of our Fourth Anniversary gift to you in the July 1985 issue, Page 55.

A Hole in One

Editor:

I am very interested in finding a program to handle golfers' scores and handicaps. If you have a program of this sort, could you send it to me? If you don't have one, is there anyone who does have one? Write to me at Box 493, Canada, S0A 2X0. I have a 64K CoCo and a disk drive.

G. Young
Esterhazy, Saskatchewan

Editor's Note: You just scored a hole in one! See Page 215 of this issue for the review of Don Hug's program, *Golf Handicaps*.

Counting Calories

Editor:

I have been a subscriber for over a year and RAINBOW has taught me more about my CoCo than any other publication I have ever read. It has also provided me with many useful programs.

My wife and I have become very calorie conscious, not unlike millions of other Americans. I don't know how to program in BASIC, although I am getting more familiar with the language. Are you planning to publish a program that will enable me to enter the caloric value for items of food and drink that we prefer, and then when I would enter a daily menu, provide me with a caloric countdown or total? Or, do you know of anyone marketing such a program? I have a 32K ECB CoCo.

Len Zielinski
Niles, IL

Editor's Note: Color Connection Software has a program called *DIET-ADE*. See the review on Page 206 of the May 1985 issue. Also, read our July 1985 "Received and Certified" for information on *Nutriguide* by Homesoft Company.

CoCo Checkmate

Editor:

In short, I like your magazine greatly! Can you please help me? I am looking for a program with the game of chess on cassette for one player.

C.A. Bailey
Oneida, TN

Editor's Note: Read the review of *Cyrus World Class Chess*, by Radio Shack, in this issue on Page 195. Also, *FOX CHESS* by Computerware — a review appears on Page 195 of the July 1985 RAINBOW.

Editor:

Could you please tell me if you have printed or know of a program that teaches

chess, or is a game-playing program available on tape for the CoCo?

W.W. Reed
Midway, WA

Editor's Note: Computer Systems Distributors sells *CHESSD: A Real CoCo Chess Program*. See the ad in the June 1985 issue on Page 227.

Taking Care of Business

Editor:

In response to the letter from Sam Cerami [Page 7] in the June 1985 issue, I have the exact equipment that he has, and being new to the computer world, have found the Tandy *Color Profile* allows me to do all the stock and tax record keeping that is necessary. In addition, I use the *VIP Library* for profit and loss analysis.

If he has either or both of these programs, I would be happy to share with him the formats I have used to do this work. I also have found some excellent books on these subjects.

I really enjoy RAINBOW, although being a newcomer, I still do not understand a lot of what I read in the articles. My desire to use the computer rather than write programs has led me to purchase programs to fit my needs. I have, therefore, used your reviews to help me pick the right programs.

Write to me at 2344 E. Encanto, 85203.

Joe Zagar
Mesa, AZ

Regards to RAINBOWfest

Editor:

I think everyone should give Lonnie Falk and his supporting staff a big round of applause for an outstanding RAINBOWfest-Chicago. It was a pleasure being able to see the people you only hear over the phone.

You will have to pardon the expression but, "From East to West, no doubt, RAINBOW is the best!"

Charlie Schneider
Softco Computer Supply
Downers Grove, IL

HINTS AND TIPS

Editor:

I have faithfully input all of the "One Liners" and have enjoyed them very much. I have them all on one tape with an index to go along with it. I have done something with it you may want to pass on to others. At the beginning of each, I put:

1. " _ _ _ _ _ " (An eight-letter title describing what it is. If it needs joystick, or something special, I also indicate that.)
2. One-Liner by (the name of the person)
3. (The person's city)

4. (Date) 1985 Rainbow Page(---)
5. (Start of program)

This way, if I run into a problem, I can quickly look up the page in the appropriate RAINBOW.

One other thing I have discovered: Some of the One Liners are too long and won't accept the last two or three letters. I found by going to EDIT 5 and then 'X,' I can add the missing letters without any problem. It may be an eccentricity of my CoCo, and others may not have this problem. I have a 64K ECB.

Thanks for an excellent magazine.

Harvey W. Marks
Lakewood, CO

Unfearful Flying

Editor:

I recently purchased the flight simulator *FLIGHTSIM I* and I have developed an easy method for a safe flight.

Once you've loaded the program and you are at the title screen, set the auto-pilot's heading for the direction you want, then set the altitude at 1,000 feet. Next, push 'F' to turn off the Freeze mode and descend the runway till you accumulate a speed of about 200 knots. Now pull back on the right joystick to take off. Once you're in the air push 'G' to raise the landing gear. Continue to climb until you've reached an altitude of about 250 feet and push 'A' to activate the auto-pilot (you may have to push 'R' for recover if you begin to lose control or stall). The plane will now shift to either side to attain the set heading and will also continue to climb till it reaches 1,000 feet.

After you've sighted an airport and you're ready to land, push 'A' to turn off the auto-pilot. Now push 'G' to lock in the landing gear and slowly descend toward the landing strip, decreasing speed as you go.

For more information write to me at 329 Sunset Drive, 21502.

Scott Geraghty
Cumberland, MD

Editor:

The game *Chopper Assault* (June 1985, Page 28) can be made to run on a disk system very easily. Simply change the variable AS to SA in lines 330, 520, 540 and 760. Also, I'd like to see you print more strategy war games.

Your magazine is far better than any of your competition. Keep up the good work!

Eric Asberry
Mt. Carmel, IL

Penguin Patch

Editor:

In your February 1985 issue the game called *Penguin Patrol* caught my eye. It is an arcade-style video game but I found it to be a bit hard to play because it doesn't get enough response from the keyboard, so I wrote this patch to make the game respond to the right joystick.

```
20 GOSUB 1000
1000 H=0 V=0
1010 IF JOYSTK(0) <=8 THEN H=-32
V=0
```

```
1020 IF JOYSTK(0) >=55 THEN H=32 V=0
1030 IF JOYSTK(1) <=8 THEN V=-32
H=0
1040 IF JOYSTK(1) >=55 THEN V=32 H=0
1050 RETURN
```

P.S. Spierenburg
Dollard Dee Ormeaux, Canada

Subroutine for Stalling

Editor:

I'd like to pass on a very short delay routine that has served me well. Include this in the form of a subroutine as follows:

```
10 POKE 275,1
15 IFPEEK(275)=0 THEN RETURN ELSE 15
```

The subroutine can be included in any procedure and will afford the user approximately three seconds of delay if the system is doing nothing else but returning a prompt after the delay. It pokes a one in the high byte of timer and loops until a zero is generated.

Thank you for a superb magazine.

John P. Roberis, Jr.
Savannah, TN

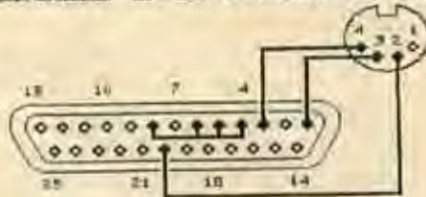
Oh, Brother!

Editor:

Some time back my wife purchased a Brother Correctronic 50 typewriter. We recently purchased the Brother IF-50 Interface which transforms the typewriter into a daisy wheel printer, but we had to build the printer cable ourselves. This proved to be more difficult than expected. After a week of trial and error and some second guessing by friends, one of my friends called Brother. Between Brother and our friend, the printer (a.k.a. typewriter) works great.

In the hope that this might help others who might be in this frustrating situation, I am enclosing a wiring diagram (courtesy of *CoCo Max*) that should be of service. You will need a 4-pin DIN plug (#274-007), a D-Subminiature DB-25 pin male connector and 4+ feet of 3-conductor wire (278-371). CoCo pin 1 is not used. CoCo pin 2 goes to IF-50 pin 20. CoCo pin 3 goes to IF-50 pin 1. CoCo pin 4 goes to IF-50 pin 3. Jumper pins 4, 5, 6 and 8. Set the DIP switches as follows: switches 1, 2, 3 and 6 to on; switches 4 and 5 to off.

Brother IF-50 Printer Cable



Looking from the outside at the RS-232 and RS-232-C jacks.

Dennis O. Dorrity
Fort Ord, CA

Editor:

The purpose of this letter is to tell you, for the benefit of your subscribers, about the good service and response I have received from one of RAINBOW's advertisers.

I ordered *LFAST* from D.J. Leffler, based on an ad in the April issue of RAINBOW; within a few days the program and owner's manual were delivered. When I called to get clarification of some questions, I received quick and courteous response. About *LFAST*: It's the greatest thing since sliced bread. I recommend it highly for anyone programming in assembly or machine language.

A.J. Laufer
Chesterland, OH

Editor:

I was delighted with the program called *Lurkley Manor* by Richard Ramella. It is a marvelous piece of work. I hope that one day he will submit a 64K ECB Adventure or Simulation. I know 64K is not as prevalent as 16K or 32K, but once in a while, let's have one for us 64Kers.

Colorware's *Real Talker* and *Talkhead* are beyond belief! They are the best as are Jack Knott's accompanying programs. He backs up his merchandise — I know!

Bob Nevin
Bayside, NY

The Graphics Dump You've Been Looking For

Editor:

This letter is in reply to Brad Williams ["Letters to Rainbow," June 1985, Page 7] and Beau Palmer and all those looking for a screen dump program. In the October 1983 issue of THE RAINBOW there is a graphics dump program by J. Paul Fountain. I use it all the time with my LP VII printer.

I really like THE RAINBOW and read it from cover to cover every month.

David Morgan
Joplin, MO

KUDOS

Editor:

Just a note much overdue to say thank you! I've come a million miles in understanding my CoCo and it's probably 25 percent my part and 75 percent RAINBOW's.

Fred Scerbo and Steve Blyn have taken my children and made their day, and "old mom" sitting at the keyboard gets all the hugs, thanks and, "Gee, you're smart."

It's amazing how Dan Downard can answer my questions before I even get around to sending them in.

RAINBOW allows me to be master of my machine. It is always a great day when the mailman brings my RAINBOW. I only wish it would come more often — 30 days can seem forever when you start feeling the tension of needing another RAINBOW fix.

Kathy Brisbin
Temple, TX

Gallery Votary

Editor:

I think "CoCo Gallery" is a great idea! The Color Computer can do some fancy graphics, and it's about time someone showed them off!

Allen Huffman
Broaddux, TX

Small Investment — Big Return

Editor:

I would like to commend you on an excellent job done in devoting RAINBOW to the Color Computer. I have been a fan of yours for about nine months now. As the proud owner of two Color Computers, I feel that every issue provides a healthy addition to my software library and overall knowledge of the Color Computer. I've spent over \$3,000 on hardware and I believe \$31 for a subscription to THE RAINBOW is the best investment I've made so far. Thanks for an excellent magazine and keep up the good work!

Mark Daniels
Fargo, ND

BULLETIN BOARD SYSTEMS

Editor:

This letter is to inform your readers of a merger. Colorama Plus of Port Jefferson Station has merged with Colorama of Middle Island.

Both bulletin boards will now be known as Colorama Plus. They are both run on a 24-hour, seven-day-a-week basis. Each system will support X-modem downloads, along with <C>ft for Colorcom/e users. Colorama Plus offers something no other bulletin board offers, we have an online CoCo club, a magazine section, online games, club section, programming hints, corrections to RAINBOW, club newsletter, stop and shop boutique, graphics gallery, downloads, plus a whole lot more.

The board is open to all with limited access to first-time callers. If anyone wishes to join the CoCo Club we are asking for a \$10 donation for one year's access to the club section.

The numbers are listed as Colorama Plus of Port Jefferson (516) 331-3718 and Colorama Plus of Middle Island (516) 924-6262.

John Adkins
Colorama Plus Sysop
Mt. Sinai, NY

Editor:

I have established a BBS in my area called The Californian of Ventura. It has the following menu selections: answers, bargains, converse with Sysop, downloads, intelligence, message base, magazine, user log, parameter change, questionnaire, want ads, time view, upload, xpert speed, and sign and update.

Also, the system is dedicated to the CoCo, but other computer users are welcome. The number is (805) 656-7390. It runs 24 hours a day, seven days a week.

Jack Sanders
Ventura, CA

Editor:

I run the only local BBS. The program is widely used in Connecticut and is written by Cliff Skolnick. It works under his own operating system called KDOS64 (this was copyrighted in 1983 and is not related to K-DOS). Cliff is writing an OS-9 BBS in machine code and will be marketing it soon.

People who wish to log into my BBS must send \$3 to me in care of The Barn Board along with their name, city and state, type of computer, phone number and an eight-letter password. The BBS does work at 1200 Baud and is open 24 hours a day. Write to 36 Norfolk Road, 06759.

Phone (203) 567-8077 (voice) or (203) 567-4852 (BBS).

Angus Nicholson
Litchfield, CT

Editor:

I would like to announce a new BBS for the Metro Atlanta area. The number is (404) 255-1791. Operating hours are now at night and on weekends.

David Tidwell
Atlanta, GA

Editor:

I would like to announce the Great American Connection BBS. It is up and running 24 hours a day, seven days a week. We have uploads, downloads, want ads, E-Mail, online games and much more. The number is (201) 928-0949.

Michael Jury
Jackson, NJ

Editor:

There is a BBS in New York called Cutthroats BBS. It is a very good BBS with many sub-boards. The number is (914) 737-6770.

Elliot Richman
Hartsdale, NY

Editor:

We are pleased to announce that our BBS, Grand Central Terminal, now supports both 300 and 1200 Baud users.

We have added a Model 100 SIG and a scanner subsection. With popular downloads such as Hi-Res graphics, machine

language music files, digitized pictures, printer and disk utilities and our POKE and PEEK file, we are the choice board for Color Computer users in the New York area as well as surrounding areas.

Grand Central Terminal is up 24 hours a day, seven days a week and is a free access BBS in New York City, which can be reached at (212) 682-0681. Once again, we wish to thank THE RAINBOW readers for their generous contributions, uploads and support.

Steve Schechter
Sysop

Editor:

I would like to announce the new number for our Maxi CoCo BBS 5.0 Bulletin Board System: (216) 793-7353. We operate at 300 Baud, 24 hours a day, seven days a week. Our Sysop is Curt Nickel.

William Willis
Youngstown, OH

Editor:

I would like to inform your readers that I run the CoCo Beach BBS in Kent. It is up 24 hours a day and includes downloads, uploads, great text files and online pictures. The number is (206) 432-2512.

Jeff Gill, Jr.
Kent, WA

Editor:

Halifax Dartmouth Colour Computer Users Group (HDCCUG) BBS operates Monday through Friday, 9:30 p.m. to 9 a.m.; Saturday, 5:30 p.m. through Monday, 9 a.m.; (902) 434-5278; Sysop is Peter Allen.

Please do not call outside of the advertised hours. This is a business line for Sector Software.

A. Knight
Dartmouth, Nova Scotia

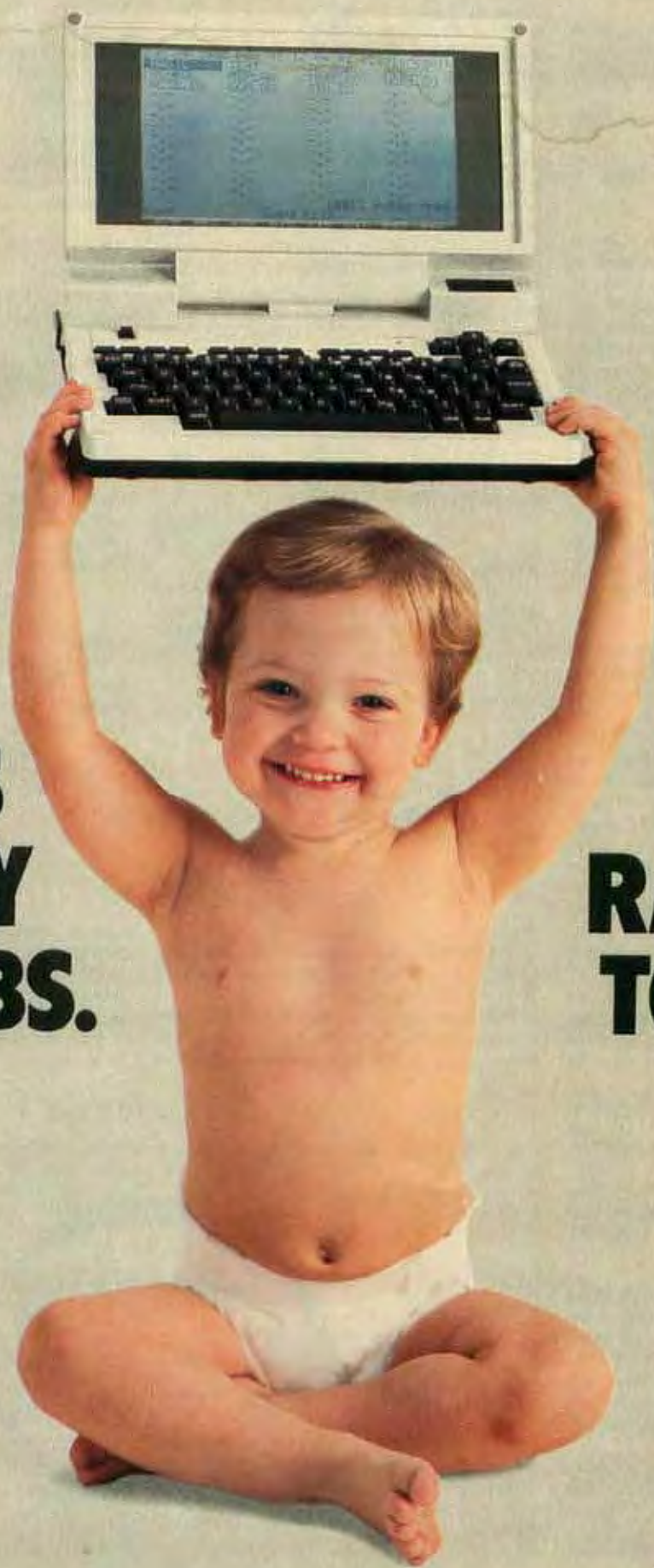
THE RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

ARTS AND LETTERS



Envelope Of The Month

John Kniatkowski
Mary Esther, FL



**IT'S
ONLY
4½ LBS.**

**AND
RARING
TO GO!**

The Tandy 200 is the one portable for all.

Meet the New Generation of Portable Computing

Our celebrated Model 100 set a new standard in portable computing. Now we've done it again! Introducing the Tandy 200, another true breakthrough, featuring advanced features you requested. You get more built-in software, a bigger screen and a larger memory. All this in a system that measures just $2\frac{1}{4} \times 11\frac{3}{4} \times 8\frac{1}{2}$ ", and goes wherever you go because it's completely battery powered.



Six Built-In Programs Including Multiplan™

For complex spreadsheet analysis and calculations, we put popular Multiplan software into the Tandy 200's permanent memory. It's easy to do sales forecasts, profit and loss projections, budgeting, pricing, engineering calculations and more.

Comes with Five More Powerful Programs

An improved version of the Model 100's easy-to-use word processing program makes the Tandy 200 especially useful for journalists, salespeople, students and anyone who needs to write letter-perfect memos, reports and correspondence in a hurry. Edit, delete and move blocks of text with the touch of a convenient function key.

Four other "instant-on" programs let you use the Tandy 200 as your personal appointment calendar, address and phone directory and telephone auto-dialer/directory (the Tandy 200 generates tone dialing pulses, so you can use it with long-distance services). A much more powerful built-in program for communications makes it easy to access other computers by phone, as well as national information networks. Resident BASIC language lets you write your own programs, too.

Why 40 Columns Are "Bigger" than 80

Take a look at the 80-column screens on other portables, and you'll see why we chose a 16×40 -character format. Characters on 80-column displays are tiny and difficult to read. Tandy 200's flip-up liquid crystal display has 240×128 resolution for big, clear graphics and easy-to-read characters. Tandy 200 is the perfect take-along tool for word processing and spreadsheets—without eyestrain.

We also increased the standard memory size to 24,000 characters, expandable to 72K.

The Best in Technology for Under \$1000

Whether you're a student, scientist, busy professional or home computer user, the Tandy 200 is a smart investment. The Tandy 200 even has parallel printer, RS-232C, cassette and bar code reader interfaces for added versatility. You can even add disk storage and a monitor for a complete desktop computer system.

Adopt One Today!

Step up to the powerful software and impressive capabilities of the Tandy 200 portable computer for just \$999 (26-3860). Best of all, the Advanced Technology Tandy 200 represents the state of the art in performance, quality and price breakthrough (because we've introduced the latest technology for over 60 years). Stop by your local Radio Shack Computer Center, or participating Radio Shack store or dealer and "size it up" today!

Prices apply at Radio Shack Computer Centers and at participating Radio Shack stores and dealers. Multiplan™ Microsoft Corp.



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CITY _____ STATE _____ ZIP _____
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Whenever members of the CoCo Community gather together, one of the first subjects these days seems to turn to the "new" Color Computer. With a mixture of expectation, speculation and lots of other things, people all have different ideas about what might be coming next from Tandy.

I was reminded about this the other day when I received a letter from a reader. He mentioned that he had a friend who was "into" Commodore computers and, having just bought the latest one, came running over to show off the new manual.

"Look at this," crowed the Commodorian (a new word, perhaps?). "The 'new' Commodore has a LINE command, a CIRCLE command and a bunch of other stuff, too!"

My correspondent said he studied the manual for a minute and replied: "So what, the Color Computer has had all this — and a lot more — for the past four years."

My point, I suppose, is that what we take for granted many view as the latest innovation. When you really look at it, the Color Computer has been so far ahead of everyone for so long that anything others have as "new" we would have to view as "So what?"

Oh, certainly. We'd like more memory. We could use a better screen display. We could use a better — and more friendly — operating system. We could use the ability to mix text and graphics on the same screen.

Hey! Wait a minute. We *have* those things!

Nope, perhaps not right out of the box. But what comes out of the box isn't as important as what you can do with the things that do come out.

Let's look at these things briefly. You can upgrade CoCo to 128K, and I keep hearing about more than that. I also keep hearing about hard drives, too, which vastly improve the storage "memory"; not to mention the fine disk drives that are available.

There are a host of programs — from *Telewriter* (the first) through the *Elite* series, *PBJ*, *Cer-Comp*, the *Pro-Color* Series, *DynaCalc* and many others — that give you "wide" screen displays, in an application or any other form you want. This is something of a "standard," really.

We have OS-9 as a truly powerful operating system. And, now, many of the programs we've been using on a "regular" CoCo are being written for OS-9. In addition, there are a bunch of new programs out that give OS-9 even more power (such as those from Computerware, Microtech, D.P. Johnson and Frank Hogg Labs). And, too, there is a new program called the *OS-9 Solution* from Spectrum Projects which makes OS-9 easy to use.

No one could wish for a more powerful system than OS-9. And with everything coming available for it, there are more ways to go with this "alternate operating system" than there are for some "primary" systems, period.

It is almost silly to have to mention all the wonders you can do with the CoCo screen. We have *CoCo Max*, *ViziDraw*, *Graphicom*, *Bjork Blocks*, the *Nexus* system and a host of others. We also have printer utilities galore, enough games to satisfy even the most ambidextrous Earthling, some super speech programs and some really innovative things

Telewriter-64™

the Color Computer Word Processor

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

THE ORIGINAL

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

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

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

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

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

— Color Computer News, Jan. 1982

TELEWRITER-64

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

64K COMPATIBLE

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

64 COLUMNS (AND 85!)

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

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple. Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPV11/V11), DM11-100/200, Epson, Oki, Centronics, NEC, C. Itoh, Smith-Corona, Termiact, etc).

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

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

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

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

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

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

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

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

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

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

— The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

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

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

To order, send check or money order to:

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Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add \$2 for shipping. Californians add 6% state tax.)

Now available at
Radio Shack stores
via express order

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



Metric Industries



MODEL 101 INTERFACE ~~54.95~~ 49.50

The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). It comes with a "UL" listed power supply that can be unplugged from the interface if your printer supplies power (Most do). The 101 is only 4" x 2" x 1" and comes with all cables and connectors for your computer and printer.



MODEL 102 SWITCHER 35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy gauge anodized aluminum cabinet with non-slip rubber feet.



MODEL 103 COMBO ~~85.95~~ 73.50

With the turn of a knob the model 103 switches your computer's RS232C serial port to any one of 3 outputs — 2 serial and 1 parallel. The serial ports may be used for modems, serial printers or even another computer. The parallel port can be used with any Centronics compatible printer. The 103 has the best features from the 101 and 102: color coded position indicator lights, 6 switch selectable baud rates, heavy anodized aluminum cabinet, "UL" listed power supply and many more.



The Model 101, 102 and 103 will work with any level COCO basic, any memory size 4K-64K and are covered by a 180-day warranty.

The Model 101 and 103 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Gorilla, C.Itoh, Okidata and many others. They support basic print commands, word processors and graphic commands.

CASSETTE LABEL PROGRAM 6.95

This fancy printing utility prints 5 lines of information on pinfeed cassette labels. "Cassette Label" is menu driven and is very easy to use. It uses the special features of your printer for standard, extended or condensed characters. Each line of text is automatically centered. Before the label is printed, it is shown on your CRT — enabling you to make changes if you like — then print 1, 2 or 100 labels. The program comes on tape and it is supplied with 24 labels to get you started. 16K ECB required.



OTHER ITEMS

High quality 5-screw shell C-10 cassette tapes **\$7.50/dozen**

Hard plastic storage boxes for cassette tapes **\$2.50/dozen**

Pin feed cassette labels **\$3.00/100**



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NEW LOW PRICES

that fall into almost no category, such as Speech Systems' EARS, Green Mountain Micro's Machine Language Learning Lab, a whole host of small business software and so much more I cannot even keep track of it all.

Honestly, these things just roll off my fingertips and into my word processor! For each I have mentioned, there are scads of others. No, I am not trying to give a commercial for these firms.

What I am doing, though, is wondering aloud whether we even need a "new" Color Computer. Tandy keeps lowering the price, and the support — from both third party and Tandy — keeps getting better. In short, we have a super computer. Maybe we have reached close to an ultimate.

Not an ultimate in what people can make CoCo do, because I believe we will continue to keep expanding both the quality and quantity of what is

"Maybe the CoCo as we know it ... is pretty much perfect."

available for the Color Computer. But I have to remember I paid \$399 for my first CoCo and got 4K of memory and just regular BASIC. Now you get 32K, Extended BASIC and a better keyboard for just \$169.95.

I keep thinking of Thor. He invented the wheel. We haven't been able to improve on it much in quite some time. Maybe the CoCo as we know it — as a machine — is pretty much perfect.

Maybe in Thor's time there were people who invented other things to get around on. Bags which squeezed out mud so that things could slither along? But the wheel was the best.

I like to think CoCo is the wheel of home computers. We'll have people who use it to do a variety of things — turn with water, provide a "base" for vehicles, use it to tell time with gears and the like. Constantly, people will find better, more efficient and a greater variety of uses for CoCo.

But can they make CoCo itself better? Or is it, much like the wheel, so good that it is well near perfect at the price?

Sometimes I truly wonder.

— Lonnie Falk

TOP RATINGS
HOT COCO MAGAZINE
SEPTEMBER 1984



YOU COULD FALL IN LOVE WITH
AUTOTERM!
IT TURNS YOUR COLOR COMPUTER INTO THE
**WORLD'S
SMARTEST
TERMINAL**

AND
MOST
LOVABLE

GOOD LOOKIN'

AUTOTERM shows true upper/lower case in screen widths of 32, 40, 42, 51, or 64 characters with no split words. The width of 32 has extra large letters. Scrolling is forward, backward, and fast. Block graphics pictures are displayed automatically and can be scrolled.

The screen's top line shows operating mode, unused memory size, memory on/off, and caps-lock on/off. It also gives helpful prompts.

SWEET TALKIN'

KEY-BEEP can be on/off. Unacceptable keystrokes cause a lower pitched BOPI. This ERROR-BEEBOP can be on/off.

Talks to other computers with Full or Half Duplex; Baud Rate of 110, 150, 300, 600, 1200; Parity as even, odd, mark, space, none; 7 or 8 bit Word; any Stop Bits; all 128 ASCII characters; true line Break; XON/XOFF protocol; and optional line-at-a-time transmission. Able to send and receive text, block graphics, BASIC and ML programs. A 64K machine holds up to 46,600 characters (34,900 in HI-RES).

DUAL PROCESSING lets you review & edit while more data is coming in.

Fully supports D.C. Hayes and other intelligent modems.

Talks to your printer with any page size, margins, line spacing, split word avoidance. Embed your printer's control sequences for boldface, underlining, etc. Narrow text can be automatically spread out.

You'll also use Autoterm for simple word processing and record keeping

You can display directories, delete files, transmit directly from disk, and work with files larger than memory. Easily maintain a disk copy of an entire session.

Compatible with TELEWRITER (ASCII) & other word processors.

SMOOTH WALKIN'

AUTOTERM moves smoothly and quickly between word processing and intelligent terminal action. Create text, correct your typing errors; then connect to the other computer, upload your text, download information, file it, and sign-off; then edit the received data, print it in an attractive format, and/or save it on file.

Editing is super simple with the cursor. Find strings instantly, too! Any operating parameter, such as screen width, can be altered at any time. Uncompleted commands can be cancelled.

PUTTY IN YOUR HANDS

The word processor can be used to create, print, and/or save on file your personal KSMs. They let AUTOTERM act like you. For example, it can dial through your modem, sign-on, interact, perform file operations, & sign-off; an entire session without your help. KSMs can answer the phone, prompt the caller, take messages, save them, hang-up, and wait for the next call. The KSM potential is unbelievable!

NO OTHER COMPUTER IN
THE WORLD CAN MATCH
YOUR COCO'S AUTOMATIC
TERMINAL CAPABILITIES!!!

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by John Crane

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BUILDING AUGUST'S RAINBOW

Analyzing Our Surveys

• *What's this, a new format for your column? What gives?*

Well, as they say, imitation is the sincerest form of flattery — or, at least, the most obvious. So, when I note from our **RAINBOWfest** survey responses that "Letters to Rainbow," "Reviewing Reviews," "Pipeline," "Downloads" and "Earth to Ed" are among our top-rated departments, I recognize a good device when I see one: concise, topical treatment of reader concerns. Besides, I get mail, too, and I have no shame. Shoot the Answer Man another question.

• *OK, what else did you glean from the survey?*

That **Joseph Kolar**, **Dick White**, **Dale Puckett** and **Tony DiStefano** needn't consider changing anything; our survey respondents rate them tops. In fact, **all of our departments received gratifyingly good marks**. Oh, nobody escaped getting a share of the "fair" and "poor" marks, but, overall, all of our regulars were rated "excellent" or "good" some **70 to 85%** of the time. For obvious reasons, we'll keep the total rankings confidential, but, just for the record, "Scoreboard" and "Scoreboard Pointers" were ranked at the very bottom.

• *Aha! Does that mean they get the ax?*

Maybe. Maybe not. Certainly, a low rating means we're going to take a strong look at a given department, but before we give up the ballgame, perhaps we'll "punt" and regroup. **Surveys have so many variables** and are only one part of our continuing evaluation process.

• *OK, OK. We all know statistics must be kept in perspective. Now tell us what we told you. What else did you learn?*

Our **RAINBOWfest-Irvine** respondents say they bought, on the average, **four products** in the past year as a result of **RAINBOW** ads. Ranking at the top of software **most wanted are utilities and word processing**, followed by business and games. As to hardware, **acquiring a monitor was the chief interest**, followed closely by more memory, disk drives, modems and speech/sound synthesizers. While **98%** of Irvine respondents rated **THE RAINBOW** as excellent or good (**76%** excellent!), they would like to see more utilities, hardware and machine language.

• *Overall, then, I see the Irvine survey corresponds closely with the one at Princeton.*

That's true, and preliminary results from Chicago tend to follow the same pattern. A significant **45%** of our respondents indicated they are hesitant about buying from a new advertiser. Concomitantly, they **prefer to see a new product advertised three times, or more**, before being inclined to purchase it. In fact, a whopping **89%** of respondents rely on **RAINBOW** reviews. Some **28%** always wait and another **61%** at least sometimes wait until they've seen **RAINBOW's** product review before making a purchase. And, **88%** of those surveyed rate our reviewers as qualified (**59%**) or well-qualified (**29%**).

• *What else did we tell you?*

Well, **92%** at least sometimes will type in a program listing, but only **12%** do so frequently. A full **93%** of those surveyed have had occasion to use our advertiser index. Some **78%** say **color ads get their attention more than black and white ads**.

• *What's the feeling about issue themes?*

In general, respondents seem well pleased. Only a mere **3%** said they seldom or never like them. The **most popular are the Anniversary, Utilities, Games and Beginners issues** — in that order. The Music and Business themes were rated lowest with Printers and Education doing only slightly better. Is there a theme you'd like to see?

• *I'll think about it. In the meantime, isn't it time for your closing theme?*

How kind of you to remember. Yes, that brings us to the **\$31** question. You see, the survey form we value the highest is **THE RAINBOW** subscription form — yes, we certainly do read and heed the comments **RAINBOW** and **RAINBOW ON TAPE** subscribers make — because that means you're a regular reader and, as the first question in this column underlines, **our readers are rated tops as writers, too**.

— Jim Reed

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Rainbow Magazine - (November 1984)

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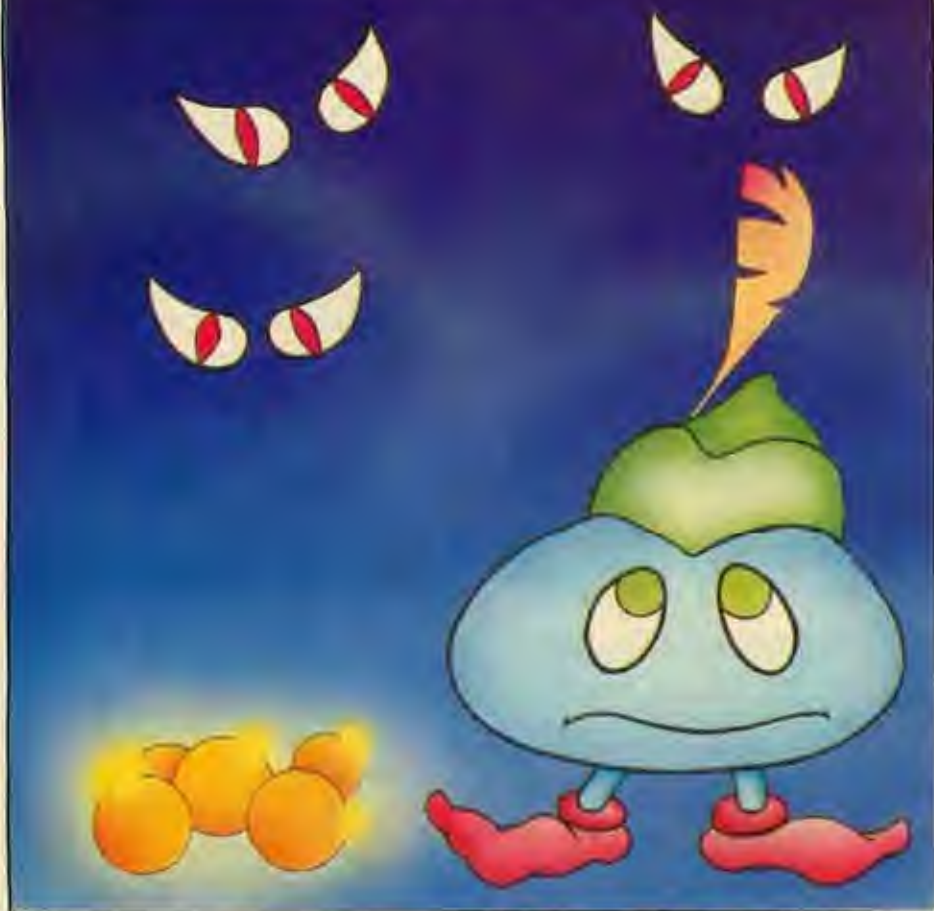
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Brotan the Blue

Takes On The Fickle Finger of Fate

By Alan A. Saporta



Ust a few minutes ago, you were the high apprentice of Zygon, a powerful wizard who dwells in the hills of a countryside. It was a routine magic-creating day until the wizard asked you to hand him the maroon potion, but accidentally, you gave him the azure potion. The mixing of his new potion with the wrong ingredient (he hadn't noticed your foolish mistake) resulted in an explosion

(Alan Saporta is a sophomore and a self-taught computerist. He has worked with many different computers, but his favorite is the Color Computer.)

and destruction of part of his laboratory.

Even though he was close to the blast, he did survive and, in his rage, turned you into a Brotan. Brotans are short, blue creatures (no, not Smurfs! Brotans are shorter) with two green eyes and one mouth. Their only purpose in life is to eat yellow energy dots and (something that goes without saying) avoid red Gremlins who eat anything, including yellow energy dots, themselves and blue Brotans.

If you attain an energy score of 15,000, Zygon will return you to your normal state. But, until then, he has placed you in a strange box where two things are constantly produced: yellow energy dots and red Gremlins.

How to Play

This is a game for those with 32K Extended Color BASIC. You use three of the arrow keys to move the Brotan to the right, left and down. Once you go down an opening, you can't go back up. Because PEEKs are used to poll the keyboard, there is no need to continuously hit the keys; just hold down the arrow key of your choice.

After the title page is displayed, press any key (except BREAK) and the screen ("strange box") will be drawn. The strange box has six levels. At the beginning, the first two levels have three openings, the next three have two openings and the exit level has one.

The Brotan begins at the topmost, inner level at the left. To cross an opening just continue in one direction and a bridge will be formed. If you want to descend an opening, place yourself on top of it (lean a bit to the left) and press the down-arrow key. The bridge will be broken (if there is one) and a blue "slide" will form on which the Brotan will descend.

The energy dots are the yellow plus signs that line the top of each level. They are placed at a random distance from one another and can be worth zero, four, eight or 12 points. That, too, is random. When you score, the screen flashes and sounds, and four points are added to your energy score. If an energy dot is worth eight points the screen will flash twice and eight points are added, etc. Some dots are what I call "duds" — they are worthless. If you encounter one, you will simply consume it with no ill effects.

In the middle of the box is a giant red energy dot. If eaten, the screen flashes and 50 points are added. There is one per screen.

When you advance a skill rank, one of the openings on one of the levels will be blocked, preventing your escape to a lower level and increasing your chances of losing one "man" (you have eight). The skill ranks are as follows: Completing the first screen places you on the first rank, then every 250th point you will advance to the next rank (meaning more openings will be blocked if and when you reach the next screen). You can jump two or three skill ranks in one screen (just count how many

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openings have been blocked when the next screen is drawn). When you reach the seventh skill rank everything stays the same. There will only be one opening per level through which to escape.

For your convenience, there is a pause feature for those who get that annoying phone call right before they reach the 15,000 mark. By pressing any key (except BREAK) all action will stop. When you lose a man your score and the amount of men you have left are updated.

If your computer can't take the "speed-up" POKE 65495,0, then delete it from lines 10 and 2011. Also, if you reach 15,000 you are given the option to continue (just in case you want to

know how high a score you can get). When you reach 2,000 points you get an extra man and at 5,000 you get two more. You also get points when you descend openings. One limitation, though: You can't have more than nine men at once.

About Those Gremlins

They pop out everywhere (the amount and where they pop out is randomly determined). If one ever blocks your only means of reaching the next level, you can kill him by hitting him, but it will cost you at least one man; many will get two and some can never be killed, making death inevitable. Most can be killed, but that's a chance you'll have to take.

Hints

Here are a few hints that will help: 1) The leftmost row of energy dots is duds; 2) Even though the red Gremlins appear as if they are nomads, after some experience you might catch a "pattern" they may follow; and 3) If two red Gremlins are on both sides of you and both block another opening, always kill the one on your left (the Brotan's right).

This game is based more on luck and risk than skill. Will you eat more energy dots, or will you escape down an opening because with one man left you're afraid a red Gremlin will appear and block your path to victory? *Brotan the Blue* is a great escape from the monotonous life of a wizard's apprentice.

32	.....	226
54	.....	239
210	.....	62
506	.....	14
1008	.....	59
2004	.....	150
END	.....	104

The listing: BROTRAN

```

Ø *****BROTRAN*****
2 '(C)1984 BY A.A.M.S.&ASAP CO
4 '*WRITTEN BY ALAN A SAPORTA*
6 '**ALL RIGHTS RESERVED*****
8 '*****JULY 1984*****
1Ø PCLEAR8: CLEAR1ØØØ: X=32: Y=25: G
Y=8: SC=Ø: DIM BL(24,16): FR=Ø: X=RN
D(-TIMER)
12 POKE 65495,Ø: GOSUB 2ØØØ
14 GOSUB4ØØØ: GOSUB1ØØØØ: GOSUB1Ø5Ø
16 CL=RND(5Ø): FORCD=32TO224 STEP
CL: FOR RY=25TO125 STEP 2Ø: CIRCL
E(CD,RY),3,2:NEXT RY,CD: CD=218: X
=32: Y=25: MX=CD: IF RK=5 THEN GOTO
1Ø12
17 CIRCLE(134,72),5,4: PAINT(135,
72),4,4
18 D=PEEK(342): L=PEEK(343): R=PEE
K(344): S=X: F=Y: RK=Ø: CD=218
2Ø IF D=247 AND Y=>25 AND Y<1Ø8
THEN GOTO1ØØØ ELSE IF Y>1Ø8 AND D
=247 THEN GOTO5ØØØ
22 IF L=247 THEN X=X-2: GOTO28

```

```

24 IF R=247 THEN X=X+2: GOTO28
26 GOTO18
28 IF X<32 THEN X=32
3Ø IF X>218 THEN X=218
32 PUT(S,F)-(S+8,Y+11),SP: IFSC>2
ØØØTHENGY=GY+1: IFSC>5ØØØANDFR=1T
HENGY=GY+2: FR=2: IFSC>1ØØØØANDFR=
2THENGY=GY+3: FR=3
34 PUT(CD,Y)-(CD+8,Y+11),SP: IFSC
<15ØØØ THEN 36 ELSE IFRP=1 THENG
OTO35
35 CLS: PRINT"YOU HAVE BEEN LET O
UT!": PRINT: PRINT"YOU HAVE WON!":
PRINT: PRINT"BUT WOULD YOU LIKE T
O CONTINUE TO SEE HOW HIGH A SCO
RE YOU CAN GET": INPUTGP$: IFLEFT
$(GP$,1)<>"Y"THEN END ELSE PMODE
3,1: SCREEN1,Ø: RP=1Ø
36 PUT(X,Y)-(X+8,Y+11),GU
37 IF Y=65 AND PPOINT(X-1,Y+1Ø)=
4 OR PPOINT(X+1Ø,Y+9)=4 AND X>11
9 AND X<139 THEN SC=SC+5Ø: PMODE4
,1: SCREEN1,1: PMODE3,1: SOUND15Ø,2
: SOUND155,2: SOUND162,2: SCREEN1,Ø
38 A=PPOINT(X-1,Y): B=PPOINT(X+12
,Y): IFX=32THEN18ELSE IF A=4 OR B
=4 THEN GOTO 2ØØØ ELSE IF A=2 OR
B=2 AND X>33 THEN SC=SC+4: PMODE3
,1: SCREEN1,1: PLAY"T2ØØØ3V31GABBG
CGDAB": SCREEN1,Ø
4Ø RR=RND(1Ø1): IF RR>5Ø AND RR<5
5 THEN GOTO 5Ø ELSE GOTO 18
42 GOTO18
5Ø MX=CV: CD=RND(188)+32: CR=CD-MX
: IFCR>3Ø THENCD=MX+3Ø ELSEIFCR<Ø
THEN GOTO56
52 CD=MX+CR: PUT(CD,Y)-(CD+8,Y+11
),SP: PUT(CD,Y)-(CD+8,Y+11),MO: GO
TO38

```

```

54 GOTO18
56 RF=MX-CR:FOR CV=MX TO RF:PUT(
CV,Y)-(CV+12,Y+11),SP:PUT(CV,Y)-
(CV+12,Y+11),MO:RK=8:GOTO38:NEXT
CV
58 GOTO18
100 Y(1)=Y:Y(2)=Y+20:IFPPOINT(X+
4,Y+13)<>1THENPOKE342,255:GOTO18
102 FOR YR=Y(1) TO Y(2):PUT(X,YR
)-(X+12,YR+11),GU:NEXT YR:SC=SC+
5:POKE342,255:Y=YR-1:GOTO18
200 RK=1:GY=GY-1:IFGY=0THENGOTO2
08
201 IF GY>10 THEN GY=9
202 COLOR1,1:LINE(150,160)-(220,
190),PSET,BF:DRAW"C3BM152,165D8U
8F8E8D8BR4R6L6U8R6L6D4R3L3D4R6BR
6U8F8U8BR4BD7BR6C2"+N$(GY):IF RK
=3THENGOTO1012
204 SOUND3,4:SOUND2,5:SOUND1,8:G
OSUB300
206 GOTO 18
208 PMODE4,1:SCREEN1,1:PMODE3,1:
PLAY"L801T2EFDCBAG":FORT=1TO900:
NEXTT:PCLS
210 CLS0:PRINT0,"YOUR SCORE:";S
C
212 PRINT@128,"PLAY AGAIN (Y/N)"
;:INPUTA$:SCREEN0,1:IFLEFT$(A$,1
)="Y"THEN10ELSE CLEAR:END
214 END
300 COLOR1,1:LINE(30,160)-(130,1
80),PSET,BF:SC$=STR$(SC):YS=84:F
ORR=2TOLEN(SC$):S$=N$(VAL(MID$(S
C$,R,1))):DRAW"BM"+STR$(YS)+"",17
2C4"+S$:YS=YS+10:NEXTR:DRAW"BM30
,172C4R5U3L5U2R5BR4BD5U5NR5D5R5B
R4NR5U5R5D5BR4U5R6D2L6RF3BR6NR5U
3NR3U2R5"
302 RETURN
400 FORZ=0TO9:READN$(Z):NEXTZ:RE
TURN
402 DATA"U6R4D6NL4BR","BR2BU3E3D
6BR","NR4E5HL3G2BR","R4U3NL2U3L4
BR","BU2U4D4R6L2U4D6BR3","BU6R6L
6D2R4FD2GL4R3BR3","U6D6R5U3L5R5D
3BR","E6L6R6BD6BR","U6R4D3NL4D3N
L4BR","BR4U3L4U3R4D6BR"
500 IFX>48THENGOTO18ELSE IFX=>32
AND X<48THENFORY=125TO152:PUT(X
,Y)-(X+12,Y+12),GU:PUT(X,Y)-(X+1
2,Y+11),SP:NEXTY:RL=2
502 IF RL<>2THENPOKE342,255:GOTO
18ELSEGOSUB1000:GET(136,48)-(160
,64),BL:SC=SC+15
504 IFPPOINT(72,36)=1THENPUT(60,
28)-(84,44),BL:IFSC>250THENPUT(3
2,48)-(56,64),BL:IFSC>500THENPUT
(200,88)-(224,104),BL:IFSC>750TH

```

NEW!



MAROONED!

By Steve Hartford

Sitting on the back porch one afternoon you see a strange, flashing UFO descend from the clouds & land out in the corn field. Being the curious type, you run out to investigate and find a spaceship with its hatch open. As you step inside, the hatch closes and the ship takes off. You must find a way to get back home. A great graphics adventure! 32K & one disk drive required.

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MASTER DESIGN comes with its own screen dump routine which interfaces with all popular dot matrix printers that have dot addressable graphic ability.

See reviews in:

July '84 Rainbow, Oct. '84 Hot CoCo Telewriter-64 © 1983 by Cognitac

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```

ENPUT(164,28)-(188,44),BL:IFSC>1
000THENPUT(76,68)-(100,84),BL
505 IFSC>1250THENPUT(164,108)-(1
88,124),BL:IFSC>1500THENPUT(164,
28)-(188,44),BL
508 X=32:Y=25:POKE342,255:GOTO16
510 GOTO18
1000 PMODE3,1:PCLS2:COLOR4,2:LIN
E(8,8)-(248,152),PSET,B
1002 DRAW"C4BM8,8F8R20H8L20F8D13
6NH8R16U16NL8H8ND8U4R80U8NH8L80U
8NR72U4R24U8NH8L24U8NR16U4R60U8N
H8L60U8NR52U4R16U8NH8L16U8NR8U4R
44U8NH8L44U8NR36U4R12U8"
1004 DRAW"BM44,8D8F8U8H8R196C2R8
ND7L8C4F8L196D8R180ND4R8D12H8L52
D8F8U8NH8R52BD8L8ND4NL44R8D12H8L
20D8F8U8NH8NR20D8R12ND4R8D12H8L4
8D8F8U8NH8R48BD8L48R40ND4R8D12H8
L16D8F8U8NH8R16BD8L16R8ND4R8D12"
1006 DRAW"H8L52D8F8U8NH8R52BD8L5
2R46ND4R8D12NH8L192H8NR192D16F8U
16D16BRC2L16BM30,8R13BM8,145D7R7
BM76,28C4D8F8U8H8R52F8BM144,28D8
F8U8H8R20F8BM112,108D8F8U8H8R52F
8"
1008 LINE(84,36)-(136,44),PSET,B
:LINE(152,36)-(172,44),PSET,B:LI

```

```

NE(56,56)-(116,64),PSET,B:LINE(1
32,56)-(204,64),PSET,B:LINE(100,
76)-(178,84),PSET,B:LINE(64,96)-
(208,104),PSET,B:LINE(120,116)-
(172,124),PSET,B
1010 DRAW"BM48,48D8F8U8H8R60F8BM
124,48D8F8U8H8R72F8BM92,68D8F8U8
H8R76F8BM56,88D8F8U8H8R144F8":FO
R YT=40T0120 STEP20:PAINT(134,YT
),3,4:NEXT YT:PAINT(160,40),3,4:
PAINT(100,20),3,4:PAINT(20,36),3
,4:PAINT(92,60),3,4:PAINT(40,16)
,1,4:RK=3:GOTO202
1011 RK=5:GOTO16
1012 RETURN
1050 DIM GU(8,11),MO(8,11),SP(8,
11)
1052 PCOPY1T05
1054 AS="BR2R5L5GD4FR5EU4HL3D4L2
R4DGLD3FR2L2HGL":BS="C4R8L3D3LU3
D3L3D4R8U4L5D3L2R4L2D3G2LRE2F2R2
"
1056 DRAW"BM40,25C3;XA$:"
1058 GET(40,25)-(48,36),GU:PCOPY
5T01:GET(40,25)-(48,36),SP
1060 DRAW"BM40,25;XB$":GET(40,2
5)-(48,36),MO:PCOPY5T01:RETURN
2000 PMODE4,2:SCREEN1,1:PMODE3,2
:PCLS4
2002 AS="ND24R24D24NR8NU24L24D32
R32NU32BR12U56R24D24L24F32BR12U5
6R24D56NL24BR10BU56NR24R12D56BR1
2U12R4U12R4U12R4U12R4U8D8R4D12R4
D12NL20R4D12R4D12BR12U56D8R7D12R
7D12R7D12R7D12U56"
2004 DRAW"BM12,20C1;XA$;BM20,24C
3;XA$;"
2006 DRAW"BD100BL200C3D28R12U12N
L12D12BR8BU4NU16R12NU16D12NL12U1
2BR12BU4R8C2BR12BD8U12NR16U8R16D
20BR6NU20R12BR6U12NR16U8R16D20BR
6U20F20NU20BR20U12NR16U8R16D20BR
4RULD"
2008 DRAW"S5;BD10BL90C3L20D10R20
D10NL20;S4;BR6U12R16D4NL16D8BR6U
12R16D4NL16BD8BR6U12R16D12NL16BR
6U12R16D4L16R8F8BR13U12L7R16BD12
BR6U12R16D4NL16D8"
2010 FORR=1T01000:NEXTR:PAINT(18
0,37),2,3:PAINT(50,64),2,3:PAINT
(40,25),2,3:PAINT(120,35),2,3:PA
INT(75,35),2,3:PAINT(0,0),2,3:PA
INT(40,148),2,3
2011 POKE65494,0:PLAY"T8V3102BAG
AB;P1;B;P1;BBBB;P1;A;P1;A;P1;AA
AAA;P1;B;P1;B;P1;BBBB;P1;BAGA;B
;P1;B;P1;BBBB;P1;A;P1;A;P1;B;P1
;A;P1;GGGGGGG":POKE65495,0
2012 EXEC44539:PCLS:PMODE3,1:SCR
EEN1,0:PCLS2:RETURN

```

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The Quest for Falcons'

By Aaron Fransen

In the year of our Lord 1991, several of Earth's deep space probes encounter several intelligent forms of life. Not all are peaceful.

One of these races (through the probes' information) has found its way to Earth and is now proceeding to overtake it.

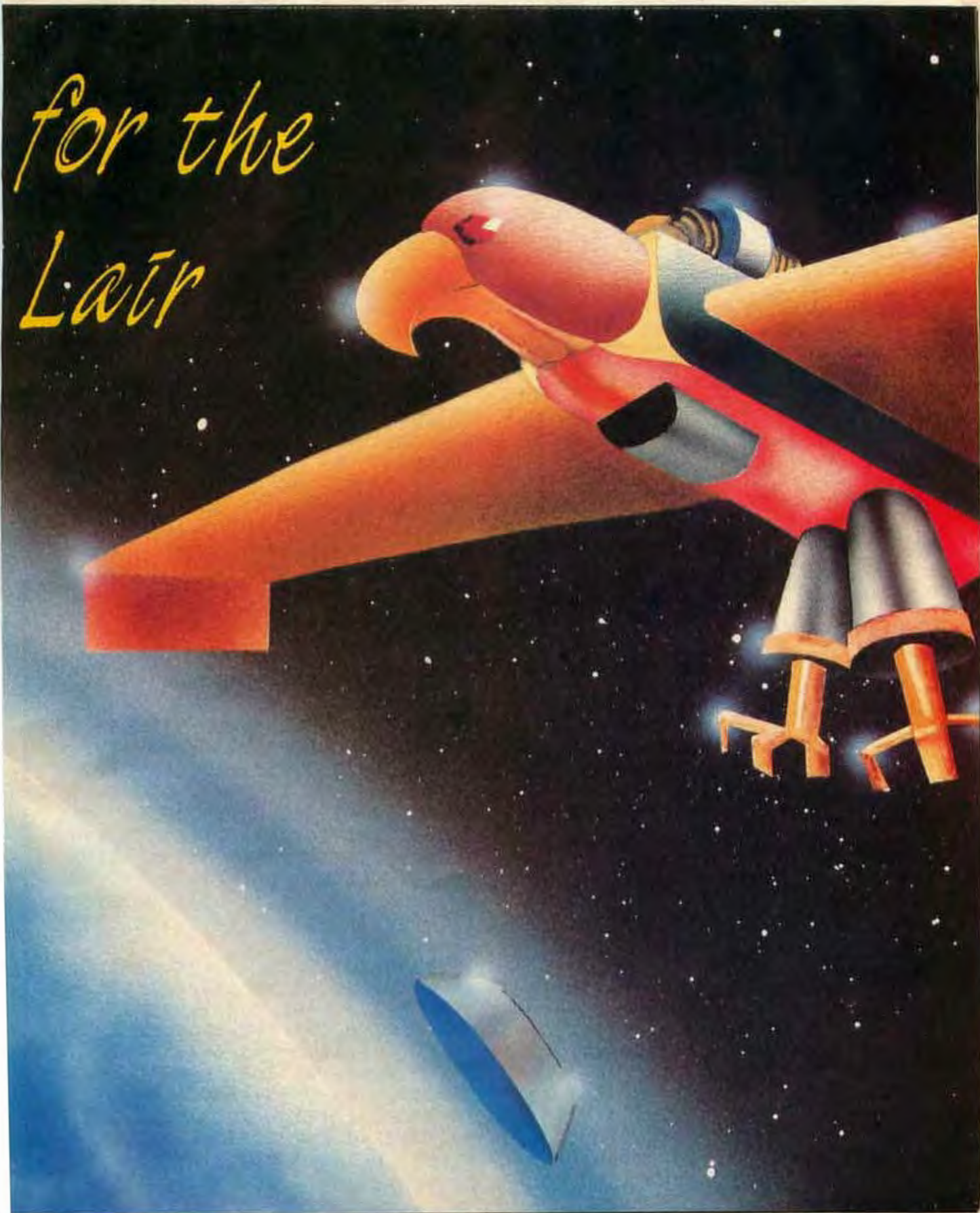
Several of their "motherships" encircled the Earth and surrounded it with a blue shield of energy, with the motherships themselves acting as the charging bases, and in the process leaving them open without defenses. However, each mothership has one falcon ship, a smaller and more versatile ship capable of firing back and blocking your laser.

You will be controlling three successive attack bases, capable of firing at the falcon ship and its base. Caution: Do *not* fire when the blue bar is directly below your own base, or you will be destroyed! To fire, simply press the firebutton on the right joystick, which controls your base.

There are nine levels of play, indicated by the blue bars at the bottom of the screen, one being the easiest and nine the most difficult.

(Aaron Fransen is a 17-year-old high school student and has been involved with the CoCo since its introduction.)

*for the
Lair*



You will receive three bases, indicated by the red bars at the bottom of the screen (emanating from the right). Your score is indicated by a red line at the bottom (emanating from the left).

What you must do is shoot through the defense of the falcon ship's base (the Falcon's Lair) so you may then destroy the Lair's power cell. Once it is destroyed the entire ship falls to the ground, explodes and you are transported to another Lair's area.

The more of the shield you destroy before destroying the power cell, the higher your score will be at the end of the round. This is not as easy as it may seem. As each level progresses, the shield starts to rebuild itself at speeds according to the level of play.

The listing is rather long, but hopefully you'll find the game to be worth it. If you would like a line-by-line

reference and variable reference table for this game, please send a SASE and \$1 to me at this address: Box 817, Revelstoke, British Columbia, Canada V0E 2S0.

Please remember I live in Canada, so use sufficient postage. If you simply have a question, complaint (or compliment?) or other comment, just send a SASE to the same address.

Instructions:

- 1) Load game.
- 2) RUN it (you may have to run it twice because of a bug in BASIC).
- 3) Press Reset (and RUN) until screen is red.
- 4) After the title page comes up and the introduction sounds are played, press fire.
- 5) Adjust the right joystick to select

difficulty, then press the firebutton.

- 6) After a few seconds the game will begin. The object is to destroy the blue power cell at the center of the Falcon's Lair (at the top of the screen), while at the same time either destroying or avoiding the small falcon ship which hovers just below the Falcon's Lair. *Do not* fire when the blue bar (the one that moves about) is directly below you, or you will be destroyed.
- 7) After you have lost all three bases, the game ends, showing you your final score and asking if you would like to try again. Your selection is made by adjusting the right joystick until the white box is around the appropriate answer; then press fire.



9.....	11
19.....	75
31.....	183
45.....	25
52.....	64
63.....	152
69.....	85
82.....	149
END.....	92

The listing: FLENLAIR

```
1 PCLEAR7:PMODE4,1:SCREEN1,1:PMODE3:PCLS3
2 I$=INKEY$:IFI$=""THEN2
3 CLS:DIM X,Y,EX,EY,PX,T,R,LEV,MEN,A(10),E(656),E1(50),E2(50),Y(16),P(31),D$(61),D(50),N$(9):ER$="R8DL8DR8DL8DR8DL8BU5"
4 POKE187,0:FORT=0TO16:READ Y(T):NEXT:FORT=0TO26:READ D$(T):NEXT:FORT=0TO9:READ N$(T):NEXT
5 PMODE4,4:PCLS:PMODE4,1:PCLS1:SCREEN1,1:I$="THE":DRAW"C0S8BM100,20":GOSUB79:I$="FALCONS":DRAW"S16BM14,60":GOSUB81:I$="LAIR":DRAW"BM60,90":GOSUB81
6 I$="BY@AARON@MARTIN@FRANSEN":DRAW"S4BM30,140":GOSUB79:FORT=0TO7:GET(25,145-T)-(210,145-T),E,G:PUT(25+T,145-T)-(210+T,145-T),E,PSET:NEXT
7 PMODE3:COLOR3:LINE(0,0)-(255,191),PSET,B:COLOR2:LINE(4,4)-(251,187),PSET,B:PMODE4:PLAY"L20T8BA GFEDCBAGFEDCBAGFEDCAGFEDCAGFEDCA GFEDCGFEDCGFEDCGFEDCFEDCFEDCFEDC EDCEDCEDCDECDCECCCC
8 P=PEEK(65280):IFP=126ORP=254THEN9ELSE8
9 CLS:PRINT@226,"WITH THE JOYSTICK, CHOOSE A LEVEL OF DIFFICULTY, THEN PRESS THE FIRE BUTTON":PLAY"P1
10 LEV=INT(JOYSTK(0)/7.4)+1:PRINT@202,"LEVEL=":LEV
11 P=PEEK(65280):IFP=126ORP=254THEN12ELSE10
12 CLS1:PRINT@227,"YOU WILL BEGIN IN A MOMENT":;SCREEN0,1
13 MEN=3
14 PMODE4,2:PCLS:PMODE3:PCLS1
15 PMODE3:COLOR2:LINE(0,0)-(31,6),PSET,BF:GET(0,0)-(31,6),P:PCLS1
16 GET(0,0)-(80,20),E:PMODE3:COLOR3:FORT=10TO20STEP2:LINE(T,4)-(T+20,9),PSET:LINE(T+30,9)-(T+50,4),PSET:LINE(T,34)-(T+20,29),PSET:LINE(T+30,29)-(T+50,34),PSET:NEXT:GET(0,0)-(80,20),E1:GET(0,20)-(80,40),E2:PCLS
17 PMODE3,4:FORT=40TO74:CIRCLE(128,144),T,3,.4:NEXTT:FORT=0TO20:CIRCLE(128,144),T,2,.7:NEXTT:COLOR2:LINE(0,140)-(70,134),PSET,BF:LINE(255,140)-(185,134),PSET,BF:LINE(0,148)-(70,154),PSET,BF:LINE(255,148)-(185,154),PSET,BF
18 PMODE3,1:LINE(0,12)-(15,22),PRESSET,BF:GET(0,12)-(15,22).E:DRAW"BM8,12C3M0,21M15,21M7,12":PAINT(7,16),3,3:PMODE4:GET(0,12)-(15
```

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,22),A:PUT(0,12)-(15,22),E
19 PCOPY7TO1:PLAY"L100T10002":PM
ODE4,2:SCREEN1,1:PMODE4,1:FORT=0
TO47:GET(0,T)-(255,T+32),E:PUT(0
,T+1)-(255,T+33),E:PLAY"FC":NEXT
T:PCOPY2TO1:PMODE4,2
20 RESTORE:FORT=0TO16:READ Y(T):
NEXTT
21 PMODE3,2:COLOR2:FORT=1TO(LEV*
28)STEP28:LINE(T,188)-(T+20,190)
,PSET,B:NEXTT:PMODE4,2
22 PMODE3,2:COLOR3:ON MEN GOSUB7
7,76,75
23 GET(0,33)-(255,46),E:SH=1:Y=1
60:X=120:R=RND(-TIMER)
24 J=JOYSTK(0):IFJ<15THENX=X-8EL
SEIFJ>48THENX=X+8
25 IFX<0ORX>240THENX=Q
26 IFRND(10-LEV)=1THENPUT(PX,172
)-(PX+31,178),E:PX=RND(20)*8:PUT
(PX,172)-(PX+31,178),P
27 PUT(Q,160)-(Q+15,170),E:PUT(X
,160)-(X+15,170),A:P=PEEK(65280)
:IFP=126ORP=254THENGOSUB39
28 IFTIMER>1500-(LEV*100)THENTIM
ER=0:GOSUB57
29 IFRND(12-LEV)=1THENGOSUB37
30 GOSUB34

```

```

31 SH=-SH:IFSH=-1THENPUT(EX,EY)-
(EX+80,EY+20),E1 ELSEPUT(EX,EY)-
(EX+80,EY+20),E2
32 PMODE3,2:COLOR3:LINE(0,184)-
SCR/100,185),PSET,B:PMODE4,2
33 Q=X:GOTO24
34 EX=EX+((RND(3)-2)*8):IFEX<0OR
EX>172THENEX=QX
35 EY=EY+((RND(3)-2)*2):IFEY<30T
HENEY=30ELSEIFEY>120THENEY=120
36 QX=EX:RETURN
37 LINE(EX+35,EY+10)-(EX+35,170)
,PSET:LINE(EX+45,EY+10)-(EX+45,1
70),PSET:PLAY"L20T4004BGEDC":IF(
EX+46>X AND EX+46<X+15)OR(EX+34>
X AND EX+34<X+15)THEN 59
38 LINE(EX+35,EY+10)-(EX+35,170)
,PRESET:LINE(EX+45,EY+10)-(EX+45
,170),PRESET:RETURN
39 IFX>=PX AND X<PX+20THEN59
40 IFX>EX AND X<EX+70THEN45
41 T=X/8:IFT<7ORT>23THENTY=0:GOS
UB74:RETURN
42 T=T-7:TY=Y(T):GOSUB74:IFY(T)=
0THEN44ELSEY(T)=Y(T)-4:LINE((T*8
)+60,Y(T))-(T*8)+67,Y(T)+8),PRE
SET,BF:SCR=SCR+50
43 IF(T>6AND T<10)AND Y(T)<10THE

```



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```

N47
44 RETURN
45 SCR=SCR+20:TY=EY+5:GOSUB74:PL
AY"OLABDGEFABDFE":PMODE4,2:FORT=
0TO18:PUT(EX+RND(80),EY+RND(20))
-(EX+RND(80),EY+RND(20)),E,NOT:N
EXTT
46 PUT(EX,EY)-(EX+80,EY+20),E:EX
=RND(20)*8:EY=RND(100)+32:RETURN
47 PMODE4,2:R=1:PLAY"T2L2":GET(1
08,0)-(149,11),D,G:FORT=0TO77:PU
T(108+R,0)-(149+R,11),D,PSET:PLA
Y"ET+":IFR=1THENR=0ELSER=1
48 NEXTT:PCOPY6TO1:PMODE4,1:GET(
0,15)-(255,80),E:FORT=15TO67STEP
2:PUT(0,T)-(255,T+65),E:PLAY"L10
0T50C":NEXTT:PMODE4,2:FORT=20TO1
50STEP4:PUT(0,T)-(255,T+65),E
49 PLAY"L100T20C":NEXT:PMODE4,2:
FORT=0TO4:X=RND(128)+64:Y=191-RN
D(32):FORR=3TORND(20)+10:CIRCLE(
X,Y),R,1,.9:CIRCLE(X,Y),R-3,0,.9
:NEXTR:PLAY"L50T50O1CEDCC":NEXTT
50 FORT=0TO30:PMODE3,2:SCREEN1,1
:PLAY"O3GEDC":PMODE4,2:SCREEN1,1
:PLAY"GEDC":NEXT
51 FORT=0TO16:INC=INC+(Y(T)-30)
*-.5):NEXTT:CLS:PRINT@233,"BONUS

```

```

":FORT=SCR TO SCR+INC:PRINT@24
0,T:PLAY"L15T8E":NEXTT:SCR=SCR+I
NC
52 SCREEN1,0:PCLS1:DRAW"C0BM80,4
0":I$="SCORE":GOSUB79:DRAW"BM128
,40":I$=STR$(SCR):GOSUB80:DRAW"B
M40,60":I$="ADVANCE@TO@NEXT@LEVE
L":GOSUB79
53 DRAW"BM36,80":I$="PRESS@FIRE@
TO@CONTINUE":GOSUB79:PLAY"L200T1
00"
54 C=RND(12):FORT=21TO1STEP-1:PL
AY"V"+STR$(T)+"":+STR$(C):P=PEEK
(65280):IFP=126ORP=254THEN55ELSE
NEXTT:GOTO54
55 PCLS:PLAY"V28":LEV=LEV+1:IFLE
V>9THENLEV=9
56 GOTO19
57 T=RND(16):IFY(T)>28THENRETURN
58 PMODE4,1:GET(T*8)+60,Y(T)-(
(T*8)+67,Y(T)+4),E:PMODE4,2:PUT(
(T*8)+60,Y(T)-(T*8)+67,Y(T)+4)
,E:Y(T)=Y(T)+4:GET(0,20)-(60,40)
,E:RETURN
59 PMODE4,2:PLAY"L10T8BGEDCAFDG
EDCDDC":FORT=0TO3:Q=X+RND(40)-10
:W=Y+RND(20)-5:FORR=3TORND(10)+5
:CIRCLE(Q,W),R,1:CIRCLE(Q,W),R-3

```

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SF-1 Single-sheet feeder for the LX-80. **\$145** (\$7 shpg)

*EPSON RX-80F/T+

RX-P package includes Epson RX-80F/T+ printer, Epson serial interface, a serial Color Computer to Epson cable, and free Printer Tutorial. **\$317** (\$7 shpg)

MONITORS

123 Zenith 12" Green Screen, 640 dots x 200 dots resolution, 15 MHz band width. **\$114** (\$7 shpg)

122 Zenith 12" Amber Screen, 640 dots x 200 dots resolution, 15 MHz band width. **\$134** (\$7 shpg)

* 131 Zenith 13" Color Monitor with speaker, composite & RGB jack, 240 dots x 200 dots resolution, 2.5 MHz band width. **\$394 \$149** (\$14 shpg)

NEW: 141 Roland 13" Color Monitor with speaker, 270 dots x 200 dots resolution, 4 MHz band width. **\$247** (\$12 shpg)

All monitors require video controller. Reverse video free with monitor order.

MEMORY

64K Upgrades—1 Year Warranty

64-E1 for E Boards with complete instructions. Remove old chips and replace with preassembled package—no soldering or trace cuts. **\$52.45** (\$2 shpg)

64-F1 for F Boards. No soldering needed. Capacitor leads must be cut. **\$48.45** (\$2 shpg)

64-2 for COCO 2. Kit requires one solder point, no trace cuts. **\$48.45** (\$2 shpg)

SURGE SUPPRESSOR

SS-1 protects your data and equipment against power surges and transients. **\$16.25** (\$2 shpg)

CONTROLLERS

New Controller from J&M: Has switch that allows either JDOS or RS DOS to be the disk operating system; eliminates software compatibility problems, while preserving the advantages of J&M's gold contacts and data separator. Also added to the DC-2 is a parallel port, which means a serial interface is no longer needed to make a parallel printer (like the Epson) work.

DC-2 Disk Controller with JDOS. **\$138** (\$2 shpg)

RS-1: RS DOS ROM Chip. **\$20.00** (\$2 shpg)

DC-1 Disk Controller reads and writes to 35 and 40 track single and double-sided drives for all models of the Color Computer w/ JDOS. **\$128** (\$2 shpg)

VC-1 Video Interface mounts inside Color Computer by piggy-backing IC on top of interface—no soldering, no trace cuts. All models give composite video & sound. **\$24.45** (\$2 shpg)

VC-2 for COCO 2—mono only. **\$26.45** (\$2 shpg)

VC-3 for COCO 2—both color or monochrome. **\$39.45** (\$2 shpg)

VC-4 for new Color Computer (no sockets, chips are soldered to mother board). Attaches with spring-loaded clips. Color or mono. **\$39.45** (\$2 shpg)

DRIVE O PACKAGE

359,424 byte package includes half-height, double-sided double-density TEAC drive with slim-line case and heavy-duty power supply, DC-2 J&M Controller, and a gold-plated connecting cable. Accesses both 35 and 40 track disks.

D0-P package **\$354** (\$7 shpg)

HOWARD QUALITY STANDS



New TS-1X Monitor Stand: Designer-beautiful stand with clear corner posts, easy side access to ROM port, reset and on/off buttons. **\$39.50** (\$3 shpg)

TS-1: Standard 13" monitor stand for the original Color Computer. Specify black, ivory or clear. 15" x 11" x 4". **\$29.50** (\$3 shpg)

TS-2: Same as above for the COCO 2. **\$29.50** (\$3 shpg)

PS-1X Printer Stand features new noise-suppressing foam top and cork base. 15" x 11" x 2 1/4". **\$24.95** (\$3 shpg)

EPSON AND J&M

The EJP Package

The Epson LX-80 Printer teamed with our new J&M DC-2 Controller gives you top printing capabilities plus built-in switch gives JDOS or Radio Shack DOS so all software can run on your Color Computer. Package includes: Epson LX-80 Printer with ET-1 tractor; DC-2 controller; parallel Color Computer to J&M cable; Epson Printer Tutorial (\$29.95 value).

Complete EJP package **\$425.00** (\$7 shpg)

GUARANTEE

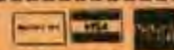
Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back—no questions asked.



Howard Medical Computers

1690 Elston, Chicago 60622

1-800-443-1444



Telephone (312) 278-1440

Computer Bulletin Board (312) 278-9513

Cat. No.	Quantity	Description	Unit cost	Cost
			\$	\$
<input type="checkbox"/> My check or money order is enclosed <input type="checkbox"/> Send C.O.D.			Total Cost	
<input type="checkbox"/> Bill (include one)			Shipping	
<input type="checkbox"/> Credit Card # _____ <input type="checkbox"/> Exp. date _____			Ill. res. add 8%	
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			Total order	\$



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SPEED RACER

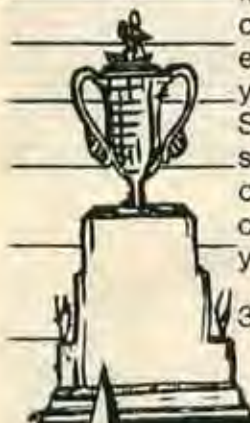
by Steven Hirsch

The checkered flag drops as your pulse rises in this lively new arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for the most exciting race the CoCo has ever seen! Vie for time as you speed through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but step lively since some will stop at nothing to see the end of the race, or the end of you! Four challenging raceways, complete with obstacles and colorful 3-D scenery, put your skills to the test in this Pole Position™ type game.



32K Color Computer Required.

\$34.95



ROMMEL 3-D

By Kary McFadden

You clutch the tank controls, searching for any sign of the enemy. Suddenly a blip appears on radar! Frantically, you move your tank into position. At last you spot the elusive enemy tank! Facing it, you race to lock sights and fire before he does!

Enter the ultimate battle-zone in this exciting 3-D tank combat game. Strategy, speed, and your tank's cannon are your only hope as you wind through a three-dimensional course inhabited by impenetrable barriers and enemy tanks.

Dazzling graphics and lifelike sound take you a step beyond the ordinary in this fast, machine-language arcade game. Enter the next dimension, ROMMEL's troops are waiting for you!



32K Color Computer Required.

\$29.95

```

,Ø:NEXTR:PLAY"L2ØT2Ø01CEDC":NEXT
T
6Ø MEN=MEN-1:IFMEN<1THEN62
61 PMODE4,2:PCLS:GOTO18
62 PCOPY6TO1:PMODE4,1:GET(Ø,15)-
(255,8Ø),E:FORT=15TO47STEP2:PUT(
Ø,T)-(255,T+65),E:PLAY"L1ØØT5ØC"
:NEXTT:PMODE3,2:COLOR2:R=.8:X=Ø:
FORT=6ØTO191:LINE(128-X,T)-(128+
X,T),PSET:X=X+R:NEXTT
63 PLAY"L2ØT2ØCDEFGABO+CDEFGO-CD
EFABO+CDEFGO-CDEFGABO+CDEFGABO-C
DEFGABO+CDEFGO-DEFGABO+CDEFGO-DE
FGABO+CDEFGO-DEFGABO+CDEFGO-DEFG
ABO+CDEFGO-EFGABO+CDEFGO-EFGABO+
CDEFGO-EFGABO+CDEFGO-EFGABO+CDEF
GO-
64 PLAY"FGABO+CDEFGO-FGABO+CDEFG
O-FGABO+CDEFGO-FGABO+CDEFGO-GABO
+CDEFGO-GABO+CDEFGO-GABO+CDEFGO-
GABO+CDEFGO-ABO+CDEFGO-ABO+CDEFG
O-ABO+CDEFGO-ABO+CDEFGO-BO+CDEFG
O-BO+CDEFGO-BO+CDEFGO-BO+CDEFG
65 PLAY"CDEFGCDEFGCDEFGCDEFGDEFG
DEFGDEFGDEFGDEFGDEFGDEFGDEFG
GGGG
66 PMODE4,2:I$="THE@ENEMY@HAS@SU
CCEDED":DRAW"BM32,4":GOSUB82:I$
="YOU@HAVE@FAILED":DRAW"BM64,5Ø"
:GOSUB82
67 I$="YOU@WILL@RECEIVE@":DRAW"B
M48,12Ø":GOSUB82:I$=RIGHT$(STR$(
SCR),LEN(STR$(SCR))-1):GOSUB8Ø
68 I$="DOLLARS@FOR@YOUR@EFFORTS"
:DRAW"BM32,13Ø":GOSUB82
69 I$="DO@YOU@WISH@TO@TRY@AGAIN"
:DRAW"BM32,15Ø":GOSUB82:I$="@@YE
S@@@@@NO@@":DRAW"BM64,17Ø":GOS
UB82
7Ø T=SGN(JOYSTK(Ø)-31):IFT=-1THE
NR=ØELSER=1
71 COLORR:LINE(132,168)-(196,178
),PSET,B:COLORR+1:LINE(124,168)-
(6Ø,178),PSET,B
72 P=PEEK(6528Ø):IFP=126ORP=254T
HEN73ELSE7Ø
73 IFT=-1THENRUNELSECLS:PRINT"TH
IS IS THE END...":END
74 PMODE3,2:COLOR2:LINE(X+7,Y)-(
X+9,TY),PSET,B:PLAY"O2BGDC":LINE
(X+7,Y)-(X+9,TY),PSET,B:RETURN
75 LINE(167,182)-(193,184),PSET,
B
76 LINE(197,182)-(223,184),PSET,
B
77 LINE(227,182)-(253,184),PSET,
B:RETURN
78 DATA16,24,24,28,28,28,32,32,3

```

```

2,32,32,28,28,28,24,24,16
79 FORT=1TOLEN(I$):Q$=MID$(I$,T,
1):R=ASC(Q$)-64:DRAWD$(R):NEXTT:
RETURN
8Ø FORT=1TOLEN(I$):Q=VAL(MID$(I$
,T,1)):DRAW N$(Q)+"BL7"+N$(Q)+"B
L":NEXTT:RETURN
81 FORT=1TOLEN(I$):Q$=MID$(I$,T,
1):R=ASC(Q$)-64:DRAWD$(R)+"S4BL2
9BUS16"+D$(R)+"S4BL29BUS16"+D$(R
)+"S4BL3BD2S16":NEXTT:RETURN
82 FORT=1TOLEN(I$):Q$=MID$(I$,T,
1):R=ASC(Q$)-64:DRAW"CØ"+ER$+"C1
"+D$(R)+"BL7"+D$(R)+"BL":NEXTT:R
ETURN
83 DATA BR8,BRGD2NDR4NDU2HNL2BR5
,RNR3D4NLR3EHNLEBR3BU,BRR2NFL2GD
2FR2EBU3BR4
84 DATA RNR2D4NLR2EU2HBR5,NR4D2N
R3D2R4BR4BU4,NR4D2NR3D2BR8BU4,BR
1NR3GD2FR3ENL2BR3BU3,D2ND2R4ND2U
2BR4

```



```

85 DATA BR2NLNRD4NLRBR5BU4,BR4D3
GL2NHBR7BU4,D2ND2RNE2F2BR5BU4,D4
R4BR4BU4,ND4F2E2ND4BR4
86 DATA ND4F4U4BR4,NR4D4R4U4BR4,
ND4R3FGNL1BR5BU2,BRNR2GD2FR2ENFN
HU2BR4BU,"ND4R3FDGLM+2,+1BU4BR4"
87 DATA BR4L3GFR3FGL3BR7BU4,R2ND
4R2BR4,D3FR2EU3BR4,D2F2E2U2BR4,D
4E2F2U4BR4
88 DATA F4H2G2E4BR4,DF2NDE2UBR4,
R4G4R4BU4BR4
89 DATA BRGD2FR2EU2HNLBR5,BR2NGD
4NLRBR5BU4,BDER2FDL3GDR4BR4BU4
9Ø DATA BDER2FGFGL2NHBR7BU4,D2R4
ND2NU2R1BR3BU2,NR4D2R3FGL3BR8BU4
91 DATA BR4L3GD2FR3EHNL3BR4BU2,R
4G2D2BR6BU4,BRNR2GFGFR2EHEBR4BU1
,BR3NFL2GFR3NUDGL2BR7BU4

```

Why do more CoCo owners choose 'REAL TALKER'?

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

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

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

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

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

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



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

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

1. 'DR. TALK'-This interactive "Eliza" type psychoanalyst program will discuss your innermost problems at length.
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\$59.95

- 'REAL TALKER-1' (for the original Color Computer).....\$59.95
 'REAL TALKER-2' (for the Color Computer-2).....\$64.95
 'Y - BRANCHING CABLE' For disk systems. If you have a disk system but do not have a Radio Shack Multi-Slot unit, this economical cable will allow to connect and use your Real Talker and Disk system together.....27.95

TALKHEAD

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



SOFTWARE FOR THE 'REAL TALKER'

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

ONLY **\$19.95**

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CoCo Max

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



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

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



UNMATCHED CAPABILITY...

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



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

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

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



THE BIG PICTURE

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

FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than 1/2 page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to 1/4 page size.

FREEDOM TO CREATE...

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



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



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

Plug your same joystick, mouse or touch

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



COCO MAX REQUIREMENTS

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

THE COCO MAX SYSTEM

AN ABSOLUTE GUARANTEE

CoCo Max is a hardware/software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 30 days for a full, courteous refund from Colorware.

THE HARDWARE...

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



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

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

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



A DIGITIZER OPTION...

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



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

THE COMPLETE COCO MAX SYSTEM, with software on **DISK**.....\$69.95
with software on **CASSETTE** (Available Mar '85).....\$69.95

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

Sorry, COCO MAX is not compatible with JDOS

COLORWARE

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



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Random Mosaics

By Bob and Daniel Delbourgo



andom Mosaics is a very simple program which works entirely in the low resolution graphics mode. It was inspired by the mosaics one often sees on floors and murals.

The computer draws the mosaics at random with various colors and patterns. Nine different types of mosaics (in addition to the title card mosaic) have been devised and come in increments of just under 10 lines each.

Line 9 makes the random selection and subroutine 100 ensures that colors are distinct to bring out the best in the profiles. If you do not like the patterns you can easily add a few more mosaics of your own by altering Line 9 appropriately.

Notice the high-speed poke in Line 1 and delete it if your computer cannot handle it. Type in the program, RUN it and enjoy the ever changing scenery.

(For questions regarding this program, the Delbourgos can be contacted at 15 Willowdene Avenue, Sandy Bay, Hobart, Tasmania, Australia 7005)

(Daniel Delbourgo is the 13-year-old son of Bob Delbourgo who is an Australian physicist. They have fun collaborating on creating special graphics effects.)

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QUALITY PROGRAMS FOR YOUR COCO & TDP-100

PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.



TO PRESERVE QUANDIC — Hint sheet

If you have not been able to **PRESERVE QUANDIC** you will be happy to hear that our hint sheets are now available. It is fully coded to give you only the information you wish to decode. **\$3.95**

LIZPAC — STATISTICS

Absolutely the most complete statistics package we have seen for **ANY** computer anywhere. Lizpac is 850,000 Bytes of programming filling 7 disks with an eighth disk containing data files to be used in the examples. The 200 page manual completely explains all that Lizpac has to offer. Write for more information. Req. 32K disk only. **\$195.00**



FLIGHT SIMULATORS

Flight — This graphics flight simulator gives you four levels of difficulty from student level to instrument only landing. The high resolution graphics screen shows your instruments and two representations of your plane in relation to the flight path. When you bring your plane in the synthesized voice from the tower says "perfect landing!". This program was written by a professional pilot and it shows! Req. 32K and a joystick. **Tape — \$24.95; Disk — \$29.95**

JUMBO JET

Take off from one airport, fly to another, and land safely, using full instruments and a thru the window view. It takes two joysticks to fly the mighty 747C Jumbo Jet. To complete this graphics simulation successfully, you must not only make a satisfactory take-off and landing, but turn the plane 180 degrees, land on a diagonal airstrip, and do all of this without running out of fuel, crashing or subjecting the plane to excessive amounts of stress damage. Req. 32K EB. **Tape — \$24.95; Disk — \$29.95**

MICROARTIST

Finally!!! a graphics program so easy to use anyone can create beautiful detailed pictures. Save your pictures to tape or disk and incorporate your artwork in your own programs or print it out on your printer. The ease menu selection provides 16 modes of operation including zoom, get/put, paint, text, erase and much more. Take advantage of all the **COLOR** your color computer has to offer. Order **MICROARTIST** now! Req. 32K EB and a mouse or joystick. **Tape — \$24.95; Disk — \$29.95**



SUPER ASTROLOGY

This program calculates complete natal horoscopes to an accuracy of approximately one minute of arc. All you need to know is the time and place of birth. Req. 32K. **Tape — \$24.95; Disk — \$29.95**

SCEPTER
OF
URSEA



SCEPTER OF URSEA

Explore the kingdom of Ursea in search of the elusive scepter. The country-side is represented by an elaborate graphics screen which harbors friend and foe alike. Or enter the dark dungeons, where unknown dangers and wealth await you. Roll up your character and set out on a great adventure. Req. 32K EB. **Disk only — \$29.95**

CITY WAR

Strategy and politics are the key to winning **CITY WAR**. The object is to eliminate the leader of the opposing country. There are 14 commands accessed by a single key stroke. With your secret access code you are the only one that can command your army of missiles. You can even request a cease fire from your opponent. The "save the game" feature makes it easy to resume negotiations. **Tape — \$24.95; Disk — \$29.95**

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12	67
31	159
38	99
50	99
64	166
75	183
83	174
92	100
END	80

The listing: MOSAIC

```

1 CLS:POKE65495,0:SS="L4003CO2B
AGFEDC":PRINT@448,"RANDOM MOSAIC
S BY D&R DELBOURGO";PRINT@480,"
hobart, tasmania, australia7005"
;FORV=1TO5:GOSUB100
2 Z=R:FORV=0TO384STEP128:FORX=1T
O25STEP6:GOSUB6:NEXTX,Y
3 Z=S:FORV=0TO256STEP128:FORX=33
TO57STEP6:GOSUB7:NEXTX,Y
4 Z=T:FORV=0TO256STEP128:FORX=69
TO93STEP6:GOSUB8:NEXTX,Y
5 PLAY"P1":NEXTV:PLAYS$:GOTO9
6 O=1024+Y+X:FORW=0TO3:POKEO+W,Z
:POKEO+34+W,Z:NEXTW:PLAY"L255O2C
":RETURN
7 O=1024+Y+X:FORW=0TO1:POKEO+W,Z
:POKEO+32+W,Z:POKEO+34+W,Z:POKEO
+64+W,Z:NEXTW:PLAY"L255O2E":RETU
RN
8 O=1024+Y+X:FORW=0TO1:POKEO+W,Z
:POKEO+30+W,Z:POKEO+32+W,Z:POKEO
+64+W,Z:NEXTW:PLAY"L255O2G":RETU
RN
9 A=RND(9):ONA GOTO10,20,30,40,5
0,60,70,80,90
10 CLS:FORV=1TO5:GOSUB100
11 Z=R:FORV=65TO449STEP128:FORX=
0TO24STEP8:GOSUB16:NEXTX,Y
12 Z=S:FORV=37TO421STEP128:FORX=
0TO16STEP8:GOSUB17:NEXTX,Y
13 Z=T:FORV=129TO385STEP128:FORX
=0TO24STEP8:GOSUB16:NEXTX,Y
14 Z=U:FORV=101TO357STEP128:FORX
=0TO16STEP8:GOSUB17:NEXTX,Y
15 PLAY"P1":NEXTV:PLAYS$:GOTO9
16 O=1024+Y+X:POKEO,Z:POKEO+1,Z:
POKEO+3,Z:POKEO+4,Z:POKEO-31,Z:P
OKEO-30,Z:POKEO-29,Z:POKEO-62,Z:
PLAY"O2L255C":RETURN
17 O=1024+Y+X:POKEO,Z:POKEO+1,Z:
POKEO+3,Z:POKEO+4,Z:POKEO+33,Z:P
OKEO+34,Z:POKEO+35,Z:POKEO+66,Z:
PLAY"O2L255G":RETURN
20 CLS:FORV=1TO5:GOSUB100
21 Z=R:FORV=0TO194STEP194:FORX=3
3TO57STEP6:GOSUB26:NEXTX,Y
22 Z=S:FORV=0TO188STEP188:FORX=3
6TO60STEP6:GOSUB26:NEXTX,Y

```

```

23 Z=T:FORV=0TO194STEP194:FORX=1
30TO154STEP6:GOSUB26:NEXTX,Y
24 Z=U:FORV=0TO188STEP188:FORX=1
33TO157STEP6:GOSUB26:NEXTX,Y
25 PLAY"P1":NEXTV:PLAYS$:GOTO9
26 O=1024+Y+X:POKEO,Z:POKEO+32,Z
:POKEO+64,Z:POKEO+65,Z:POKEO+66,
Z:POKEO+96,Z:POKEO+98,Z:POKEO+12
8,Z:POKEO+130,Z:PLAY"L255O2C":RE
TURN
30 CLS:FORV=1TO5:GOSUB100
31 Z=R:FORX=33TO47STEP14:GOSUB36
:NEXTX:FORX=136TO150STEP14:GOSUB
37:NEXTX:FORX=225TO239STEP14:GOS
UB36:NEXTX:FORX=328TO342STEP14:G
OSUB37:NEXTX:FORX=417TO431STEP14
:GOSUB36:NEXTX
32 Z=S:FORX=40TO54STEP14:GOSUB36
:NEXTX:FORX=129TO143STEP14:GOSUB
37:NEXTX:FORX=232TO246STEP14:GOS
UB36:NEXTX:FORX=321TO335STEP14:G
OSUB37:NEXTX:FORX=424TO438STEP14
:GOSUB36:NEXTX
33 Z=T:FORX=69TO90STEP7:GOSUB39:
NEXTX:FORX=162TO183STEP7:GOSUB38
:NEXTX:FORX=261TO282STEP7:GOSUB3
9:NEXTX:FORX=354TO375STEP7:GOSUB
38:NEXTX
34 PLAY"P1":NEXTV:PLAYS$:GOTO9
36 O=1024+X:POKEO,Z:POKEO+1,Z:PO
KEO+3,Z:POKEO+4,Z:POKEO+5,Z:POKE
O+6,Z:POKEO+32,Z:POKEO+35,Z:POKE
O+38,Z:POKEO+64,Z:POKEO+65,Z:POK
EO+66,Z:POKEO+67,Z:POKEO+69,Z:PO
KEO+70,Z:PLAY"O2L255C":RETURN
37 O=1024+X:POKEO,Z:POKEO+1,Z:PO
KEO+2,Z:POKEO+3,Z:POKEO+5,Z:POKE
O+6,Z:POKEO+32,Z:POKEO+35,Z:POKE
O+38,Z:POKEO+64,Z:POKEO+65,Z:POK
EO+67,Z:POKEO+68,Z:POKEO+69,Z:PO
KEO+70,Z:PLAY"O2L255E":RETURN
38 O=1024+X:POKEO,Z:POKEO+1,Z:PO
KEO+33,Z:POKEO+65,Z:POKEO+96,Z:P
OKEO+97,Z:PLAY"O2L255G":RETURN
39 O=1024+X:POKEO,Z:POKEO+1,Z:PO
KEO+32,Z:POKEO+64,Z:POKEO+96,Z:P
OKEO+97,Z:PLAY"O3L255C":RETURN
40 CLS:FORV=1TO5:GOSUB100
41 Z=R:FORV=0TO256STEP256:FORX=1
TO21STEP10:GOSUB46:NEXTX,Y:FORV=
128TO384STEP256:FORX=6TO26STEP10
:GOSUB46:NEXTX,Y
42 Z=S:FORV=0TO256STEP256:FORX=6
TO26STEP10:GOSUB46:NEXTX,Y:FORV=
128TO384STEP256:FORX=1TO21STEP10
:GOSUB46:NEXTX,Y
43 Z=T:FORV=0TO256STEP256:FORX=3
TO28STEP5:GOSUB47:NEXTX,Y

```

```

44 Z=U:FOR Y=128 TO 384 STEP 256:FOR X
=3 TO 28 STEP 5:GOSUB 47:NEXT X,Y
45 PLAY"P1":NEXT V:PLAYS$:GOTO 9
46 O=1024+Y+X:POKEO,Z:POKEO+1,Z:
POKEO+3,Z:POKEO+4,Z:POKEO+32,Z:P
OKEO+36,Z:POKEO+64,Z:POKEO+68,Z:
POKEO+96,Z:POKEO+97,Z:POKEO+99,Z
:POKEO+100,Z:PLAY"L25502C":RETUR
N
47 O=1024+Y+X:POKEO,Z:POKEO+31,Z
:POKEO+33,Z:POKEO+63,Z:POKEO+65,
Z:POKEO+96,Z:POKEO+32,Z-3:POKEO+
64,Z-12:PLAY"L25502G":RETURN
50 CLS0:FOR V=1 TO 5:GOSUB 100
51 Z=R:FOR Y=0 TO 384 STEP 192:FOR X=2
TO 16 STEP 14:GOSUB 56:NEXT X,Y:FOR Y=
96 TO 288 STEP 192:FOR X=9 TO 23 STEP 14:
GOSUB 56:NEXT X,Y
52 Z=S:FOR Y=0 TO 384 STEP 192:FOR X=9
TO 23 STEP 14:GOSUB 56:NEXT X,Y:FOR Y=
96 TO 288 STEP 192:FOR X=2 TO 23 STEP 14:
GOSUB 56:NEXT X,Y
53 Z=T:FOR Y=0 TO 384 STEP 96:FOR X=35
TO 56 STEP 7:GOSUB 57:NEXT X,Y
54 PLAY"P1":NEXT V:PLAYS$:GOTO 9
56 O=1024+X+Y:POKEO,Z:POKEO+1,Z:
POKEO+2,Z:POKEO+4,Z:POKEO+5,Z:PO
KEO+6,Z:POKEO+32,Z:POKEO+34,Z:PO

```

```

KEO+35,Z:POKEO+36,Z:POKEO+38,Z:P
OKEO+64,Z:POKEO+70,Z:PLAY"L25502
C":RETURN
57 O=1024+X+Y:POKEO,Z:POKEO+4,Z:
POKEO+32,Z:POKEO+33,Z:POKEO+34,Z
:POKEO+35,Z:POKEO+36,Z:POKEO+66,
Z:PLAY"L25502G":RETURN
60 CLS0:FOR V=1 TO 5:GOSUB 100
61 Z=R:FOR Y=0 TO 384 STEP 128:FOR X=0
TO 24 STEP 8:GOSUB 66:NEXT X,Y
62 Z=S:FOR Y=0 TO 384 STEP 128:FOR X=3
TO 61 STEP 4:POKE 1024+X+Y,Z:NEXT X,
Y:FOR Y=0 TO 256 STEP 128:FOR X=71 TO 87
STEP 8:GOSUB 67:NEXT X,Y
63 Z=T:FOR Y=0 TO 384 STEP 128:FOR X=3
9 TO 55 STEP 8:POKE 1024+Y+X,Z:NEXT X,
Y:FOR Y=0 TO 256 STEP 128:FOR X=67 TO 91
STEP 8:GOSUB 68:NEXT X,Y
64 PLAY"P1":NEXT V:PLAYS$:GOTO 9
66 O=1024+X+Y:POKEO,Z:POKEO+1,Z:
POKEO+2,Z:POKEO+4,Z:POKEO+5,Z:PO
KEO+6,Z:POKEO+32,Z:POKEO+34,Z:PO
KEO+35,Z:POKEO+36,Z:POKEO+38,Z:P
OKEO+64,Z:POKEO+65,Z:POKEO+66,Z:
POKEO+68,Z:POKEO+69,Z:POKEO+70,Z
:PLAY"O2L255C":RETURN
67 O=1024+Y+X:POKEO,Z:POKEO+31,Z
:POKEO+32,Z:POKEO+33,Z:POKEO+64,

```

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```

Z:PLAY"L25502E":RETURN
68 O=1024+Y+X:POKEO,Z:POKEO+30,Z
:POKEO+31,Z:POKEO+32,Z:POKEO+33,
Z:POKEO+34,Z:POKEO+64,Z:PLAY"L25
502G":RETURN
70 CLS0:FORV=1TO5:GOSUB100
71 Z=R:FORX=33TO57STEP6:FORY=0TO
224STEP224:GOSUB76:PLAY"L25503C"
:NEXTY,X
72 Z=S:FORX=130TO154STEP6:FORY=0
TO224STEP224:GOSUB77:PLAY"L25503
E":NEXTY,X
73 Z=T:FORX=102TO126STEP6:FORY=0
TO224STEP224:GOSUB78:PLAY"L25503
G":NEXTY,X
74 Z=U:FORX=167TO191STEP6:FORY=0
TO224STEP224:GOSUB79:PLAY"L25504
C":NEXTY,X
75 PLAY"P1":NEXTV:PLAYS$:GOTO9
76 O=1024+X+Y:FORP=0TO4:POKEO+P,
Z:NEXTP:POKEO-32,Z:POKEO+32,Z:PO
KEO-30,Z:POKEO+34,Z:POKEO-28,Z:P
OKEO+36,Z:RETURN
77 O=1024+X+Y:FORP=0TO4:POKEO+P,
Z:POKEO+P+64,Z:POKEO-32+32*P,Z:N
EXTP:POKEO-64,Z:POKEO+98,Z:RETUR
N
78 O=1024+X+Y:FORP=0TO3:POKEO-P,
Z:POKEO-32*P,Z:NEXTP:POKEO-34,Z:
RETURN
79 O=1024+X+Y:FORP=0TO3:POKEO-P,
Z:POKEO+32-32*P,Z:NEXTP:POKEO-4,
Z:RETURN
80 CLS0:FORV=1TO5:GOSUB100
81 Z=R:FORX=100TO124STEP8:FORY=0
TO192STEP192:GOSUB86:PLAY"L25503
C":NEXTY,X:FORX=417TO441STEP8:FO
RP=0TO3:POKE1024+X+P,Z:NEXTP:POK
E1024+X+35,Z:NEXTX
82 Z=S:FORX=200TO216STEP8:FORY=0
TO192STEP192:GOSUB86:PLAY"L25503
E":NEXTY,X:FORX=64TO88STEP8:FORP
=0TO3:POKE1024+X+P,Z:NEXTP:POKE1
024+X-32,Z:NEXTX:O=1216:GOSUB89:
O=1408:GOSUB89:FORP=0TO2:FORQ=0T
O192STEP192
83 POKE1183-P+Q,Z:POKE1247-P+Q,Z
:POKE1245+32*P+Q,Z:NEXTQ,P:Z=T:F
ORX=96TO120STEP8:FORY=0TO192STEP
192:GOSUB87:PLAY"L25503G":NEXTY,
X
84 FORX=38TO62STEP8:FORY=0TO384S
TEP192:GOSUB88:PLAY"L25504C":NEX
TV,X:FORX=130TO154STEP8:FORY=0TO
192STEP192:GOSUB88:PLAY"L25504C"
:NEXTY,X
85 PLAY"P1":NEXTV:PLAYS$:GOTO9
86 O=1024+X+Y:FORP=-3TO3:POKEO+P
,Z:NEXTP:FORP=-64TO64STEP32:POKE

```

```

O+P,Z:NEXTP:FORP=0TO3:POKEO+64+P
,Z:POKEO-64-P,Z:NEXTP:FORP=0TO2:
POKEO+3-32*P,Z:POKEO-3+32*P,Z:NE
XTP:RETURN
87 O=1024+X+Y:POKEO,Z:POKEO+100,
Z:RETURN
88 O=1024+X+Y:POKEO,Z:POKEO+32,Z
:RETURN
89 FORP=0TO2:POKEO-32*P,Z:POKEO+
32*P,Z:POKEO+1+P,Z:POKEO+65+P,Z:
POKEO+3-32*P,Z::NEXTP:RETURN
90 CLS0:FORV=1TO5:GOSUB100
91 Z=R:FORX=33TO27STEP8:GOSUB96:N
EXTX:FORX=167TO183STEP8:GOSUB96:
NEXTX:FORX=323TO347STEP8:GOSUB96
:NEXTX:O=1215:GOSUB97:FORP=192TO
194:POKE1024+P,Z:POKE1088+P,Z:NE
XTP
92 Z=S:FORX=7TO23STEP8:GOSUB96:N
EXTX:FORX=163TO187STEP8:GOSUB96:
NEXTX:FORX=327TO343STEP8:GOSUB96
:NEXTX
93 O=1055:GOSUB97:O=1375:GOSUB97
:FORP=32TO34:POKE1024+P,Z:POKE10
88+P,Z:POKE1344+P,Z:POKE1408+P,Z
:NEXTP
95 PLAY"P1":NEXTV:PLAYS$:GOTO9
96 O=1024+X:FORP=0TO3:POKEO-P,Z:
POKEO+32+P,Z:POKEO+64-P,Z:POKEO+
96+P,Z:POKEO+128-P,Z:NEXTP:PLAY"
L25503C":RETURN
97 FORP=0TO3:POKEO-P,Z:POKEO+64-
P,Z:POKEO+128-P,Z:NEXTP:POKEO+32
,Z:POKEO+96,Z:PLAY"L25503C":RETU
RN
100 R=RND(8):S=RND(8):IFR=S THEN
100
101 T=RND(8):IFT=R THEN101
102 IFT=S THEN101
103 U=RND(8):IFU=R THEN103
104 IFU=S THEN103
105 IFU=T THEN103
106 R=16*R+127:S=16*S+127:T=16*T
+127:U=16*U+127:RETURN

```



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Soccer Instructor

By Vincent H. Sheridan

A text and graphics program, *Soccer Instructor* helps newcomers to the game of soccer understand the field markings and their effect on the game. The program requires 32K or 64K Extended BASIC and a cassette player. I have coached minor league soccer for nine years, and wrote this program to show my family that CoCo could be used for more than playing games.

The title page is followed by an introductory note on the program after which the field is drawn in PMODE4 for the first time, off screen, and shown following the SCREEN command. The program then switches to a menu listing seven field features.

(Vincent Sheridan is a supervising design engineer with Ontario Hydro. He is an amateur photographer, and has coached minor league soccer for several years. He is interested in writing educational programs for the CoCo.)



Program Structure

10-20	Credit
30	Reserves eight graphics pages
50-240	Title page
250-280	Introductory text
290-310	INKEY\$ routine for branch to Line 10000 for field graphics subroutine
320-430	Menu
440	Branch to exit program
450	Branch to repeat program
1000-7190	Subroutines for field features
10000-10260	Draws initial soccer field

Selection of a feature will cause the field to be redrawn quickly by means of the PCOPY command. The feature is emphasized by flashing, by PSETting and PRESETting lines or PAINTing first in the foreground color and then in the background

color. After five flashes, the text screen is shown to describe the field feature and its effect on the game.

Soccer Instructor will be of use to beginning soccer players and coaches alike for a better understanding of the game.

240	.....	236	4000	.....	98
340	.....	54	6090	.....	27
1010	.....	95	7015	.....	205
1111	.....	184	7170	.....	217
2140	.....	222	10140	.....	63
3050	.....	114	END	.....	223

The listing: SOCCER

```

10 REM*****
   *   SOCCER FIELD   *
   * AN ILLUSTRATED GUIDE *
   * FOR NEW SOCCER PLAYERS *
   *   BY V.A.SHERIDAN *
   * COPYRIGHT (C) 1985 *
   *****
20 REM*****
30 PCLEAR8
40 CLS
50 FOR X=33TO62
60 PRINT@X,CHR$(128)
70 NEXTX
80 FORX=449TO478
90 PRINT@X,CHR$(128)
100 NEXTX
110 FORY=65TO417STEP32
120 PRINT@Y,CHR$(128)
130 NEXTY
140 FORY=80TO462STEP32
150 PRINT@Y,CHR$(128)
160 NEXTY
170 FORZ=94TO446STEP32
180 PRINT@Z,CHR$(128)
190 NEXTZ
200 PRINT@131,"S O C C E R";
210 PRINT@164,"F I E L D";
220 PRINT@338,"A GUIDE FOR";
230 PRINT@370,"NEW PLAYERS";
240 FORT=0TO3000:NEXTT

```

```

250 CLS
260 PRINT:PRINT"*****SOCCER
   FIELD***** THE GAME OF SOC
   CER IS PLAYED ONA SPECIALLY MARK
   ED FIELD.IT IS IMPORTANT THAT A
   NEW PLAYER   LEARNS WHAT THES
   E MARKINGS ARE FOR AND HOW THEY
   EFFECT THE GAME";
270 PRINT".I HOPE THIS PROGRAM W
   ILL PROVE TO BE USEFUL.
   A PICTURE OF THE SOCCER
   R FIELD   FOLLOWS, YOU WILL THEN
   SEE A LISTOF FIELD FEATURES.PRES
   SING THE NUMBER KEY WILL TELL Y
   OU MORE."
280 PRINT:PRINT"PRESS ANY KEY TO
   SEE THE FIELD."
290 I$=INKEY$
300 IF I$=""THEN290
310 IFI$<>"THENCLS:GOSUB10000
320 PRINT"           soccer field
   ":PRINT"(1)SIZE OF THE
   FIELD.           (2)THE GOAL.
   EA.             (3)THE GOAL AR
   SPOT.           (4)THE PENALTY
   AREA.           (5)THE PENALTY
   "
330 PRINT"(6)THE CENTRE CIRCLE.
   (7)THE CORNERS."
340 PRINT:PRINT"PICK A SUBJECT A
   ND PRESS THE   NUMBER KEY,OR PR
   ESS 'E' TO END THE PROGRAM,OR P
   RESS 'R' TO   REPEAT THE PROGR
   AM."
350 K$=INKEY$
360 IFK$=""THEN350
370 IFK$="1"THENSOUND200,2:GOSUB
   10000
380 IFK$="2"THENSOUND200,2:GOSUB

```


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	HI-RES II NEW	HI-RES I OLD	BRAND X
Upper/Lower case characters	Yes	Yes	Yes
Reverse Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (92K to 255 (9)	51 only (1)	
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Full/Black	Full/Black	Full/Black
X,Y Coordinate Control			
Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key lines format	Client/Key/Com key		No
16, 32 & 64K Supported	Yes	Yes	Yes
Green or Black Background			
Color	Yes	No	No
Dual Character sets (e.g. Enhanced 64 and 85)			
Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character			
Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatibility	Yes	No	No
On Error Goto Function	No	Yes	Yes
Expanded Basic Reserved	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	\$24.95	\$19.95	\$29.95



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```

2000
390 IFK$="3"THENSOUND200,2:GOSUB
3000
400 IFK$="4"THENSOUND200,2:GOSUB
4000
410 IFK$="5"THENSOUND200,2:GOSUB
5000
420 IFK$="6"THENSOUND200,2:GOSUB
6000
430 IFK$="7"THENSOUND200,2:GOSUB
7000
440 IFK$="E"THENCLS:PRINT@193,"N
OW YOU KNOW THE FIELD!!":PRINT@2
57,"HAVE A GOOD SOCCER SEASON!!"
:FORT=1 TO1000:NEXTT:CLS:END
450 IFK$="R"THENCLS:GOTO10
460 CLS:GOTO320
1000 FORN=1TO5
1010 PMODE4,5:COLOR0,1:SCREEN1,0
:PCOPY1TO5:PCOPY2TO6:PCOPY3TO7:P
COPY4TO8
1020 FORT=1TO500:NEXTT
1030 LINE(4,16)-(252,176),PRESET
,B:SOUND150,4:FORT=1TO500:NEXTT
1040 NEXTN
1050 PCLS
1060 CLS
1070 SCREEN0,0
1080 PRINT"*****SIZE OF FIEL
D*****"
1090 PRINT" THE FIELD IS 50 TO 1
00 YARDS WIDE,AND 100 TO 130 Y
ARDS LONG. THE LINES AT THE GOAL
ENDS OF THE FIELD ARE CALLED
GOAL LINES,AND THE LINES DOWN TH
E SIDES OF THE FIELD ARE CALLED
SIDELINES."
1100 PRINT"IF THE ATTACKING TEAM
KICKS THE BALL OVER THE GOAL LI
NE THE DEFENDING TEAM IS AWA
RDED A GOALKICK."
1105 PRINT:PRINT"PRESS ANY KEY T
O CONTINUE."
1106 B$=INKEY$
1107 IF B$=""THEN1106ELSE1110
1110 CLS:PRINT:PRINT"IF THE DEFE
NDING TEAM TOUCHES THE BALL BE
FORE IT CROSSES THE GOAL LINE T
HE ATTACKING TEAM IS AWARDED A C
ORNER KICK. IF A PLAY
ER CAUSES THE BALL TOCROSS THE S
IDELINE,THE OPPOSING TEAM IS AWA
RDED A THROW-IN."
1111 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."
1120 A$=INKEY$
1130 IFA$=""THEN1120ELSE RETURN
2000 PMODE4,5:COLOR0,1:SCREEN1,0
:PCOPY1TO5:PCOPY2TO6:PCOPY3TO7:P

```

```

COPY4TO8
2010 FORN=1TO5
2020 LINE(0,84)-(4,88),PRESET,BF
2030 LINE(0,104)-(4,108),PRESET,
BF
2040 LINE(0,84)-(0,108),PRESET
2050 LINE(256,84)-(256,108),PRES
ET
2060 LINE(256,104)-(252,108),PRE
SET,BF
2070 LINE(256,84)-(252,88),PRESE
T,BF
2080 FORT=1TO500:NEXTT
2090 LINE(0,84)-(4,88),PSET,BF
2100 LINE(0,104)-(4,108),PSET,BF
2110 LINE(0,84)-(0,108),PSET
2120 LINE(256,84)-(256,108),PSET
2130 LINE(256,104)-(252,108),PSE
T,BF
2140 LINE(256,84)-(252,88),PSET,
BF
2150 SOUND150,6
2160 NEXTN
2170 PCLS1
2180 CLS
2190 PRINT"*****THE GOAL*
*****"
2200 PRINT" THE GOALS ARE MADE O
F TWO UPRIGHT GOALPOSTS AND
A CROSSBAR.THEY CAN ONLY BE OF
WOOD OR METAL,AND ARE PAINTED
WHITE. THE GOAL IS 8 YARDS(
24 FEET) WIDE,AND 8 FEET HIGH.
";
2210 PRINT" THE USE OF NETS IS O
PTIONAL, BUT CAN BE ENFORCED B
Y THE LOCALRULING BODY.
FOR A GOAL TO BE SCO
RED,THE BALL MUST BE COMPLETE
LY BEHIND THE GOALINE."
2220 PRINT" PRESS ANY KEY TO CON
TINUE."
2230 I$=INKEY$
2240 IF I$=""THEN2230ELSEReturn
3000 FORN=1TO5
3010 PMODE4,5:COLOR0,1:SCREEN1,0
:PCOPY1TO5:PCOPY2TO6:PCOPY3TO7:P
COPY4TO8
3020 PAINT(10,96),0,0
3030 PAINT(246,96),0,0
3040 SOUND150,4:FORT=1TO500:NEXT
T
3050 NEXTN
3060 PCLS1
3070 CLS
3080 PRINT"*****THE GOAL ARE
*****"
3090 PRINT" THE GOAL AREA IS DIR
ECTLY IN FRONT OF THE GOAL.IT

```

```

ND ONE TEAM IS GIVEN THE BALL.";
6100 PRINT"THE OPPOSING TEAM MUST
STAY IN THE OTHER HALF OF THE
FIELD AT LEAST 10 YARDS AWAY FROM
THE BALL."
6110 PRINT" PRESS ANY KEY TO CON
TINUE."
6120 I$=INKEY$
6130 IF I$="" THEN 6120 ELSE 6140
6140 CLS:PRINT:PRINT" THE BALL MUST
BE KICKED INTO THE OPPONENT'S
HALF OF THE FIELD. THE KICKER
CAN NOT TOUCH THE BALL A SECOND
TIME UNTIL IT HAS BEEN TOUCHED
BY ANOTHER PLAYER."
6150 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."
6160 K$=INKEY$
6170 IF K$="" THEN 6160 ELSE RETURN
7000 FOR N=1 TO 5
7010 PMODE 4,5:COLOR 0,1:SCREEN 1,0
:PCOPY 1 TO 5:PCOPY 2 TO 6:PCOPY 3 TO 7:PCOPY 4 TO 8
7015 FORT=1 TO 500:NEXT T
7020 PAINT(5,17),0,0
7030 PAINT(251,17),0,0
7040 PAINT(251,175),0,0
7050 PAINT(5,175),0,0
7060 SOUND 150,4:FORT=1 TO 500:NEXT
T
7070 NEXT N
7080 PCLS 1
7090 CLS
7100 PRINT"*****THE CORNER
S*****"
7110 PRINT" THE CORNERS OF THE FIELD
ARE MARKED BY AN ARC OF 1 YARD
RADIUS, AND A FLAG OF MINIMUM
HEIGHT 5 FEET."
7120 PRINT" IF A DEFENDING PLAYER
TOUCHES THE BALL BEFORE IT PASSES
OVER THE GOAL LINE, THE ATTACKING
TEAM IS AWARDED A CORNER KICK. THE
BALL IS PLACED INSIDE THE CORNER
MARKING BEFORE BEING KICKED INTO
PLAY."
7130 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."
7140 I$=INKEY$
7150 IF I$="" THEN 7140 ELSE 7160
7160 CLS:PRINT:PRINT" THE DEFENDING
PLAYERS MUST BE AT LEAST 10 YARDS
AWAY FROM THE BALL UNTIL IT IS
KICKED. A GOAL MAY BE SCORED
DIRECTLY FROM A CORNER KICK."
7170 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."
7180 K$=INKEY$

```

```

7190 IF K$="" THEN 7180 ELSE RETURN
10000 PMODE 4,1
10010 COLOR 0,1
10030 PCLS 1
10040 LINE(4,16)-(252,176),PSET,B
10050 LINE(128,16)-(128,176),PSET
T
10060 LINE(4,52)-(4,140),PSET,B
10070 LINE(4,76)-(4,116),PSET,B
10080 CIRCLE(128,96),2,0
10090 CIRCLE(28,96),2,0
10100 CIRCLE(28,96),2,0,1,.875,.125
10110 LINE(0,84)-(4,88),PSET,BF
10120 LINE(0,104)-(4,108),PSET,BF
10130 LINE(0,84)-(0,108),PSET
10140 LINE(256,84)-(256,108),PSET
T
10150 LINE(256,104)-(252,108),PSET
,BF
10160 LINE(256,84)-(252,88),PSET
,BF
10170 CIRCLE(228,96),2,0,1,.375,.625
10180 CIRCLE(228,96),2,0
10190 LINE(252,76)-(240,116),PSET
T,B
10200 LINE(252,52)-(216,140),PSET
T,B
10210 CIRCLE(4,16),8,0,1,0,.25
10220 CIRCLE(252,16),8,0,1,.25,.50
10230 CIRCLE(252,176),8,0,1,.5,.75
10240 CIRCLE(4,176),8,0,1,.75,0
10245 SCREEN 1,0
10250 FOR T=1 TO 10000:NEXT T
10260 RETURN

```

Quickie . . .

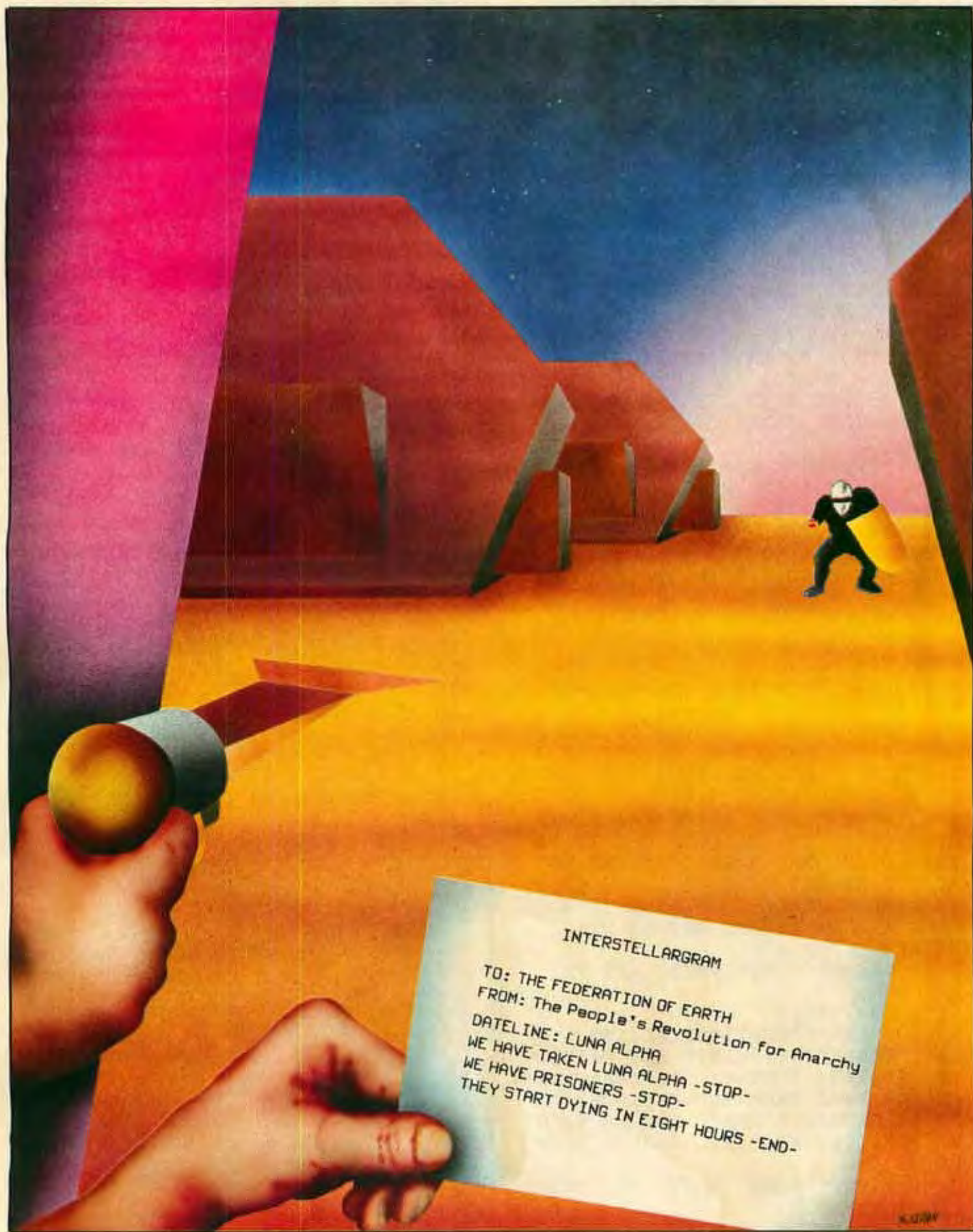
Sinelines

If you want the graphics to move a bit faster or slower to match your preferred beat, then change the 'S' variable in Line 61 to, for example .05 for slower music. Experiment!

```

10 REM**SINLINES, BY NORM CUTLER
20 PCLS:PMODE 4,1:SCREEN 1,1
60 B=B+1
61 S=S+.1
70 Q=0+Q
80 IF B>250 THEN PCLS:I=-2
90 IF Q>180 THEN Q=-2
92 IF Q<5 THEN Q=2
93 IF B<5 THEN I=2
96 X=(SIN(S)*129)+129
100 LINE(X,Q)-(Q,B),PSET
150 GOTO 60

```



INTERSTELLARGRAM
TO: THE FEDERATION OF EARTH
FROM: The People's Revolution for Anarchy
DATELINE: LUNA ALPHA
WE HAVE TAKEN LUNA ALPHA -STOP-
WE HAVE PRISONERS -STOP-
THEY START DYING IN EIGHT HOURS -END-

Save The Captive Scientists!

OPERATION FREEDOM

By Steve Britton IV

“This is the only message we have received from them,” your superior says as he hands you the interstellargram. “The lives of almost 80 of the Earth’s most brilliant scientists are at stake! That is why I have decided to send you, our best agent, to free as many of those people as you can, before it is too late . . .”

With these words ringing in your ears you now stand at the beginning of what seems to be a deserted lunar street. This is only one of the many that run throughout Luna Alpha, the first lunar colony of its kind, population: 80.

Operation Freedom will run on any 16K CoCo with Extended Color BASIC. The object of the game is to free as many captives as possible and safely escape without being killed by terrorist laser fire.

The playing screen is divided into three views. The largest is a map showing your position in Luna Alpha. At the bottom of the screen toward the middle is a side view of you as you run along the lunar streets. The smallest view, in the lower left corner of the screen, is the view of your laser weapon’s targeting system.

You may move around the streets (yellow lines) of the map using the right joystick. Your position is indicated by the blue

(Steve Britton is a 16-year-old student who will be a senior at William Blount High School this fall. He is a self-taught programmer and has been developing programs for the past two and a half years.)

dot. The small red areas are the locations of captives being held prisoner by the terrorists. To free these captives, move up to an area that you have not been to yet and watch for the prison bars to appear on the side view and press the firebutton. The number of captives you have freed from this area is indicated under the word "FREED" located at the top right corner of the screen. The number of captives in an area will vary from one to six.

As you move around the deserted streets of Luna Alpha, you will encounter terrorists quite frequently. When a terrorist has been encountered, a red square will appear in the view of your targeting system. This square represents the relative position of the terrorist.

Notice the two rows of green dots running up and down and left to right along the two sides of this view. These are aim indicators. To aim at the terrorist, use the right joystick. Moving the joystick left and right controls the horizontal indicators, while moving the joystick up and down controls the vertical indicators. Align the blinking indicators up so when you fire, the point where the indicators intersect is on top of the red square.

On paper this sounds quite complex, but when you actually play a few times it becomes quite simple. Just hitting the

red square will not kill the terrorist because the terrorists have developed a special armor. Keep firing, though, until you hit a weak spot. However, don't concentrate too deeply on killing the terrorist because he is firing at you, too! He will either shoot at your head or at your feet. When a terrorist fires, you will see the shot coming toward you (on the side view) at a speed determined by the skill level chosen at the beginning of the game (one is easy and five is hard). To dodge this shot, push the right joystick all the way up and press the firebutton to jump. Push the right joystick all the way down and press the firebutton to duck. Be sure to hold the firebutton down until the shot has safely passed.

All of this running and shooting can drain one's strength and ammunition supply rather quickly. Your strength and ammo are indicated by red lines at the lower right of the screen. When the red line under strength reads zero, you will die of fatigue. When your ammo reaches zero, you will not be able to shoot at terrorists; you will simply have to dodge any shots fired until the terrorist goes away. They usually only take a few shots and retreat anyway, so it is relatively easy to survive without ammunition.

The green areas on the map are the

secret hideaways inhabited by the scientists who managed to escape the terrorists. Stop at these places to rest and reload your laser weapon with energy by moving up beside them until a green figure appears in front of you in the side view. When this occurs, hit the firebutton and your strength and ammo are now ready for combat once again.

Free as many captives as you can being careful not to use too much strength in the process and stop to restore your essentials until you reach your destination; the starbase where an escape ship awaits to "beam you up" (located at the top left of the map and represented by a green star-like shape).

When you successfully complete Phase one by reaching the escape ship you then start over on Phase two. After each successful completion of a phase 1,000 bonus points are awarded. The higher the phase, the harder the game. For each phase you gain, the difficulty factor will increase by one until it reaches five (the highest skill level). For beginners, I would recommend starting on Phase one or two to get used to the controls. Intermediates will find challenge on Level three, while experts will find levels four and five quite difficult to master.

Good luck!



120	.....94	8027	.....254
125	.....170	9000	.....189
155	.....207	10020	.....24
510	.....73	20020	.....18
1005	.....190	30010	.....130
7020	.....84	END	.....23

The listing: FREEDOM

```

Ø CLSØ:C$=CHR$(128):GOTO4ØØØØ
1 PH=1:CLSØ:PRINT@45,"PHASE 1";:
FORX=1TO5ØØ:SCREENØ,1:NEXTX
2 POKE14Ø,15Ø
99 PMODEL1,1:PCLS3
1ØØ DRAW"BM16,3C2R2D2R2L6BM9,8R2
F2R8F2H2L4D2R2L2D4R2D2R2F2D2BM14
,18D4L2BM16,8R2"
1Ø1 DRAW"BM38,3R2D2R2L6BM31,8R2F
2R8D2L4D4R2D2R4D2BM36,18D4L2BM38
,8R2"
1Ø2 DRAW"BM56,1R2D2R2L6BM54,8E2R
6F2H2L2D2L2D4L2D2R6D2"
1Ø3 DRAW"BM82,9R2D2R2L6BM8Ø,14R6
D2L4D2L2H2F2D4L2R2U4R6D4R4"

```

```

1Ø4 DRAW"BM1ØØ,6R2F2G2L2U2D6U4R2
F2D2BM1Ø8,14R1BM112,6D8BM116,14R
1BM12Ø,6D8U4R2E2H2L2BM1ØØ,2ØD2R1
4L2U2L4BM124,22L6R2U2R2"
1Ø5 DRAW"BM135,1ØC4R18D2L18R4D8L
4R18D2L18U2R8U8R4D8R4U8"
1Ø6 DRAW"BM162,7C1R4D2L4R2D4R2F2
H2L4H2F2R2D6R2D2R2D2BM16Ø,22U2R2
U2"
11Ø DIMR1(1,2),R2(2,2),J(1,2),D(
1,2),K(2,2),P(1,2),H(1,2),IK(1,2
),IS(1,2),ZT(7,7)
12Ø GET(9,3)-(22,23),R1:GET(3Ø,2
)-(45,23),R2:GET(54,1)-(65,16),J
:GET(76,9)-(9Ø,22),D:GET(1ØØ,6)-
(125,22),K:GET(135,1Ø)-(155,22),
P:GET(16Ø,7)-(169,22),H
121 PCLS3:COLOR4,3:LINE(5,3)-(19
7,117),PSET,B:LINE(5,135)-(53,17
7),PSET,B:LINE(68,135)-(165,176)
,PSET,B
122 DRAW"BM184,1Ø6C1R2L4D2R4F2H2
U2E2G2L4H2F2D2G2E2U2R4U1C2U29L4Ø
D26L38U26L42D26L36U5ØR4ØD1ØR38U3
ØR48D18R2ØU4ØL76D24L58U18L24U8C1
R2L4U2R4E2G2L4H2F2D2G2E2R4F2H2BM

```

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183, 133C2R6L6D4R6D4L6BM193, 133R4
L2D8BM201, 133R4D6F2H2U2L4D4U8BM2
11, 133R6L6D4R2L2D4R6"
123 DRAW"BM168, 79C2D8C4R2L4D2R4B
M145, 76C1L2U2R2BM145, 88C2L8C4U2L
2D4R2BM106, 99C1L2U2D4L2U4BM84, 79
C2D8C4R2D2L4BM65, 80C1L2U2L2D4R2B
M47, 100C2U8C4R2U2L4D2BM28, 96C1L2
U2L2D4R2BM221, 133C2D8U8F4R2D4U8B
M231, 133R6D2U2L6D8R6U2R2L4BM243,
133R4L2D8BM251, 133D8U4R4U4D8"
124 DRAW"BM31, 64C2R8C4U2R2D4L2BM
52, 55C2D8C4R2D2L4U2BM73, 56C1R2U2
R2D4L2BM108, 47C2R10D4C4R2D2L4U2B
M127, 31C2U8C4R2U2L4D2BM132, 35C1D
2R2D2L4U2BM174, 35C2L6U6C4R2U2L4D
2BM151, 12C2D10C4R2D2L4U2BM178, 12
C1R2U2R2D4L2"
125 DRAW"BM98, 19C2L6C4U2L2D4R2BM
71, 32C2U8L8C4U2L2D4R2BM51, 36C2D6
C4R2D2L4U2BM45, 20C1R2U2R2D4L2BM2
3, 16C2D20C4R2D2L4U2BM205, 2C2R6L6
D8U4R2BM215, 2R4D6F2H2U2L4D4U8BM2
25, 2R6L6D4R2L2D4R6BM235, 2R6L6D4R
2L2D4R6BM245, 2R4F2D4G2L4U8"
126 DRAW"BM183, 156C2G2D6U4R4U2D6
BM189, 156D8U8R2D2R6U2L2D2G2E2R4D
6BM203, 156D8U8R2D2R6U2L2D2G2E2R4
D6BM219, 156G2D4F2E2U4H2BM103, 16C

1R2U2R2D4L2":FORX=11TO47STEP4
127 PSET(X,137,1):NEXTX
128 FORY=139TO175STEP4
129 PSET(9,Y,1):NEXTY
130 COLOR2,3
131 IFPH>1ANDLQ<7THENLQ=LQ+1:GOT
O135
132 CLS:INPUT"LEVEL <1-5>";LQ:IF
LQ>5ORLQ<1THEN132ELSELQ=LQ+2
135 PRESET(X,Y):PLAY"V3103T255":
SCREEN1,0
140 X=186:Y=100:C=222:OO=205:PP=
25:V=222:W=0
150 S=20:A=20
151 COLOR4,3:LINE(182,146)-(220,
148),PSET,B:LINE(174,168)-(220,1
70),PSET,B:COLOR2,3
152 PRESET(X,Y)
155 J=JOYSTK(0):J1=JOYSTK(1):IFY
=11THENY=10
156 IFX=18AND Y=10THEN200000ELSEI
FX=17AND Y=10THEN200000
157 PUT(139,150)-(150,170),R1:EX
EC43359:IFRND(11)=1THEN8000
158 IFPPOINT(X+2,Y)=1ORPPOINT(X-
2,Y)=1ORPPOINT(X,Y+2)=1ORPPOINT(
X,Y-2)=1THENRH=1:PUT(111,155)-(1
20,170),H:ELSEIFRH=1THENLINE(104
,155)-(120,170),PRESET,BF:RH=0

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```

159 IFPPOINT(X+2,Y)=4ORPPOINT(X-
2,Y)=4ORPPOINT(X,Y+2)=4ORPPOINT(
X,Y-2)=4THENPC=1:PUT(111,155)-(1
31,167),P ELSEIFPC=1THENLINE(111
,155)-(131,167),PRESET,BF:PC=0
160 IFJ=63ORJ=0ORJ1=0ORJ1=63THEN
500
165 IFTIMER>=100THEN600ELSEPUT(1
39,150)-(152,170),R2:EXEC43359:F
ORQ=1TO35:NEXTQ:LINE(139,150)-(1
56,170),PRESET,BF
170 PE=PEEK(65280):IFPE=126ORPE=
254THEN700ELSE155
500 IFRH=1ANDPEEK(65280)=126ORPE
EK(65280)=254THEN700ELSEIFJ=63T
HENIFPPOINT(X+2,Y)=2THENPSET(X,Y
):X=X+2:PRESET(X,Y):GOTO165
505 IFJ=0THENIFPPOINT(X-2,Y)=2TH
ENPSET(X,Y):X=X-2:PRESET(X,Y):GO
TO165
510 IFJ1=63THENIFPPOINT(X,Y+2)=2
THENPSET(X,Y):Y=Y+2:PRESET(X,Y):
GOTO165
515 IFJ1=0THENIFPPOINT(X,Y-2)=2T
HENPSET(X,Y):Y=Y-2:PRESET(X,Y):G
OTO165
520 GOTO165

```

```

600 TIMER=0:S=S-1:C=C-2:PSET(C,1
46,2):PSET(C,148,2):IFC=182THEN5
000ELSEGOTO165
700 Q=RND(5):FD=FD+Q:FORZ=1TOQ:S
OUND(Z*30),1:LINE(OO,PP)-(OO+3,P
P+2),PSET,B:OO=OO+8:IFOO>=245THE
NPP=PP+6:OO=205
701 IFPPOINT(X+2,Y)=4THENPSET(X+
2,Y,3):PSET(X+3,Y,3)
702 IFPPOINT(X-2,Y)=4THENPSET(X-
2,Y,3):PSET(X-3,Y,3)
703 IFPPOINT(X,Y+2)=4THENPSET(X,
Y+2,3):PSET(X,Y+3,3)
704 IFPPOINT(X,Y-2)=4THENPSET(X,
Y-2,3):PSET(X,Y-3,3)
705 NEXTZ:SC=SC+(7*Q):GOTO155
800 V=V-2:PSET(V,168,2):PSET(V,1
70,2):RETURN
1000 XT=RND(30)+11:YT=RND(33)+13
8
1005 LINE(XT,YT)-(XT+3,YT+3),PSE
T,BF
1010 AZ=1
1015 GOTO170
5000 LINE(139,150)-(150,170),PRE
SET,BF:PUT(131,154)-(156,170),K:
FORX=1TO15:PLAY"T25CCA":NEXTX

```

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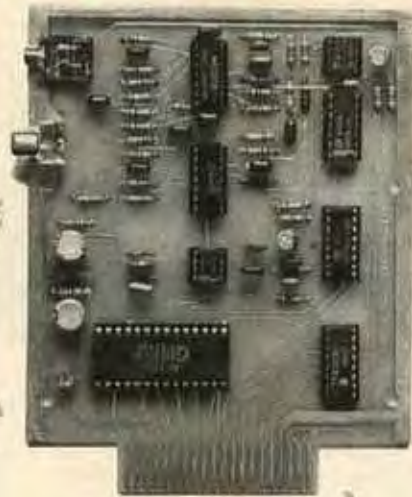
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Two Years In the Making. Speech Systems was formed to develop new and innovative speech products. After 2 years of intensive Research and Development, we have created a truly sophisticated speech recognition device. Recognition rates from 95% to 98% are typical. Until now, such a product was outside the price range of the personnel computer market, and even small businesses.

EARS is trained by your voice and capable of recognizing any word or phrase. Training EARS to your particular voice print takes seconds. Up to 64 voice prints may be loaded into memory. You may then save on tape or disk as many as you like so that your total vocabulary is virtually infinite.

Speech and Sound Recognition. EARS is really a sound recognition system, so it really doesn't matter whether you speak in English, Spanish, or French. In fact you do not have to speak at all, you can train EARS to understand sounds such as a musical note or a door slamming.

Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that

you would normally do through a keyboard can now be done by just speaking.

Programming EARS is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN; MATCH will instruct EARS to listen to you and return the matching phrase.

It Talks. EARS is also capable of high quality speech. We mean REALLY high quality. The speech is a fixed vocabulary spoken by a professional announcer. Speech Systems is currently creating a library of thousands of high quality words and phrases. For a demonstration call (312) 879-6844, you won't believe your ears or our EARS.

DISK OWNERS. EARS will work with any disk system with either a MULTI-PAK or Y-CABLE. Our new Triple Y-CABLE was specifically developed for those wishing to add SUPER VOICE as a third device.

You Get Everything You Need. You get everything you need including a specially designed professional headset style noise

cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

SUPER VOICE \$20 OFF

Imagine talking to your computer and it talking back to you. When you need an unlimited vocabulary, you can't beat SUPER VOICE. For a limited time, we will give you the SUPER VOICE for \$59.95 with your EARS purchase. Even if you already have another speech unit, here is your chance to buy the best and save \$20.

VOICE CONTROL

Applications for EARS are astounding. Here is our first of many listening programs to come. VOICE CONTROL is a program specifically designed to allow you to control any appliance in your house with your voice and our HOME COMMANDER (sold separately). For example, you can control your TV by saying "TV ON" or "TV OFF". \$24.95

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SUPER VOICE is no ordinary speech synthesizer. It uses Silicon Systems, Inc. SSI-263, the most advanced speech/sound chip available. SUPER VOICE is not only capable of highly intelligible speech, sound effects, and singing over a 6 octave range, but now we have turned SUPER VOICE into a monophonic Super Music Synthesizer with our PIANO KEYBOARD.

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The world's first TALKING HI-RES GRAPHICS adventure. Finding the hidden treasure is the easy part, getting back home is another story. **FREE EARS** to the first one to submit a solution.

32K Disk \$24.95



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When the SUPER VOICE speaks in a low pitched voice, the man speaks, when a high pitched voice is used the woman speaks. \$24.95

THE PIANO KEYBOARD

**FOR
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A 2½ octave (32 note) and 4 octave (49 note) professional Piano Keyboard connects to your COCO and SUPER VOICE to turn SUPER VOICE into a real music synthesizer. These keyboards are not toys. They are the same style, shape, size and feel as professional synthesizer keyboards. Included is the software to give MUSICA 2 (sold separately) Piano Keyboard input and SUPER SYNTH, a program that allows you to control critical SUPER VOICE parameters to develop incredible sounds.

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The HOME COMMANDER easily connects to the cassette port of your Color Computer and lets you control appliances in your home.

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The HOME COMMANDER uses your home's existing electrical wiring to control virtually anything. Appliances are controlled via small control modules available at your local SEARS or Radio Shack store.

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If you were disappointed in the software that came with the Radio Shack PLUG'N POWER unit, and you probably were, we'll offer you our powerful software separately. An early version is described in the Feb., April, June, and August 1983 issues of RAINBOW. Our current version is even better. **\$19.95**
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Use the PRECISION TIME MODULE to add the time element to your games or use on BBS. If you like, purchase separately our BBS.

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BATTERY BACKUP

Even when your computer is off, the clock keeps correct time by operating using the internal battery backup system.



FREE
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PROGRAM
requires VOICE
SUPER VOICE
or
SPEECH & SOUND PAK

MONTHS, LEAP YEARS & DST

The PRECISION TIME MODULE automatically adjusts for the different number of days in each month as well as leap years. And believe it or not, it adjusts for DST so you don't have to remember if it's SPRING FORWARD or FALL FORWARD.

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FOR
MUSICA 2
and
SUPER VOICE

PIANO KEYBOARD



The best music composition program, MUSICA 2, and most advanced speech/sound synthesizer, SUPER VOICE, just got better.

Imagine, now you can compose music with MUSICA 2 by inputting notes via a real piano keyboard. Hit A# and MUSICA 2 instantly displays the note.

The same keyboard can be used with SUPER VOICE to give you a real monophonic music synthesizer. The PIANO KEYBOARD comes in a 2½ and 4 octave version. They are not toys. They are the same style, shape, size, and feel you find in professional synthesizers.

Included is an enhanced command which gives MUSICA 2 (sold separately) piano keyboard input. Also included is SUPER SYNTH, a program which turns SUPER VOICE (see \$20 off special offer) into a Super Synthesizer. Disk owners must use a Y-CABLE or Multi-Pak.

2½ octave (32 note)\$79.95 4 octave (49 note)\$119.95

MUSICA 2 \$29.95

Tape or Disk

- When in stereo mode, music is played through our STEREO PAK (purchased separately).
- Loudness of each voice may be individually specified.
- Memory available is constantly displayed.
- Voice waveshapes may be exchanged between voices at any point.
- Tempo may be specified and may even be altered as the music plays.
- Flats and sharps supported.
- Billions of timbre combinations.
- High resolution graphic display, looks just like sheet music.
- MUSICA 2 is 100% software, no need for hardware unless you want music produced in STEREO. In that case, the STEREO PAK may be purchased separately. It's a must for the audiophile!
- Repeat bars allow repeating of music without re-inserting music a second or third time.
- 30 page manual describes all.
- Requires minimum of 32K.



- Allows you to specify key signature.
- Voice timbre (waveshape) may be altered by specifying harmonic content just like stops on an organ.
- During editing, voice being inserted is displayed.
- Each measure is numbered for easy reading of music.
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- Each voice may be visually highlighted for easy identification.
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- Input notes from Coco keyboard, joystick, or Piano Keyboard.

- Output music to your printer (Gemini 10X, Epson, R.S. printers).



- Play music from your own BASIC program.
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NEW! STEREO PAK™ \$39.95

Plug this gem into your computer, connect to your home stereo system and sit back and enjoy music realism. The STEREO PAK is a hardware music synthesizer that plays our MUSIC LIBRARY and MUSICA 2 music in stereo. Because it was designed specifically with music reproduction in mind, the sound is superb. The highs are crisp and clear while the bass notes will rattle your walls.

The STEREO PAK is all hardware. It is intended as an enhancement for MUSICA 2 and our MUSIC LIBRARY. Disk owners may use the STEREO PAK with the R.S. Multi-Pak or our Y-CABLE (\$28.95)

New!
NOW "PLAY"
AND "SOUND"
COMMANDS COME
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Requires 64K



NEW! MUSIC LIBRARY™ — 3 VOLUMES

You get over 100 four voice songs with a combined playing time of 3 hours. That's right, 3 hours of music. You won't believe your CoCo could sound so good. To fit over 100 songs required both sides of 5 C-20 tapes and the disk version uses 5 full disks (that's a half box of disks).

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Stage, Screen, and TV	Classical
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```

5001 CLS4:PRINT@102,"may"C$"you"
C$"rest"C$"in"C$"peace";
5002 FORE=128TO480STEP32:PRINT@E
,STRING$(31,"");:NEXT
5003 PRINT@224,"YOU FREED "FD" P
EOPLE ...";
5004 PRINT@320,"AND KILLED "XI"
IMPERIALS ...";
5005 PRINT@384,"FOR A TOTAL SCOR
E OF "SC;
5006 IFINKEY$=""THEN5006
5007 GOTO121
6000 INPUTX,Y:PSET(X,Y,1):SCREEN
1,0:FORX=1TO200:NEXTX:GOTO6000
6999 RH=1
7000 IFRH=0ANDPC=0THEN155ELSEIFP
C=1THEN700ELSEIFRH=1THEN FOR C=1
82 TO220:PSET(C,146,4):PSET(C,14
8,4):PLAYSTR$(INT((224-C)/4)):NE
XTC:S=20:C=222
7005 FORV=174TO220:PSET(V,168,4)
:PSET(V,170,4):PLAYSTR$(INT((224
-V)/4)):NEXTV:V=222
7010 IFPPOINT(X+2,Y)=1THENPSET(X
+2,Y,3):PSET(X+3,Y,3)
7015 IFPPOINT(X-2,Y)=1THENPSET(X
-2,Y,3):PSET(X-3,Y,3)
7020 IFPPOINT(X,Y+2)=1THENPSET(X

```

```

,Y+2,3):PSET(X,Y+3,3)
7025 IFPPOINT(X,Y-2)=1THENPSET(X
,Y-2,3):PSET(X,Y-3,3)
7030 GOTO155
8000 EX=RND(19)+15:EY=RND(16)+14
3
8005 LINE(70,137)-(129,170),PRES
ET,BF
8010 COLOR4,3:LINE(EX+2,EY+1)-(E
X,EY+5),PSET,BF:COLOR2,3:J=JOYST
K(0):J1=JOYSTK(1)
8011 IFJ<6THENJ=6
8012 IFJ1<6THENJ1=6
8015 J=INT(J/6):WX=(J*4)+6:J1=IN
T(J1/6):WY=(J1*4)+134
8020 PSET(WX,137,4):PSET(9,WY,4)
8025 Q=PEEK(65280):IFQ=126ORQ=25
4THENPK=PPOINT(WX,WY):IFV<176THE
N8050ELSEGOSUB8000:LINE(WX,137)-(
WX,WY),PSET:LINE(134,157)-(73,15
7),PSET:LINE(9,WY)-(WX,WY),PSET:
PLAY"ABABABAB":IFPK=4THEN8030ELS
ELINE(WX,137)-(WX,WY),PRESET:LIN
E(9,WY)-(WX,WY),PRESET
8026 LINE(73,157)-(134,157),PRES
ET:GOTO8050
8027 GOTO8050
8030 XI=XI+1:COLOR4,3:LINE(EX-4,

```

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```

EY) - (EX+10, EY+10), PSET, BF: COLOR2
, 3: FORQ=30TO100STEP5: PLAY "T"+STR
$(Q)+"AB": NEXTQ: LINE (EX-4, EY) - (E
X+10, EY+10), PRESET, BF: SC=SC+300:
LINE (WX, 137) - (WX, WY), PRESET: LINE
(9, WY) - (WX, WY), PRESET: PSET (WX, 13
7, 1): PSET (9, WY, 1)
8031 LINE (73, 157) - (134, 157), PRES
ET: GOTO155
8050 PSET (WX, 137, 1): PSET (9, WY, 1)
: IFRND (16) <= (LQ-2) THEN8060ELSE8
010
8060 IO=IO+1: IFIO=4THENIO=0: LINE
(EX-4, EY) - (EX+10, EY+10), PRESET, B
F: GOTO155ELSEZZ=1: Q=70: PSET (EX+2
, EY+3, 4): PLAY "ABABCD": PSET (EX+
2, EY+3, 1): IFRND (2)=1THEN9000
8065 Q=Q+ZZ: ZZ=ZZ+LQ
8066 EXEC43359
8067 J=JOYSTK(0): J1=JOYSTK(1)
8070 IFPPOINT (146, 150)=2ANDQ>=14
6THEN5000ELSEPSET (Q, 150, 4): DV=PE
EK (65280): IF (DV=126ORDV=254) ANDJ
1=63THENPUT (139, 157) - (150, 170), D
: LINE (139, 150) - (150, 155), PRESET,
BF ELSEPUT (139, 150) - (150, 170), R1
8075 IFQ<=149THEN8065
8080 LINE (71, 150) - (150, 150), PRES

```

```

ET: PLAY "CDCDABAB": LINE (139, 150) -
(150, 170), PRESET, BF: PUT (139, 150)
- (150, 170), R1: LINE (156, 151) - (162
, 151), PRESET: LINE (167, 151) - (180,
151), PRESET: GOTO8050
9000 Q=Q+ZZ: ZZ=ZZ+LQ
9001 EXEC43359
9005 J=JOYSTK(0): J1=JOYSTK(1)
9010 IFPPOINT (146, 166)=2ANDQ>=14
6THEN5000ELSEPSET (Q, 166, 4): DV=PE
EK (65280): IF (DV=126ORDV=254) ANDJ
1=0THENPUT (139, 150) - (150, 165), J:
LINE (139, 167) - (150, 170), PRESET, B
F ELSEPUT (139, 150) - (150, 170), R1
9020 IFQ<=149THEN9000
9030 LINE (71, 166) - (150, 166), PRES
ET: PLAY "CDCDABAB": LINE (139, 150) -
(150, 170), PRESET, BF: PUT (139, 150)
- (150, 170), R1: LINE (156, 167) - (162
, 167), PRESET: LINE (167, 167) - (180,
167), PRESET: GOTO8050
10000 CLS0
10001 PRINT@136, " ";
10002 POKE140, 245
10005 A$="operation": GOSUB10030
10010 A$="freedom"
10015 POKE1169, 58: EXEC43359
10016 PRINT@146, " ";

```

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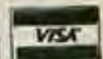
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```

10020 GOSUB10030
10021 FORX=1TO100:NEXTX:POKE1198
,45:EXEC43359:PRINT@175,"";A$="
by":GOSUB10030
10022 POKE1201,45:EXEC43359:PRIN
T@202,"";A$="steve":GOSUB10030
10023 PRINT@208,"";A$="britton"
:GOSUB10030
10025 FORX=1TO800:NEXTX:GOTO1
10030 FORX=1TOLEN(A$)
10031 POKE140,150
10035 B$=MID$(A$,X,1):PRINTB$;:E
XEC43359:FORZ=1TO RND(50):NEXTZ:
NEXTX
10040 RETURN
10045 NEXTKQ
10050 DRAW"BM88,4D7U3R4U4D7BM94,
8D3F1R3BM95,8R2D2L2BM100,6D6BM10
3,8D7U5R2E1U1H1L2BM116,4D4BM116,
11M116,11BM120,4D4BM120,11M120,1
1BM123,4D4BM123,11M123,11"
10060 FORKQ=1TO200:NEXTKQ:LINE(8

```

```

20050 DRAW"BM40,100C2D2R6U2L4D6R
2U4C4BM39,100D6R2U2BM44,108L2D2R
2BM48,100D6L2U2":GET(0,71)-(83,1
20),ZT
20060 PLAY"O1T1;4;6;5;1;T1;3"
20070 FORY=71TO0STEP-1:PCLS3:W=W
+2:PUT(0,Y)-(83,Y+49),ZT:PLAY"T"
+STR$(W)+"O2ABCD":NEXTY
20080 CLS0:PRINT"you"C$"have"C$
escaped";:POKE1024+17,33:POKE102
4+18,33
20090 FORE=128TO480STEP32:PRINT@
E,STRING$(31,"");:NEXT
20095 SC=SC+1000
30000 PRINT@224,"YOU FREED "FD"
PEOPLE ...";
30010 PRINT@320,"AND KILLED "XI"
IMPERIALS ...";
30020 PRINT@384,"FOR A TOTAL SCO
RE OF "SC;
30030 IFINKEY$=""THEN30030
30031 PH=PH+1:CLS0:PRINT@45,"PHA

```



```

8,4)-(123,15),PRESET,BF
10070 GOTO10020
20000 C$=CHR$(128):PMODE1,1:PCLS
3:SCREEN1,0:COLOR2,3:DRAW"BM0,12
0C4R4L2M8,99R66M80,120R2L4BM75,9
9E8U12H8L66G8D12F8":PAINT(36,88)
,4,4:PSET(20,180,2):DRAW"BM16,18
3C2F2R4E2M20,187G2D2BM23,190U2":
GET(16,180)-(24,190),IK:LINE(16,
-(40,99),PRESET,BF:NEXTX
180)-(24,190),PRESET,BF
20010 FORJZ=1TO10:PRESET(RND(80)
,RND(25)+71):NEXTJZ
20020 FORX=1TOINT(FD/5)
20025 FORZ=250TO40STEP-20
20030 GET(Z,111)-(Z+10,120),IS:P
UT(Z,111)-(Z+10,120),IK:EXEC4335
9:FORA=1TO50:NEXTA:PUT(Z,111)-(Z
+10,120),IS
20040 NEXTZ:PUT(40,111)-(50,120)
,IK:LINE(40,99)-(50,120),PSET,BF
:FORT=50TO100STEP10:PLAY"T"+STR$
(T)+"ABABABA":NEXTT:LINE(50,120)

```

```

SE";PH;:FORX=1TO500:SCREEN0,1:N
EXTX:GOTO121
40000 CLS:A$="TO:THE FEDERATION
OF EARTH":PRINT@0,"";:GOSUB10030
:A$="FROM:PEOPLE'S REVOLUTION FO
R":PRINT@64,"";:GOSUB10030:A$="A
NARCHY":PRINT@96,"";:GOSUB10030:
A$="DATELINE:LUNA ALPHA":PRINT@1
35,"";:GOSUB10030
40009 FORX=1TO200:NEXTX
40010 A$="WE HAVE TAKEN LUNA ALP
HA":PRINT@192,"";:GOSUB10030:PRI
NT@218,"-STOP-";:SOUND200,1
40014 FORX=1TO100:NEXTX
40015 A$="WE HAVE PRISONERS":PRI
NT@256,"";:GOSUB10030:PRINT@282,
"-STOP-":SOUND200,1
40019 FORX=1TO100:NEXTX
40020 A$="THEY START DYING IN 8
HRS.":PRINT@320,"";:GOSUB10030:P
RINT@346,"-END-":SOUND200,1
40030 FORX=1TO500:NEXTX:GOTO1000
0

```

Say 'Hello' To This Directory Helper

By Doug Heyza

"Stop! Slow down! I want to get on!"

Have you been saying those words every time you look at your diskette's directory? Well, I have a solution. *Hello* will help those of us who would like to see the directory before it scrolls down the screen.

From the program you can LOAD, RUN, KILL and RENAME programs with a section of the directory to look on. The program has a total of three pages available and 26 program names possible per page. *Hello* will list the programs you have on the pages, starting from the first page.

After you type in the program, make sure you save it. When you load or run a program from *Hello* it will be replaced with the program you select. A good thing to do is save this program on your most-used diskettes; it will save time in changing diskettes.

Instructions

When you run *Hello*, the program will ask for a drive number. Press the

(Doug Heyza is 15 years old and attends Stevenson High School in Livonia, Michigan. He is interested in computers and electronics and plans to have a computer-oriented career.)

appropriate drive number from which you want the directory listed (0, 1, 2 or 3). The program will then assign the programs on the disk with a letter and display them on the screen. These letters are used instead of typing in the whole program name:

R=Run	L=Load
N=Rename	K=Kill
P=Page	E=End program
!=Rerun program	

To use a function, press the letter of the function you want, which is outlined in black at the bottom of the screen. When using the functions Load and Run the program asks for a letter; press the corresponding letter to the program you want.

Pressing 'R' (Run) will LOAD a BASIC program and RUN it. If the program is in machine language it will be LOADED and EXECed. If the BASIC program needs a CLEAR or a PCLEAR before being RUN, don't use this option. Or, if a machine language program needs an EXECing address, don't use this option; you may be able to use the next option.

Pressing 'L' (Load) will basically do the same thing as Run except it only LOADs the program and does not RUN or EXEC it.

Pressing 'N' (Rename) will ask for the letter assigned to the program you would like to change, then there will be a space for the new name to be entered. Enter the name only in the blue space (first eight characters), then enter the extension in the red space (last three characters). It will then ask, "CORRECT (YES/NO)?" You must type YES and press the ENTER key. Inputting anything else will take you to the main menu. After YES is entered it will RENAME the program you selected and relist the directory from Page 1.

By pressing 'K' (Kill), you will be asked to press the letter of the program you want to kill. After the appropriate letter is pressed it will ask, "CORRECT (YES/NO)?" You must, again, type YES. It will kill the program and relist the directory.

Pressing 'P' (Page) will take you to the next page of the directory. If you are on the last page it will return to Page 1. It will also tell you what page you are on and the total number of pages.

Pressing 'E' (End Program), will exit you from the program, but will not clear it from memory.

Pressing the up-arrow key will rerun the *Hello* program. You can use this if the program you want isn't on the diskette you selected. First, change the diskette when you're at the main menu and while the disk light is off, press the up-arrow key. The new diskette's directory will be listed after you enter the drive number.

If you press the wrong function, and it is asking for a letter, pressing the CLEAR key will take you back to the main menu.

How it Works

Hello checks Track 17 on the drive you select, which contains the names of the programs on that disk. It uses the `DSKI$` command. It will check from sectors 3-11. Bytes 0-7 contain the name. If byte 0 is zero, then the name has been deleted and the program skips it. If byte 0 is "FF" (hexadecimal), then there are no more program names and

the program goes to the next procedure.

The extensions are in bytes 8-10 and the last thing it looks for is the file type (example: BASIC, data). That resides in byte 11. If it is a BASIC program, byte 11 would be zero. BASIC data files are one. Machine languages are two and text editor sources are three. If it isn't zero or two, it doesn't allow you to load it. (You can find out more in your "Disk Systems" book.)

It will then proceed to print the directory with a corresponding letter, one for each program on that page. From there it goes to the main menu subroutine and waits for a key (using the `INKEY$` statement) and goes to the proper subroutines. It uses the regular commands to `LOAD`, `RENAME` and `KILL`. To `RUN` it uses `LOAD "program name",R`.

For machine language programs it uses `LOADM` and `LOADM` followed by an `EXEC` command. The flashing cursor is produced by a colored square being printed before the `INKEY$` and a `CHR$(9)`, backspace, after it checks to see if there is an `INKEY$`. Otherwise, it branches to the subroutine selected.

Variables

DN — Drive number
 IS — `INKEY$` inputs
 T\$ — Program name
 ES — Extension name
 PS — Program name and extension
 F — File type
 PG — Number of pages
 PL — Number of program on last page
 P — Page presently on
 ST — Number of programs per column
 PN — Program number
 LP — Program number from input
 RS — New name input from rename

Changes that Can be Made

If you have only one drive you can put `REMARKS` before lines 40-100 to keep from entering the drive number every time you run the program.

If you don't receive `RAINBOW ON TAPE` and don't want to type this program in, send me \$3 for postage and handling. I'll send you a cassette copy. My address is 36145 Jay, Livonia, MI 48152.

240	.....	128
470	.....	59
640	.....	213
850	.....	160
END	.....	70

The listing: HELLO

```

10 'HELLO                BY DOUG HEYZA
20 CLEAR 2000
30 'SELECT DRIVE NUMBER
40 CLS
50 SOUND 200,1:PRINT"DRIVE # : "
60 PRINT"(0,1,2 OR 3)"
70 PRINT@10,CHR$(191);:IS=INKEY$
:IF IS="" THEN PRINT CHR$(8);:GO
TO 70
80 IF IS<"0" OR IS>"3" THEN 70
90 DN=VAL(IS)
100 PRINT@10,DN;
110 DRIVE DN
120 DIM A$(69),N(69),T$(69),E$(6
9),P$(69),F(69)
130 'READ DIRECTORY
140 N=0:P=0:FOR X=3 TO 11
150 DSKI$ DN,17,X,A$(1),A$(2)
160 FOR Q=1 TO 2
170 FOR I=1 TO 128 STEP 32
180 N=N+1
190 T$(N)=MID$(A$(Q),I,8)
200 IF ASC(T$(N))=255 THEN N=N-1
:GOTO270
210 IF ASC(T$(N))=0 THEN N=N-1:G


```

```

OTO250
220 E$(N)=MID$(A$(Q),I+8,3)
230 P$(N)=T$(N)+". "+E$(N)
240 F(N)=ASC(MID$(A$(Q),I+11,1))
250 NEXT I,Q,X
260 'PRINT FILES
270 PG=INT(N/26+.97)
280 PL=INT(((N-(PG-1)*26)/2)+.5)
290 P=P+1
300 CLS
310 IF P=PG THEN ST=PL ELSE ST=1
3
320 FOR PN=1 TO ST
330 PRINT CHR$(PN+96);" ";P$(PN+
((P-1)*26)),
340 IF P$(PN+ST+((P-1)*26))="" T
HEN 360
350 PRINT CHR$(PN+ST+96);" ";P$(
PN+ST+((P-1)*26))
360 NEXT PN
370 'MAIN MENU
380 SOUND 200,1:PRINT@448," rUN
LOAD RENAME KILL eND";
390 PRINT@480,"FUNCTION: ";CH
R$(126);"RUN PAGE";P;"OF";PG;
400 PRINT@490,CHR$(175);:IS=INKE
Y$:IF IS="" THEN PRINT CHR$(8);:
GOTO 400
410 IF IS="R" THEN 500
420 IF IS="L" THEN 580
430 IF IS="N" THEN 660

```

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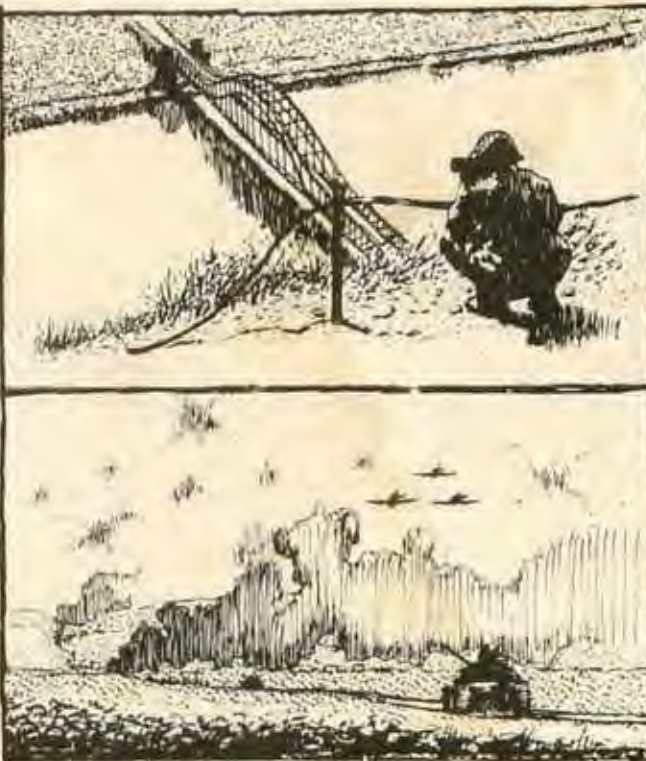
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```

440 IF I$="K" THEN 820
450 IF I$="E" THEN END
460 IF I$="P" THEN 920
470 IF I$="^" THEN RUN
480 SOUND 20,5:GOTO 400
490 'RUN
500 PRINT@448,"RUN LETTER:
";
510 GOSUB 950
520 IF F(LP)=1 THEN PRINT@480,"C
AN'T LOAD DATA ";:
SOUND 200,5:FOR EE=1 TO 500:NEXT
EE:GOTO 500
530 PRINT@448,"RUNNING: ";P$(LP)
;
540 IF F(LP)=2 THEN LOADM P$(LP)
:EXEC
550 IF F(LP)=0 THEN LOAD P$(LP),
R
560 GOTO 380
570 'LOAD
580 PRINT@448,"LOAD LETTER:
";
590 GOSUB 950
600 IF F(LP)=1 THEN PRINT@480,"C
AN'T LOAD DATA ";:
SOUND 20,5:FOR EE=1 TO 500:NEXT
EE:GOTO 500
610 PRINT@448,"LOADING: ";P$(LP)
;
620 IF F(LP)=2 THEN LOADM P$(LP)
:END
630 IF F(LP)=0 THEN LOAD P$(LP):
END
640 GOTO 380
650 'RENAME
660 PRINT@448,"RENAME LETTER:
";
670 GOSUB 950
680 PRINT@448,P$(LP);" TO ";STRI
NG$(8,175);".";STRING$(3,191);
690 PRINT@464,;:SOUND 200,1:LINE
INPUT N$
700 IF LEN(N$)>8 THEN 680
710 PRINT@472, ".";STRING$(3,191)
;
720 PRINT@473,;:SOUND 200,1:LINE
INPUT E$
730 IF LEN(E$)>3 THEN 710
740 R$=N$+"."+E$
750 PRINT@480,STRING$(31," ");
760 PRINT@480,"CORRECT (yes/no)?
";
770 SOUND 200,1:LINE INPUT YN$
780 IF YN$<>"YES" THEN CLS:GOTO
300
790 RENAME P$(LP) TO R$
800 GOTO 140
810 'KILL
820 PRINT@448,"KILL LETTER:
";
830 GOSUB 950
840 PRINT@448,"KILL: ";P$(LP);
850 PRINT@480,STRING$(31," ");
860 PRINT@480,"CORRECT (yes/no)?
";
870 SOUND 200,1:LINE INPUT YN$
880 IF YN$<>"YES" THEN CLS:GOTO
300
890 KILL P$(LP)
900 GOTO 140
910 'PAGE
920 IF P=PG THEN P=0
930 GOTO 290
940 'INPUT LETTERS
950 SOUND 200,1:PRINT@480,"[clea
r] TO EXIT TO MENU ";
960 PRINT@463,CHR$(255);:I$=INKE
Y$:IF I$="" THEN PRINT CHR$(8);:
GOTO 960
970 IF I$=CHR$(12) THEN 380
980 LP=(ASC(I$)-64)+((P-1)*26)
990 IF P$(LP)="" THEN SOUND 20,5
: GOTO 960
1000 PRINT@480,STRING$(31," ");
1010 RETURN

```

Corporation Plus is a fast paced arcade styled game combining skill, strategy and luck. In the course of the game, players may buy and sell corporations, invest in the stock market, buy lottery tickets, lose or gain capital in situations on the board or go bankrupt.

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By Bob, Daniel and Tino Delbourgo

It is quite common to get a view of the rotating Earth at the start of a news program. This is easy to arrange through cinefilm or on main-frame computers with powerful graphics, but represents a real challenge on small microcomputers with their limited memories. We offer you a program for our favorite 64K machine which just manages such a graphics feat. (You can, of course, adapt it to other circumstances.)

(Bob, Daniel and Tino Delbourgo are a father/sons programming team who have a particular interest in computer graphics. Tino delves into machine language, Daniel handles graphics and Bob provides the mathematical formulae.)

There are two tricks needed to simulate a spinning world: First, one has to devise a way of encapsulating the map of the Earth; second, one must find a way of storing the pictures in the computer — this is where the memory limitation is most acute.

For trick #1, we have broken up the world into 18 lunes (20 degree separations between lines of longitude), marked out the key vertices that needed joining and stored them in strings via DATA statements. Then, depending on the orientation of the Earth, we have called them up, done the necessary spherical projection and drawing, and stored the frame on tape or disk. For trick #2, we have managed to release 36 graphics pages in PMODE2 (a large slice of memory), and after calling up

Around The World In 18 Frames

the pictures from tape or disk, stored each frame in two pages.

After that it is a simple matter to flick through them in quick succession and get a perfectly satisfactory representation of the turning world. The eye is easily deceived into thinking the motion is smooth; with fewer pictures this would not have been true.

The program is necessarily divided into two parts. Listing 1, *Earthrot*, takes care of the world map and the successive drawings. When running it, do make sure your tape or disk is ready to store the 18 screens. *Pageturn*, the second listing, contains a machine language injection to release 20 pages in the upper reaches of the 64K of the 64K.

In addition, you will need to do some appropriate POKES to release a further 16 pages in the lower 32K — the instructions appear in the program. With all this memory available, loading the screens becomes a cinch (remember to have your disk ready or your tape properly rewound). The final step is the cinematography.

Even if your colleagues have another computer brand, they will be impressed by the versatility of CoCo, so please bring them along to the show!

(The Delbourgos may be reached at 15 Willowdene Ave., Sandy Bay, Hobart, Australia 7005 for any questions you may have concerning these programs.)

```

110 .....90
200 .....38
290 .....246
360 .....1
390 .....217
470 .....97
END .....70

```

Listing 1: EARTHROT

```

10 CLEAR1700:PI=3.14159265:CLS:P
RINT"ROTATING EARTH -- THE DELBO
URGOS":PRINT"WAIT A MOMENT FOR T
HE GEOGRAPHICSTRINGS TO BE READ
... "
20 DIMN(20),A$(20):N(1)=45:N(2)=
40:N(3)=43:N(4)=20:N(5)=20:N(6)=
46:N(7)=69:N(8)=44:N(9)=25:N(10)
=15:N(11)=10:N(12)=18:N(13)=17:N
(14)=42:N(15)=63:N(16)=27:N(17)=
11:N(18)=36
30 FORJ=1TO18:FORI=1TON(J):READL
A,LO:A$(J)=A$(J)+CHR$(LA+90)+CHR
$(LO):NEXTI,J
40 PRINT:PRINT"WILL YOU SAVE THE
PICTURES TO <T>APE OR <D>ISK?
"
50 IN$=INKEY$:IFIN$="T"THENDE=1:
GOTO70
60 IFIN$="D"THENDE=2:VERIFON:GO
TO70ELSE50
70 FORJ=18TO1STEP-1
80 PMODE2,1:PCLS1:SCREEN1,0
90 FORK=1TO9:I=J+K-1:IFI>18THENI
=I-18
100 LA=ASC(LEFT$(A$(I),1))-90:LO
=ASC(MID$(A$(I),2,1))-110+20*K:W
=0
110 LO=LO*PI/180:LA=90-LA:LA=LA*
PI/180:GOSUB200:X1=X:Y1=Y
120 FORII=3TOLEN(A$(I))STEP2:LA=
ASC(MID$(A$(I),II,1))-90:LO=ASC(
MID$(A$(I),II+1,1)):W=0:GOSUB210

```

```

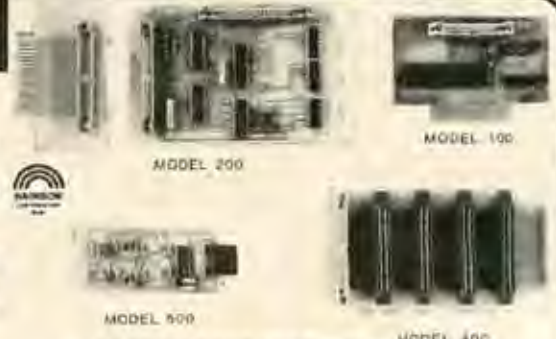
:NEXTII,K
130 CIRCLE(128,96),96,0:CIRCLE(1
8,18),16:LINE(18,18)-(18+16*COS(
J*2*PI/9),18+16*SIN(-J*2*PI/9)),
PSET:PAINT(240,190),0,0:PAINT(20
,190),0,0
135 IFJ=2*INT(J/2)THENPSET(10,90
,1):PSET(30,170,1):PSET(210,6,1)
:PSET(230,70,1):PSET(235,130,1):
PSET(220,180,1):PSET(250,40,1):P
SET(10,130,1)
140 IFDE=2THENSAREM"PAGE"+MID$(S
TR$(19-J),2),&H0E00,&H19FF,&HB44
A
150 IFDE=1THENCAREM"PAGE"+MID$(
STR$(19-J),2),&H0600,&H11FF,&HB4
4A:MOTORON:FORTT=1TO1000:NEXTTT:
MOTOROFF
160 NEXTJ:PRINT:PRINT"all saved!
":END
170 FORF=0TO1:FORK=-3TO4STEPST/2
:PMODEM,13-ST:PCLS1:SCREEN1,SC:C
OLORINT(M/2)
180 FORL=1TO ST:A=USR0((32-ST+L)
*256+2*K+6+L+16*F):NEXTL,K,F
190 FORI=1TO33-M STEPST:A=USR1(I
):SCREEN1,SC:FORT=1TO20:NEXTT,I:
GOTO190
200 Y=95*(1-COS(LA)):X=128+95*(S
IN(LA))*(SIN(LO)):X=INT(X):Y=INT
(Y):RETURN
210 IFLO>20THENLO=LO-100:W=1
220 LO=LO-110+20*K:LO=LO*PI/180:
LA=90-LA:LA=LA*PI/180:GOSUB200
230 IFW=1THENCOLOR1ELSECOLOR0
240 LINE(X,Y)-(X1,Y1),PSET
250 X1=X:Y1=Y:RETURN
260 DATA 78,20,79,16,76,20,78,20
,70,120,62,6,60,8,61,11,57,13,59
,18,64,17,67,20,54,120,55,11,58,
12,57,10,55,10,50,0,40,100,41,2,
42,4,43,10,38,17,36,17,37,13,38,
17,39,18,44,13,45,15,40,20,32,12

```

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0,29,20,31,10,33,12,32,0,5,100,4
 ,10,-2,9,-7,13,-20,12
 270 DATA -35,18,-35,20,-70,120,-
 68,10,-70,0
 280 DATA 70,0,71,9,68,20,68,17,6
 5,18,66,20,67,100,67,2,65,6,62,5
 ,61,12,54,0,40,100,36,2,38,4,41,
 4,41,7,46,8,45,18,42,20,41,7,37,
 8,37,17,32,16,31,10,32,0,20,120,
 30,18,28,17,29,15,15,20,0,110,-1
 7,120,-20,15,-23,15,-34,8,-35,0,
 -70,120,-68,14,-69,0
 290 DATA 66,0,69,14,66,20,46,120
 ,45,16,43,16,42,20,46,20,44,112,
 47,9,45,6,38,8,36,12,41,14,43,11
 ,44,12,40,120,26,120,27,17,28,12
 ,31,7,24,10,25,16,22,20,17,17,12
 ,7,20,0,15,100,11,6,12,12,4,8,-4
 ,0,-17,0,-17,106,-14,10,-20,10,-
 25,8,-24,5,-17,6,-20,100
 300 DATA -70,100,-65,1,-68,20
 310 DATA 66,0,69,0,72,6,71,12,67
 ,8,69,16,71,15,71,20,10,120,8,18
 ,16,14,22,12,20,10,25,6,25,0,0,1
 20,-68,100,-68,14,-70,15,-67,20
 320 DATA 71,0,76,20,5,120,7,18,1
 6,17,14,16,22,10,21,8,15,2,10,0,
 9,100,7,2,6,0,9,0,4,120,6,16,-2,
 20,-67,120,-66,5,-67,0
 330 DATA 76,0,75,12,71,4,72,20,4
 0,120,38,17,36,20,26,120,22,15,2
 1,9,20,11,19,8,21,9,20,6,18,5,13
 ,7,8,5,13,2,8,0,5,4,1,4,6,0,-2,5
 ,4,3,-2,100,-4,3,-9,15,-6,10,-4
 ,3
 340 DATA 1,120,0,18,4,17,5,19,7,
 17,2,9,-2,11,-3,16,0,18,-5,20,-2
 0,120,-22,16,-36,17,-35,20,-67,1
 20,-66,15,-67,0
 350 DATA 72,0,68,17,70,20,58,120
 ,56,18,55,20,46,20,42,13,43,8,40
 ,7,36,9,35,6,40,5,40,0,36,100,36
 ,2,34,0,30,2,26,0,40,120,38,19,3

5,10,34,9,36,20,21,101,23,3,22,1
 ,21,1,6,105,8,7,9,5,13,4,15,2,17
 ,2,17,1,15,0,13,4,9,2,9,5,7,3,6,
 5
 360 DATA 1,101,2,5,-1,0,-1,2,-5,
 2,-3,0,-5,0,-3,120,-4,16,-1,12,-
 3,13,-5,17,-9,20,-17,120,-15,15,
 -12,16,-13,10,-16,8,-15,6,-20,0,
 -36,120,-33,18,-35,16,-34,11,-35
 ,0,-67,100,-66,14,-67,20
 370 DATA 70,0,68,20,53,120,56,17
 ,58,20,61,20,58,16,58,0,50,110,3
 6,100,39,2,41,1,42,3,44,1,49,3,5
 6,1,44,1,41,1,40,1,-3,100,-6,8,-
 5,14,-3,12,-5,15,-7,12,-6,8,-10,
 10,-9,8,-7,4,-9,0
 380 DATA -17,100,-12,2,-25,13,-3
 0,14,-36,10,-38,5,-36,0,-42,104,
 -41,7,-44,6,-43,4,-42,4,-67,100,
 -72,20
 390 DATA 68,0,67,20,65,120,63,19
 ,59,1,53,0,-49,108,-48,11,-42,14
 ,38,19,-37,16,-35,14,-37,15,-40
 ,13,-42,14,-41,11,-46,7,-49,8,-6
 0,100,-72,100,-73,14,-80,0,-82,8
 ,81,11,-81,20
 400 DATA 65,0,65,10,67,0,72,20,7
 0,9,67,20,67,9,65,17,62,13,60,20
 ,58,13,58,20,0,100,-82,100,-81,2
 0
 410 DATA 72,0,71,20,58,100,59,8,
 61,13,60,20,0,110,-76,120,-79,0,
 -81,0
 420 DATA 73,20,74,12,78,15,79,20
 ,73,20,72,120,71,0,33,120,41,15,
 47,15,50,13,48,15,60,0,0,110,-76
 ,100,-78,10,-75,11,-74,20
 430 DATA 70,20,74,5,70,4,69,10,7
 0,20,68,120,67,15,71,0,17,120,20
 ,13,32,6,23,9,33,0,0,100,-74,100
 ,76,20,-71,20
 440 DATA 80,20,79,0,76,0,76,20,7
 4,120,74,9,73,7,69,14,71,20,51,1

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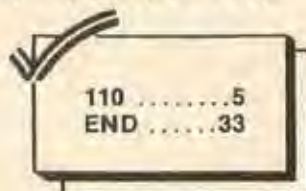
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```

20,52,16,55,16,57,6,61,6,64,10,6
8,12,68,0,50,100,32,120,26,20,25
,18,29,17,29,4,23,120,23,16,21,2
0,23,16,29,104,26,3,19,4,18,8,22
,10,22,13,16,12,16,16,11,18,10,2
0,10,16,13,13,17,0
450 DATA -74,100,-76,20
460 DATA 80,0,76,10,82,20,75,120
,76,10,74,0,71,0,67,18,66,11,64,
14,65,2,68,6,71,0,51,100,63,2,61
,9,58,12,60,16,53,20,50,120,49,1
3,46,10,47,14,45,17,43,14,44,15,
40,4,34,2,32,0,25,0,23,100,21,3,
20,109,18,11,18,7,20,9,21,102,21
,0
470 DATA 10,100,12,8,10,20,10,10
0,8,2,5,2,0,0,-7,0,-16,5,-18,8,-
35,7,-54,6,-56,8,-56,13,-54,6,-5
3,11,-38,18,-38,20,-77,120,-72,2
0,-70,16,-63,20,-67,15,-71,9,-76
,0
480 DATA 82,0,84,20,66,120,61,16
,67,4,69,5,75,0,53,100,51,4,51,0
,46,1,51,4,48,7,46,1,10,100,7,3,
6,10,0,12,-3,20,-21,120,-24,14,-
34,9,-33,3,-36,5,-38,0,-78,120,-
77,0
490 DATA 84,0,82,20,75,10,73,15,
66,0,20,100,-3,100,-7,5,-21,0,-7
8,100,-72,20
500 DATA 64,3,67,9,66,0,64,3,50,
120,53,19,56,17,59,18,59,17,57,1
6,55,16,54,12,51,12,51,14,55,16,
54,17,50,16,50,20,48,13,47,14,42
,14,42,11,36,11,35,15,36,19,42,2
0,33,120,35,15,33,12,28,10,23,5,
14,3,5,11,5,20,-70,120,-72,0

```



Listing 2: PAGETURN

```

10 CLEAR200,&H7FA0:DEFUSR0=&H7FA
1:DEFUSR1=&H7FC7
20 CLS:PRINT"SPINNING EARTH -- T
HE DELBOURGOS":PRINT" HAVE YOU R
EMEMBERED TO ENTER"
30 PRINT" POKE28160,0:POKE25,110
:NEW for disk OR":PRINT" P
OKE26112,0:POKE25,102:NEW f
or tape?"
40 PRINT:PRINT" IF YOU HAVE, PRE
SS <ENTER>; OTHERWISE <BREAK
>, ENTER POKES, AND RELOAD THE P
ROGRAM."
50 IFINKEY$<>CHR$(13)THEN50

```



```

60 PRINT:PRINT" LOAD FROM <T>APE
OR <D>ISK?"
70 A$=INKEY$:IFA$<>"T"ANDA$<>"D"
THEN70
80 PRINT" GET YOUR TAPE/DISK REA
DY... AND THEN HIT ANY KEY."
90 IFINKEY$=""THEN90
100 FORI=&H7FA1 TO&H7FFF:READD:P
OKEI,D:NEXTI
110 DATA189,179,237,52,4,31,137,
141,50,31,1,53,4,141,44,31,3,16,
142,6,0,26,80,127,255,223,236,12
9,237,193,49,62,38,248,127,255,2
22,57,189,179,237,77,38,48,141,1
3,31,1
120 DATA220,183,147,186,159,186,
48,139,159,183,57,90,193,35,34,2
8,150,188,192,20,36,4,203,20,134
,128,52,2,134,6,61,235,224,79,30
,137,77,43,4,145,25,36,1,57,126,
180,74
130 PMODE2,15:PCLS:SCREEN1,0
140 FORP=1TO35STEP2
150 IFA$="D"THENLOADM"PAGE"+MID$
(STR$( (P+1)/2),2),21504
160 IFA$="T"THEN:CLOADM"PAGE"+MI
D$(STR$( (P+1)/2),2),21504
165 A=USR0(35*256+P):A=USR0(36*2
56+P+1)
170 NEXTP
180 FORP=1TO35STEP2:A=USR1(P):SC
REEN1,1:FORT=1TO40:NEXTT,P:GOTO1
80

```

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Teasers by Tobbs-Sunb.	4-up	32K-disk	39.95	MISCELLANEOUS			
Inner City - simulation	7-up	32K-disk	49.95	Name That Song 1,2,or 3	2-up	16K-Ext.	11.95
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ETT typing tutor (Color/Correction)	4-up	16K-Ext.	21.95	Science Game	8-up	32K-disk	29.95
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With five years of data stored in a notebook, the author decides it's time to create a spreadsheet to analyze it

Spreadsheets Real Data

By Richard A. White
Rainbow Contributing Editor

I got my CoCo in late 1980. Then, it was a new machine and there was no software available except a few ROM packs from Radio Shack. The only practical thing to do was learn to program in BASIC. One of the first things I learned was that it takes three to four weeks to learn enough BASIC to use up the memory in a 4K machine.

By April 1981, I had upgraded to 16K. Extended BASIC was out and I had that, also. Each of those items cost as much as a 64K CoCo costs today. And, I was working on one of my first "major" programs: a program to calculate gas mileage for my recently purchased new car. That was a good learning exercise though it consumed hours and hours.

The program finally worked, though there were weaknesses. Editing data entry errors was difficult and missing data caused problems. The display of results was limited and there was no code to scroll up and down the data.

(Richard White has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the author of the TMS database management program.)

All in all, I found little encouragement to continue using the program or to rewrite it. However, I continued to write down each gasoline purchase, the date and the mileage, though the rest of the family failed to do so from time to time.

Now it's 1985 and I have five years of data in a notebook. Why not do a

"When setting out to analyze data, it is important to determine what is significant and what is not. The methods used in the analysis can then be selected and properly applied."

quick spreadsheet to analyze that data and see what it may have to say?

When setting out to analyze data, it is important to determine what is significant and what is not. The methods used in the analysis can then be selected and properly applied. In this case, the tank was not always completely filled

at each purchase, so the mileage for each single gasoline purchase is meaningless in some cases. Determining the average mileage over three to five purchases will reduce these variations.

On the other hand, averaging will hide some real peaks and valleys leaving only longer term trends like diminishing performance for lack of engine maintenance, or the mileage loss due to very cold weather in winter and use of air conditioning in the summer.

I chose to use a five point moving average. This means the mileage calculated is averaged over the last five gasoline purchases.

The other data to be entered will be the odometer reading for each purchase and the month (number) of each purchase. We will use the month later when we do some data plotting.

The finished spreadsheet with son data is shown in Figure 1. Column headings in cells A5 . . . D5 are right justified to align better over the data in the columns. Data in columns 'C' through 'E' is entered as numbers. DynaCalc shows the numbers in columns 'A' and 'B' as they are entered. Column C was formatted for two decimal places.

You may remember that in *DynaCalc* an empty cell will not take a format, however, a space may be typed into cell C6 and a format can be applied to that cell. C6 can then be replicated down Column C. The cells will still look empty, but the format is there waiting to act when you type in a value. Columns 'D' and 'E' are formatted also, but each cell contains a formula and is willing to accept a format.

Before moving to the formulae, let's look at the data. The 4.4 gallons shown in C12 represents a partial fill because the car was driven almost 300 miles since the last fill. This causes the calculated average gas mileage, 32 mpg, to be erroneously high, but not excessively so due to the use of the averaging over five data points. The next purchase was a fill-up and the new gas mileage is a better representation.

The data for cells B16 and C16 was missing. Nothing to do in this case but make a guess of both miles and gallons and enter these. After all, we are dealing with a data set that cannot be duplicated as you might with laboratory data. What is gone is gone forever. However, we do know on an average what mileage we are getting and can make an educated guess.

I later found an even better way. Pick some estimated miles where gas was probably added and divide that number by average gas mileage then being obtained. If the last fill-up occurred at 45,600 miles, the estimated miles at the next fill-up is 45,850 and the car is getting approximately 28 miles per gallon, the entry in the gallons column would be 250/28. The computer will perform the calculation and print 8.93 in the cell. Even better, *DynaCalc* stores the entry as 250/28 which is shown on the cell contents line at the top of the sheet when the cursor is placed over the cell.

At the top of the spreadsheet we do not have five data pieces to average so we start out with a simple average formula in D7. While there are gallons shown in C6, this serves only to start with a full tank and is not used in the calculations. In D8, we have two fills to work with and set up the form of the equations we will use for the remainder of Column D.

The formula in D11 has five purchases to average. This formula can be replicated to the rest of the column, as long as you want to make it. I took it to row 150, which will cover several years. Before doing the replicate, remember

to apply the two-decimal place format. Note in each of the succeeding equations the cell addresses are adjusted one row down in each case. This is another example of relative addressing discussed in previous columns.

Column E is set up to plot the mileage as a bar graph. I expected all the mileage

values would exceed 15, so I subtracted that amount from each 'D' column value and applied a graph format to each cell. Actually, do this only to cell E7, then replicate that cell over the range E8...E150. Again the addressing is relative.

In cell D152, the average mileage

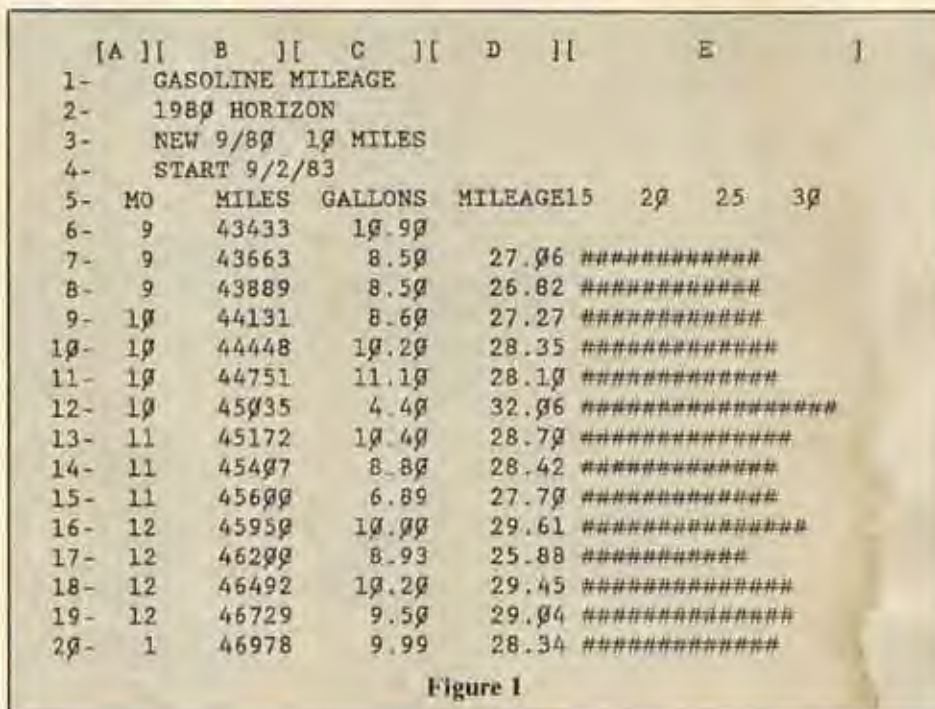


Figure 1

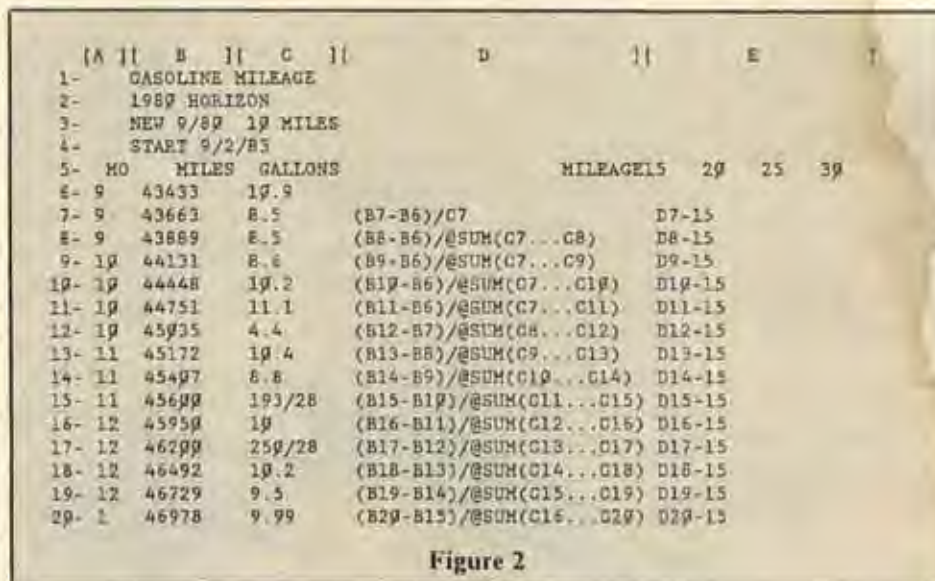


Figure 2

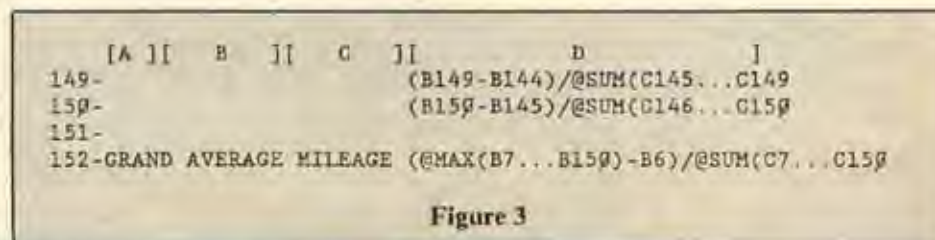


Figure 3

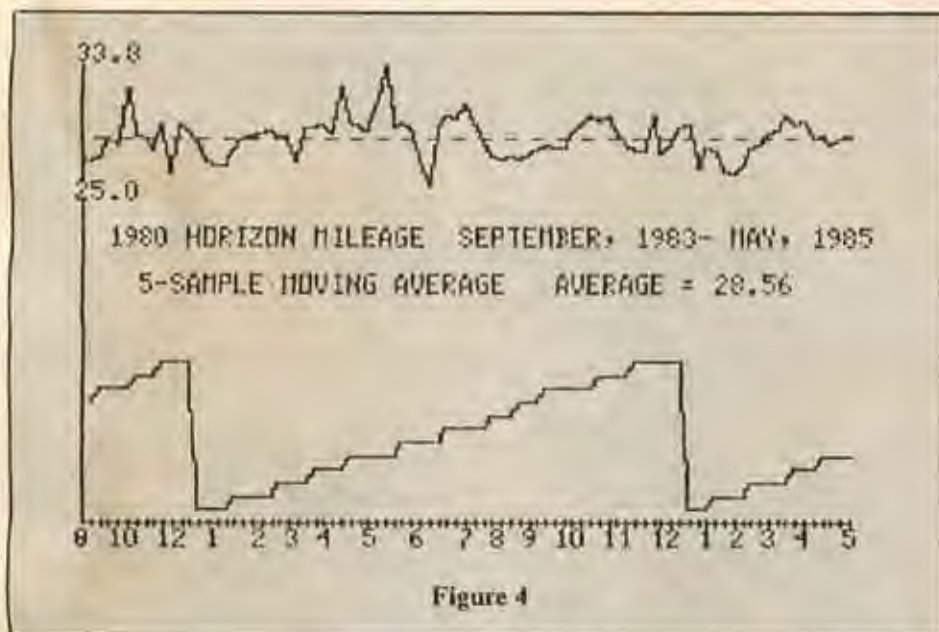


Figure 4

based on all the data in the spreadsheet is calculated. B7 is the starting miles. @MAX(B7... B150) finds the highest number in the range B7... B150. This will be the miles in the last entry. Data can be entered from time to time and the spreadsheet will still work. @SUM(C7... C150) sums only cells that have values.

DynaCalc has a plotting capability that is unique in CoCo spreadsheets. You can make a line plot, a bar chart, a pie chart or a high/low/average plot such as those used to show stock performance. Plots are made on the high resolution graphics screen.

Data to be plotted is drawn from specified ranges of cells on the spreadsheet with a maximum of 121 cells per range. Except for the pie chart, up to three ranges may be defined. The graph is automatically sized according to the

value extremes within the ranges specified. Once the plot is made, you can type captions onto it, save it to disk or print it on your printer.

The graph in Figure 4 is a printout of a plot of my gas mileage data. This is actually a composite of two plots. First, a plot of identical ranges from the mileage and month columns was made. The gas mileage line is at the top.

Since the months were entered as numbers from 1 to 12, they plot as a stepped line at the bottom of the chart. The text and numbers on the plot are made in the caption mode. The arrow keys are used to move the cursor to where the user wants and the text is typed in. Text can be erased by moving to its beginning and typing spaces. Careful, for the plotted lines can be erased as well.

The dashed line through the gas mileage curve is a calculated average for the data points used. This could not be done from the plot as shown since *DynaCalc* would have used both the month and the mileage values to determine an average.

First, I saved my captioned graph with both the mileage and month curves to disk, then I exited the graphics mode and reentered to get a clean screen. This time I plotted only the mileage figures and used the average line option. The first plot was then loaded. It overlaid the second. The result looks just like the first plot except the average line of the second shows.

Now comes the bottom line. What can be learned from this plot? First, the automobile performance has been essentially constant over the 21 month period. There are low spots each winter and high spots in the spring and fall. These seem to reflect the effects of driving in the cold and snow versus driving in moderate weather without air conditioning. The overall average mileage for this period was about one mile per gallon better than the previous two years reflecting an office move to a location where I could drive interstates for the most part, rather than all city streets. Finally, this data tells me the engine remains sound and in tune.

Other uses? Surely you can find them. How about lab and other reports for those in high school or college? Keeping and plotting sports statistics seems a natural. Budgeting is another — plot your budget amounts against what is actually spent. And the uses in business are almost limitless.

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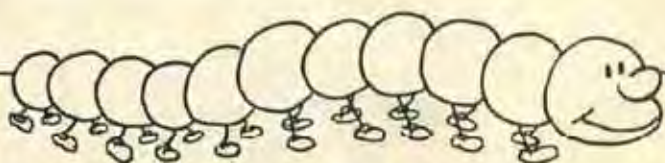
NOTE: 16K CASSETTE DOESN'T INCLUDE THE MIXED SUBJECT QUIZ

WARNING - YOU MAY BECOME ADDICTED

CoCo worms its way into preschool fun. . .

A Caterpillar's Alphabet

By Mike Knolhoff



As a teacher I am able to see and evaluate educational software quite frequently. This gives me the opportunity to get ideas for programs I can write for my own children for my classes.

I recently saw an interesting program that was written for a more expensive computer. The program was designed to help preschoolers or primary school children learn the alphabet. A sequence of five letters was displayed in order on the screen with the middle letter left blank. The student was to figure out which letter went in the blank and type that letter. The letter typed would then appear in the blank, and a right or wrong answer would be given.

Each time the student typed the correct letter, a caterpillar segment would appear on the screen until the caterpillar was complete. At that time

the caterpillar would walk around and off the screen as a visual reward for a job well done. Tapping any key would then restart the program.

The program required no reading skills on the part of the student, and all keyboard input from the student consisted of single keystrokes. The program was written in machine language and sold for about \$30.

The listing that follows is my version of this program. Thanks to the powerful graphics commands Tandy gave the CoCo, it is written entirely in BASIC. Admittedly, the graphics are not as refined and the animation not as smooth as its inspiration program, but it does function in much the same manner (and is a great deal more economical). I believe parents will find it very beneficial for their 4-6 year old children.

You need 16K Extended BASIC for the program. It uses the speed-up POKE in Line 690, so if your computer cannot handle this POKE you will have to edit that line to remove it. It will run on disk as well as cassette.

The following is a brief line description of the program:

Line	Description
10-20	Program set up
30-80	Title screen
90-250	DRAW and GET caterpillar segments
260-340	Put letter sequence on the screen
350-370	Receive keyboard input
380-390	Display answer in blank spot
400	Branch to 570 on correct answer
410-420	Wrong answer cue
430	Second try for first wrong answer
440-490	Flash correct answer
500-550	Erase sequence of letters
560	Return to start of loop
570-670	Put caterpillar segment on screen
680-840	Animation routine moves caterpillar left to right and off screen
850-1070	Animation routine moves caterpillar right to left and off screen
1080-1090	Await key press to begin again
1100-1380	Draw strings for letters of the alphabet

(Mike Knolhoff is a 6th grade teacher who is married and has three children. He is currently earning a master's degree emphasizing computer applications in education.)

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named, multiple arguments
WHILE-DO and IF-THEN-ELSE
All execution errors trappable
Fast, 65K char string facilities
Assembly language interface
Fast Decimal f.p. arithmetic
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Cursor positioning
Print USING

Device-independent ASCII and
binary file I/O to the byte
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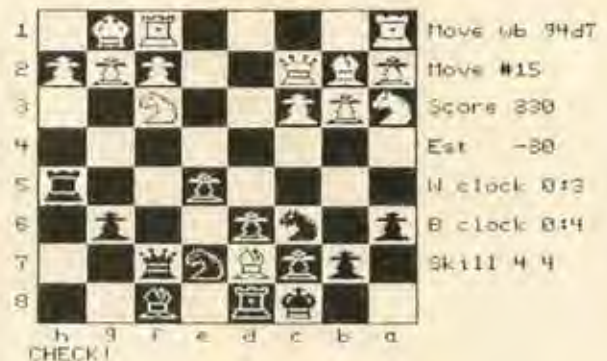
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140	214
390	128
590	187
770	213
960	229
1150	106
END	212

The listing: LETRSKIP

```

1 '*****
2 '   CATERPILLAR
3 '   LETTER SKIP
4 '*****
5 '       BY
6 '   MIKE KNOLHOFF
7 '   STERLING, IL.
8 '       MAY 1984
9 '*****
10 C=0:DIMH1(14),B(14),H2(14),BL
    (14)
20 CLS2:GOSUB1110
30 PRINT@201," CATERPILLAR ";:PR
    INT@265," LETTER SKIP ";
40 A$="T3O3L4CP32L8CP128L4DP32L8
    DP128EP128GP128EP128L4.C"
50 PLAYA$
60 PLAY"P8L4CP32L8CP128L4DP32L8D
    P128L4.EP128CP8"
70 PLAYA$
80 PLAY"P8L3AP32DP128L8FP128L4.E
    P128L1C"
90 PMODE3,1:PCLS:SCREEN0,1
100 CIRCLE(20,20),8,6,.9:PAINT(2
    0,20),6,6
110 CIRCLE(24,16),2,8
120 DRAW"BM26,22C8L6H2"
130 DRAW"BM18,14C8U4E4BR4G4D4"
140 GET(12,2)-(28,32),H1,G
150 PCLS
160 CIRCLE(20,20),8,6,.9:PAINT(2
    0,20),6,6
170 CIRCLE(16,16),2,8
180 DRAW"BM14,22C8R6E2"
190 DRAW"BM18,14C8U4H4BR4F4D4"
200 GET(12,2)-(28,32),H2,G
210 PCLS
220 CIRCLE(20,20),8,6,.9:PAINT(2
    0,20),6,6
230 DRAW"BM18,26C8NG4BR4F4"
240 CIRCLE(20,20),4,8,.9
250 GET(12,2)-(28,32),B,G
260 PCLS
270 SCREEN1,1
280 R=RND(-TIMER)
290 R=RND(26)
300 IF R<3THEN310ELSEDRAW"BM0,20
    C7S16"+L$(R-2)
310 IF R<2THEN320ELSEDRAW"BM50,2
    0C7S16"+L$(R-1)

```

```

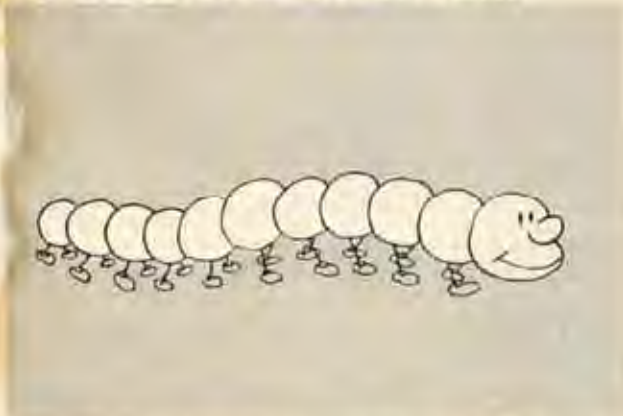
320 DRAW"BM92,64C8S16R12"
330 IF R>25THEN350ELSEDRAW"BM150
    ,20C7S16"+L$(R+1)
340 IF R>24THEN350ELSEDRAW"BM200
    ,20C7S16"+L$(R+2)
350 I$=INKEY$:IFI$=""THEN350
360 A=ASC(I$)-64
370 IFA<1OR A>26THEN350
380 DRAW"BM100,20C8S16"+L$(A)
390 FORK=1TO500:NEXTK
400 IFA=R THEN570
410 FORX=1TO50:PLAY"V30T255L255O
    1CP250":NEXTX
420 W=W+1:DRAW"BM100,20C5S16"+L$
    (A)
430 IFW=1THEN350
440 W=0:FORX=1TO5
450 DRAW"BM100,20C8S16"+L$(R)
460 FORK=1TO100:NEXTK
470 DRAW"BM100,20C5S16"+L$(R)
480 FORK=1TO100:NEXTK
490 NEXTX
500 IFR<3THEN510ELSEDRAW"BM0,20C
    5S16"+L$(R-2)
510 IFR<2THEN520ELSEDRAW"BM50,20
    C5S16"+L$(R-1)
520 DRAW"BM100,20C5S16"+L$(R):DR
    AW"BM92,64C5R12"
530 IFR>25THEN540ELSEDRAW"BM150,
    20C5S16"+L$(R+1)
540 IFR>24THEN560ELSEDRAW"BM200,
    20C5S16"+L$(R+2)
550 FORK=1TO300:NEXT
560 GOTO290
570 W=0
580 C=C+1
590 ON C GOTO600,610,620,630,640
    ,650,660
600 PUT(96,100)-(112,130),H1,PSE
    T:GOTO665
610 PUT(80,100)-(96,130),B,PSET:
    GOTO665
620 PUT(64,100)-(80,130),B,PSET:
    GOTO665
630 PUT(48,100)-(64,130),B,PSET:
    GOTO665
640 PUT(32,100)-(48,130),B,PSET:
    GOTO665
650 PUT(16,100)-(32,130),B,PSET:
    GOTO665
660 PUT(0,100)-(16,130),B,PSET
665 FORX=1TO5:SCREEN1,0:FORK=1TO
    150:NEXTK:SCREEN1,1:FORK=1TO150:
    NEXTK:NEXTX
670 PLAY"T255L255V3002CDEFGABO3C
    DEFGABO4CDEFGABAGFEDCO3BAGFEDCO3
    BAGFEDCO2BAGFEDC"
680 IFC<7THEN500
690 POKE65495,0:SCREEN1,0:X1=112

```

```

:X2=128:M$="V3101T255L255CP255C"
700 FORK=1TO8
710 PUT(X1,100)-(X2,130),H1,PSET
720 PUT(X1-16,100)-(X2-16,130),B
,PSET
730 PUT(X1-112,100)-(X2-112,130)
,BL,PSET
740 PLAYM$:FORD=1TO50:NEXTD
750 X1=X1+16:X2=X2+16
760 NEXTK
770 PUT(224,100)-(240,130),B,PSE
T
780 PUT(128,100)-(144,130),BL,PS
ET:PLAYM$:FORD=1TO120:NEXTD
790 X1=144:X2=160
800 FORK=1TO6
805 PUT(224,100)-(240,130),BL,PS
ET
810 PUT(X1,100)-(X2,130),BL,PSET
:PLAYM$
815 PUT(224,100)-(240,130),B,PSE
T
820 FORD=1TO80:NEXTD
830 X1=X1+16:X2=X2+16:NEXTK

```



```

835 PUT(224,100)-(240,130),BL,PS
ET
840 FORD=1TO800:NEXTD
850 PUT(224,150)-(240,180),H2,PS
ET:PLAYM$:FORD=1TO120:NEXTD
860 X1=208:X2=224:FORK=1TO6
870 PUT(X1,150)-(X2,180),H2,PSET
880 PUT(X1+16,150)-(X2+16,180),B
,PSET:PLAYM$
890 X1=X1-16:X2=X2-16
900 FORD=1TO80:NEXTD
910 NEXTK
920 X1=112:X2=128
930 FORK=1TO8
940 PUT(X1,150)-(X2,180),H2,PSET
950 PUT(X1+16,150)-(X2+16,180),B
,PSET
960 PUT(X1+112,150)-(X2+112,180)
,BL,PSET:PLAYM$
970 FORD=1TO50:NEXTD
980 X1=X1-16:X2=X2-16:NEXTK

```

```

990 PUT(96,150)-(112,180),BL,PSE
T
1000 PUT(0,150)-(16,180),B,PSET:
PLAYM$
1010 FORD=1TO120:NEXTD
1020 X1=80:X2=96
1030 FORK=1TO6
1035 PUT(0,150)-(16,180),BL,PSET
1040 PUT(X1,150)-(X2,180),BL,PSE
T:PLAYM$
1045 PUT(0,150)-(16,180),B,PSET
1050 FORD=1TO80:NEXTD
1060 X1=X1-16:X2=X2-16
1070 NEXTK
1075 PUT(0,150)-(16,180),BL,PSET
1080 I$=INKEY$:IFI$=""THEN1080
1090 POKE65494,0:C=0:SCREEN1,1:G
OTO500
1100 END
1110 DIML$(26)
1120 L$(1)="BD10U5NR8U1E4F4D6BR4
BU10"
1130 L$(2)="D10R6E2U1H2NL6E2U1H2
L6BR12"
1140 L$(3)="BR3NR5G3D4F3R5BR3BU1
0"
1150 L$(4)="D10R5E3U4H3L5BR12"
1160 L$(5)="NR8D5NR6D5R8BR4BU10"
1170 L$(6)="NR8D5NR6D5BR12BU10"
1180 L$(7)="BR8L6G2D6F2R4E2U3L4B
R8BU5"
1190 L$(8)="D10U5R8D5U10BR4"
1200 L$(9)="BR1R6L3D10L3R6BR5BU1
0"
1210 L$(10)="BR2R6L3D8G2L1H2U2BR
12BU6"
1220 L$(11)="D10BR8L1H5NL2E5R1BR
4"
1230 L$(12)="D10R8BR4BU10"
1240 L$(13)="ND10F4E4ND10BR4"
1250 L$(14)="ND10D1F8D1U10BR4"
1260 L$(15)="BR2G2D6F2R4E2U6H2L4
BR10"
1270 L$(16)="ND10R6F2D1G2L6BR12B
U5"
1280 L$(17)="BR2G2D6F2R4E1NH3NF1
E1U6H2L4BR10"
1290 L$(18)="ND10R6F2D1G2L6R1F5B
R4BU10"
1300 L$(19)="BR8L6G2D1F2R4F2D1G2
L6BR12BU10"
1310 L$(20)="R4ND10R4BR4"
1320 L$(21)="D8F2R4E2U8BR4"
1330 L$(22)="D6F4E4U6BR4"
1340 L$(23)="D10E4NU1F4U10BR4"
1350 L$(24)="D1F8D1BL8U1E8U1BR4"
1360 L$(25)="D1F4ND5E4U1BR4"
1370 L$(26)="R8D1G8D1R8BR4BU10"
1380 RETURN

```

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GAME SHORTIES

Now, just the moment you've been waiting for . . .

Hip, Hip, Hooray!

Oodles

A Mind Boggler

See if you can solve this *Picstick* puzzle. Play against the computer, alternating turns until all 15 sticks are taken. The object is to force the computer to take the last stick. Each turn (your's and the computer's) is limited to one, two or three sticks. Of course, when you figure out the correct pattern you will always win. But, how long will that take?

The listing: PICSTICK

```
1 CLS:PRINT"PICK UP STICKS":PRINT
2 PRINT" YOU MAY PICK UP 1,2, OR
3"
3 PRINT" STICKS EACH TIME. THE O
BJECT"
4 PRINT" IS TO MAKE THE COMPUTER
PICK"
5 PRINT" THE LAST ONE. PRESS ENT
ER"
6 PRINT" WHEN YOU ARE READY."
7 INPUT A$
8 CLS(0)
10 FOR I=1 TO 15
20 FOR J=16 TO 31
30 SET(I*4,J,4)
40 NEXT J
50 NEXT I
60 SW=1 :T=15
100 PRINT@0,"ENTER NO. (1,2, OR
3)"
110 INPUT A$
120 A=VAL(A$)
130 IF A<1 OR A>3 THEN 100
140 T=T-A
145 PRINT" STICKS CHOSEN="A" REM
AIN="T
150 IF T>0 THEN 180
160 IF SW=1 THEN PRINT@0,"YOU LO
SE" ELSE PRINT@0,"YOU WIN"
170 GO TO 100
180 SW = -SW
```

```
190 B=(15-(T+A))+1:B1=(B+A)-1
200 FOR I=B TO B1
210 FOR J=16 TO 31
220 RESET(I*4,J)
230 NEXT J
240 NEXT I
250 IF SW=1 THEN 100
260 ST=T-1
270 MC=0
280 IF MC=3 THEN 360
290 MC =MC+1
300 A=(ST-MC)/4
310 A=ABS(A)
320 A=A-INT(A)
330 IF A<>0 THEN 280
340 A=MC
350 GOTO 140
360 A=1
370 GOTO 140
1000 PRINT@32,"END GAME"
1010 PRINT"RESTART = ENTER"
1020 INPUT A$:GOTO 8
```

Brian Baxter
Arlington, TX

Where Are the Walls?

The *Maze Game* begins with a man (in the upper left corner of a blank screen) and a blue dot (in the lower right corner of the screen) indicating an exit. Your goal is to find your way out of the dark maze, however, the walls are invisible. They only appear as you run into them.

The listing: MAZEGAME

```
10 REM MAZE
20 DIM A$(16)
30 MV=0:F=3
40 GOSUB 700
60 FOR I=1 TO 16
70 READ A$(I)
80 NEXT I
90 READ L,E:X=INT(L/100):Y=L-(X*
```

of Games For 4K

```

100)
95 EX=INT(E/100):EY=E-(EX*100)
100 CLS(0):MX=X:MY=Y
101 SET(EY*2,(EX-1)*2,3)
105 GOSUB 400
120 B$=INKEY$
123 IF EX=X AND EY=Y THEN 800
125 IF B$="" THEN 120
130 MX=X:MY=Y
140 IF B$="U" AND X>1 THEN MX=X-
1
150 IF B$="D" AND X<16 THEN MX=X
+1
160 IF B$="L" AND Y>1 THEN MY=Y-
1
170 IF B$="R" AND Y<32 THEN MY=Y
+1
180 IF MID$(A$(MX),MY,1)="W" THEN
GOSUB 200 ELSE GOSUB 300
190 GOTO 120
200 REM WALL
210 II=(MX-1)*2:IJ=(MY-1)*2
220 FOR I=II TO II+1
230 FOR J=IJ TO IJ+1
240 SET(J,I,8):NEXT J
250 NEXT I:RETURN
300 REM RESET/SET POSITION
310 II=(X-1)*2:IJ=(Y-1)*2
320 FOR I=II TO II+1
330 FOR J=IJ TO IJ+1
340 RESET(J,I)
350 NEXT J:NEXT I
400 II=(MX-1)*2:IJ=(MY-1)*2
410 FOR I=II TO II+1
420 FOR J=IJ TO IJ+1
430 SET(J,I,5)
440 NEXT J:NEXT I
445 X=MX:Y=MY:MV=MV+1
450 RETURN
500 DATA WWWWWWWWWWWWWWWWWWWWWWW
WWWWWWWW
510 DATA WSWSSWSSWSSSWSSSWWFSWS
WSSSWSSSW
520 DATA WSWSWSWSWWSWWSWSSSSWSWS
WSWSSSW
530 DATA WSSSWSWSSSSWSWWSWWSWSWS
WSSWWWSW
540 DATA WWWWSWSWSWSSWSSSSWSWSWS
WSSSSSWSW
550 DATA WSSSSSSWSWSSSSWWSWWSWSSS
WSWSSSW
560 DATA WSWSWWWWSWWSWSSSSSSSSWS
SSSSWSSW
570 DATA WSWSWSSSWSSSSWWSWSSWSSW
WWWWWSW
580 DATA WSWSSSWSWWWSSSSSSWSWWS
SSSSWSSW
590 DATA WSSWWWSWSSSWFWWWWSWS
WSWSSSW
600 DATA WFWSSSSWSWSSWSSSSSSWS
WSSSWSSW
610 DATA WWWWSWWWSWWSWWSWWSW
WWWSWWSW
620 DATA WSSSSWSSSWSWSSSSWSWWS
SSSSWSSW
630 DATA WSWWSSWWSWSSSSWSWWSW
SWWWWWW
640 DATA WFSSSWSSSWSWWSWWSWFW
SSSSSSSW
650 DATA WWWWWWWWWWWWWWWWWWWWW
WWWWWSW
660 DATA 0202,1631
700 CLS:PRINT"MAZE (VERISION 1)"
710 PRINT:PRINT"FIND YOUR WAY OU
T"
720 PRINT"U=UP D=DOWN L=LEFT R=R
IGHT"
725 PRINT"EXIT IS BLUE SQUARE"
730 PRINT"PRESS 'ENTER' TO START
"
740 INPUT B$
750 RETURN
800 CLS:PRINT"YOU MADE IT OUT IN
"MV"MOVES."

```

Brian Baxter
Arlington, TX

Watch Out, Danny Sullivan!

Indy4K is a road race in which you control a super-fast car with your right joystick. Stay on the road for as many miles as you can.

If your CoCo can not take the "Vitamin E" POKE, delete it from Line 0.

The listing: INDY4K

```
0 POKE65495,0:CLS:PRINT@106,"KAM
AKAZIE KAR":PRINT@175,"BY":PRINT
@238,"PAUL":PRINT@269,"WAGORN":P
RINT@334,"FOR":PRINT@397,"APOLLO
":PRINT@428,"SOFTWARE"
1 SOUND 100,4:SOUND140,5:SOUND10
0,1:SOUND140,1:SOUND100,1:SOUND1
10,1:SOUND120,1:SOUND130,1:SOUND
140,1:SOUND130,2:SOUND120,4:SOUN
D110,8:SOUND100,10
2 FORPO=503 TO 23 STEP -64:PRINT
@PO,"!";
3 POKE65315,63:FORI=1TO255STEP9:
POKE65312,255:POKE65312,I:NEXT
4 PRINT@PO-31,"!";:POKE65315,63:
FORI=1TO255STEP9:POKE65312,255:P
OKE65312,I:NEXT:NEXTPO
5 PRINT@490,"PRESS A KEY";:EXEC4
1329
6 C1$=CHR$(132+96)+CHR$(143+48)+
CHR$(136+96):C2$=CHR$(132+96)+CH
R$(140+48)+CHR$(136+96):WL$=CHR$
(194):CLS:P=15:S$=CHR$(255):M$=C
HR$(128):R$=CHR$(131+32)+S$+M$+M
$+M$+M$+WL$+M$+M$+M$+S$+CHR$(131
+32):RP=12
7 FORI=1 TO20:PRINTTAB(RP);R$:NE
XT:PRINT@P,C1$;:PRINT@P+32,C2$;:
PRINT@14+98,"start";:SOUND100,1:
SOUND200,3:SOUND50,3:SOUND100,1:
SOUND140,2:SOUND130,3:SOUND110,4
:SOUND100,5:SOUND90,6:SOUND80,7:
PRINT@0,"";
8 CD=RND(3)-2:FORL=1TO 4
9 D=D+1
10 IF JOYSTK(0)=<3 AND P=>=1 THEN
P=P-1:ELSEIFJOYSTK(0)>=60 ANDP<
=28 THENP=P+1
11 KI=P+64+1024:IFPEEK(KI)=255OR
PEEK(KI+1)=255ORPEEK(KI+2)=255TH
EN 16
12 PRINTTAB(RP);R$
13 GOSUB15:IFRP+CD>0ANDRP+CD<18T
HENRP=RP+CD:NEXTL:ELSEGOTO8
14 GOTO 8
15 PRINT@P,C1$;:PRINT@P+32,C2$;:
PRINT@479,"":RETURN
16 E1$=CHR$(139+48)+CHR$(140+16)
+CHR$(141+48):E2$=E1$:E3$=CHR$(1
```

```
41+16)+CHR$(131+96)+CHR$(139+16)
:E4$=E3$:FORI=1TO5:PRINT@P,E1$;:
PRINT@P+32,E2$;:POKE65315,63:FOR
R=1TO4:POKE65312,255:POKE65312,R
ND(255):NEXT:PRINT@P,E3$;:PRINT@
P+32,E4$;
17 SOUND200,1:NEXTI
18 SOUND10,4:SOUND40,2:SOUND1,1:
SOUND10,1:SOUND40,4:SOUND20,1:PR
INT@230,"MILELAGE:"D/20"MILES."
19 PRINT@480+RP+1,"PRESS A KEY";
:POKE65314,14:EXEC41329:CLEAR:GO
TO6
20 FORI=1TO 4:MOTORON:FORK=1TO50
0:NEXT:SOUND1,4:FORK=1TO500:NEXT
:CSAVE"KAM KAR":NEXT
```

Paul Wagorn
Carp, Ontario

Screen Cleaning

Use the arrow keys in *Cleanup* to travel the screen and clean up all of the characters. But, don't touch the outer walls or any of the graphics.

The listing: CLEANUP

```
5 CLEAR 500:CLS
10 PRINT:PRINT"(PRESS ANY KEY TO
START)"
15 A$=INKEY$:IF A$=""THEN 15
20 CLS:BL=0:SC=0:INPUT"STARTING
LEVEL(1-50)";S:IF S<1 OR S>50 TH
EN 20
25 CLS(0):PRINT"SCORE=";SC
30 FOR X=0 TO S*3-1
35 P=RND(375)+96:IF PEEK(P+15360
)<33 THEN PRINT@P,CHR$(RND(63)+1
28);ELSE35
40 NEXT X
45 FOR X=0 TO S*3-1
50 P=RND(375)+97:IF X/3=INT(X/3)
THEN IF PEEK(P+15360)<33 THEN P
RINT@P,CHR$(RND(94)+32);ELSE 50
55 NEXT X
60 FOR X=0 TO 63:SET(X,3,5):SET(
X,31,5):NEXT X:FOR X=4 TO 31:SET
(0,X,5):SET(63,X,5):NEXT X
65 X=5:Y=5:U=0:H=0:A$=INKEY$:FOR
D=1 TO 2 STEP 0:IF INKEY$<>"TH
EN D=2:NEXT D ELSE NEXT D
70 K$=INKEY$
75 IF K$=CHR$(94) THEN U=-1:H=0
ELSE IF K$=CHR$(10) THEN U=1:H=0
ELSE IF K$=CHR$(8) THEN U=0:H=-
1 ELSE IF K$=CHR$(9) THEN U=0:H=
1
80 X=X+H:Y=Y+U:IF POINT(X,Y)>1 T
HEN 100
```



```

85 IF POINT(X,Y)=-1 THEN SC=SC+1
:BL=BL+1:PRINT@7,SC;
90 SET(X,Y,1):IF BL<S THEN 70
95 CLS:PRINT"LEVEL";S;"COMPLETED
...BONUS:";S*5:SC=SC+S*5:BL=0:S=
S+1:FOR D=1 TO 1000:NEXT D:GOTO
25
100 SOUND 45,1:CLS:PRINT"YOU MAD
E IT TO LEVEL "S;"WITH A SCORE O
F "SC

```

Stephan J. Elms
Fort Ann, NY

Hunt and Peck

Typanic will test your knowledge of the CoCo's keyboard, as well as your reflexes. Shoot down falling characters before they hit the ground by typing the appropriate key on the keyboard. If you miss five times, the game is over and the CoCo displays your score.

The listing: TYPANIC

```

10 CLS:PRINT@43,"TYPANIC":PRINT:
PRINTTAB(7);"LEVEL":PRINTTAB(7)
;"(1) BEGINNER":PRINTTAB(7);"(2)
INTERMEDIATE":PRINTTAB(7);"(3)
EXPERT":PRINTTAB(7);"(4) PRETTY
DARN HARD"
20 A$=INKEY$:IF A$="" THEN 20
30 A=VAL(A$):IF A>4 OR A<1 THEN
20
40 POKE282,1:CLS:T=300-50*VAL(A$
)
50 PO=2+RND(28):C=32+RND(58)
60 C$=CHR$(C):Y=PO
70 A$=INKEY$
80 PRINT@Y,C$;:Y=Y+32
90 IF Y>448 THEN 130
100 IF A$=C$ THEN 150
110 FOR DL=1 TO T:NEXTDL:PRINT@Y
-32," ";
120 IF A$="" THEN 70 ELSE 70
130 SOUND 1,1:W=W+1:IF W=5THEN17
0
140 GOTO 50
150 T=T-A:SOUND 200,1:PRINT@Y-32
," ";:SC=SC+1:PRINT@0,SC:IFT<4 T
HEN T=5
160 GOTO50
170 CLS0:FOR S=200 TO 1 STEP -6
180 SOUND S,1:NEXTS
190 PRINT@160,"YOUR SCORE IS "SC
;
200 PRINT@224,"PLAY AGAIN (Y/N)?
";:A$=INKEY$:IFA$=""THEN200ELSEI
FA$="Y"THENRUN ELSEEND

```

Michael Sims
Nanuet, NY

Memory Jogger

Letter Memory is a simple but challenging game that tests your memory. The object of the game is to remember a letter string that keeps growing larger. When you run the program it will briefly display a letter which you are to remember. You must type the letter and the same letter will appear with another letter added. The computer will keep adding more and more to the string, one letter at a time, until you forget part of the string (or, if you type it incorrectly).

The listing: LETRMMRY

```

10 '
20 ' LETTER MEMORY
30 ' BY BEN JOHNSON
40 '
50 SC=0
60 A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
Z"
70 CLS
80 FOR T=1 TO 255
90 GOSUB 140
100 INPUT F$
110 IF F$<>S$ THEN 220
120 SC=SC+T:IF T/5=INT(T/5) THEN
SC=SC+5
130 NEXT T
140 R=RND(26)
150 D$=MID$(A$,R,1)
160 S$=S$+D$
170 D$=""
180 PRINTS$
190 FOR H=1 TO 500:NEXT H
200 CLS
210 RETURN
220 CLS3:PRINT"? ";F$:PRINT"SORR
Y, YOU LOST TRACK."
230 PRINT"SCORE: "SC
240 PRINT"CURRENT STRING:"
250 PRINTS$
260 GOSUB310
270 FOR L=1 TO E:PRINT@159+NM(L)
,"-":NEXTL
280 PRINT:TAP <ENTER> TO P
LAY AGAIN..."
290 A$=INKEY$:IF A$<>CHR$(13) TH
EN 290
300 RUN
310 FOR J=1 TO LEN(S$)
320 IF MID$(S$,J,1)<>MID$(F$,J,1
) THEN E=E+1:NM(E)=J:NEXT ELSE N
EXT
330 FOR J=1 TO LEN(F$)
340 IF MID$(F$,J,1)<>MID$(S$,J,1
) THEN E=E+1:NM(E)=J:NEXT ELSE N
EXT
350 RETURN

```

Ben Johnson
Charlestown, WV



Inverting The Output

By Ed Ellers
Rainbow Technical Writer

• In your June 1985 issue, you recommended Radio Shack's Hi-Res Screen Print Utility, so maybe you can help me with this. My PMODE 4 diagrams are displayed with white lines on a black background, and BWDUMP prints them that way. However, I need black lines on white paper because the diagrams reproduce better that way. Is there a simple way (e.g., a set of POKES) to invert the output from BWDUMP?

Humphrey Bryson
Stratford, CT

I don't know of any way to make BWDUMP invert its printing, but you can invert the screen easily if your program is in BASIC. One way is to change PCLS to PCLSS (to clear to white) and then use PRESET to "set" points to black and PSET to "reset" them to white when desired. Another is by running this program:

```
10 FOR Y=0 TO 191:FOR X=0 TO 255
20 S=PPDINT(X,Y):IF S=0 THEN
   PSET(X,Y) ELSE PRESET(X,Y)
30 NEXT X,Y
```

(Ed Ellers, a RAINBOW and PCM staff member, is a self-confessed electronics fanatic whose other interests include science fiction.)

CoCo Fender-Benders?

• Some time ago there was mentioned an auto touch-up paint that could be used to touch up the original gray CoCo. Do you know what type of paint would be used?

Harold L. Laroff
Monsey, NY

Strangely enough, the paint to use for this job is made to match late model Mercedes models' silver finish. You can find this at any auto parts store or (if you're desperate) at the parts department of a Mercedes-Benz dealer.

Where Did It Go?

• When I load a machine language tape into my 64K ECB CoCo, then enter PRINT MEM, the MEM value remains the same. Could it be it's storing the value in high memory?

Aaron Repath
Tucson, AZ

Yes it could, but that isn't causing the apparent discrepancy. The MEM value represents the amount of memory left for

BASIC programs and variables; loading machine language file has no effect on the pointer.

Watching the Files Go By

• We now find that we have more files on our disks than will display on our directory screen. We would like to do one of the following:

- 1) Get a printout of the directory, or
- 2) Display the directory in two columns as on the screen.

Do you have a solution to this problem?

John E. Bee
Boise, ID

Yes. To get a printout of a disk directory, just get your printer ready (and POKE 15 with the proper value, if needed), then enter POKE 111,254:DIR or DIR1. The POK redirects output from the screen to the printer. I've never had any luck using it for other screen output.

DATA Statement Tricks

• How can you input various items of

information at prompts and then, by programming, transfer the information to a DATA statement?

For example:

```
(890):
10 LINE INPUT "CHECK NUMBER";C$
(9/12/84):
20 LINE INPUT "DATE";D$
(10.00):
30 LINE INPUT "$ AMOUNT";A$
```

B900 DATA B90, "9/12/84", "10.00"

I am a magician, but don't know how to do this trick!

John R. Morrison
Beaver, PA

The third guess on your reply card was about right; it's like the Hindu rope trick that everyone talks about, but no one does. DATA statements are mainly intended for data items that are pretty well fixed and simply need to be tucked into memory when the program is run. It is possible, but hardly practical, to POKE in new lines like this; you would have to know all sorts of pointer addresses to get the lines in the right place with the proper format.

Board Conflicts

• *I have been using the CNR Engineering SP-1 internal serial interface board to connect my CoCo to an Epson MX-80 printer. I will soon have another Tandy computer which has parallel output. Can I plug this into my MX-80 without taking out the SP-1 serial board?*

Ralph J. Fusco, M.D.
Miami, FL

It would be best to take out the option board before using the MX-80 with a parallel interface. Leaving it in shouldn't do any damage, but the board's signals may interfere with the signals coming from the other computer.

ASCII Aggravation

• *Ever since I have owned my CoCo, I have had trouble saving and loading files in ASCII on tape. If I listen to the tape, I find that the signal is very weak. Everything works fine when using the binary mode.*

Rodney Lee Gibbons
Fairmont, WV

This sounds like a problem with your cassette recorder. Apparently the automatic

level control circuit is increasing level during the blank spaces between blocks; when the block comes along, the ALC drops way down and takes some time to recover. The result is that the signal is recorded too weakly. If you don't have a Radio Shack computer recorder, I suggest getting one.

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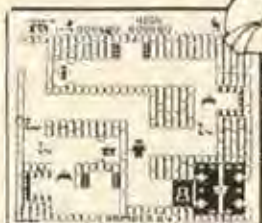
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Interfacing Machine Language With BASIC

By R. Bartly Betts
Rainbow Contributing Editor

While the topic of this month's column is interfacing machine language programs with BASIC, it covers other territory as well. Along with another method of initializing machine language programs, it introduces a few ROM routines to use.

Finally, everything is tied up in a neat machine language program that lets you type a selected number of characters on the screen. The characters you type are in reverse video but, when you press ENTER, they flip back to regular video and are stored in a string variable that you specify.

Last month the feature program demonstrated one way to interface BASIC to machine language. The program this month shows you another way to interface BASIC with machine language, and also how to interface machine language with BASIC.

Push and Pull

But first, some lessons. Two new instructions for you to learn are PSHS and PULS. PSHS (Push a Register on

the Hardware Stack) is used like a good filing system. In effect, issuing an instruction like PSHS Y is like filing the sales figures for yoyos in a file drawer. The next time you need to know how many yoyos are sold, open the drawer and pull the yoyo file.

Likewise, if you have some information in Register Y and are afraid it might get lost or destroyed if you leave it there, you can file its contents on the hardware stack with a PSHS Y instruction. In fact, PSHS can be used to save any number of the registers. To test this, type Listing 1, then single-step through it to observe the results:

Listing 1: DEMO
(A demonstration of the PSHS and PULS instructions.)

```

00100 START LDA #9
00110 LDB #8
00120 LDX #7
00130 LDU #6
00140 PSHS A,B,X,U
00150 CLRA
00160 CLRB
00170 LDX#0
00180 LDU#0
00190 PULS A,B,X,U
00200 DONE SWI
00210 END
    
```

As you can see, this program does nothing but load values into four registers, then clears them to zero. Before clearing them, however, Line 140 causes them to be pushed onto the hardware stack. After the registers are clear, a PULS instruction is issued in Line 190 to restore the values. In this demonstration program, four registers are saved. PSHS can, however, save as many or as few registers as you wish using only one PSHS instruction.

Reading the Registers

To see the program in action, enter the ZBUG mode by typing Z and ENTER. To begin single-stepping, type START, (type a comma after START). Press 'R' to see the condition of the registers. Register A contains the value '9'. To step to the next instruction, press the comma again. Again press 'R' to see the registers. Register A still contains '9' and Register B contains '8'.

Continue through the program by pressing the comma to advance. Examine the registers each time. You see the four registers A, B, X and U loaded with values. The subsequent PSHS instruction does not cause any change. Next, the registers are cleared. Finally the PULS instruction loads all the original values back into the four registers.

(R. Bartly Betts is currently a technical writer for Tandy Corp. and is a former news reporter and magazine editor. As the father of 10 children, computers are his escape from reality.)

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When using the PSHS and PULS instructions, remember that you must keep track of the order in which registers are loaded onto the stack. The stack operates in a "last in, first out" manner. Therefore, if you push the value in Register Y onto the stack, followed by the value in Register X, a PULS Y instruction does not load Y's original value back into Y, it loads the value from X.

Relating to ROM

Last month I discussed writing to the text screen by storing character values directly into the screen memory. This column introduces you to a different approach.

"A great many ROM routines are available for you to use from machine language. All you need to know is what they do and where they are."

In BASIC, characters are displayed on the video screen by a subroutine in ROM (Read Only Memory). ROM has hundreds of routines that BASIC uses to do its work. For instance, there are routines to turn on your cassette recorder or disk drives. There are routines to do arithmetic. There are routines to read key presses when you type, and there are routines to display characters on the screen. A great many ROM routines are available for you to use from machine language. All you need to know is what they do and where they are.

Listing 2 makes use of two of these subroutines to 1) get a keypress and 2) display the generated character on the video screen. It also introduces you to the USR method of interfacing to BASIC.

The origin of this program is set to \$E00 to be compatible with all computers. The next instruction, in Line 110, jumps to a ROM subroutine that loads Register D with the value of the argument, or parameter, included in the BASIC USR command. For instance, if you issue the command A=USR\$(101),

Listing 2: SCRNTYPE

(A program to read keyboard input and display it on the screen. The location for the display is controlled by the USR function.)

```
00010 *****
00020 * SCREEN TYPE *
00030 * BY R. BARTLY BETTS *
00040 *****
00050 *
00060 *
0E00 00100           ORG      $E00
0E01 BD B3ED      00110 START JSR      $B3ED
0E03 G3 0400      00120        ADDD   #1024
0E06 1F 01        00130        TFR     D,X
0E08 BD A1C1      00140 GKEY  JSR      $A1C1
0E0B 27 FB        00150        BEQ     GKEY
0E0D 81 20        00160        CMPA   #32
0E0F 27 0C        00170        BEQ     SPACE
0E11 81 08        00180        CMPA   #8
0E13 27 0E        00190        BEQ     BACK
0E15 81 0D        00200        CMPA   #13
0E17 27 12        00210        BEQ     DONE
0E19 A7 80        00220        STA     ,X+
0E1B 20 EB        00230        BRA     GKEY
0E1D 86 60        00240 SPACE LDA     #96
0E1F A7 80        00250        STA     ,X+
0E21 20 E5        00260        BRA     GKEY
0E23 30 1F        00270 BACK  LEAX   -1,X
0E25 86 60        00280        LDA     #96
0E27 A7 84        00290        STA     ,X
0E29 20 DD        00300        BRA     GKEY
0E2B 39            00310 DONE  RTS
                 00320        END

0000 TOTAL ERRORS
```

Line 110 stores the value 101 in the 'D' register. Therefore, in the case of this program, the characters you type begin at screen location 101.

Line 120 of the program adds 1024 to the value now stored in Register D. This is because the text screen memory begins at 1024. When this value is added to the screen location value you set in the USR command, the result is the proper screen memory location. The new value of 'D' is then transferred to Register X for safe keeping.

A second ROM routine is used in Line 140. Here, the routine at \$A1C1 is used to capture the keys you type. It stores your keystrokes in Register A. Routine \$A1C1 does not produce a cursor when you type. I have used the label GKEY to mark the beginning of

the routine that handles the character you type. Here is how the routine works:

- Line 150 compares a keystroke stored in Register A to a value of zero. Zero in Register A means that no key is pressed and the routine loops back to check again.
- Line 160 compares the keystroke to a space (you pressed the space bar). If it is a space, Line 170 branches to a routine to display space (character 96). The normal character 32 (generated when you press the space bar) causes a black block to appear on the screen when stored in text screen memory.
- Line 180 compares the keystroke to a backspace (character 8). If you press a backspace, Line 190

YOU should be here . . .

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branches to a routine that decreases Register X by one and stores 96 in place of the previously typed character, erasing it.

- Line 200 compares Register A to the value generated by a carriage return. If it is a carriage return, 210 causes the program to end.
- If you press a key, but it was not a carriage return, space or back-space, Line 220 stores the character value you typed into text screen memory at the location pointed to by Register X and increases Register X by one.
- Line 230 then causes the program to always branch back to the GKEY routine to look for the next keystroke.

"When using the PSHS and PULS instructions, remember that you must keep track of the order in which registers are loaded onto the stack. The stack operates in a 'last in, first out' manner."

You can see that using ROM routines is easy. A jump-to-subroutine instruction (JSR) is all that is required. Each ROM routine ends with a RTS (Return From Subroutine) instruction that causes it to return control to your program, beginning execution at the line following the JSR.

Joining Forces with BASIC

To use Listing 2 with BASIC, all you need are a few short lines that establish the beginning of the machine language routine and call it with a USR command that contains a valid argument. Listing 3 does this:

Listing 3: INTRFACE

(A BASIC program to interface the previous machine language program with BASIC.)

```
10 CLS
20 DEFUSR0=&HE00
30 A=USR0(101)
40 END
```

Listing 4: REVTYPE

(A program to display keyboard input on the screen in reverse video, then invert the characters when you press ENTER.)

```
00010 *****
00020 * REVERSE TYPE *
00030 * BY CHRIS BONE *
00040 *****
00050 *
00060 *
7000 ORG $7000
7001 E6 84 00110 START LDB ,X
7002 10AE 02 00120 LDY 2,X
7003 34 20 00130 PSHS Y
7004 9E 88 00140 LDX $88
7005 BF 705F 00150 STX BEGIN
7006 3A 00160 ABX
7007 BF 705D 00170 STX LENGTH
7008 BD ALB1 00180 LOOP JSR $ALB1
7009 81 0D 00190 CMPA #$0D
7010 27 2D 00200 BEQ DONE
7011 81 20 00210 CMPA #32
7012 25 0C 00220 BLO CONTRL
7013 26 08 00230 BNE FLIP
7014 9E 88 00240 LDX $88
7015 A7 80 00250 STA ,X+
7016 9F 88 00260 STX $88
7017 20 07 00270 BRA CONTR0
7018 88 20 00280 FLIP EORA #$20
7019 BD A30A 00290 CONTRL JSR $A30A
7020 9E 88 00300 LDX $88
7021 BC 705F 00310 CONTR0 CMPX BEGIN
7022 24 07 00320 BHS NOTBEF
7023 BE 705F 00330 LDX BEGIN
7024 9F 88 00340 STX $88
7025 20 D8 00350 BRA LOOP
7026 BC 705D 00360 NOTBEF CMPX LENGTH
7027 25 D3 00370 BLO LOOP
7028 86 08 00380 LDA #$8
7029 BD A30A 00390 JSR $A30A
7030 20 CC 00400 BRA LOOP
7031 BE 705F 00410 DONE LDX BEGIN
7032 35 20 00420 PULS Y
7033 A6 84 00430 DONELP LDA ,X
7034 88 40 00440 EORA #$40
7035 A7 80 00450 STA ,X+
7036 81 60 00460 CMPA #$60
7037 26 02 00470 BNE NOTSPC
7038 86 20 00480 LDA #$20
7039 A7 A0 00490 NOTSPC STA ,Y+
7040 BC 705D 00500 CMPX LENGTH
7041 26 ED 00510 BNE DONELP
7042 39 00520 RTS
7043 5D 00530 LENGTH RMB 2
7044 5F 00540 BEGIN RMB 2
00000 0000 00550 END
00000 TOTAL ERRORS
```

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Line 20 establishes the beginning of your machine language program with the DEFUSR statement. Line 30 calls the machine language program, passing it an argument of 101. Thus, when the program is run, the characters you type begin to appear at screen location 101.

To use the programs, simply LOAD them using the proper loading commands, type RUN and ENTER (because the machine language program is initialized by the BASIC program, you do not use the EXEC command). The screen clears and you can begin typing. To return to BASIC, press ENTER.

Type and Invert

Listing 4 uses some of the preceding features in a different way. The current cursor position establishes where the characters you type are displayed. The characters appear in reverse but, when you finish and press ENTER, they immediately invert to normal uppercase characters.

This program also uses two new ROM routines. The routine at \$A1B1 is similar to the routine at \$A1C1, except the normal cursor is on the screen as you type. The second routine at \$A304 causes the characters typed to be displayed on the screen. This is the routine your computer uses in BASIC, and it replaces the STA instruction we used in the earlier program.

Listing 5 is commented to help you follow its logic. The following notes describe some of the key points:

- The RMB instructions in lines 530 and 540 set aside storage space that points to the beginning and end of the string.
- Memory location \$88 stores the current screen cursor position.
- The ABX instruction adds the 'X' and 'B' registers. 'X' and 'B' are the only registers that allow this 16- and 8-bit addition.
- The subroutine at \$A1B1 gets whatever key you press and stores it in Register A. This subroutine provides a normal cursor while waiting for a key press.
- The subroutine at \$A30A displays the character currently in Register A on the screen at the current cursor position.
- If you are not familiar with the ASCII values of characters (used in lines 190, 210, 310, 360, 380, 460 and 500), there is an ASCII chart in your Color BASIC manuals.

Listing 6: SAMPLE

A BASIC program to show how REVTYPE can be used.)

```

10 CLS
20 CLEAR 10000,&H6FFF: REM change
   &H6FFF to &H3FFF for a 16K mach
   ine
25 LOADM"REVTYPE: REM change LOA
   DM to "CLOAD for a tape system
30 DEFUSR0=&H70000: REM change &H
   70000 to &H30000 for a 16K machine
40 PRINT TAB(5) "COMPLETE THE SE
   NTENCE
50 FOR T=1 TO 3
60 READ A$
70 S$(T)=A$
80 NEXT T
90 FOR T=1 TO 3
100 PRINT
110 PRINT S$(T) " ";
120 B$=USR0("
   ")
130 C$=S$(T)+" "+B$
140 PRINT
150 PRINT "this is what you wrot
   e:"
160 PRINT C$
170 NEXT T
180 DATA ROSES ARE,MY BONNIE LIE
   S,HOME IS WHERE THE

```

Listing 5: CALLER

(BASIC program to call the Reverse Type program. The number of spaces between the quotes in Line 120 establish the maximum number of characters you can type.)

```

10 DEFUSR0=&H70000
20 A$=USR0(" ")
30 END

```

Listing 6 is a sample of how the program might be handled from BASIC.

The program asks you to complete three sentences. The characters you type are in reverse video. When you complete your entry and press the ENTER key, the typed characters flip back to normal video. To show that the characters you type are stored in B\$, Line 130 combines them with the partial sentence.

After using the program, LIST it. The last characters you typed are now part of the program and are displayed between the quotation marks in Line 120.

Forging Ahead

Now, put your imagination to work. Use some of the techniques you have learned to write programs of your own. You can, for instance, combine last month's program with the one for this month and create a program that lets you type characters in reverse video, flip them when you are through, then flash them.

You probably realize that you now have the knowledge to write a simple word processor, or create your own editing routine for a program.

You should feel that assembly language isn't too difficult. You should have the heady feeling of accomplishment that comes with realizing you are writing routines which could be used in full-fledged machine language games and utilities.

We have covered a lot of ground; now take your time and explore the new territory during the next month. It's a territory filled with more treasures. When you find some, write me, and we will share them with others. My address is 2251 Lipscomb, Fort Worth, TX 76110.

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DESTINATION: MOON BASE AMPHIBIA

By Nick Bradbury

The idea for *Amphibia* is loosely based on the arcade game *Moon Patrol*. A Hi-Res 32K game, *Amphibia* has several features which you may find interesting:

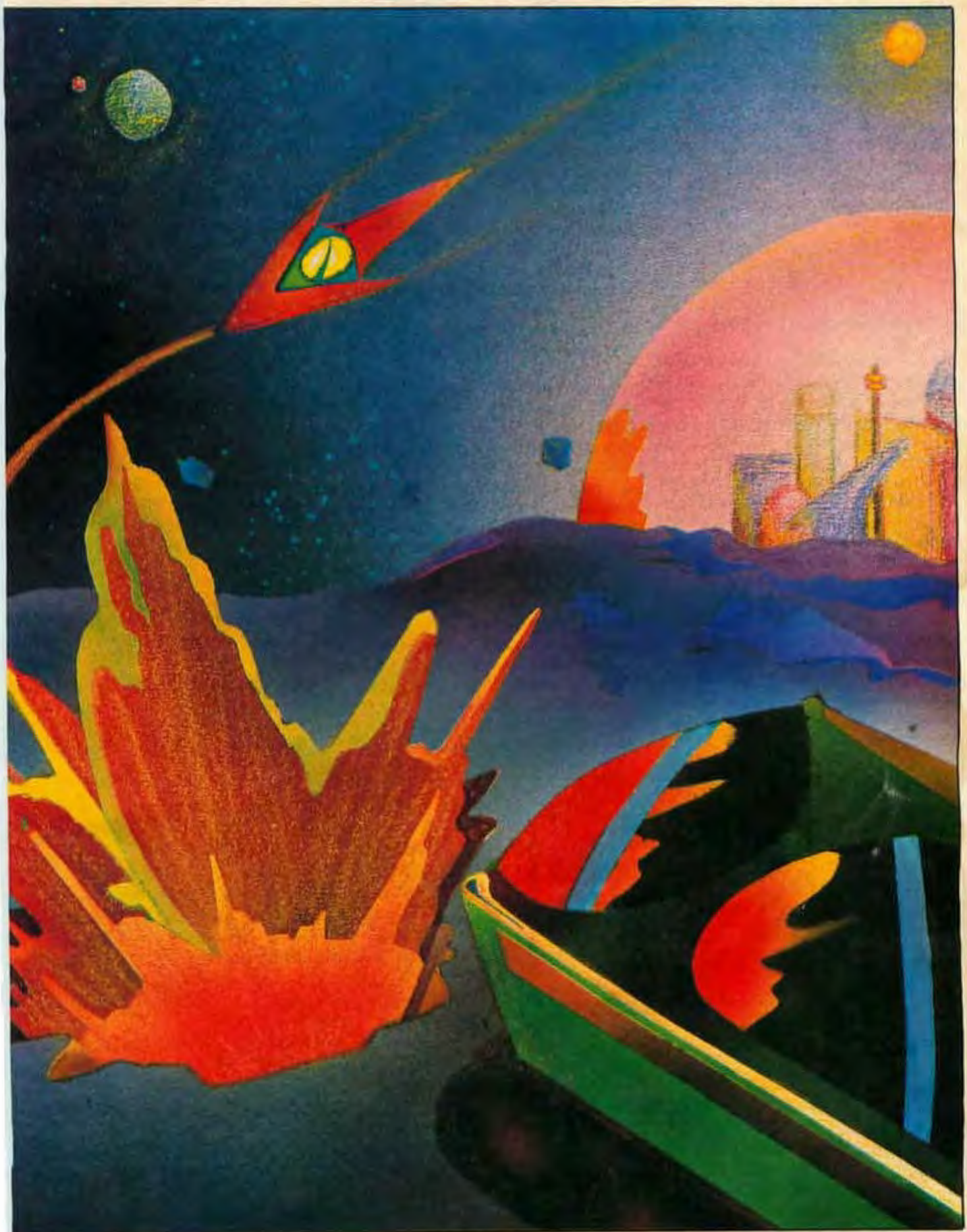
- 1) Hi-Res artifact graphics
- 2) Machine language subroutines for "superfast" speed
- 3) Four totally different screens
- 4) Scrolling screens for continuous play

Because of the many machine language subroutines in *Amphibia*, I will explain how these routines work and also how the graphics were created.

How to Play

You travel the surface of an alien planet trying to reach your final destination: Moon Base Amphibia! Your vehicle is capable of traveling under water as well as over land. To reach your base, you must complete three levels of difficult obstacles: 1) boulders and rockets,

(Nick Bradbury enjoys cartooning, music and computer programming. He will attend the University of Missouri-Rolla this fall where he plans to obtain his bachelor's in computer science.)



2) bombs and craters, and 3) geysers and surface rockets.

On each level, the right joystick controls your movements (you can only move left and right) and the firebutton controls jumps.

On Level one, you must jump over boulders while avoiding jumping up into the overhead rockets. Your timing must be perfect to jump over the boulders. After the timer runs out (at the bottom of the screen), you will go to the next screen.

In the second screen, you are under the alien ocean. Large craters appear and you must jump over them. Occasionally, undersea patrollers appear above you. You must avoid the bombs they drop and watch out for the craters the bombs leave when they hit the ocean floor.

After this screen, you will go on to level three. There are two obstacles you must avoid in this screen. The surface rockets appear to your left. These rockets pause for a moment, then unexpectedly shoot across the screen. You must jump over these rockets using split-second timing. Geysers will occasionally appear at the right of the screen. These are impossible to completely jump, but you must jump high enough so the water does not reach your cockpit.

After completion of these three screens, you will appear in front of the moon base. Above and below you are two revolving treadmills. The top treadmill is slowly coming down upon you, so you must act fast. To your right are two berserkers which you must

avoid before you can reach your base. To reach your base, you must move your vehicle to the right. Upon completion of this screen, you will receive a bonus and will return to the first screen.

How to Create Graphics

The shapes in *Amphibia* are created in an extremely simple way. All shapes were originally drawn on graph paper. Because of Extended BASIC's DRAW command, this drawing can be easily translated into a draw string. For example, if a line on the graph paper moves right four spaces, I translate this to equal "R4." After the complete string has been created, I draw it the size I want using the powerful scale option of the DRAW command. The PAINT command was used to fill in the shapes.

The colors used in this game are the famous "artifact" colors that give different colors in PMODE 4 using SCREEN 1,1. The best way I've found to use these colors is by using memory location 178. By changing the value in this location, the colors in the graphics commands are changed. By poking a 1 into this location, blue will show up. By painting in this mode with the format of PAINT (x,y),.1, the color blue will show up instead of white.

The ML Subroutines

The most important subroutine is the routine that copies an object onto the graphics screen. The other routines do the same action or scroll the background. I will only explain the copy routine, for I feel it is the most useful.

This routine (see accompanying listing) uses less than 50 bytes. First draw the shapes onto pages five through eight. The ML routine copies these shapes onto a specified section of the viewing screen. The ROM routine a SB3ED (hexadecimal) is used to send the location from the USR command to the ML routine. This ROM routine transfers the contents in between the USR brackets and places it into the 'D' register. The ML routine takes this location and places the shape in the desired memory location. You may use this routine in any of your programs.

Getting it Working

There are two problems you may find in *Amphibia*. First, the artifact color may not turn out correctly. To solve this, you will see a cleared screen at the beginning of the program. If this screen is a bluish color, press Reset and rerun the program until the colors are correct. After a short pause, the screen will change and the program will continue.

The other problem you may have is with the famous "speed-up" POKE that is used. If you have problems with this POKE, change the value of "PK" in Line 0 to 65494. This will set the speed for the entire program.

If you encounter any problems with *Amphibia*, please write me and include a full explanation of what went wrong. Also, please include a self-addressed stamped envelope. I will write back as soon as possible. My address is 10500 Sandpiper Lane, Knoxville, TN 37922.

112	.....	233	5255	.....	218
410	.....	33	6900	.....	24
1016	.....	104	7124	.....	85
1218	.....	60	7430	.....	95
2000	.....	179	7905	.....	158
3052	.....	69	8130	.....	104
3162	.....	234	8400	.....	33
3316	.....	218	8984	.....	62
5050	.....	151	9190	.....	118
5175	.....	128	END	.....	128

Listing 1: AMPHIBIA

```

0 CLS0: CLEAR85, 31000: PCLEAR8: DIM
A1(10): PK=65495: POKEPK, 0: PMODE3,
1: PCLS3: PMODE4, 1: SCREEN1, 1: S1=0:
NS=4: PX=10: PY=12: GOSUB5000: GOSUB
2000: CLS: PRINT@32, Z$: : PRINT@448,
Z$: : PRINT@72, "a m p h i b i a": P
RINT@131, "(C)1983 BY NICK BRADBU

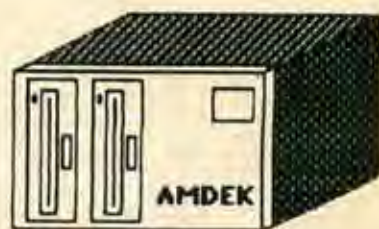
```

```

RY": PRINT@160, Z$:
20 SCREEN0, 0: PMODE4, 1: PCLS0: PMOD
E4, 5: PCLS0: POKEPK, 0: PRINT@224: PR
INT@256: PRINT@284: GOSUB1000: GOSU
B3000: DEFUSR0=31000: DEFUSR1=3105
0: DEFUSR2=31100: DEFUSR3=31150: DE
FUSR4=31200: DEFUSR5=31250: DEFUSR
8=31400: GOSUB6300: GOSUB6500: PLAY
"03V30L255T255": POKE65494, 0:
85 IFINKEY$=CHR$(13) THEN0ELSEPL
AY"FAAE": GOTO85
90 R1=0: R2=0: TI=0: POKEPK, 0: BG=52
54: BX=5: E1=0: E2=0: PC=0: JP=0: U=US
R0(BG)
98 LV=1: PMODE4, 1: COLOR1, 0: SCREEN
1, 1
100 J0=JOYSTK(0): IFJP=1 THEN108EL
SEIFJ0<2 THEN200ELSEIFJ0>43 THEN2
25
108 PC=1-PC: U=USR0(BG): U=USR4(0)

```

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```

:IFPC=1THENEXEC31550
112 IFR1=1THENGOSUB405
120 IFJP=1THEN310ELSEIF(PEEK(&HF
F00)AND1)=0THEN300
124 IFPC=1THENBG=BG-32ELSEBG=BG+
32
130 U=USR4(0):U=USR3(0):IFR1=1TH
ENGOSUB405ELSEIFRND(15)=1THENGOS
UB400
144 IFR2=1THENGOSUB425ELSEIFRND(
26)=1THENGOSUB420
180 TI=TI+1:IFTI>8THENTI=0:GOSUB
6400
190 PLAY"O5V31P255":GOTO100
200 IFBX<1THEN108ELSEBX=BX-1:BG=
BG-1
205 U=USR1(BG+7):GOTO108
225 IFBX>16THEN108ELSEBX=BX+1:BG
=BG+1
230 U=USR1(BG-1):GOTO108
300 JP=1:J2=0:J1=0:PLAYP2$
310 IFJ2=1THEN320ELSEJ1=J1+1:IFJ
1>4THENJ2=1ELSEBG=BG-128
315 GOTO330
320 J1=J1-1:IFJ1<1THEN350ELSEBG=
BG+128
330 GOTO130
350 J2=0:JP=0:GOTO130
400 R1=1:E1=5755:U=USR5(E1):X1=2
9
405 P1=PEEK(E1+98):IFP1<>255THEN
910ELSEE1=E1-1:X1=X1-1:IFX1<1THE
N414
410 U=USR5(E1):RETURN
414 R1=0:I=480:U=USR1(E1-I):U=US
R1(E1-I+1):U=USR1(E1-I+2):U=USR1
(E1-I+3):U=USR1(E1-I+4):RETURN
420 R2=1:E2=4768:U=USR8(E2):X2=1
425 P1=PEEK(E2+258):IFP1<>42THEN
910ELSEE2=E2+1:X2=X2+1:IFX2>28TH
EN440
430 U=USR8(E2):RETURN
440 R2=0:FORI=0TO4:U=USR1(E2+I):
NEXTI:RETURN
910 PLAYPP$:NS=NS-1:CLS:SCREEN0:
PRINT@32,Z$;:PRINT@448,Z$;:PRINT
@99,"YOU HAVE"NS"BUGGIES LEFT.":
PRINT@163,"YOUR SCORE IS"SI"POIN
TS.":PMODE4,1:COLOR1,0:LINE(0,98
)-(255,150),PRESET,BF:FORX=0TO25
5:Y=143+RND(3):PSET(X,Y):PSET(X,
Y+1):NEXTX:PMODE4,1:COLOR1,0:
955 R1=0:JP=0:J2=0:PC=0:R2=0:GOS
UB6500:POKE65494,0:PRINT@387,"PR
ESS <ENTER> TO CONTINUE"
975 IFINKEY$=CHR$(13)THEN980ELSE
975
980 CLS:POKEPK,0:GOTO98
1000 PMODE3,1:COLOR4,1:LINE(0,0)

```

```

-(255,30),PSET,B:LINE(4,4)-(248,
26),PSET,B:PAINT(2,2),3,4:PMODE4
,1:COLOR1,0:FORX=0TO255:Y=143+RN
D(3):PSET(X,Y):PSET(X,Y+1):NEXTX
:POKE178,2:PAINT(128,190),,1:COL
OR1,0:Y=90:X1=256:FORX=0TO128:PS
ET(X,Y):PSET(X1,Y):PSET(X,Y+1)
1016 NEXTX:PMODE4,1:COLOR1,0:LIN
E(0,170)-(255,192),PRESET,BF:LIN
E(0,170)-(255,192),PSET,B:D1$="R
2F1E1R1D1F1D1L1G1H1D1L2H1G1L1H1L
1E1U1R1E1R1":PMODE4,1:DRAW"C1S16
BM44,58:XD1$;BM128,61:XD1$;BM212
,58:XD1$;":COLOR1,0:PAINT(60,60)
,,1:PAINT(130,64),,1:PAINT(214
1100 PMODE4,1:COLOR1,0:PCLS0:D1$
="E1U1F1R1F1":LINE(0,150)-(255,1
88),PSET,BF:FORX=6TO250STEP12:CI
RCLE(X,56),8,1:NEXTX:LINE(0,52)-
(255,70),PRESET,BF:LINE(251,51)-
(256,51),PSET:POKE178,1:PAINT(12
8,60),,1:COLOR1,0:PAINT(100,160)
,,1:PMODE4,1:COLOR1,0:PMODE4,1
1185 PMODE3,1:COLOR4,1:LINE(0,0)
-(255,30),PSET,B:LINE(4,4)-(248,
26),PSET,B:PAINT(2,2),3,4:PMODE4
,1:COLOR1,0:FORI=1TO30:PRESET(RN
D(255),161+RND(7)):NEXTI:RETURN
1200 PMODE4,1:COLOR1,0:PCLS0:PMO
DE3,1:COLOR3,1:LINE(0,156)-(255,
180),PSET,BF:PMODE4,1:COLOR1,0:F
ORI=1TO100:PRESET(RND(256),159+R
ND(8)):NEXTI:X1=256:COLOR1,0:Y=8
0:FORX=0TO128:PSET(X,Y):PSET(X,Y
+1):PSET(X1,Y):PSET(X1,Y+1):X1=X
1-1:Y=Y-2+RND(3):IFY<72THENY=7
1218 NEXTX:PMODE3,1:COLOR4,1:LIN
E(0,0)-(255,30),PSET,B:LINE(4,4)
-(248,26),PSET,B:PAINT(2,2),3,4:
PMODE4,1:COLOR1,0:D1$="R2F1E1R1D
1F1D1L1G1H1D1L2H1G1L1H1C1E1U1R1E
1R1":PMODE4,1:DRAW"C1S16BM36,40:
XD1$;BM110,44:XD1$;BM210,40:XD1$
;":PAINT(42,49),,1:PAINT(116,5
1280 PMODE4,1:COLOR1,0:LINE(0,17
0)-(255,192),PRESET,BF:LINE(0,17
0)-(255,192),PSET,B:POKE178,1:PA
INT(128,66),,1:RETURN
1300 PMODE4,1:COLOR1,0:PCLS0:LIN
E(0,170)-(255,192),PRESET,BF:LIN
E(0,170)-(255,192),PSET,B:PMODE3
,1:COLOR4,1:LINE(0,0)-(255,30),P
SET,B:LINE(4,4)-(248,26),PSET,B:
PAINT(2,2),3,4:PMODE4,1:COLOR1,0
:D1$="U4E2R1U4E1U2H1L1H1U1H1U1E1
U1E1R1E1U1E1D1F1E1U1F1D1F1R1F1
1340 LINE(0,31)-(255,48),PSET,BF
:LINE(0,162)-(255,169),PSET,BF:P
MODE4,1:COLOR1,0:CIRCLE(180,89),

```

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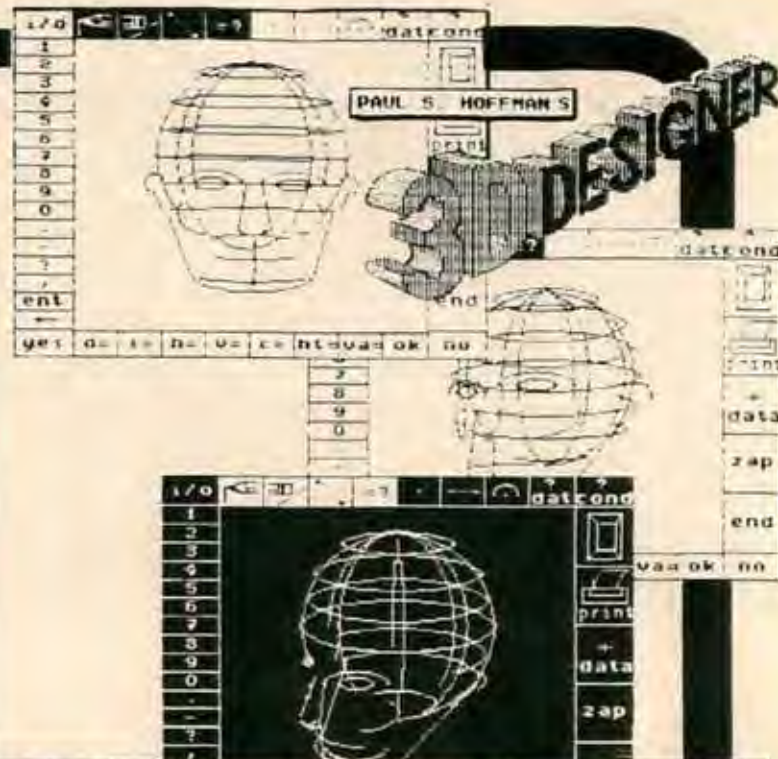


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```

10,1:POKE178,1:PAINT(180,115),,1
:COLOR1,0:RETURN
2000 P2$="O2V30L255T255DCGAFB":P
3$="O3V30L255T255FA":P4$="O1V30L
255T255AO2G01A":P5$="O5V30L255T2
55EO3A01G":PP$="O1V30L255T255FFA
FEAV25EGFADCEV20BGFEDAV15GFDACEV
10CBEGDDAV5FDEADV2GFEDA":Z$=STRI
NG$(32,"*")
2505 TM$="BM+3,0U6L3R6BR2BD6;BM+
5,-6L4R2D6L2R4BR3;BM+1,0U6R1F2D1
U1E2R1D6BR3;BM+5,0L4U6R4BD3BL2L1
BD3BR6;":RETURN
3000 PMODE4,5:D1$="E1R9NR2G1D2R4
U2NH1D3G1U1L2D1L3U1L2D1L1U1L2D1L
1H1U3":D2$="R2D1NL2D1L1NU2L1U2":
DD$="NL2R1D1R1H1F1D1L5U1E1":PMOD
E4,5:DRAW"C1S16BM34,92;XD0$;":PO
KE178,1:PAINT(32,97),,1:COLOR1,0
:CIRCLE(28,101),2,1:CIRCLE(39,10
1),2,1:GET(20,90)-(46,105),A1,
3010 DRAW"C1S16BM8,8;XD1$;":DRAW
"BM14,8;XD2$;BM22,8;XD2$;BM30,8;
XD2$;":POKE178,1:PAINT(40,21),,1
:COLOR1,0:CIRCLE(20,24),4,1:CIRC
LE(32,24),4,1:CIRCLE(52,24),4,1:
DRAW"C1S16BM8,42;XD1$;":DRAW"BM1
4,42;XD2$;BM22,42;XD2$;BM30,42;X

```

```

D2$;":POKE178,2:PAINT(40,55),,
3028 LINE(0,30)-(92,68),PSET,B:P
OKE178,1:PAINT(1,31),,1:PMODE3,5
:COLOR2,1:LINE(0,30)-(92,68),PSE
T,B:PMODE4,5:COLOR1,0:D3$="R1F1D
1F1L6U1E1R1E1":PMODE4,5:COLOR1,0
:DRAW"BM98,13;XD3$;":PAINT(98,20
),,1:LINE(92,21)-(94,23),PRESET:
LINE(92,21)-(95,18),PRESET:LIN
3052 LINE(140,14)-(150,22),PSET,
B:POKE178,2:PAINT(144,16),,1:COL
OR1,0:PMODE4,5:COLOR1,0:D5$="R8F
1L9U1":DRAW"C1S12BM215,16;XD5$;":
:PAINT(220,16),,1:PSET(243,19):P
MODE3,5:COLOR3,1:X=214:FOR Y=13TO
15:LINE(X,Y)-(X+12,Y),PSET:X=X+2
:NEXT Y:X=222:FOR Y=19TO21:LINE(
3100 PMODE4,5:COLOR1,0:D1$="E1U1
E1R2F1D1R1E1R3E1R2E1U1H1R4G1D3F1
D3H1D3F1L4E1U1H1L2H1L3H1L1D1G1L2
H1U1H1":DRAW"C1S8BM102,48;XD1$;":
:CIRCLE(108,47),3,1:PAINT(126,47
),,1:PAINT(108,51),,1:PAINT(108,
43),,1:LINE(118,46)-(134,48),PRE
SET,B:COLOR3,1:FOR X=120TO130ST
3142 PMODE4,5:DRAW"C1S8BM182,52;
XD2$;":POKE178,2:PAINT(188,52),,
1:COLOR1,0:DRAW"BM168,52;XD2$;":

```



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```

D1$="D4R12U4G2L1G1L1G1H1L1H2L1H1
":DRAW"C1S16BM208,50;XD1$;":PAIN
T(220,60),,1:PAINT(246,60),,1:PM
ODE4,5:COLOR1,0:LINE(94,33)-(256
,64),PSET,B:POKE178,1:PAINT(95
3162 PMODE4,5:COLOR1,0:LINE(254,
49)-(255,64),PSET,B:PMODE4,5:COL
OR1,0:D1$="R1E1U1F1R1F1R2E1R1E1F
1R1F1":D2$="E1U1H1L1G1U2E1R2F1E1
R2F1D2H1L1G1D1F1":PMODE4,5:DRAW"
C1S16BM12,101;XD1$;":LINE(12,102
)-(64,102),PSET:POKE178,2:PAINT(
50,100),,1:PAINT(26,100),,1:PM
3220 DRAW"C4S16BM29,98;XD2$;":PM
ODE4,5:POKE178,1:PAINT(36,88),,1
:PMODE3,5:PMODE4,5:DRAW"C1S16BM8
4,101;XD1$;":LINE(84,102)-(136,1
02),PSET:POKE178,2:PAINT(96,100)
,,1:PAINT(124,100),,1:PMODE3,5:C
OLOR3,1:LINE(84,102)-(136,102),P
SET:DRAW"C4S24BM98,98;XD2$;":P
3246 DRAW"S8BM34,92;XD2$;":COLOR
4,1:LINE(110,100)-(110,80),PSET:
LINE(106,100)-(106,80),PSET:LINE
(114,98)-(114,80),PSET:PMODE4,5:
COLOR1,0:D3$="E1R5F1R1F1R1F1L8E1
L3D1H1U1E1":DRAW"C1S12BM24,121;X
D3$;":PAINT(42,124),,1:D4$="U1E1
R2F2L5":D5$="G2R3E2L3":PMODE3,
3266 DRAW"BM28,124;XD5$;":PAINT(
20,128),3,3:LINE(32,130)-(10,130
),PRESET:COLOR2,1:FORX=40TO54STE
P4:PRESET(X,126):NEXTX:LINE(46,1
21)-(48,123),PSET,BF:PRESET(49,1
21):RETURN
3300 PMODE4,5:COLOR1,0:PCOPY5TO1
:PCL50:PCOPY1TO5:LINE(0,29)-(255
,48),PRESET,BF:D1$="NU4ND4NL4NR4
":D2$="NE4NF4NG4NH4":LINE(0,42)-
(255,42),PSET:LINE(0,54)-(255,54
),PSET:LINE(0,40)-(255,40),PSET:
LINE(0,56)-(255,56),PSET:POKE178
,2:PAINT(100,55),,1:PAINT(100,
3316 LINE(0,62)-(255,62),PSET:LI
NE(0,74)-(255,74),PSET:LINE(0,60)
)-(255,60),PSET:LINE(0,76)-(255,
76),PSET:POKE178,2:PAINT(128,61)
,,1:PAINT(128,75),,1:COLOR1,0:FO
RX=8TO256STEP16:CIRCLE(X,48),7,1
:CIRCLE(X,68),7,1:NEXTX:DRAW"C1S
4":FORX=8TO256STEP16:DRAW"BM"+
5000 ML$="BDB3ED1F01108E1E01C607
A6A0A7805A26F930881931A819108C21
872DEB39":TT=31000:GOSUB5500:ML$
="BDB3ED1F01108E1E08C601A6A0A780
5A26F930881F31A81F108C21882DEB39
":TT=31050:GOSUB5500:ML$="BDB3ED
1F018600C607A7805A26FB39":TT=311
00:GOSUB5500

```

```

5030 ML$="8E1001108E1000A680A7A0
8C129F26F78E129F108E12BFA684A7A4
3088E031A8E08C0FFF26F139":TT=311
50:GOSUB5500:ML$="8E1801108E1800
A680A7A08C18BF26F78E18BF108E18DF
A684A7A43088E031A8E08C17FF26F139
":TT=31200:GOSUB5500
5050 ML$="BDB3ED1F01108E1FAAC605
A6A0A7805A26F930881B31A81B108C21
2E2DEB39":TT=31250:GOSUB5500:ML$
="BDB3ED1F01108E1FB9C606A6A0A780
5A26F930881A31A81A108C20BE2DEB39
":TT=31400:GOSUB5500
5090 ML$="8E0CE1108E0CE0A680A7A0
8C0FDF26F78E0FDF108E0FFFA684A7A4
3088E031A8E08C0CFF26F139":TT=315
50:GOSUB5500:ML$="BDB3ED1F01108E
21C1C607A6A0A7805A26F930881931A8
19108C25C72DEB39":TT=31600:GOSUB
5500
5110 ML$="BDB3ED1F01108E2288C601
A6A0A7805A26F930881F31A81F108C26
682DEB39":TT=31650:GOSUB5500:ML$
="8E18C1108E18C0A680A7A08C1B1F26
F78E1B1F108E1B3FA684A7A43088E031
A8E08C18DF26F186FF8E1A20A7843088
E08C18A026F639":TT=31700:GOSUB55
00

```



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```

5130 ML$="8E0C01108E0C00A680A7A0
8C0CDF26F78E0CDF108E0CFFA684A7A4
3088E031A8E08C0BDF26F139":TT=317
60:GOSUB5500:ML$="BDB3ED1F01108E
222CC607A6A0A7805A26F930881931A8
19108C25922DEB39":TT=31800:GOSUB
5500
5150 ML$="BDB3ED1F01108E2337C601
A6A0A7805A26F930881F31A81F108C25
172DEB39":TT=31850:GOSUB5500:ML$
="BDB3ED1F01108E2335C601A6A0A780
5A26F930881F31A81F108C25152DEB39
":TT=31900:GOSUB5500:ML$="BDB3ED
1F01108E23BAC606A6A0A7805A26F930
881A31A81A108C253E2DEB39"
5175 TT=31950:GOSUB5500:ML$="BDB
3ED1F01108E27A0C608A6A0AA84A7805
A26F730881831A818108C2BA72DE939"
:TT=32000:GOSUB5500:ML$="393939"
:TT=32050:GOSUB5500:ML$="8E0A811
08E0A80A680A7A08C123F26F78E123F1
08E125FA684A7A43088E031A8E08C0A9
F26F139":TT=32100:GOSUB5500
5210 ML$="8E0E81108E0E80A680A7A0
8C123F26F78E123F108E125FA684A7A4
3088E031A8E08C0E9F26F139":TT=321
50:GOSUB5500:ML$="8E19E1108E19E0
A680A7A08C1B1F26F78E1B1F108E1B3F
A684A7A43088E031A8E08C19DF26F139
":TT=32200:GOSUB5500
5230 ML$="BDB3ED1F01108E26A1C609
A6A0A7805A26F930881731A817108C2A
C92DEB39":TT=32250:GOSUB5500:ML$
="BDB3ED1F01108E26AAC609A6A0A780
5A26F930881731A817108C2AD22DEB39
":TT=32300:GOSUB5500:ML$="BDB3ED
1F01108E26B2C609A6A0A7805A26F930
881731A817108C2ADB2DEB39"
5255 TT=32350:GOSUB5500:ML$="BDB
3ED1F01108E2BC1C607A6A0A7805A26F
930881931A819108C2EA72DEB39":TT=
32400:GOSUB5500:ML$="BDB3ED1F011
08E2300C60FA6A0A7805A26F93088113
1A811108C252F2DEB39":TT=32450:GO
SUB5500
5280 ML$="BDB3ED1F01108E2580C60F
A6A0A7805A26F930881131A811108C27
6F2DEB39":TT=32500:GOSUB5500:ML$
="BDB3ED1F01108E1E71C602A6A0A780
5A26F930881E31A81E108C21F22DEB39
":TT=32550:GOSUB5500:RETURN
5500 FORI=1TOLEN(ML$)STEP2:AA$=M
ID$(ML$,I,2):AA=VAL("&H"+AA$):PO
KETT+VV,AA:VV=VV+1:NEXTI:VV=0:RE
TURN
6300 TM=0:PMODE3,1:COLOR3,1:TY=1
78:FORTX=40TO240STEP4:LINE(TX,TY
)-(TX,TY+6),PSET:TM=TM+1:NEXTTX:
PMODE4,1:DRAW"C1S4BM4,184;XTM$;"

```

```

:RETURN
6400 TX=TX-4:PMODE3,1:COLOR4,0:L
INE(TX,TY)-(TX,TY+6),PSET:S1=S1+
5:TM=TM-1:IFTM<1THEN6900
6425 PMODE4,1:COLOR1,0:PLAYP3$:R
ETURN
6500 PMODE4,1:COLOR1,0:IFNS<=0TH
EN20000
6504 LINE(8,7)-(240,24),PRESET,B
F:X=8:Y=8:FORI=1TONS:PUT(X,Y)-(X
+26,Y+15),A1,OR:X=X+26:NEXTI:RET
URN
6900 IFLV>1THEN7600ELSEPOKE65494
,0:POKE65314,170:PLAY"01V30L255T
255FEO2A":POKE65314,255:FORI=1TO
200:NEXTI
6905 CLS:SCREEN0:PRINT@32,Z$;:PR
INT@448,Z$;:NS=NS+1:PRINT@96,"YO
U HAVE COMPLETED LEVEL ONE.":PRI
NT" BONUS 500!!!":S1=S1+500:PRIN
T:PRINT"YOUR SCORE NOW IS"S1.":
PRINT"YOU HAVE"NS"ROVERS LEFT.":
POKEPK,0:LV=2:PMODE4,1:COLOR1,0:
PCLS0:GOSUB6500:GOSUB1100:GOSU
7000 CLS:DEFUSR0=31600:DEFUSR1=3
1650:DEFUSR2=31700:DEFUSR3=31760
:DEFUSR4=31800:DEFUSR5=31850:DEF
USR6=31900:DEFUSR7=31950:POKE654
94,0:CLS:SCREEN0,0:PRINT@227,"PR
ESS <ENTER> TO CONTINUE"
7074 IFINKEY$<>CHR$(13)THEN7074
7090 BG=5287:BX=5:JP=0:PC=0:E1=0
:E2=0:E3=0:POKEPK,0:PMODE4,1:COL
OR1,0:SCREEN1,1
7100 J0=JOYSTK(0):IFJP=1THEN7108
ELSEIFJ0<20THEN7200ELSEIFJ0>43TH
EN7225
7108 PC=1-PC:IFE1=1THENGOSUB7410
7110 U=USR0(BG):U=USR2(0):U=USR3
(0):IFJP=1THEN7310ELSEIF(PEEK(&H
FF00)AND1)=0THEN7300
7124 IFE1=1THENGOSUB7410ELSEIFRN
D(24)=1THENGOSUB7400
7128 IFE2=1THENGOSUB7440
7130 U=USR2(0):ML=ML+1:IFML>8AND
E1=0THENIFRND(INT(TM/3))=1THENGO
SUB7500:ML=0
7140 IFPEEK(BG+1061)=85THEN7905
7180 TI=TI+1:IFTI>10THENTI=0:GOS
UB6400
7190 PLAY"05V31P255":GOTO7100
7200 IFBX<1THEN7108ELSEBX=BX-1:B
G=BG-1
7205 U=USR1(BG+7):GOTO7108
7225 IFBX>16THEN7108ELSEBX=BX+1:
BG=BG+1
7230 U=USR1(BG-1):GOTO7108
7300 JP=1:J2=0:J1=0:PLAYP2$
7310 IFJ2=1THEN7320ELSEJ1=J1+1:I

```

```

FJ1>3THENJ2=1ELSEBG=BG-128
7315 GOTO7330
7320 J1=J1-1:IFJ1<1THEN7350ELSEB
G=BG+128
7330 GOTO7124
7350 J2=0:JP=0:GOTO7130
7400 E1=1:EP=3739:U=USR4(EP)
7410 EP=EP-1:IFEP<3711THEN7420EL
SEU=USR4(EP)
7412 IFE2=1THEN7415ELSEIFRND(18)
=1THEN7430
7415 RETURN
7420 E1=0:FORI=0TO6:U=USR1(EP+I)
:NEXTI:RETURN
7430 E2=1:EO=EP+514:PLAYP5$:EY=0
:U=USR5(E0)
7440 EY=EY+6:EO=EO+192:IFEY>42TH
EN7460
7445 IFPC=1THENU=USR5(E0) ELSEU=
USR6(E0)
7448 P1=PEEK(E0+512):IFP1<>85THE
N7905
7450 RETURN
7460 EI=EO+448:U=USR1(E0-448):E2
=0:GOSUB7505:PLAYP4$:RETURN
7500 EI=6299
7505 U=USR7(EI):RETURN
7600 IFLV>2THEN8600ELSEPOKE65494

```

```

,0:POKE65314,170:PLAY"01V30L255T
255FEO4E":POKE65314,255:FORI=1TO
200:NEXTI
7605 NS=NS+1:S1=S1+1000:CLS:SCRE
EN0:PRINT@32,Z$;:PRINT@448,Z$;:P
RINT@96,"YOU HAVE COMPLETED LEVE
L TWO":PRINT" BONUS 1000!!!":PRI
NT:PRINT"YOU HAVE"NS"ROVERS LEFT
.":POKEPK,0:LV=3:PMODE4,1:COLOR1
,0:PCLS0:GOSUB6500:GOSUB1200:GOS
UB6300:GOTO8000
7905 POKE65494,0:PLAYPP$:CLS:SCR
EEN0,0:NS=NS-1:PRINT@32,Z$;:PRIN
T@448,Z$;:PRINT@99,"YOU HAVE"NS"
BUGGIES LEFT.":PRINT@163,"YOUR S
CORE IS"S1"POINTS.":PMODE3,1:COL
OR2,1:LINE(0,69)-(255,149),PSET,
BF:COLOR4,1:LINE(0,150)-(255,170
),PSET,BF:PMODE4,1:COLOR1,0:FO
7970 POKE65494,0:PRINT@387,"PRES
S <ENTER> TO CONTINUE"
7975 IFINKEY$=CHR$(13)THEN7980EL
SE7975
7980 CLS:POKEPK,0:GOTO7090:STOP
8000 CLS:DEFUSR0=31000:DEFUSR1=3
1050:DEFUSR2=32100:DEFUSR3=32150
:DEFUSR4=32200:DEFUSR5=32250:DEF
USR6=32300:DEFUSR7=32350:DEFUSR8
=32400:POKE65494,0:CLS:SCREEN0,0
:PRINT@227,"PRESS <ENTER> TO CON
TINUE"
8074 IFINKEY$<>CHR$(13)THEN8074
8090 JP=0:BG=5574:BX=5:CT=0:E1=0
:E2=0:F3=0:U=USR4(BG)
8098 PMODE4,1:COLOR1,0:SCREEN1,1
:POKEPK,0:GOSUB6500
8100 J0=JOYSTK(0):U=USR3(0):U=US
R4(0):IFPC=1THENU=USR2(0)
8104 IFJP=1THEN8108ELSEIFJ0<20TH
EN8200ELSEIFJ0>43THEN8225
8108 PC=1-PC:IFF3=1THENGOSUB8550
8110 U=USR0(BG):IFE1=1THENGOSUB8
410ELSEIFE2=1THENPE=PEEK(F2+485)
:IFPE<255THEN8910
8120 IFJP=1THEN8310ELSEIF(PEEK(&
HFF00)AND1)=0THEN8300
8130 U=USR4(0):CT=CT+1:IFCT<7THE
N8180
8135 IFE2=1THENGOSUB8510ELSEIFE1
=0ANDRND(20)=1THENGOSUB8550
8140 IFE2=1THEN8180ELSEIFE1=1THE
NGOSUB8410ELSEIFRND(20)=1THENGOS
UB8400
8180 PE=PEEK(BG+357):IFPE>0THEN8
910
8185 TI=TI+1:IFTI>9THENTI=0:GOSU
B6400
8190 PLAY"03V31P255":GOTO8100
8200 IFBX<1THEN8108ELSEBX=BX-1:B

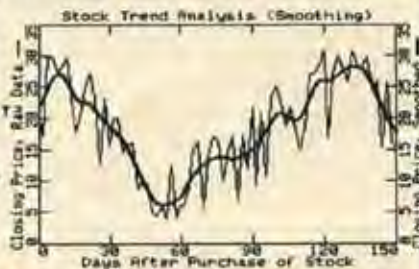
```

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```

G=BG-1
8205 U=USR1(BG+7):GOTO8108
8225 IFBX>16THEN8108ELSEBX=BX+1:
BG=BG+1
8230 U=USR1(BG-1):GOTO8108
8300 JP=1:J2=0:J1=0:PLAYP2$
8310 IFJ2=1THEN8320ELSEJ1=J1+1:I
FJ1>7THENJ2=1ELSEBG=BG-128
8315 GOTO8330
8320 J1=J1-1:IFJ1<1THEN8350ELSEB
G=BG+128
8330 GOTO8130
8350 J2=0:JP=0:GOTO8130
8400 E1=1:F1=5464:FX=27
8410 IFPC=1THEN8450ELSEU=USR5(F1
):F1=F1-1
8420 GOTO8480
8450 U=USR6(F1):F1=F1-1
8480 FX=FX-1:IFFX<1THENE1=0:U=US
R7(F1):POKE6528,170:CT=0
8490 RETURN
8500 E2=1:F2=5728:X2=2:FF=0:F3=0
8510 IFF3=1THEN8550ELSEFF=FF+RND
(3):IFF>26THENFF=0:F3=1:GOTO855
0
8514 IFPC=1THENF2=F2-32ELSEF2=F2
+32
8530 U=USR8(F2):GOTO8580

```

```

8550 F2=F2+1:FF=FF+1:IFF>27THEN
8590ELSEU=USR8(F2)
8580 RETURN
8590 E2=0:U=USR7(F2-416):CT=0:F3
=0:RETURN
8600 POKE65494,0:POKE65314,170:P
LAY"01V30L255T255FEO2FEO3FEO4FEO
5FEO4FEO3FEFEFEF":POKE65314,255
8610 CLS:FORI=1TO200:NEXTI:SCREE
N0,0:PRINT@32,Z$;:PRINT@448,Z$;:
PRINT@96,"YOU HAVE COMPLETED LEV
EL THREE.":PRINT" BONUS 1500!!!"
:S1=S1+1500:PRINT:PRINT"YOUR SCO
RE IS NOW"S1"POINTS.":PRINT"YOU
WILL GO TO THE FINAL LEVEL":PRIN
T"WITH"NS"BUGGIES.":GOTO9000
8910 PLAYPP$:FORI=1TO200:NEXTI:S
CREEN0,0:CLS:PRINT@32,Z$;:PRINT@
448,Z$;:PRINT@98,"YOU HAVE"NS"BU
GGIES LEFT.":PRINT@164,"YOUR SCO
RE IS"S1".":PMODE4,1:COLOR1,0:LI
NE(0,88)-(255,155),PRESET,BF:NS=
NS-1:POKE65494,0:CLS:PRINT@227,"
PRESS <ENTER> TO CONTINUE"
8984 IFINKEY$<>CHR$(13)THEN8984
8990 CLS:JP=0:BG=5574:BX=5:CT=0:
E1=0:E2=0:F3=0:GOTO8008
9000 POKEPK,0:GOSUB3300:GOSUB130
0:GOSUB6300:GOSUB6500:DEFUSR0=31
000:DEFUSR1=31050:DEFUSR2=32450:
DEFUSR3=32500:DEFUSR4=32550:JP=0
:BG=5252:BX=3:RP=6176:E1=0:E2=0:
RQ=RP-3072
9098 PMODE4,1:COLOR1,0:SCREEN1,1
:EX=3183:E1=0:E2=0:EY=5583
9100 J0=JOYSTK(0):IFJ0<20THEN920
0ELSEIFJ0>43THEN9225
9108 PC=1-PC:U=USR0(BG):GOSUB940
0:IFPC=1THENU=USR2(RP):U=USR2(RQ
) ELSEU=USR3(RP):U=USR3(RQ)
9122 IFPC=1THENRQ=RQ+32
9180 PE=PEEK(BG+99):IFPE>0THEN99
00
9185 PE=PEEK(BG+101):IFPE>0THEN9
900
9190 PLAY"P255":GOTO9100
9200 IFBX<1THEN9108ELSEBX=BX-1:B
G=BG-1
9205 U=USR1(BG+7):GOTO9108
9225 IFBX>16THEN9108ELSEBX=BX+1:
BG=BG+1
9230 U=USR1(BG-1):IFBG=5261THEN9
500
9245 GOTO9108
9400 IFE1=1THEN9450
9410 EX=EX+192:U=USR4(EX):E2=E2+
1:IFE2>8THENE1=1
9430 GOTO9470
9450 EX=EX-192:U=USR4(EX):E2=E2-

```

### TOTHIAN SOFTWARE

**TEACHER PAK** Four 16K Ext. BASIC programs. Make out grades (with or without weighting), statistical analysis of grades, alphabetize name lists, create seating charts. On tape but works with disk. 80-column printer helpful. \$34.95

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All of these programs carry the Rainbow Seal.

```

1:IFE2<1THENE1=Ø
947Ø IFE1=1THEN9485
9475 EY=EY-192:U=USR4(EY):RETURN
9485 IFE2<3THENU=USR4(EY) ELSEEY
=EY+192:U=USR4(EY)
949Ø RETURN
95ØØ U=USRØ(BG):POKE65314,17Ø:PL
AY"V31L255T255DEFEDGDE":POKE6531
4,255:POKE65494,Ø:PLAY"O3V3ØL255
T255DEFFDEEDFADFADFADF":CLS:FORI
=1TO3ØØ:NEXTI:PRINT@32,Z$;:PRINT
@448,Z$;:PRINT@96,"CONGRATULATIO
NS!!!":PRINT"YOU HAVE MADE IT TO
":PRINT"MOON BASE AMPHIBIA!!!"
959Ø GOTO2Ø
99ØØ POKE65494,Ø:PLAYPP$:FORI=1T

```

```

02ØØ:NEXTI:SCREENØ,Ø:CLS:PRINT@3
2,Z$;:PRINT@448,Z$;:PRINT@98,"YO
U HAVE"NS"BUGGIES LEFT.":PRINT@1
64,"YOUR SCORE IS"S1".":GOSUB13Ø
Ø:JP=Ø:BG=5252:BX=3:RP=6176:E1=Ø
:E2=Ø:RQ=RP-3Ø72:NS=NS-1:POKE654
94,Ø:CLS:PRINT@227,"PRESS <ENT
9984 IFINKEY$<>CHR$(13)THEN9984
999Ø CLS:POKEPK,Ø:GOTO9Ø98
2ØØØØ POKE65494,Ø:FORI=1TO2ØØ:NE
XTI:CLS:SCREENØ,Ø:PRINT@32,Z$;:P
RINT@448,Z$;:PRINT@128,"YOUR FIN
AL SCORE IS"S1:PRINT@352:INPUT"P
LAY AGAIN (Y/N)";A$:L$=LEFT$(A$,
1):IFL$="Y"THENRUN

```

Listing 2:

```

7918          ØØØØØ          ORG 31ØØØ
ØØØØ5 *THIS ROUTINE PUTS THE BUGGY GRAPHIC ON THE GRAPHIC SCREEN
ØØØØ7 *AT THE LOCATION SPECIFIED THROUGH THE BASIC PROGRAM.
7918 BD      B3ED      ØØØ1Ø START      JSR $B3ED          *GET PARAMETER FROM BASIC
791B 1F      Ø1        ØØØ2Ø          TFR D,X          *STORE PARAMETER IN X
791D 1Ø8E 1EØ1      ØØØ3Ø          LDY #$1EØ1      *PUT LOCATION OF BUGGY GRAPHIC IN Y
7921 C6      Ø7        ØØØ4Ø          LDB #7          *LENGTH IN BYTES OF GRAPHIC
7923 A6      AØ        ØØØ5Ø LOOP1     LDA ,Y+         *LOAD BYTE FROM BUGGY
7925 A7      8Ø        ØØØ6Ø          STA ,X+         *PLACE BYTE ON SCREEN
7927 5A          ØØØ7Ø          DECB          *COUNT
7928 26      F9        ØØØ8Ø          BNE LOOP1      *IF NOT ZERO, THEN GO BACK
792A 3Ø      88 19     ØØØ9Ø          LEAX $19,X     *NEXT LINE
792D 31      A8 19     ØØ1ØØ          LEAY $19,Y    *NEXT LINE
793Ø 1Ø8C 2187      ØØ11Ø          CMPY #$2187   *END OF GRAPHIC?
7934 2D      ED        ØØ12Ø          BLT LOOP1     *NO, RETURN
7936 39          ØØ13Ø          RTS
          ØØØØ      ØØ14Ø          END
ØØØØØ TOTAL ERRORS

```

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# PIPELINE

**UNIX TRAINING** — OS-9 users wanting to learn more about the UNIX operating environment will be interested in a new series of UNIX Systems tutorials to be conducted by AT&T at the UNIX Expo, Sept. 18-20 in New York City.

A multi-level program composed of 20 sessions is designed to teach skills for job-specific applications and will include a series of laboratory courses to provide hands-on experience.

The exposition is expected to attract more than 200 leading manufacturers and vendors displaying the latest UNIX-based hardware, software and services. Write: Robert Birkfeld, National Expositions Co., 14 West 40th Street, New York, NY 10018.

**FORTH AND GOAL** — Cybertron Forth, an instructional package for the FORTH computer language, has been introduced by Cybertron, Inc.

The package includes software and tools for applications program development, along with a comprehensive educational manual on the language and full source listings.

FORTH is an advanced language used for real-time and control applications. It allows the addition of new words as a permanent extension of the language by letting the programmer use a new word or symbol to represent complex functions within the computer. Write: 30600 Solon Industrial Parkway, Solon, OH 44139.

**SUNNY SUGAR** — Sugar Software's move from Reynoldsburg, Ohio to Florida is now complete. Although the company continued to respond to customer orders within 24 hours of

receipt, Susan Davis wants to pass along her apologies for any inconvenience experienced during the move.

Sugar's new address is: 1710 North 50th Ave., Hollywood, FL 33021. The telephone number is 305-981-1241.

**NO, THANKS** — The board of directors of H & R Block recently turned down a \$72.5 million offer to purchase its subsidiary, the CompuServe Information Service, by a group headed by Jeffrey M. Wilkins, former chairman and chief executive officer of CompuServe.

During the past year Wilkins has made similar proposals to buy various segments of CompuServe, according to Henry W. Bloch, president of H & R Block. Wilkins was axed just prior to the offer and David C. Swaddling, CompuServe's chief financial officer, resigned.

Bloch said that since acquiring CompuServe in 1980, H & R Block has made direct investments totaling more than \$20 million. "These strategic investments are beginning to pay off in accelerated earnings and revenue growth. We have every intention of continuing on this promising course," said Bloch.

CompuServe claims more than 200,000 personal computer subscribers. Unaudited pretax earnings for fiscal year 1985 were up approximately 50 percent.

**DAILY NEWS** — So much is happening so rapidly in the world of computers that Ziff-Davis Publishing Co. plans to introduce *Computer Industry Daily* this summer. The newspaper will cover the entire computer industry, including

product announcements, international developments, managerial changes, analyses and columns by well-known computer industry experts.

The publication will be targeted at computer businesses, along with professionals in businesses that serve the industry. Write: Ziff-Davis Publishing Co., One Park Avenue, New York, NY 10016.

**TAX HELP** — If you claim time on your Color Computer as a business expense on your personal income tax form, you may find the new Personal Computer Usage Record helpful during an audit.

It's a 4-by-6-inch logbook designed for logging your time on the computer. Each page of the ledger is divided into columns which make it easy to record the amount of time spent for personal and/or business use. Write: Richard C. Foley, 1440 Japaul Lane, San Jose, CA 95132.

**RS-232 PROTECTION** — A "lightning sponge" to protect devices remotely connected to a host computer by RS-232 cables has been introduced by Telebyte Technology.

The device is designed to accommodate lightning strikes on or near RS-232 cables and provide a low impedance path to "earth" ground before they can damage display terminals and computers. Write: 270 E. Pulaski Road, Greenlawn, NY 11740.

**SCREEN SHIELD** — The Sentinel VDT BodyGuard has been introduced by Packaging Industries Group. Consisting of a superfine wire mesh protective shield which fits over a computer monitor, the BodyGuard is anti-glare, anti-reflective and anti-static.

The maker also says that the shield provides protection from low level radiation and eliminates buildup of static electricity and possible resulting dust and potential skin problems. Write: One Sentinel Plaza, Hyannis, MA 02601.

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|-----------------------------------------------------------|------------------|-----------|
| Screen                                                    | 32X16            | 51X24     |
| Precision                                                 | 9 digits         | 16 digits |
| Hi-Res Graphics                                           | NO               | YES       |
| Visicalc cmd format                                       | NO               | YES       |
| New low price!                                            | 64K Disk \$79.95 |           |
| Side Wise -Print DYNACALC files up to 255 chars-sideways! |                  | \$19.95   |

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COLORCOM/E - A complete smart terminal package! Upload, Download, Hi-Res (51X24) screen, 300/1200 Baud, Offline Printing, Rompak/Disk\* - \$39.95  
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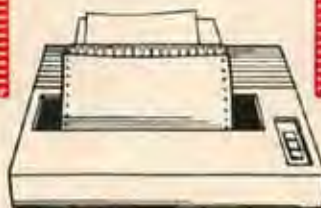
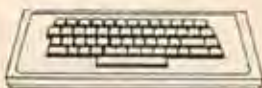
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# CoCo, Phone Home

By Bill Bernico

**H**ere's a nice little program to show your friends. It's called *Phone*, and upon running the program, a black desk phone appears and begins ringing. If you hit ENTER, you've answered the phone and your printed message appears on the screen along with your spoken message.

All you have to do is put this program on tape, and immediately after it, put your spoken message. Match the spoken message to the screen message for a finishing touch and you're done.

Now, call a friend into the room, run the program and let them answer it. By now you've had time to include them in your message. "Good morning, Mr. Phelps. Your mission, should you decide to accept it . . ."

*(Bill Bernico is a self-taught computerist who also enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wis.)*

| Line    | Description                                                      |
|---------|------------------------------------------------------------------|
| 20      | 128 Makes the phone black                                        |
|         | 159= Yellow                                                      |
|         | 175 = Blue                                                       |
|         | 191 = Red                                                        |
|         | 207 = White                                                      |
|         | 223 = Cyan                                                       |
|         | 239 = Magenta                                                    |
|         | 255 = Orange                                                     |
| 30-210  | Draws the phone                                                  |
| 220-310 | Draws the phone cord                                             |
| 320-350 | Puts number buttons on face of phone                             |
| 360     | Produces 10 rings                                                |
| 370     | Creates ringing sound                                            |
| 380     | Delay between rings                                              |
| 390     | If ENTER is hit, phone is answered                               |
| 410     | Input your message here to match the spoken message on tape      |
| 420     | Sends cassette message to TV speaker and turns on cassette motor |

*(If you have any questions regarding this program, Bill may be reached at 708 Michigan Avenue, Sheboygan, WI 53801, phone (414) 459-7350.)*

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# Sir Eggbert Jumper Leaps To The Rescue

By David Dawson



**O**ne terrible day a hole appeared in the ground in a small kingdom. Terrible creatures began to spring from it and ravage the countryside. Many knights descended into the pit but none returned.

Finally, Eggbert, a strange knight who never used weapons and had only his odd ability to jump like a rabbit, volunteered to rid the kingdom of the menace. The king was doubtful but desperate, so he agreed to send the young, peculiar knight.

*Sir Eggbert Jumper* is a one-player game similar to many "climb-up" games like *Donkey Kong* but with more of a "swords and sorcery" theme. There are eight dungeon screens included in Eggy's tasks (his friends call him Eggy), five of which are different. The last screen holds many surprises which you will have to play to see.

## Game Play

The main objective for Eggy is to grab the yellow key and move, not jump, below the yellow door to exit the dungeon level. Be careful — jumping into the door could erase it and trap you on that level.

*(David Dawson holds a master's degree in psychology and will be working towards his doctorate in the fall. He has a wife, Leigh Anne, and a son, Adam.)*

Touching any red object will knock Eggy out. Touching yellow objects, except the key, will cause the screen to change color. While the colors remain abnormal it is not possible to jump off the level Eggy is on, but be careful not to step off the platform. The creatures cannot harm Eggy while they are not red, so use this time to get away from them.

Touching blue objects, and all objects while the colors are not normal, scores points.

A creature will appear if too much time is taken on a level. This creature leaves a permanent trail that may make it impossible to continue and effectively end the game. Be careful to finish quickly.

### Joystick Operation

Move right or left by moving the joystick in the direction desired. If at any time Eggy's feet are not supported he will fall.

To jump up, press the joystick button while pressing the joystick forward. If the stick is also inclined to the right or left, Sir Egbert will jump in that direction as well as up.

Jumping down is done the same way but the joystick must be pulled back. When jumping down it is critical that Eggy is near the edge of the platform upon attempt. If he is too far away from the edge he will try to jump up instead of down; on the other hand, if he steps off before he jumps he will fall to his death.

If a platform is above Eggy when he makes an upward jump he will bounce off the platform and, if a platform below him at the end of the jump, he will land safely. This could be used to jump over small breaks in the platform on which Eggy is traveling or to avoid objects.

Use PCLEAR2 and ENTER before running the program. As a hint to what waits on the last screen: The slogan of avid Eggy players is "Jump A Dragon

(For those having questions regarding this program, Mr. Dawson may be contacted at 4808 Davenport, Apt. # Omaha, NE 68132.)

|      |       |     |
|------|-------|-----|
| 590  | ..... | 12  |
| 750  | ..... | 202 |
| 1130 | ..... | 152 |
| 1310 | ..... | 172 |
| 2000 | ..... | 67  |
| 4005 | ..... | 215 |
| 4420 | ..... | 187 |
| 4840 | ..... | 91  |
| 4960 | ..... | 223 |
| END  | ..... | 56  |

The listing: EGGBERT

```

5 CLEAR100:PCLEAR2:PMODEL,1:PCLS
10 DIM H1(11,15):DIM H2(11,15):D
IM OJ(9,5):DIM C1(13,17):DIM C2(
13,15)
20 DRAW"C3BM20,120D2NR6D4R2NF4L2
D2L2D2L2BM106,120D2NL6D4L2NG4R2D
2R2D2R2"
30 FOR C=1TO8:READX,Y:PSET(X,Y,4
):NEXT:DATA 20,116,20,118,22,116
,22,118,104,116,104,118,106,116,
106,118
40 DRAW"C2BM36,90D4L2U2NU2R8D2"
50 COLOR4,1:LINE(86,58)-(98,72),
PSET,BF:PRESET(98,70):PRESET(98,
72):PRESET(98,58):PRESET(96,58):
PRESET(88,58):PRESET(88,60)
60 LINE(86,56)-(86,66),PRESET:LI
NE(92,68)-(98,70),PRESET,BF
70 PRESET(92,66):PRESET(90,66):P
SET(96,62,2):PSET(96,68,3)
80 GET(16,116)-(26,130),H1:GET(1
00,116)-(110,130),H2:GET(36,90)-
(44,94),OJ:GET(88,58)-(100,72),C
2
100 CLS:PRINT@128,"(C) 1982 BY D
AVID LIONELL DAWSON":PE=3
400 CL=0:KX=20:KY=168
405 IF RO=0 THEN 480

```

```

408 IF RO=8 THEN DRAW"BM40,80R4B
R3NU3D3BR4U6F6U6BR8F2ND4E2BR4D6R
6U6NL6BR4D6R6U6BR4D3ND3R4NF2U3NL
4BR12NR6D3NR6D3BR12U3NR6U3R6D6BR
4NR6U6R6BR4NR6D3NR6D4R6":FOR XX=
1 TO 3:PLAY "T10;L4;O1;12;12;8;8
;4":NEXTXX
409 PLAY"T10;L4;O3;1;3;5;3;5;6;6
;8;6;5;6;8;10;12;O4;L1;1"
410 DRAW"BM"+STR$(DX)+" "+STR$(D
Y)
420 SOUND255,8:FOR X=1 TO52:DRAW
"5"+STR$(X):GOSUB8200:NEXT:SC=SC
+RO*100:DRAW"S4"
480 RO=RO+1
482 IF RO=9 THEN SCREEN0,0:FOR X
=1 TO 250 STEP6:CLSRND(8):SOUNDX
,1:NEXT:CLS:PRINT@224,"DUNGEON
COMPLETE,BONUS=";SC*100:SC=SC+SC
*100:RESTORE
485 IF RO=9 THEN FOR C=1TO4:READ
X,X,X,X:NEXT
500 IF RO=9 THEN RO=1
510 COLOR 3,1:PCLS
515 LINE(0,0)-(254,4),PSET,BF
520 ON RO GOSUB 4000,4200,4000,4
400,4200,4400,4600,4800
540 READ F:FOR C=1 TO F
550 READPX,PY:DRAW"BM"+STR$(PX)+
"+STR$(PY):GOSUB 8000
570 NEXT
590 READ F:FOR C=1 TO F
610 READ PX,PY:DRAW"BM"+STR$(PX)
+" "+STR$(PY):GOSUB8100
630 NEXT
640 READDX,DY
650 DRAW"BM"+STR$(DX)+" "+STR$(D
Y)
660 GOSUB 8200
670 READNO:IF NO=0 THEN 700

```



```

680 FOR C=1 TO NO
690 READ PX(C),PY(C)
695 NEXT
700 READ PX,PY:PUT(PX,PY)-(PX+8,
PY+4),OJ
710 DATA 2,140,92,140,184,2,230,
85,130,131,10,0,2,80,30,50,76,14
,82
720 DATA 3,10,46,170,46,60,92,2,
50,89,160,132,128,52,2,128,30,12
8,76,208,36
730 DATA 2,140,92,140,184,2,230,
85,130,131,10,0,2,80,30,50,76,14
,82
740 DATA 3,190,46,130,92,8,138,2
,10,37,170,129,45,0,6,100,122,20
0,76,10,76,50,30,100,30,160,30,2
38,82
750 DATA 3,10,46,170,46,60,92,2,
50,89,160,132,128,52,2,128,30,12
8,76,208,36
760 DATA 3,190,46,130,92,8,138,2
,10,37,170,129,45,0,6,100,122,20
0,76,10,76,50,30,100,30,160,30,2
38,82
770 DATA 4,40,138,74,92,130,92,1
0,92,1,110,85,90,98,1,180,122,20
,129
780 DATA 1,180,138,1,100,129,10,
54,0,240,175
785 CO=200-RO*10
1000 IF RO<3 THEN NO=0
1010 CNT=0:K=0:I=1
1020 HX=50:HY=168
1025 SCREEN 1,0
1030 LX=HX:LY=HY:EX=0
1031 CNT=CNT+1
1039 IF PPOINT(HX+5,HY+18)=7 THE
N 1100
1040 IF PPOINT(HX+5,HY+18)=3 THE
N 1100
1050 IF PPOINT(HX+5,HY+35)=3 OR
PPOINT(HX+5,HY+35)=7 THEN HY=HY+
17:GOTO1200 ELSE 3000
1100 X=JOYSTK(0):Y=JOYSTK(1):IF
X>40 THEN M=1 ELSE IF X<20 THEN
M=2 ELSE M=0
1110 IF Y<20 THEN U=1 ELSE IF Y>
40 THEN U=2 ELSE U=0
1120 IF PEEK(65280)=254 OR PEEK(
65280)=126 THEN 1130 ELSE 1190
1130 PLAY"T255;12;1":IF U=2 THEN
IF PPOINT(HX+15,HY+18)=1 OR PPO
INT(HX-15,HY+18)=1 THEN HY=HY+46
:GOTO1190
1140 IF PPOINT(HX+5,HY-27)=1 THE
N HY=HY-46:EX=15:GOTO1190 ELSEHY
=HY-17:EX=15:GOTO1190
1190 IF M=0 THEN 1200 ELSE IF M=

```

```

1 THEN HX=HX+10+EX ELSE IF M=2 T
HEN HX=HX-10-EX
1200 IF HX>245 THEN HX=245 ELSE
IF HX<15 THEN HX=15
1210 LINE(LX-10,LY)-(LX+14,LY+14
),PRESET,BF:IF M=1 THEN PUT(HX,H
Y)-(HX+12,HY+14),H1 ELSE PUT(HX,
HY)-(HX+12,HY+14),H2
1220 IF K=1 THEN PUT(HX,HY)-(HX+
10,HY+6),OJ
1230 IF NO=0 THEN 1300
1240 X=RND(NO):LINE(PX(X)-4,PY(X
))- (PX(X)+16,PY(X)+14),PRESET,BF
1250 IF HX<PX(X) THEN PX(X)=PX(X
)-6 ELSE PX(X)=PX(X)+6
1260 PUT(PX(X),PY(X))-(PX(X)+12,
PY(X)+14),C1
1300 IF CNT<CO THEN 1400
1310 KX=KX+I*4:IF KX<10 THEN KY=
KY-46:I=1 ELSE IF KX>245 THEN KY
=KY-46:I=-1
1315 IF KY<30 THEN KY=168
1320 PUT(KX,KY)-(KX+12,KY+14),C2
:CIRCLE(KX-2,KY+5),5,4,3
1400 IF K=0 THENIF RND(40)=1 THE
N PUT(PX,PY)-(PX+8,PY+4),OJ
1410 IF RO<>8 THEN 1450
1420 IF DF=0 THENDF=1:PX(1)=136

```

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```

:PY(1)=48 ELSE LINE(PX(1),PY(1))
-(PX(1)+12,PY(1)+14),PRESET,BF
1430 IF PX(1)<HX THEN PX(1)=PX(1)
)+4 ELSE PX(1)=PX(1)-4
1435 PY(1)=PY(1)+RND(30)
1440 IF PPOINT(PX(1)-6,PY(1))<>1
OR PY(1)>182 THEN DF=0:PLAY"T25
5;2;6;10" ELSE PUT(PX(1),PY(1))-
(PX(1)+12,PY(1)+14),C1
1450 IF PPOINT(HX-12,HY+8)=1 AND
PPOINT(HX+12,HY+8)=1 THEN 2000
1455 IF PPOINT(HX-12,HY+8)=5 THE
N 2000
1460 IF PPOINT(HX-12,HY+8)=4 OR
PPOINT(HX+12,HY+8)=4 THEN 3200
1470 IF PPOINT(HX-12,HY+8)=2 OR
PPOINT(HX+12,HY+8)=2 THEN IF HX>
PX-13 AND HX<PX+18 AND HY<PY AND
HY>PY-40 THEN K=1:PLAY"T1;04;L1
6;12":GOTO1800 ELSE CL=CNT+50:SC
REEN 1,1:GOTO1800
1472 SC=SC+RO*10
1480 SOUND 250,1
1800 FOR X=12 TO1 STEP -2:PLAY"T
255;L16;04;"+STR$(X):CIRCLE(HX,H
Y+6),X+10,2,.2:CIRCLE(HX,HY+6),X
+10,1,.2:NEXT
2000 IF CNT>CL THEN SCREEN 1,0

```

```

2005 IF K=1 AND PPOINT(HX+5,HY-1
2)=2 THEN 400
2010 GOTO 1030
3000 FOR X=HY TO 171:HY=X:LINE(H
X-5,HY)-(HX+10,HY-10),PRESET,BF:
PUT(HX,HY)-(HX+10,HY+14),H1:NEXT
3200 FORX=1TO10:SOUNDX,1:SCREEN1
,1:SCREEN1,0:NEXTX
3210 LINE(HX,HY)-(HX+10,HY+12),P
RESET,BF
3220 DRAW"BM"+STR$(HX)+", "+STR$(
HY+16)+"H4R8NU6R8U2L2"
3225 SOUND100,10:SOUND1,20
3230 IF PE=1 THENSCREEN 0,0:CLS:
PRINT@160,"TRY AGAIN ADVENTURER!
":PRINT"YOU REACHED LEVEL";RO:PR
INT"SCORE WAS";SC:END ELSE PE=PE
-1:CLS:SCREEN 0,0:PRINT@160,"AD
VENTURERS REMAINING";PE:FORX=1TO
2000:NEXT:GOTO1010
4000 LINE(0,184)-(254,191),PSET,
BF
4005 LINE(0,0)-(254,2),PSET,BF
4010 LINE(0,138)-(208,144),PSET,
BF
4020 LINE(0,92)-(70,98),PSET,BF
4030 LINE(104,92)-(254,98),PSET,
BF

```

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```

4040 LINE(0,46)-(100,52),PSET,BF
4050 LINE(144,46)-(214,52),PSET,
BF
4060 LINE(208,46)-(214,92),PSET,
BF
4070 COLOR4,1:LINE(202,26)-(214,
40),PSET,BF:PRESET(214,26):PRESE
T(202,26):CIRCLE(208,32),5,2:PSE
T(208,32):LINE(204,38)-(212,38),
PRESET
4080 GET(202,26)-(214,40),C1:LIN
E(202,26)-(214,40),PRESET,BF
4100 RETURN
4200 LINE(0,184)-(254,191),PSET,
BF:LINE(0,138)-(96,144),PSET,BF
4210 LINE(128,138)-(216,144),PSE
T,BF:LINE(44,92)-(254,96),PSET,B
F
4220 LINE(0,46)-(96,52),PSET,BF:
LINE(128,46)-(228,52),PSET,BF
4230 COLOR4,1:CIRCLE(18,172),14,
4:PAINT(18,172),4,4:FOR X=1 TO 4
:PSET(RND(28),146+RND(12),4):NEX
T:LINE(10,158)-(28,165),PSET,BF
4240 RETURN
4400 LINE(0,184)-(254,191),PSET,
BF:LINE(0,138)-(44,144),PSET,BF
4410 LINE(154,138)-(230,144),PSE
T,BF:LINE(64,92)-(152,98),PSET,B
F
4420 LINE(202,92)-(254,98),PSET,
BF:LINE(0,46)-(64,52),PSET,BF:LI
NE(178,46)-(218,52),PSET,BF
4430 RETURN
4600 LINE(0,184)-(254,191),PSET,
BF
4610 LINE(0,138)-(204,144),PSET,
BF:LINE(0,92)-(28,98),PSET,BF:LI
NE(74,92)-(148,98),PSET,BF:COLOR
4,1:LINE(148,0)-(254,98),PSET,BF
:LINE(0,0)-(148,52),PSET,BF
4620 RETURN
4800 LINE(0,62)-(26,34),PSET:LIN
E-(44,56),PSET:LINE-(54,30),PSET
:LINE-(216,30),PSET:LINE-(222,52
),PSET:LINE-(240,28),PSET:LINE-(
244,60),PSET:LINE-(254,42),PSET
4810 PAINT(100,20),3,3
4820 COLOR 4,1
4830 LINE(76,0)-(70,14),PSET:LIN
E-(118,46),PSET:LINE-(94,16),PSE
T:LINE-(112,2),PSET:LINE-(130,22
),PSET:LINE-(138,30),PSET:LINE-(
138,40),PSET:LINE-(142,44),PSET:
LINE-(146,40),PSET:LINE-(148,30)
,PSET:LINE-(154,22),PSET
4840 LINE-(150,16),PSET:LINE-(14
2,12),PSET:LINE-(136,16),PSET:LI
NE-(130,22),PSET:LINE(156,22)-(1

```

```

78,4),PSET:LINE-(212,18),PSET:LI
NE-(202,46),PSET:LINE-(232,12),P
SET:LINE-(232,0),PSET
4850 PAINT(144,0),2,4:PAINT(144,
20),4,4
4870 LINE(120,10)-(122,28),PSET:
LINE-(136,34),PSET:LINE-(148,34)
,PSET:LINE-(162,28),PSET:LINE-(1
64,12),PSET
4880 PAINT(158,22),4,4:PAINT(128
,22),4,4
4885 CIRCLE(138,26),2,2,.5:CIRCL
E(148,26),2,2,.5
4890 PSET(138,24,3):PSET(138,26,
3):PSET(148,24,3):PSET(148,26,3)
:PSET(144,40,3):PSET(140,40,3)
4900 COLOR 2,1:LINE(142,12)-(134
,9),PSET:LINE(146,8)-(138,5),PSE
T:DRAW"C4BM128,32D8ND8R4ND8L8ND8
BM156,32D8ND8R4ND8L8D8"
4910 COLOR 3,1:LINE(0,92)-(162,9
8),PSET,BF
4920 LINE(0,184)-(254,191),PSET,
BF:LINE(62,138)-(128,144),PSET,B
F:LINE(178,138)-(200,144),PSET,B
F
4930 LINE(50,90)-(140,100),PRESE
T,BF
4950 CIRCLE(142,58),4,4:CIRCLE(1
42,58),1,2:COLOR4,1:LINE(146,56)
-(138,48),PSET
4960 GET(136,48)-(148,62),C1
4970 LINE(136,48)-(148,62),PRESE
T,BF
4980 RETURN
8000 DRAW"C3U10E4R4F4NL8D10":PAI
NT(PX+4,PY-3),3,3
8010 RETURN
8100 DRAW"C2NU8R8E4H4ND8L8G4F4"
8110 RETURN
8200 DRAW"C2NR20NL4D2NL4D2NL4D6N
L4D2NL4D2NL4D6R20U20":PAINT(DX+2
,DY+2),2,2
8205 DRAW"BM-14,+4C3R6D2L2ND4L4"
8210 RETURN

```

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- All Caps if needed
- Several Printer Formats
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- 32 x 16, 42, 51, 64 or 85 x 24
- Send all 128 characters from keyboard

### Buffer:

- Merge text or programs
- 49K to 53K memory
- Four Buffer Send Modes
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- Editor—Move forward and reverse thru buffer. Insert, type over, delete lines, characters or words. Block delete.

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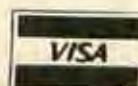
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# Play And Learn Together— Wonderment Is Contagious!

By Bob Albrecht and Ramon Zamora  
Rainbow Contributing Editor

"School Is In The Heart Of A Child" is for parents of quite young children. We want to help you work and play with your 3- to 8-year-old child and learn to use computers as a joyful family experience. We suggest ways to use the home computer as another means to encourage your child's independence, growth and control over her own life. See the pride on her face as she directs the computer to do what she selects with deliberation. See her head gears switch to "on" as she progresses step by step with your presence and caring guidance. We will explore (we hope, with your help) the following:

- Specific "teaching" techniques so the discovery can be the child's own.
- Critical evaluation of software based on extensive playtesting in family and related environments.
- Additional resources to consult: books, magazines, software publishers, networks, etc.
- Suggestions for interludes and fun times away from the computer (a must!): call the librarian for information; watch TV together and discuss it; work together as volunteers in a community project; take an "awareness" walk.
- Whatever we learn from families we work with in Menlo Park or from you, our readers, let's pool our knowledge and share our experiences as we learn from our children.

Copyright© 1985 by DragonQuest, P.O. Box 7627, Menlo Park, CA 94026.

(Well-known author Bob Albrecht co-authors the "GameMaster's Apprentice" feature for THE RAINBOW each month. Ramon Zamora is author and co-author of several books, co-founder of Computer Town USA!, and currently designing computer games for kids at Child Ware Corp. in Menlo Park, Calif.)

Since you haven't said you want more Wandering Star this time we will give you an assortment of program from TRS-80 Color BASIC by Bob Albrecht.

We begin with *Intergalactic Broadcasting*. We suggest you type it in using *your* name. Then, encourage your child to change it to her or his name.

```

100 CLS
105 '
110 PRINT "INTERGALACTIC"
120 SOUND 89, 20
125 '
130 PRINT "BROADCASTING"
140 SOUND 125, 20
145 '
150 PRINT "COMPANY"
160 SOUND 147, 20
165 '
170 PRINT "BRINGS TO YOU..."
180 SOUND 176, 40
185 '
200 CLS
210 PRINT "LUCY "; --
220 SOUND 89, 1
230 GOTO 210
  
```

Of course, you may want to put your name in Line 210.

You see, the way to make a computer wonderful to a child is to play with the child on the computer. Play together, learn together. Wonderment is contagious!

We think your small child might like this one. Encourage him or her to type in his or her name.

```

100 REM**GRAND FINALE SCH 16-2
110 CLS
199 '
200 REM**FOR WHOM?
210 INPUT "YOUR NAME"; N$
299 '
300 REM**CRESCENDO FOR N$
310 CLS
320 FOR T=1 TO 255
330 : PRINT N$;
340 : SOUND T, 1
350 NEXT T
399 '
400 REM**LONG TIME DELAY
410 FOR K=1 TO 2500: NEXT K
499 '
500 REM**DO IT AGAIN
510 GOTO 110

```

Patience!  
This will take  
about five seconds.



Almost every kid we know is on a team or has a friend on a team. So we suggest this program called *Go, Team, Go!*

```

100 REM**GO TEAM GO! SCH 16-3
199 '
200 REM**'GO' ON A BLUE SCREEN
210 CLS 3: PRINT "GO";
220 GOSUB 910 ← Use time delay subroutine
299 '
300 REM**'TEAM' ON ORANGE SCREEN
310 CLS 8: PRINT "TEAM";
320 GOSUB 910 ← Use time delay subroutine
399 '
400 REM**'GO!' ON MAGENTA SCREEN
410 CLS 7: PRINT "GO!";
420 GOSUB 910 ← Use time delay subroutine
430 GOSUB 910 ← Use time delay subroutine
                    twice for longer delay
499 '
500 REM**KEEP IT GOING
510 GOTO 210
599 '
600 REM**TIME DELAY SUBROUTINE
910 FOR K=1 TO 500: NEXT K
920 RETURN

```

Adults love to kid adults. Kids love to kid adults. Adults love to kid kids. And so on. Imagine this: You are the last one to go to bed tonight. Before you go, put a message on the screen for the early risers.

```

100 REM**MESSAGE BLINKER SCH 16-4
199 '
200 REM**GET MESSAGE & PLACE
210 CLS
220 INPUT "YOUR MESSAGE"; M$
230 INPUT "WHERE SHALL I BLINK IT"; P
299 '
300 REM**BLINK MESSAGE ON
310 CLS: PRINT @P, M$;
320 Z = 500
330 GOSUB 910
399 '
400 REM**BLINK MESSAGE OFF
410 CLS 2
420 Z = 300
430 GOSUB 910
499 '
500 REM**DO IT AGAIN
510 GOTO 310
599 '
900 REM**TIME DELAY SUBROUTINE
910 FOR K=1 TO Z: NEXT K
920 RETURN

```

BRUSH  
YOUR TEETH!



Can you figure out how to use the following program to paint many (or few) colored stripes on the screen?

```

100 REM**STRIPE 'PAINTBRUSH' SCH 16-5
110 CLS 0
199 '
200 REM**DIALOG WITH PAINTER
210 PRINT @0, CHR$(30): PRINT @0, ;
220 INPUT "DOWN,L,R,CLR"; DOWN, L, R, CLR
299 '
300 REM**PAINT HORIZONTAL STRIPE
310 FOR OVER=L TO R
320 : SET(OVER, DOWN, CLR)
330 NEXT OVER
399 '
400 REM**DONE. SOUND OFF.
410 SOUND 89, 10
499 '
500 REM**GO BACK FOR MORE
510 GOTO 210

```

Aha! L is the Left  
end of the stripe.  
R is the Right end.



The real wonderment of computers is to make them do what you want them to do. Everyone who reads this magazine can learn to read and understand CoCo BASIC programs, if only the people who write for the magazine have compassion for you, the beginner. If you learn to read and understand BASIC programs written by others, you will soon learn to express yourself in the language built in to every home computer.

Now try to read and understand this program. Replace the DATA statements with locations of your stars.

```

100 REM**CONSTELLATION SCH 16-6
110 CLS 0
199 '
200 REM**NS IS NUMBER OF STARS
210 READ NS
299 '
300 REM**TURN ON NS STARS
310 FOR STAR=1 TO NS
320 : READ OVER, DOWN
330 : SET(OVER, DOWN, 8)
340 NEXT STAR
399 '
400 REM**DO NOTHING LOOP
410 GOTO 410
499 '
500 REM**STAR DATA
910 DATA 7
920 DATA 6, 12, 18, 10
930 DATA 26, 12, 34, 14
940 DATA 38, 20, 54, 20
950 DATA 56, 14

```



Values of OVER and DOWN  
for seven stars

A mandala is a symmetric pattern; nice to look at. A giant snowflake is beautifully symmetric about its center. Snowflakes are great mandalas but melt too soon. Use this program to put an ever changing mandala on the screen.

```

100 REM**MANDALA, EVER CHANGING
SCH 16-7
110 CLS 0
199 '
200 REM**HORIZONTAL & VERTICAL O
FFSET
210 H = RND(32) - 1
220 V = RND(16) - 1
299 '
300 REM**RANDOM COLOR
310 KOLOR = RND(8)
399 '
400 REM**TURN ON FOUR BLIPS
410 SET(31 - H, 15 - V, KOLOR)

```

```

420 SET(31 - H, 16 + V, KOLOR)
430 SET(32 + H, 15 - V, KOLOR)
440 SET(32 + H, 16 + V, KOLOR)
499 '
500 REM**DELAY, THEN DO MORE
510 Z = 10
520 FOR K=1 TO Z: NEXT K
530 GOTO 210

```

RUN the program. The computer turns on four lights at a time, symmetric with the center of the screen. If you don't see this happen, increase the time delay by changing Line 510 to:

```
510 Z = 500
```

and RUN the program again. If you want the mandala to change more rapidly, delete lines 510 and 520, or change Line 510 to 510 Z = 1.

Experiment! Try these variations:

Variation 1: Change only Line 210, as follows:

```
210 H = RND(RND(32)) - 1
```

Variation 2: Change only Line 220, as follows:

```
220 V = RND(RND(16)) - 1
```

Variation 3: Change both lines 210 and 220, as follows:

```
210 H = RND(RND(32)) - 1
```

```
220 V = RND(RND(16)) - 1
```

Variation 4: Change either Line 210 or Line 220, or both as follows:

```
210 H = RND(RND(RND(32))) - 1
```

```
220 V = RND(RND(RND(16))) - 1
```

Variation 5: Change either Line 210, or Line 220, or both

```
210 H = 32 - RND(RND(32))
```

```
220 V = 16 - RND(RND(16))
```

Variation 6: Change Line 310:

```
310 KOLOR = RND(RND(8))
```

Variation 7: Anything suggested by the above variations.

Experiment! The best  
variations are your  
variations.

Here is a simple number guessing game. The number of stars tells you how close you are to the CoCo's secret number. Can you guess the number in seven guesses (ever, time)?

The listing: STARS

500 .....37  
END .....65

```

100 REM**STARS - A GUESSING GAME
SCH 16-8
199 '
200 REM**TELL HOW TO PLAY
210 CLS

```



```

22Ø PRINT "WELCOME TO MY GALAXY.
I'LL"
23Ø PRINT "THINK OF NUMBER, 1 TO
1ØØ."
24Ø PRINT "YOU GUESS MY NUMBER.
IF YOU"
25Ø PRINT "MISS, I'LL PRINT SOME
STARS."
26Ø PRINT "THE CLOSER YOU ARE, T
HE MORE"
27Ø PRINT "STARS YOU WILL SEE."
28Ø PRINT "IF YOU SEE 7 STARS (*
*****), "
29Ø PRINT "YOU ARE VERY, VERY CL
OSE!"
299 '
3ØØ REM**COCO 'THINKS' OF A NUMB
ER
31Ø X = RND(1ØØ)
399 '
4ØØ REM**GET GUESS, G
41Ø PRINT @48Ø, ;
42Ø INPUT "YOUR GUESS"; G
499 '

```

```

5ØØ REM**D IS DISTANCE FROM X
51Ø D = ABS(X - G)
599 '
6ØØ REM**CHECK FOR A WIN
61Ø IF D=Ø THEN 81Ø
699 '
7ØØ REM**NO WIN. PRINT HINT.
71Ø PRINT @464, " *";
72Ø IF D<64 THEN PRINT " *";
73Ø IF D<32 THEN PRINT " *";
74Ø IF D<16 THEN PRINT " *";
75Ø IF D<8 THEN PRINT " *";
76Ø IF D<4 THEN PRINT " *";
77Ø IF D<2 THEN PRINT " *";
78Ø PRINT: GOTO 41Ø
799 '
8ØØ REM**WINNER!
81Ø CLS
82Ø FOR K=1 TO 1ØØ
83Ø : PRINT @RND(51Ø), " *";
84Ø NEXT K
85Ø PRINT @48Ø, "YOU GOT IT, MY
NUMBER WAS" X
899 '

```



### XPNDR2™ for the CoCo DISK SYSTEM



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```

900 REM**PLAY AGAIN?
910 PRINT "TO PLAY AGAIN, PRESS
ANY KEY"
920 IF INKEY$="" THEN 920 ELSE 2
10

```

### Plain and Fancy Patterns, the Easy Way

Our next number pattern program will generate any of the sequences shown in previous episodes, and lots more. Each sequence is defined by four numbers: 'S,' 'M,' 'A' and 'B.' 'S' is the first number in the pattern. To get the next number:

- 1) Add 'A' to the preceding number
- 2) Multiply the result of Step 1 by 'M'
- 3) Add 'B' to the result of Step 2 in BASIC:  $S = M * (S + A) + B$

The following table shows the values of 'S,' 'M,' 'A' and 'B' for some of our previous patterns.

| Pattern          | S  | M  | A  | B |
|------------------|----|----|----|---|
| 1,2,3,4, ...     | 1  | 1  | 1  | 0 |
| 2,5,8,11, ...    | 2  | 1  | 3  | 0 |
| 1,2,4,8, ...     | 1  | 2  | 0  | 0 |
| 11,111,1111, ... | 11 | 10 | 0  | 1 |
| 32,332,3332, ... | 32 | 10 | 1  | 2 |
| 34,334,3334, ... | 34 | 10 | -1 | 4 |

It's your turn. Show the values of 'S,' 'M,' 'A' and 'B' for each of the following patterns.

| Pattern            | S | M | A | B |
|--------------------|---|---|---|---|
| 2,4,6,8, ...       |   |   |   |   |
| 1,3,5,7, ...       |   |   |   |   |
| 1,10,100,1000, ... |   |   |   |   |
| 3,6,12,24, ...     |   |   |   |   |
| 1,-2,4,-8, ...     |   |   |   |   |
| 99,999,9999, ...   |   |   |   |   |
| 43,433,4333, ...   |   |   |   |   |
| 98,998,9998, ...   |   |   |   |   |
| 37,337,3337, ...   |   |   |   |   |
| 12,102,1002, ...   |   |   |   |   |

Relax for a while. Do something physical. Jog, stretch, dance, play tennis. Then browse through our previous *Number Patterns* programs. Now, refreshed in mind and body, do the next exercise.

### Exercise

Write the program *Number Patterns* which generates patterns defined by 'S,' 'M,' 'A' and 'B.' Read their values from DATA statements. Write DATA statements for the patterns you want to see.

We will help you get started by showing an outline of the program using REM statements. All you have to do is write the statements that follow each REM statement.



We recommend starting this way with all your programs.

```

1000 REM**NUMBER PATTERNS
2000 REM**READ STARTING NUMBERS
3000 REM**SHOW 'LATEST' NUMBER
4000 REM**COMPUTE NEXT NUMBER
5000 REM**WHAT TO DO NEXT
9000 REM**DATA: VALUES OF S,M,A,B

```

### DragonSmoke

Our newsletter, *DragonSmoke*, is growing slowly. We began in January 1985 with two pages copied on our trusty Canon PC copy machine, then grew to eight pages in February, 16 in March, and 20 in April. Here are two ways to sample *DragonSmoke*.

copy machine, then grew to eight pages in February, 16 in March, and 20 in April. Here are two ways to sample *DragonSmoke*.

— Send \$1 and we will send you the first four issues, January, February, March and April.

— Or, send \$1 and ask for the latest issue. Our address: *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026.

*DragonSmoke* is a beginner's periodical covering computers, role playing games, play-by-mail games and tennis.

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# CoCo, Can You Spare A Dime?

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.*

**B**y now all of you should be familiar with the graphics power of your Color Computer. We have spent many articles in the past year reviewing different graphics techniques that will let you have fun with the graphics commands of Color Extended BASIC. We have drawn rock groups, baseball teams and even motion picture characters. What we have really *not* done until now is use any of this graphics magic for educational purposes. Our educational graphics have been limited to the CHR\$ found in Color BASIC.

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

This month, we will remedy that with the *Color Change Quiz* written in 16K Color Extended BASIC. The program can be used to help instruct youngsters in the correct counting of coins, but best of all, it will do so using the kind of Hi-Res graphics you would expect from a program costing quite a bit of money.

## Computer Graphics and Education

As computers get more and more sophisticated, we have come to expect a great deal from them as far as high resolution graphics are concerned. I remember when I first got the original 16K Color BASIC CoCo back in the spring of 1981 and how excited everyone got when I produced a low resolution character block map of Europe for my students. None of my students had ever seen anything remotely like it on a computer TV screen, and even though the image was rather rough, most of them got the idea of what I was trying to present.

However, when we wish to present something drawn on a computer screen in graphics today, we have much greater competition to deal with. Arcade games now explode with detailed color graphics. Can we seriously expect a student using an educational program on a

computer to be satisfied with anything less? Therefore, if we are going to display or simulate something on a CoCo screen, we should be careful to make it look as close to the object copies as possible.

Unfortunately, I have seen a number of graphics programs which deal with dollars and coins and do a very poor job of displaying the currency. Can we expect students to make change in real life if a computer drills them in money skills by using a circle with "25 cent" written inside of it?

If we are going to draw a quarter then we should see good old George Washington right down to his pigtail hairdo. Similarly, a dime should have Roosevelt, a nickel should have Jefferson and a penny should be copper-red with honest Abe Lincoln on it. Regrettably, I have yet to see any reasonably priced educational software offer that kind of detail. That's why I wrote *Color Change Quiz*.

## The Wish

Since I have gotten many letters from parents who like to use their CoCos for math instruction with their youngsters offering this program seemed to be the right idea at this time. Money handling



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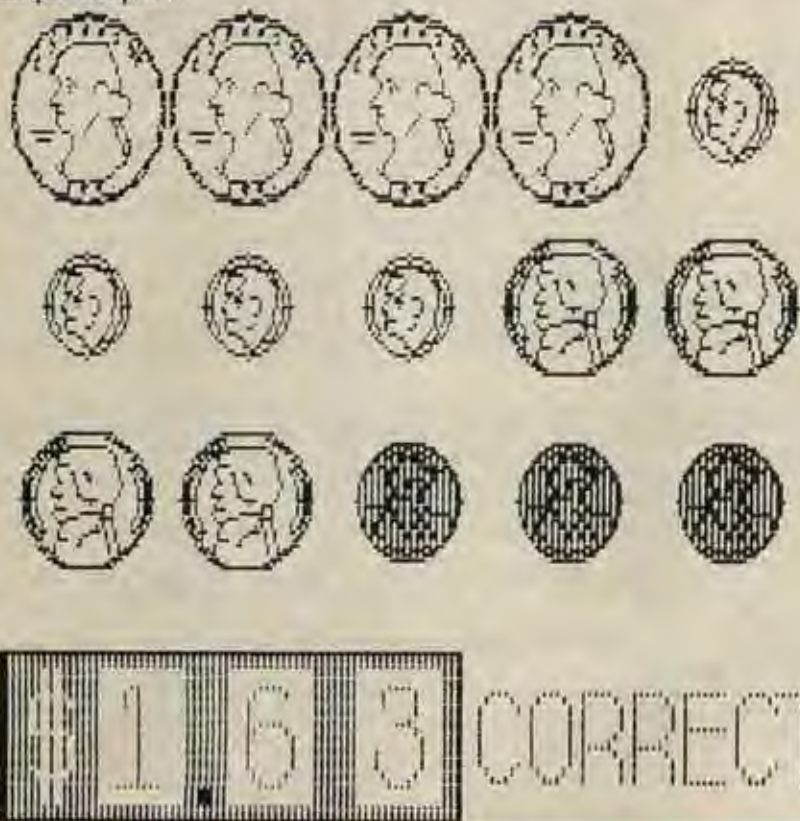
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### Sample Graphics



### One-Liner Contest Winner . . .

This "pixel-blaster" program loads any standard Hi-Res (PMODE 4) picture file from disk and then converts the whole picture to either red or cyan, depending on whether you select odd or even aliasing and the reset state of the CoCo. You can then re-save the file on disk.

For use with cassette systems, change LOADM to CLOADM, SAVE to CSAVEM and change the SAVEM addresses to &H600, &H10FF, &HA027.

#### The listing:

```
Ø CLS:INPUT"PICTURE";F$:INPUT"EV
EN (1) OR ODD (2) ALIASING";A:PM
ODE4,1:PCLS:SCREEN1,1:LOADMF$:FO
RI=A TO256STEP2:LINE(I,Ø)-(I,192
),PRESET:NEXT:FORD=1TO3ØØØ:NEXT:
INPUT"RESAVE IT (Y/N)";A$:CLS:IF
LEFT$(A$,1)="Y"THENSAVEM F$, &HEØ
Ø, &H25FF, &HAØ27
```

Scott Bain  
San Diego, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tapes*.)

is a skill everyone needs to master in order to survive, so having an easy-to-use program for the CoCo on this subject was a desirable wish for many readers.

Other suggestions that have come included ways to have students make the correct correlation between a digital clock and the type with two hands. These ideas slowly jell to form a way from month to month. In this case, the change skills seemed to be a good route to follow.

### The Program

*Color Change Quiz* starts off with a now typical title card using the CH blocks. I have found that these make quick and colorful title screens because they allow the use of a totally black background. Since we have to include instructions or prompts to make the program run the way we wish, as well as our credits and copyright symbols staying in the text mode saves us the difficulty of redrawing our alphabet in the graphics mode.

Also, INPUT statements would not work in graphics; we would have to use the INKEY\$ function instead. To put all into a nutshell: Why go to all th

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rouble when the text mode will let us to it attractively and efficiently? Case closed.

The actual coins in our program are limited to quarters, dimes, nickels and pennies. I have left out the half-dollar for two reasons: Few people use half-dollars nowadays, and drawing a half-dollar on the screen would take up too much space, allowing for the use of fewer coins on the screen at one time. Also, if I were to take up the space using a half-dollar, the next logical step would be to draw a Susan B. Anthony dollar since it is smaller than a half-dollar. The main purpose of this program is to be functional.

The coins are created using a combination of DRAW and CIRCLE commands. I have taken great pains to make the characters on the coins look as much like the actual coins' figures as possible. I did not go into as much detail on the penny. You will see a shadowy image of Lincoln, but you will have no difficulty recognizing the coin as a penny.)

Each of the coin graphics is stored in a graphics array using the GET command. When we want to draw a given coin, we simply PUT the appropriate array where we want it. The selection of coins displayed is determined by a selection of random numbers.

### Running the Program

When you run the program, you will be asked to select the number of coins to be displayed. The maximum number of coins is 15, but you can display as little as one coin. The screen will go blank and then display a title card asking you to select the red-colored letter. You must select either 'A' or 'B.' This determines our color-set and helps insure that our pennies are red, not blue.

Next, our screen will display our coins starting in the upper left-hand corner. The lower left-hand corner will show a box with three spaces (\$0.00). Above the space farthest to the left will appear an arrow. Let's say the total for

the coins on the screen is \$.30; then the first digit you must enter is '0' for the dollar's place. It must be entered as \$0.30 instead of \$.30.

If at any point you enter an incorrect digit, pressing the backspace arrow will correct the error. When the final digit is entered, the screen will indicate if the answer was correct or wrong. If the answer is wrong, you may not continue until you enter the correct answer.

The program will keep displaying sets of coins for you to add until you press the '@' key. Then, a "scorecard" will appear with the number wrong, the number correct, your percentage and the prompt for trying again ('Y' or 'N'). That's all it takes to run the program.

Try *Color Change Quiz* if only to see the graphics it draws. You will find it is very useful to any youngster trying to learn about coin mathematics. Best of all, it will teach these skills in a way which graphically represents exactly how these coins appear in the real world. After all, isn't that what a computer program should do?

|     |       |     |
|-----|-------|-----|
| 140 | ..... | 205 |
| 280 | ..... | 174 |
| 400 | ..... | 147 |
| 540 | ..... | 24  |
| 670 | ..... | 195 |
| 870 | ..... | 189 |
| 950 | ..... | 246 |
| END | ..... | 11  |

The listing: CHNGQUIZ

```

10 *****
20 *      COLOR CHANGE QUIZ      *
30 *      BY FRED B. SCERBO      *
40 *      COPYRIGHT (C) 1985      *
50 * 149 BARBOUR ST.N.ADAMS,MA*
60 *****
70 SCREEN0,0:CLS0:FORI=0TO64STEP
32:FORY=1062TO1080:READA:POKEI+Y
,A+128:NEXTY,I
80 FORI=0TO64STEP32:FORY=1156TO1
179:READA:POKEI+Y,A+128:NEXTY,I:
FORI=0TO64STEP32:FORY=1256TO1270
:READA:POKEI+Y,A+128:NEXTY,I
90 DATA63,60,60,,63,60,63,,63,48
,48,,63,60,63,,63,60,63
100 DATA127,112,112,,127,112,127
,,127,112,112,,127,112,127,,127,
125,114
110 DATA44,44,44,,44,44,44,,44,4
4,44,,44,44,44,,44,32,44
120 DATA95,92,92,,95,80,95,,87,9

```

```

2,91,,95,91,80,95,,95,92,92,,95,
92,92
130 DATA95,80,80,,95,92,95,,95,9
2,95,,95,84,91,95,,95,84,95,,95,
92,92
140 DATA92,92,92,,92,80,92,,92,8
0,92,,92,80,84,92,,92,92,92,,92,
92,92
150 DATA47,44,47,,47,32,47,,36,4
7,40,,44,44,47
160 DATA47,33,47,,47,32,47,,32,4
7,32,,35,44,32
170 DATA44,44,46,,44,44,44,,36,4
4,40,,44,44,44
180 DIM D(55),P(55),N(55),Q(55),
A(8),CV(4),TV(10),N$(10),CS(15),
PS(15)
190 DATA BL2L3H2U7E2R3F2D7G2,BLL
6R3U11LGD,NU2L7U3E2R3E2U2H2L3G2D
2,BH4BL3D2F2R3E2U3H2NL2EU2HL3GD,
L3R2U11LG5D2R8,BL7BU2F2R3E2U3H2L
3G2U6R7D2,BU10BLHL3G2D7F2R3E2U3H
2L3G2,BL6E6U5L7D3,BU2G2L3H2U3E2H
U2ER3FD2GNL3F2D3,BL5NHR3E2U7H2L3
G2D3F2R3E2
200 FORI=0TO9:READN$(I):NEXT
210 JK(1)=100:JK(2)=10:JK(3)=1
220 PRINT@352,"          BY FRED B.
SCERBO":PRINT"          COPYRIGHT (
C) 1985"
230 R=5:PRINT@416," ENTER NUMBER
OF COINS (MAX.15)":PRINT:PRINT@

```

```

460,"";:INPUT QW:IF QW>15THEN230
ELSE IF QW=0 THEN 230
240 T=1:IF QW>5THENDL=2
250 IF QW>10 THEN DL=3
260 GOTO270
270 PMODE4,1:PCLS1:SCREEN1,1
280 CV(1)=1:CV(2)=5:CV(3)=10:CV(
4)=25
290 PMODE3,1
300 FORI=1TO3:DRAW"S16BM"+STR$(I
+84)+",136C7U3NR4U2END6R2ND6FD5B
R12C6U6RND6R2FDGNL2RFDGL3":NEXTI
310 DRAW"S12BM36,50C1U6R3FDGNL3B
D3BR3U6R3FDGL3R2F2DBR3NR3U3NR2U3
R3BR3BD6R3U3L3U3R3BR3BD6R3U3L3U3
R3BR2"
320 DRAW"BD6BR16U6L2R4BR3D6U3R4U
3D6BR3NR3U3NR2U3R3"
330 DRAW"BM27,88U6R3FDGL3R2F2DBR
3NR3U3NR2U3R3BR3ND6R2F2D2G2L2BR1
8NU6R3BR3NR3U3NR2U3R3BR3R2ND6R2B
R3R2ND6R2BR3NR3D3NR2D3R3BR3U6R3F
DGL3R2F2D"
340 X$=INKEY$:IFX$="A"THEN350ELS
EIFX$="B"THEN360ELSE340
350 L=7:GOTO370
360 L=6
370 CLS0:PMODE4,1:PCLS1:SCREEN0,

```

```

1
380 CIRCLE(40,40),14,0,.9
390 DRAW"S4C0BM48,44NG5U3EU4HULH
2L2HL5GLGDGD2FG2DRD2NR3D2FR2FRFD
RFRBU6GLREBU2REU2HL2BL3BDNL2NGHL
HLBU4R4BFGBGF"
400 CIRCLE(40,40),12,0,.9,.4,.2
410 GET(16,18)-(64,62),D,G:PCLS1
420 CIRCLE(80,40),16,0,.9:PAINT(
80,40),0,0:PMODE3,1:PAINT(80,40)
,L,8:PMODE4,1:SCREEN0,1:CIRCLE(8
0,40),16,0,.9:CIRCLE(81,40),16,0
,.9,.6,.3
430 LINE(60,26)-(100,54),PSET,B:
CIRCLE(80,40),14,0,.9,.15,.4:CIR
CLE(80,40),14,0,.9,.65,.9
440 FORI=70TO71:DRAW"C0BM"+STR$(
I)+",46UE3UBRNF2BLUE2UHU2HR2E2UR
BRR2FRFRDR2D2G4F2DRBL4F6BL4NH3BL
4NH4BU11U2R3BD2DBD5BR4NR4BL8BU4L
3NU2BL3BD2L5":NEXT
450 GET(56,18)-(104,62),P,G
460 FORI=0TO1:CIRCLE(135,40),20+
I,0,.8:NEXTI
470 COLOR1,0:LINE(110,24)-(160,5
6),PSET,B
480 FORI=17TO19STEP2:CIRCLE(135,
40),I,0,.8,.4,.7:CIRCLE(135,40),
I,0,.8,.9,.1:NEXT
490 DRAW"C0BM125,52U2ENR3U2E3R3E
R6FD2FD2FD2BR3U2HU2HU2NL4U3L3D3R
3U3E2UEUHU2HU2HLHL12GLGD2NR3GDNF
2FDG2DNR3R2DGDNR3GF2R2"
500 FORI=2TO6STEP4:CIRCLE(136,34
),I,0,1.3,.2,.5:NEXT
510 CIRCLE(138,50),6,0,.7,.5,.8
520 GET(111,18)-(159,62),N,G
530 FORI=20TO22:CIRCLE(200,40),I
,0,.9,.6,.9:CIRCLE(200,40),I,0,.
9,.2,.3:NEXTI
540 COLOR1,0:FORI=180TO210STEP5:
LINE(I,20)-(I+2,90),PSET,BF:NEXT
I
550 FORI=0TO1:CIRCLE(200,40),24+
I,0,.9:NEXT
560 CIRCLE(200,40),19,0,.9,.15,.
35
570 DRAW"C0BM212,52U2LU2H2U2H2R2
F3D2RD3BL4BU8R2E2U2HL2HL2H2L2GDB
R8U3HU2H2UHUL11GLGLDL2LDLDBRF2B
DG3DR3LD2NR2D2F2R2FD3G3DGBR8BU9N
E4BL11BD2L4BH2R7BR7BU10H2NLBD2D"
580 GET(176,18)-(224,62),Q,G
590 GOTO640
600 PUT(C,D)-(C+48,D+44),P,PSET:
RETURN
610 PUT(C,D)-(C+48,D+44),N,PSET:
RETURN
620 PUT(C,D)-(C+48,D+44),D,PSET:

```

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```

RETURN
63Ø PUT(C,D)-(C+48,D+44),Q,PSET:
RETURN
64Ø PMODE4,1:PCLS5:SCREEN1,1
65Ø KC=Ø:PMODE3,1
66Ø HL=RND(3Ø):IF HL<27 THEN 68Ø
67Ø FOR RT=1TOQW:CS(RT)=HL-26:NE
XTRT:GOTO69Ø
68Ø FOR RT=1TOQW:CS(RT)=RND(4)::
NEXTRT
69Ø SR=Ø
70Ø FOR RT=1TOQW-1:IF CS(RT)<CS(
RT+1)THEN72Ø
71Ø NEXT RT:IF SR=1THEN69ØELSE73
Ø
72Ø TEM=CS(RT):CS(RT)=CS(RT+1):C
S(RT+1)=TEM:SR=1:GOTO71Ø
73Ø D=Ø:JC=Ø:FORY=1TO DL:C=2:FOR
I=T TO R:JC=JC+1
74Ø F=CS(JC)
75Ø TV=TV+CV(F):KC=KC+1
76Ø IF F=1THENGOSUB6ØØELSEIF F=2
THENGOSUB61ØELSEIF F=3THENGOSUB6
2ØELSEIF F=4THENGOSUB63Ø
77Ø C=C+5Ø:IF KC=QW THEN8ØØ
78Ø NEXTI
79Ø D=D+44:NEXTY
80Ø COLOR8,6:LINE(Ø,144)-(142,18
2),PRESET,BF
81Ø FORK=ØTO8ØSTEP4Ø:LINE(32+K,1
48)-(56+K,178),PSET,BF:NEXTK
82Ø DRAW"C5S4BM62,178U3R2D3"
83Ø COLOR7,5:LINE(Ø,144)-(142,18
2),PRESET,B
84Ø DRAW"S8BM1Ø,17ØC8FRND3NU12R2
ND3NU12REU3HL5U3ER4F"
85Ø PV=1:FORK=ØTO8ØSTEP4Ø:DRAW"B
M"+STR$(K+44)+" ,14ØC7NU6NH2E2L3"
86Ø X$=INKEY$:IFX$=CHR$(8)THEN95
ØELSEIFX$="@ "THEN97ØELSEIFX$=" "T
HEN86Ø
87Ø KP=ASC(X$):IFKP<48THEN86ØELS
EIFKP>57THEN86Ø
88Ø KP=KP-48:DRAW"BM"+STR$(K+51)
+" ,174C7"+N$(KP)+"BM"+STR$(K+44)
+" ,14ØC8NU6NH2E2L3"
89Ø AV=AV+KP*(JK(PV)):PV=PV+1:NE
XTK
90Ø IF AV<>TV THEN94Ø
91Ø NR=NR+1:DRAW"S16BM153,173C7H
U3ERFBD3GNLBR3HU3ERFD3GNLBR2U5R2
FDGNL2FDBRU5R2FDGNL2FDBRU5NR3D2N
R3D3R3BR2HU3ERFBD3GNLBR3U5L2R4":
SOUND2ØØ,4
92Ø FOR P=1TO1ØØØ:NEXT P
93Ø GOTO96Ø
94Ø NW=NW+1:FOR BQ=1TO3:PMODE4,1
:SCREEN1,Ø:SOUND19,5:PMODE4,1:SC
REEN1,1:SOUND1,5:PMODE3,1:NEXT B

```

```

Q:AV=Ø:KP=Ø:GOTO8ØØ
95Ø DRAW"BM"+STR$(K+44)+" ,14ØC4N
U6NH2E2L3":AV=Ø:KP=Ø:GOTO8ØØ
96Ø AV=Ø:C=Ø:D=Ø:TV=Ø:GOTO64Ø
97Ø PMODE4,1:PCLS1:CLSØ:FORI=1Ø2
4TO1535:POKEI,32:NEXTI:SCREENØ,Ø
:PRINT@1Ø1,"number";:PRINT@165,"
number";:PRINT@1Ø8,"right";:PRIN
T@172,"wrong";
98Ø NW$=STR$(NW):NR$=STR$(NR):Q=
LEN(NR$):FORI=1TOQ:W=ASC(MID$(NR
$,I,1)):POKE1142+I-Q,W:NEXTI:Q=L
EN(NW$):FORI=1TOQ:W=ASC(MID$(NW$
,I,1)):POKE12Ø6+I-Q,W:NEXTI
99Ø SCREENØ,Ø:J=NR+NW:IF J=Ø THE
N J=1
1ØØØ SC=INT(NR/J*1ØØ):PRINT@229,
"your";:PRINT@234,"score";
1Ø1Ø NR$=STR$(SC)+"%":Q=LEN(NR$)
:FORI=1TOQ:W=ASC(MID$(NR$,I,1)):
POKE1271+I-Q,W:NEXTI
1Ø2Ø PRINT@293,"another";:PRINT@
3Ø1,"try";:PRINT@3Ø6,"y";:PRINT@
3Ø8,"or";:PRINT@311,"n";
1Ø3Ø X$=INKEY$:IF X$="Y" THEN RU
N ELSE IF X$="N" THEN CLS:END EL
SE 1Ø3Ø

```

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# The Rainy Day Account

By Steve Blyn  
Rainbow Contributing Editor

**Y**ou are never too young to learn the value of saving your money. One never knows when a rainy day emergency may come along. Similarly, one never knows when that big ticket item that you have been wanting for so long finally goes on sale.

Many school systems throughout the country have banking programs for elementary school age children. This helps to reinforce the importance of saving.

Parents and grandparents often open accounts for youngsters. This may represent a substantial amount of money. The child should not necessarily be aware of this account. We can, however, easily open a small account with the child for the purposes of instruction as well as savings. This

*(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 and his wife, Cheryl, own Computer Island.)*

account can help instill positive values and experiences into the child's environment.

A larger than life approach is often quite successful with younger children. This implies making a big deal out of what is often commonplace to us. Visiting a bank and signing your name

---

***"This month's program illustrates a simple bank account book that shows deposits and withdrawals."***

---

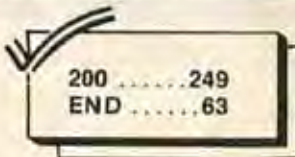
to an application for an account is a big deal to many youngsters. (Signing for your first library card is in the category of important events.)

This month's program illustrates a simple bank account book that shows deposits and withdrawals. The child's task is to compute his balance after each transaction.

The child should first be familiarized by an adult with the meaning of the key words. They are withdrawal, deposit and balance. These words may be likened to positive and negative numbers if this is appropriate for your children. A deposit of \$5.00 is similar to +5 and a withdrawal of \$3.00 similar to -3.

The balance would be +2, which is the sum of these two signed numbers. An introduction to signed numbers can be approached in this manner. Some children find this approach easy to understand; others would be better served by using play money to figure out each transaction in a tangible manner.

The reasons we use a bank for our savings should also be discussed. Mention of the safety factor and the interest that may be earned can be explained by the adult. Children will not initially believe that withdrawal can be made at any time. The fact that the money is still his even though it is in the bank should be stressed.



The listing: BANKACCT

```

10 REM"BANK ACCOUNTS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,NY,1985
30 CLS:PRINT"WHAT IS YOUR NAME";
40 INPUT NA$
50 N$=LEFT$(NA$,10)
60 FOR N=1 TO 10
70 B=50
80 READ A$(N): NEXT N
90 CLS
100 PRINT@0,N$;"'S BANK ACCOUNT"
110 PRINT STRING$(32,255);
120 PRINT"DATE WITHDRAWAL DEPOS
IT BALANCE" ;
130 PRINT"-----"
-----";
140 PRINT"01/01      0          50
      50"
150 FORR=1TO10:PRINT@160+T,A$(R)
160 T=T+32

```

```

170 NEXT R
180 DATA 01/25,02/10,03/06,04/14
,05/22,07/15,09/30,10/19,11/08,1
2/17
190 FOR T=1 TO 10
200 D=RND(20)
210 R=RND(4)
220 W=0
230 IF R=4 THEN W=RND(20):D=0
240 PRINT@168+L,W;
250 PRINT@178+L,D;
260 PRINT@185+L,"";
270 INPUT G
280 B=B+D-W
290 IF G=B THEN PRINT@492,"CORRE
CT "":PRINT@185+L," "":SOUND14
0,3:SOUND150,3:CT=CT+1
300 IF G<>B THEN PRINT@492,"SORR
Y";B::PRINT@186+L,B:SOUND10,5
310 L=L+32
320 PRINT@26,"*=";CT;
330 NEXT T
340 SOUND200,5:PRINT@483,"PRESS
ENTER TO GO AGAIN.";
350 EN$=INKEY$
360 IF EN$=CHR$(13) THEN RUN ELS
E 350

```

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# Integrating Computers Into Classroom Instruction

By Michael Plog, Ph.D.  
Rainbow Contributing Editor

When educators speak of computer uses in schools, they generally think of computer assisted instruction (CAI) or computer management of instruction (CMI). When used as CMI, the computer may never be touched by students, but used as a recording device by teachers. Some teachers have even written programs to calculate grades and print report cards.

When used as CAI, students usually have direct access to the computer. If students are sitting at a computer keyboard, they are generally learning something through the electronic medium. The computer is transformed into a smart workbook. Student responses are used by the program to determine what problems to present next, or what to assign the student.

In math classes, for example, students are practicing addition facts in front of a screen instead of using paper and pencil. Sometimes the computer lesson presents new facts to students instead of drilling on facts already learned.

There is nothing wrong with this type of computer use in schools. Such learning can be very helpful for students by using the computer to drill or even

introduce material, and no one would doubt the benefits of having the computer perform calculations for teachers.

In neither case, however, is the computer fully integrated into a lesson. Most CAI deals with lower order learning skills, such as practice, drill, etc. Some simulations attempt to deal with higher order thinking skills, such as synthesis, analysis of knowledge and testing hypotheses generated by students. This month, I would like to present a different type of classroom computer use, and ask your assistance about such suggestions.

For lack of a better term, we are calling this use of the computer "integrating with the lesson." This means the computer is used in a unit of study in various places to help students with higher order learning skills.

For example, let us consider a social studies lesson. (This example is presented only because I taught social studies, and am not all that familiar with other subject areas.) Intentionally, the lesson is one of the duller I can think of: a civics or government lesson about local elections. The class is to be divided into several groups, each group attending to a single campaign.

The purpose of the lesson will be to have students learn about local election processes, understand factors that influence local campaigns, and conduct an analysis of election victories and

losses. The class will not be spending full time every day on the lesson, but will be dealing with other activities associated with local democratic processes. This class activity will take a few months to be completed.

The role of the teacher in this lesson is to coordinate and guide student activities. The teacher will do very little lecturing, but spend most of the time working with the groups of students. The activities done by the students are the key part of this lesson, including their use of the computer.

Each group of students will have to write letters to the candidates in the various races being examined. The letters will explain what the class is doing, ask for interviews with the candidates, and ask for updates on new releases and public appearances. The letters do not have to be the same for each group, but all groups should be aware of other letters. A word processing package should be used to write the letters.

Throughout the campaign, each group of students should identify a many issues as possible discussed by each candidate. The position of each candidate on every issue should be recorded. A database package or word processing package could be used to store issues and positions. This file will need updating often, as candidate make speeches, public appearances and news releases come out.

*(Michael Plog received his Ph.D. degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district, and currently is employed at the Illinois State Board of Education.)*

The students should keep a record of each candidate's appearance before civic groups, presentations before public bodies, news conferences, etc.

One important learning activity for the class would be to conduct a pre-election public opinion poll of the races being examined. There could be three or four such polls during the campaign. Each group would contribute questions to the poll, but there should be one poll from the entire class.

The poll could be taken of students at the school and their parents (not just at the civics class). Results of polls should be released to candidates and the newspapers — with an explanation that the results are unscientific and probably not accurate in predicting the final vote.

A spreadsheet or database package could be used to store the poll results. A BASIC program could be written possibly by students in the computer class, not the students in the civics class) to calculate frequencies and percentages of responses to questions. If preferred, the spreadsheet package could be used to calculate frequencies and percentages. Some of the graphics packages available on the market would be an excellent way of obtaining figures and charts of the poll results. Naturally, a word processing package would be used to write the results of the poll.

After the election, students could obtain voting results by precinct for all races studied in the class. Precinct results can be stored on a spreadsheet or database. Comparisons of actual results with the pre-election polls could be made to determine how close the sample matched the final vote. The precinct results have greater use for analysis of the election, which is the purpose of the whole exercise.

Students can compare all races examined by the groups of the class to see what patterns exist. Each group could have to share its files with all other groups. In order to provide an analysis of the elections, the teacher may want to direct the classroom to positions on issues held by candidates, seeking engagements, editorial support from news media and even precinct voting patterns. A BASIC program or word processing package can be used to merge important information from the various files created by the students.

Throughout this entire exercise, students are not taught anything about the computer itself; they never sit down

in front of a keyboard for a lesson. The computer is integrated into the lesson, which would be impossible to complete in the same way without electronic assistance. Some students might learn how to type during the unit on local elections; some will learn their way around a database package; some will discover previously unknown secrets of a spreadsheet program; and some may never turn on the computer. Someone in each group will have to operate the computer: store and retrieve information, type reports and put pieces of data together in a coherent form. That does not mean all members of the group will have to be turned into computer operators.

The role of the computer is to organize information needed by the students in order to solve problems and assist with higher order thinking skills. In the truest sense of the term, the computer is a classroom tool, very similar to a 16mm movie projector or card catalog in the library. Students are never assigned a computer task for the purpose of that task itself, but only to help them in a learning experience.

After all, the purpose of this lesson is not to learn about commercial packages or BASIC programming; it is to learn about local elections. Without the electronic aid, students would have a much more difficult time sifting through the information on hand, and might not ever be able to conduct the same type of analysis that is possible with the computer.

The example of a civics class lesson is given for illustrative purposes only. The same type of activities could be done in many different classrooms with many different subjects.

As far as I know, there is no school where such a curriculum is in use. In all probability, there are individual classrooms where teachers are using the computer in the manner described above, but doing so in isolation from other teachers in the building. In a way, that is a desirable condition; teaching is an art, and individual teachers are expected to create individualistic lessons for their students.

If you, or anyone you know, is using the computer to conduct lessons similar to the one described, please write to me. I would like to know about the activities and start a file on such units of instruction. My address is 829 Evergreen, Chatham, IL 62629.

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|-----------------------|--------|
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| ZVM 133 Color/HI res  |        |
| RGB                   | 399.95 |
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|                       | 459.95 |
| ZVM 136 RGB/HI res    | 599.95 |

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|-------------------|--------|
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| w/speaker         | 139.95 |
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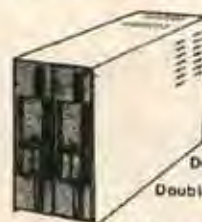
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# For The GameMaster, Just The End Of A Beginning . . .



By George Firedrake and Karl Albrecht

**I**t was September 1982. THE RAINBOW was small then — 106 pages. One of those pages was the first episode of "GameMaster's Apprentice." It began like this:

Let's pretend. Let's go adventuring in a world of imagination where magic works and great deeds can be done. Let's explore, overcome adversity, solve problems and garner fame, glory and fortune. Let's play a fantasy role playing game.

Role playing games are usually played by people

sitting around a large table. As you walk into the game area, you see people obviously having a good time. Curious, you approach.

The players interact animatedly. Then a player asks a question of the GameMaster. Play stops while she digs out the appropriate rule book. After some time, she answers. Play resumes, then stops again while rule books are consulted. You notice that much time is spent flipping pages in numerous rule books. Slowly, an idea forms in your mind. Why not use the Color Computer as a . . .

- \* Database Management System
- \* Management Information System
- \* GameMaster Information System

Call it what you will. We call it "GameMaster's Apprentice." In this series, we will surely, but slowly, explore how to use the Color Computer to help manage a fantasy world such as *Dungeons & Dragons*, *RuneQuest*, *Tunnels & Trolls* or *Worlds of Wonder*.

And so we did. This is the 27th, and last, "GameMaster's Apprentice" in THE RAINBOW. Thanks, Lonnie, for giving us space and wonderful readers so we could experiment and develop this idea. We almost know how to do it now.

Thanks, Bill Nolan, who wrote "The Dragon's Byte" for quite a long time. We wrote tutorials for beginners or new beginners. Bill wrote useful programs for experienced *D&D* players.

Our three years writing for the best CoCo magazine has been a great experience. This ending is another beginning. We'll tell you about that at the end of this final installment of "GameMaster's Apprentice."

## ROLE PLAYING GAMES

Millions of people play role playing games. A role playing game is a game in which one or more players create and play characters (adventurers) who live their imaginary lives in a specially made game world. The game world is created, managed and operated by a GameMaster (GM), referee, or dungeon master (DM).

Most people who play role playing games use a formal rule system. Some of the best known are shown below.

**Bushido.** Fantasy Games Unlimited, P.O. Box 182, Roan, NY 11576.

**Champions.** Hero Games, 92A 21st Avenue, San Mateo, CA 94402.

**Dungeons & Dragons (D&D).** TSR, P.O. Box 756, Lake Geneva, WI 53147.

**RuneQuest (RQ).** Avalon Hill, 4517 Harford Road, Baltimore, MD 21214.

**Star Trek.** FASA, P.O. Box 6930, Chicago, IL 60680.

**Tunnels & Trolls (T&T).** Blake, P.O. Box 1467, Scottsdale, AZ 85252.

Beginners beware! The rule books are formidable. If you are a beginner, we suggest you start with one of the following books, both from Reston Publishing Company, 1480 Sunset Hills Road, Reston, VA 22090.

**Adventurer's Handbook: A Guide to Role Playing Games** by Bob Albrecht and Greg Stafford.

You will also need **Adventurer's Handbook** if you play our play-by-mail beginner's game. We call it *DragonFun*.

Copyright © 1985 by DragonQuest, P.O. Box 7627, Menlo Park, CA 94026.



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- Graphically displays any monthly calendar between 1700 and 2099. You put in up to twelve 28 character memos per day... calendar shows where the memos are... call up of day shows details.
- Use for appointments or a log of past activity.
- Search capability allows you to list or print all memos between two specified dates or only ones meeting key-word criteria.
- Date computation shows elapsed time between two dates in days, weeks, months and years.
- Printed graphic calendar available with optional Screen Print Program.
- Requires 32K in BASIC

| DATE | MEMO | DATE | MEMO | DATE | MEMO |
|------|------|------|------|------|------|
| 1    |      | 8    |      | 15   |      |
| 2    |      | 9    |      | 16   |      |
| 3    |      | 10   |      | 17   |      |
| 4    |      | 11   |      | 18   |      |
| 5    |      | 12   |      | 19   |      |
| 6    |      | 13   |      | 20   |      |
| 7    |      | 14   |      | 21   |      |
| 12   |      | 19   |      | 26   |      |
| 13   |      | 20   |      | 27   |      |
| 14   |      | 21   |      | 28   |      |
| 15   |      | 22   |      | 29   |      |
| 16   |      | 23   |      | 30   |      |
| 17   |      | 24   |      | 31   |      |
| 18   |      | 25   |      |      |      |
| 19   |      | 26   |      |      |      |
| 20   |      | 27   |      |      |      |
| 21   |      | 28   |      |      |      |
| 22   |      | 29   |      |      |      |
| 23   |      | 30   |      |      |      |
| 24   |      | 31   |      |      |      |

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**DISK DATE-O-BASE CALENDAR - \$19.95** (over 4000 memos/disk... max. 300 memos/month)

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- Relocatable code lets you use all of your 16K or 32K machine.
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|          |
|----------|
| 43       |
| +89      |
| 102      |
| 1+4+6=11 |

## HELP YOUR CHILDREN HELP THEMSELVES

### MATH TUTOR

- 5 Programs in 1... ranges from simple addition through long division with 4 levels of difficulty.
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- Shows how to correct errors... step by step approach stresses accuracy.

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- Teaches students their own word list... tape or disk files hold up to 200 words each.
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- Words presented in 4 lively formats - study, scrambled word game, trial test, final test.

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### DISK DOUBLE ENTRY

If you have spent hours trying to balance your Debits and Credits, DISK DOUBLE ENTRY is for you!



- Designed for small business, club and personal use.
- Enter transactions in a journal type format. Program will maintain current account balances, produce Trial Balance, Income, and Balance Sheet reports and complete Account Ledgers.
- Will handle up to 300 accounts including report headings and totals.
- Up to 1400 average transactions on a diskette.
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## STATEMENT WRITER

For use with (and requires) Disk Double Entry.

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- Provides account summaries and mailing labels to use with your statements.
- Designed and documented to allow you to change formats to accommodate your own special needs.

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## That's INTEREST-ing

Let your computer do some REAL computation!

- Helps you solve problems dealing with time, money, and INTEREST!
- AMORTIZATION TABLES any way YOU want them... even lets you change any terms mid-schedule!
- Calculate Present Value, Future Value, Capital Recovery for any combination of payments you specify.
- Rate of Return computation predicts how hard your money will be working for you!
- Computes Bond yields... current and to redemption.
- All answers available on screen or printer.

**\$29.95** in BASIC

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## ALPHA-DRAW

Works great with GRAPHIC SCREEN PRINT PROGRAM!

- Subroutine designed to let you add any keyboard character to your graphic displays.
- You define X and Y coordinates and a string variable of one or more characters... ALPHA-DRAW does the rest!
- BONUS - includes instructions for a true line-numbered merge of tape files.

**\$8.95** in BASIC

ALL PROGRAMS require Extended Color Basic and are delivered on cassette. All, except Tape Date-O-Base Calendar, are DISK System compatible.

U.S. and CANADA add \$1.00 per order for shipping. Overseas \$2.50 per order. All prices in U.S. dollars. Florida residents add 5% sales tax. Return within two weeks if not completely satisfied.



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## A Directory of Play-By-Mail Games

Here is a list of companies who run play-by-mail games.

Advent Games, P.O. Box 81674, Lincoln, NE 68501  
Adventures By Mail, P.O. Box 436, Cohoes, NY 12047  
Adventures Design Group, P.O. Box 821072, Dallas, TX 75382  
Adventure Systems, 1669 S. Voss, Suite FF-H, Houston, TX 77057  
Arden Enterprises, Rt. 4 Box 4506, New Philadelphia, OH 44663  
Rick Barr, P.O. Box 1873, Cave Creek, AZ 85331  
Central Texas Computing, 710-S, Southwest Tower, Austin, TX 78701  
Clemens & Associates, P.O. Box 4529, San Clemente, CA 92672  
C-Mind Enterprises, 1008 Tenth St. No. 417, Sacramento, CA 95814  
Comstar Enterprises, P.O. Box 601062, N. Miami Beach, FL 33160  
ECL-Power, 6923 Pleasant Dr., Charlotte, NC 28211  
Fantastic Simulations, P.O. Box 24566, Denver, CO 80224  
Flying Buffalo, P.O. Box 1467, Scottsdale, AZ 85252-1467  
4 Sight, P.O. Box 1903, Indianapolis, IN 46206  
Game Systems, Inc., P.O. Box 431166, Miami, FL 33243  
Graff Simulations, 27530 Harper, St. Clair Shores, MI 48081  
Jabberwock Enterprises, P.O. Box 158, Somers, CT 06071  
JF&L, 305 E. Caffery, Pharr, TX 78577

KSK Concepts, P.O. Box 375, Morris Plains, NY 07950  
Neolithic Enterprises, 350 N. Lantana, Suite 58 Camarillo, CA 93010  
Palace Simulations, P.O. Box 743, Madison, NJ 07940  
Pierce & Co. PBM, P.O. Box 25675, Chicago, IL 60625  
Quest Computer Services, P.O. Box 1300, Dahlgren, VA 22448  
Rhiannon Enterprises, P.O. Box 510, N. Highlands, CA 95660  
Schubel & Son, P.O. Box 214848, Sacramento, CA 9582  
Superior Simulations, P.O. Box 505, Fairfield, ID 83327  
Time Space Simulations, 5304 Crossfield Rd., Virginia Beach, VA 23464  
Vigard Simulations, P.O. Box 231, Orangevale, CA 9566  
White Lion Enterprises, P.O. Box 188, Wood Ridge, NJ 07075  
Mike Williams, Route 4, Box 802, La Follette, TN 37766  
World Campaigns, P.O. Box 321, Epping, NH 03042  
Constantine Xanthos, 120 MacDougal St., NY, NY 1001  
Zorph Enterprises, 3646 Gibsonia Rd., Gibsonia, PA 1504

We know little or nothing about most of these companies. However, without reservation, we can recommend Flyin' Buffalo, Inc.

Fortunately, Rick Loomis, who can lay fair claim to starting all this, has begun (or helped begin) an association to promote responsible play-by-mail moderating. It is The PBM Association, 8149 E. Thomas Rd., Scottsdale, AZ 85251. Send them a self-addressed, stamped envelope and

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\*\*\* Works with DISK based systems! \*\*\*

The KEY-264K divides the 64K ram memory into two 32K banks or sides, each of which can be utilized independently by the BASIC interpreter, with the ability to switch instantly from one side to the other. IT'S LIKE HAVING TWO COMPUTERS IN ONE!! Have your BASIC program on one side and keep your variables on the other side, or have your main program on one side and your subroutines on the other side, or have your program on one side and use the other side for 4 additional HI-RES pages, or any combination you like. The possibilities are endless because the KEY-264K allows full communication between sides plus the ability to switch back and forth at will, all from within BASIC. You could also have different programs in each side and switch back and forth between them using simple keystrokes, even while the programs are running!! Or run them both at the same time in the FOREGROUND/BACKGROUND MULTI-TASKING mode. Don't buy that printer buffer yet! With the KEY-264K you can be printing in the background side while utilizing your computer normally in the foreground side AT THE SAME TIME!!! Debugging a program? Use either a BASIC command or simple keystrokes to instantly duplicate your program, in it's present status, on the opposite side. Switch to the opposite side later and pick up exactly where you were before!

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ey will send you a list of PBMA members.

If you play role playing games, play-by-mail games, on-line games on computer networks, or even solitaire adventure games on your CoCo, we bet you will enjoy the following books: *Dream Park* by Larry Niven, *Octagon* by Fred Saberhagen and *True Names* (novella) by Vernor Vinge in *BINARY STAR #5*, editor: James R. Frenkel.

### Aloysious — One More Time

Aloysious made it across the creek, successfully climbed the embankment and exercised his displeasure by throwing a few stones. Now, late in the day, he continues his journey.

Hit with fist — Success percentage: 50%

Aha! A "weapon," cheap and always available. For Aloysious, flailing with his fist is a hit or miss proposition. He connects about half the time, if he is trying to hit a person of average SIZ and DEX.

Success: Roll 50 or less on the percentile dice  
Failure: Roll 51 or more on the percentile dice

Night falls. Aloysious spends the night in the woods near the cliff. He lights a fire and makes some tea. Presently, he notices his shadow on the cliff and decides to get in a little boxing practice. Roll the dice: 36. He lands a blow. Yuch! Well, so much for boxing your shadow on a cliff.

Hit with stick — Success percentage: 25%

This is the ability to hit a moving target with a stick or similar weapon: a broom, shovel, rake or even a "real" weapon such as a mace or spear.

Success: Roll 25 or less on the percentile dice  
Failure: Roll 26 or more on the percentile dice

Aloysious awakes with a start. In the bright moonlight (fortunately), he sees a raccoon trying to pilfer his provisions. He grabs his sturdy walking stick (always by his side) and leaps to the fray, flailing as he goes.

First roll: 78 He misses.  
Second roll: 89 Another miss.  
Third roll: 52 Curses! Missed again.

The raccoon, too wise to remain hungry, runs away. Aloysious now does what he should have done before. He hangs his gear from a branch of a tree, out of reach of the more ubiquitous nocturnal bandits. With a sigh, he settles down to a good night's rest.

And so we leave Aloysious, sleeping beneath the stars with his seven characteristics and his 11 special skills. His adventures will continue to be chronicled in another place.

### Report from Cairleon

We are playing *Feudal Lords* by mail, making one turn each month. We are the Lord of Cairleon on the west coast of Britain. There are five other human players, each the lord of a fief. Forty other fiefs are controlled by the computer, which is also the GameMaster. This is a

completely computer-moderated game.

The game we are in began in the game year 801. Here is the State of Cairleon as the game began.

Market Price for Food: Sell 10, Buy 11

Lord's Rank: Baron, Leadership 2

|          |      |              |    |                |   |
|----------|------|--------------|----|----------------|---|
| Gold     | 1400 | Tax rate     | 20 | Lumber mills   | 0 |
| Food     | 1400 | Markets      | 0  | Fishing fleets | 0 |
| Knights  | 200  | Cattle       | 0  | Mines: Stone   | 0 |
| Peasants | 800  | Ships        | 0  | Metal          | 0 |
| Townsmen | 200  | Agric. bonus | 0  | Gold           | 0 |
| Castle   | 10   | Champion     | 3  | Gem            | 0 |

Each turn is one game year. We can send up to 12 orders selected from a list of 31 possible orders. We spent about three hours trying out various possibilities. Soon we will have a CoCo program to help us!

First, we must feed our peasants and knights at least one food unit per year, a total of  $800 + 200 = 1,000$  food units. Townsmen will buy their own food. We have an excess of 400 food units. We decided to give our peasants an extra 100 food units to encourage population growth. Peasants are the strength of a fief — they grow most of the food.

We now have a surplus of 300 food units. We will sell 250 at the market price, thus increasing our gold supply from 1,400 to 3,900. We will soon spend much of this gold.

The rulebook informs us that about 25 percent of surplus food will spoil, so we convert the surplus to livestock at a cost of five gold and one food unit for each unit of livestock. We buy 50 livestock. This brings our gold supply down to 3,650.

In the year 801 "food is gold," so we will use some gold to increase our ability to grow food. We spend 1,000 gold on agricultural research. We now have 2,650 gold.

We send two spies to tell us what is going on in the neighboring fiefs of Hereford and Glamorgan, both controlled by the computer. Spies cost 100 gold each, which leaves us 2,450 in our treasury.

It costs five gold to maintain a knight — there goes a cool 1,000 gold to maintain our 200 knights! We decide to disband half our army in order to use more gold to build other resources. In a couple of turns we will build the army up again. We now have 1,450 gold.

Let's spend a little more gold. We'll build a fishing village at a cost of 300 gold. This will produce additional food in the future. Here is a summary of our orders.

| Order Code | Additional Info | Description                               |
|------------|-----------------|-------------------------------------------|
| 16         | 250             | Sell 250 food                             |
| 21         | 1000            | Spend 1,000 gold on agricultural research |
| 18         | 100             | Give 100 extra food to peasants           |
| 23         | 24              | Send spy to fief #24 (Hereford)           |
| 23         | 21              | Send spy to fief #21 (Glamorgan)          |
| 8          | 100             | Disband 100 knights                       |
| 20         | 50              | Buy 50 livestock                          |
| 29         |                 | Build one fishing village                 |

We mailed our orders to Flying Buffalo and waited for a reply. In the meantime, we send letters to the Lord of Denbigh and the Lord of Dorchester, suggesting a friendly and mutually supportive alliance. Without allies, you will

soon be wiped out in this game!

Soon the computer replied with a very complete report of the State of Cairleon and news of other events in Britain.

|                               | Gold  | Food | Peasant | Townsmen | Knights |
|-------------------------------|-------|------|---------|----------|---------|
| Cairleon began 801 with:      | 1400  | 1400 | 800     | 200      | 200     |
| Maintain 200 Knights          | -1000 | -200 | +0      | +0       | +0      |
| Disband 100 Knights           | +0    | +0   | +0      | +90      | -100    |
| Sell 250 food at market       | +2500 | -250 | +0      | +0       | +0      |
| Townsmen had to buy 200 food  |       |      |         |          |         |
| Give 900 food to peasants     | +0    | -900 | +0      | +0       | +0      |
| Agricultural research faileth | -1000 | +0   | +0      | +0       | +0      |
| Spy on Hereford               | -100  | +0   | +0      | +0       | +0      |
| Spy on Glamorgan              | -100  | +0   | +0      | +0       | +0      |
| Buy 50 livestock              | -250  | -50  | +0      | +0       | +0      |
| Build 1 Fishing Fleet         | -300  | +0   | -10     | +0       | +0      |

Thy Chancellor reporteth the following revenues:

|                                 |       |       |     |     |    |
|---------------------------------|-------|-------|-----|-----|----|
| Tax & population growth/decline | +1914 | +0    | +59 | +15 | +0 |
| A normal harvest (1.52)         | +0    | +1290 | +0  | +0  | +0 |
| (Average harvest was 1.6)       |       |       |     |     |    |
| Fishing                         | +0    | +18   | +0  | +0  | +0 |
| Livestock increase by 10        |       |       |     |     |    |

Thy Sheriff reporteth other events in thy fief:

28 foreign knights join thy service.

Thy Marshall reporteth the following military activity:

- \* In Cheshire: Wroxeter won a 8:1 raid against Cheshire.
- \* In Devon: Cornwall won a 8:1 raid against Devon.
- \* In Gloucester: Hereford won a 1:1 raid against Gloucester.
- \* In Uxworth: Norfolk lost a .4:1 siege against Uxworth.

Thy champion rode errant into the Fens and defeated dwarves, gaineth eight peasants.

Spy reports

|           |                    |      |             |     |        |    |
|-----------|--------------------|------|-------------|-----|--------|----|
| Hereford  | Player: non-player |      | No Overlord |     |        |    |
|           | Gold               | 1874 | Peasants    | 819 | Castle | 10 |
|           | Food               | 1439 | Townsmen    | 204 | Ships  | 0  |
|           | Knights            | 183  |             |     |        |    |
| Glamorgan | Player: non-player |      | No Overlord |     |        |    |
|           | Gold               | 2161 | Peasants    | 854 | Castle | 11 |
|           | Food               | 1332 | Townsmen    | 191 | Ships  | 0  |
|           | Knights            | 211  |             |     |        |    |

Well, that was a good year. Cairleon begins the year '82 as follows.

Market Price for Food: Sell 9, Buy 10

Lord's Rank: Baron, Leadership 2

|          |      |              |    |                |   |
|----------|------|--------------|----|----------------|---|
| Gold     | 3064 | Tax rate     | 20 | Lumber mills   |   |
| Food     | 1308 | Markets      | 0  | Fishing Fleets | 1 |
| Knights  | 128  | Livestock    | 60 | Mines: Stone   | 0 |
| Peasants | 857  | Ships        | 0  | Metal          | 0 |
| Townsmen | 305  | Agric. Bonus | 0  | Gold           | 0 |
| Castle   | 10   | Champion     | 4  | Gem            | 0 |

Except for the size of its army, Cairleon is in much better shape than at the beginning of the game. Now if we would just get a favorable reply from the Lords of Denbigh and Worcester.

*Feudal Lords* is an excellent multi-player Simulation game requiring much careful analysis, record keeping, diplomacy, contingency planning, resource management, etc. For more information, write to either of the following.

- Flying Buffalo, Inc., P.O. Box 1467, Scottsdale, AZ 85252-1427

- Graaf Simulations, 27530 Harper, St. Clair Shores, MI 48081

#### Games for Beginners?

If you are a beginner, you may be at a disadvantage in a multi-player, play-by-mail game. Why? Because there will probably be experienced players in the game who know strategies you don't know. We are trying to arrange some games for beginners only. In these games, *all* players will be beginners (unless someone lies — please don't).

If you are interested in playing in a beginner's game, send a self-addressed, stamped envelope to *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026. Be sure to tell us what you want — we get lots of self-addressed, stamped envelopes!

#### DragonSmoke

We will continue with our own newsletter, which began in the same way as *THE RAINBOW*. Our first issue (January 1985) consisted of two pages run off on our Canon PC copy machine. *DragonSmoke* grows as did *RAINBOW*. Our February issue had eight pages; March, 16 pages, April, 20 pages; and May, 24 pages.

*THE RAINBOW* grew and became the number one magazine for the CoCo Community, with more than 200 advertisers and almost everything a CoCo user could possibly want. *THE RAINBOW* covers the world for CoCo users, from beginner to expert.

*DragonSmoke* will remain small. It will not take ads. It does not compete with magazines like *THE RAINBOW*. It is for beginners. It explores computers for beginners, role playing games, play-by-mail games, encourages new ways to learn and points CoCo users back to *RAINBOW*.

In *DragonSmoke*, we will rerun "GameMaster's Apprentice" from the beginning. Thanks to our *RAINBOW* experience, we can make it better the second time around.

Here are some ways to sample *DragonSmoke*:

— Send \$1 and we will send you the first three issues: January, February and March.

— Or, send \$1 and tell us you want the most recent issue.

Our address is *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026.

Farewell, *RAINBOW*. For us, this is the end . . . of a beginning.

#### One-Liner Contest Winner . . .

As many people already know, Halley's Comet is already well within our solar system and is expected to make its appearance later this year. This program is a graphics presentation of the sun, Earth's orbit and the path of the comet.

#### The listing:

```
1 PMODE3:PCLS3:SCREEN1,0:FORX=1T
080:PSET(RND(250),RND(190),2):NE
XT:CIRCLE(70,95),12,2,.9:PAINT(7
0,95),2,2:CIRCLE(70,95),55,,.9:F
ORY=1.4TO4.9STEP.03:V=COS(Y)*177
+230:H=SIN(Y)*65+95:PSET(V,H,1):
NEXT:PLAY"01T3V13L1CV24G02V28CP5
03L4EL1D+":GOTO1
```

Don Rowan  
Minneapolis, MN

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

#### One-Liner Contest Winner . . .

This program sorts strings alphabetically. Simply input the number (up to 999) of strings to be sorted and then input each string.

#### The listing:

```
1 DIMN$(999):CLS:PRINT@43,"SUPER
SORT":INPUT"# OF WORDS";W:FORX=
1TOW:INPUT"INPUT WORD";N$(X):NEX
TX:FORS=1TOW-1:IFN$(S)<=N$(S+1)T
HENNEXTS:CLS:FORX=1TOW:PRINTN$(X
):NEXTX:END:ELSEH$=N$(S):N$(S)=N
$(S+1):N$(S+1)=H$:S=0:NEXTS:CLS:
FORX=1TOW:PRINTN$(X):NEXTX
```

Michael Stankas  
Moundsville, WV

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

# Do you want your reports to look like this?

- Disk compatible
- Fast Machine Language sort routine
  - sort on 3 fields simultaneously
- With our ML search routines you can
  - search on a selected field
  - search for a specific item
  - search for records within range
- Phrase substitution editor - fast ML delete routines
- Up to 8 user-definable fields per record
  - up to 230 characters per field
  - variable field length
  - variable record length
  - (memory allocated is the actual length of the record)
- Upper and lower case
- User-selected report formats
  - report headings
  - full margin control
  - select which records to print
  - select field to print
  - select order in which fields are printed
  - multiple fields per line
- Send TIMS file to either tape, disk or printer — allows you to use the extensive editing capability available with a word processor to add to or combine other data with a TIMS report.
- Save, load, append and verify routines

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| G. T. BARRICK<br>THE GREAT USA           | 16K | EDUCATIONAL | \$19.95 | GRADE 4 AND UP  |
| GARY DAVIS<br>AUTO RUN                   | 16K | UTILITY     | \$19.95 | PROGRAMMER      |

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|-----------------------------------------|-----|-------------------------------|--|----------------|
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| FINALECTOR<br>DISH                      | 12K | GARY DAVIS<br>PROGRAMMER      |  | UTILITY        |
| SPREADER<br>TAPE                        | 12K | G. DAVIS & G. COSTANZI<br>3-A |  | EDUCATIONAL    |
| GILLY SYNTAX<br>TAPE                    | 16K | GARY DAVIS                    |  | EDUCATIONAL    |
|                                         |     |                               |  | GRADE 5 AND UP |

or this? . . . .

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system



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|                                                                                                                         |                                                                                                                                 |
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## TIMS UTILITY

\$14.95 - Tape

TIMS UTILITY features:

**Multi-Term Search** - Search your database using a search criterion based on up to 5 keywords. You can use either "AND LOGIC" or "OR LOGIC".

**Global Change** - This is the "automatic" version of the modify mode. It can be used when there is a unique set of features in a specified field. For example, we could change all references to Rainbow to RB.

**Global Delete** - Automatically deletes every record in the database which meets the search criteria.

**Record Change** - Add or delete fields to your records. The maximum number of fields per record is still 8.

**Split File Mode** - Use "AND" logic (all articles published in Rainbow and written by Davis) "OR" logic (all customers in Ohio or Maryland), or Range Search to split your large file into 2 or more smaller files. You can save your new file to tape or disk.

TIMS UTILITY comes on tape and is disk compatible. It requires 32K, and a file created with either TIMS or TIMSMAIL.

# The CoCo Calligrapher

Use your CoCo, your 8-bit dot addressable graphics printer and the **CoCo Calligrapher** to create beautiful signs, invitations, flyers, greeting cards, diplomas, certificates, awards and love letters.

The original **Calligrapher** letters are 36 points (1/2 inch) high and variably spaced. It includes an easy-to-use, menu-oriented program and these three tpestyles:

Old English      Cartoon  
**Old English Cartoon**  
Gay Nineties  
**Gay Nineties**  
*The CoCo Calligrapher requires 32K ECB.*  
Tape \$24.95/Disk \$29.95

## ADDITIONAL TYPESTYLES

These tapes of additional tpestyles are available for **\$19.95 each**. They can be easily moved to disk. *The original Calligrapher program is required.*

**Tape 1** - Reduced, Reversed, and Reduced-Reversed versions

Old English      Gay Nineties      Cartoon

**u v w x y n o l d s b a b c d e**

All tpestyles on Tapes 2, 3, 4, 5, and 6 include Standard (1/2 inch), Reversed, Reduced, and Reduced-Reversed unless otherwise noted.

**Tape 2: Broadway/Old Style**

**Broadway Oldstyle**

**Tape 3: Business/Antique**

**Business Antique**

*These disks of additional tpestyles are available for \$49.95 each.*

**Disk 1** - all type styles on Tapes 1, 2 and 3.

**Disk 2** - all type styles on Tapes 4, 5 and 6.

**Tape 4: Wild West/Checkers**

**Wild West Checkers**

**Tape 5: Star**

Hebrew

**Stars**      ש ל ו ם

**Victorian (Standard and Reverse only)**

**Victorian**

**Tape 6: Block/Computer**

**Block  
COMPUTER**

# The OS-9 Calligrapher

**\$39.95**

**Requires OS-9 Version 01.01.00** and a dot matrix printer. The **OS-9 Calligrapher** reads a standard input text file which contains text and formatting directives to produce standard output for printer or disk. You can specify which font to use; centering; left, right or full justification; line fill; narrow mode; margin; line width; page size; page break and indentation.

*These disks of additional tpestyles are available for \$49.95 each. They are not compatible with the CoCo Calligrapher tpestyles or program. OS-9 tpestyle disk must be used with the OS-9 Calligrapher.*

**Disk 1** - OS-9 version of all type styles on Tapes 1, 2 and 3.

**Disk 2** - OS-9 version of all type styles on Tapes 4, 5 and 6.

Dealer and author inquiries are always welcome. Canadian dealers should contact Kelly Software Distributors, Ltd., P.O. Box 11932, Edmonton, Alberta T5J-3L1, (403) 421-8003.

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# Switching Double-Sided Disks

By Tony DiStefano  
Rainbow Contributing Editor

**I**t was great seeing the whole RAINBOW gang at the Chicago RAINBOWfest in May. That made my first RAINBOWfest anniversary. There were a lot of new products to be seen. Fancy software, new and improved hardware, and a lot of new faces.

These get-togethers are quite warm and friendly. I have gone to many computer shows, some for different kinds of computers and some that host just one brand. But, I have never seen one that came close to the atmosphere at a RAINBOWfest. I tip my hat to the CoCo Community.

Speaking of new products, look forward to seeing my new line of products, starting with the DISTO disk controller.

## Clearing up Confusion

The topic of this month's project involves disk drives and disk controllers. There seems to be some confusion about disk drives being double-sided, double-density, single-sided, single-

density, 96 or 48 tpi (tracks per inch) and the compatibility between them. Especially when you talk about OS-9.

---

*"When the Color Computer first came out, the only mass storage available was a cassette recorder. Though the cassette recorder works well for music and speech, it was slow and not well-suited for computer work. A new form of mass storage had to be invented: The diskette was introduced."*

---

I hope to clear all that up right here and now and follow it up with a small project to let you see just what side of the fence, uh . . . I mean disk, you are on.

I will start off by describing a diskette

and a disk drive. First, a diskette is form of media. It holds information—what information is up to you. A telephone numbers file, a game or two, your favorite word processor. All these are files that make your computer function the way it does; this data has to be stored somewhere.

When the Color Computer first came out, the only mass storage available was a cassette recorder. Though the cassette recorder works well for music and speech, it was slow and not well-suited for computer work. A new form of mass storage had to be invented: The diskette was introduced. There are many kinds of diskettes on the market today, but I will limit this discussion to those that are compatible with our lovable CoCo.

Without going into too much detail, the Radio Shack standard diskette used with the CoCo is a 5½-inch, single-sided, double-density, 35 tracks at 96 tpi, soft-sectored diskette. The Radio Shack Disk BASIC, disk operating system, drive and controller are made to comply with these standards. You can get more details on the DOS in the Disk BASIC manual. The Radio Shack controller is made to handle two or four drives, depending on what cable you have.

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



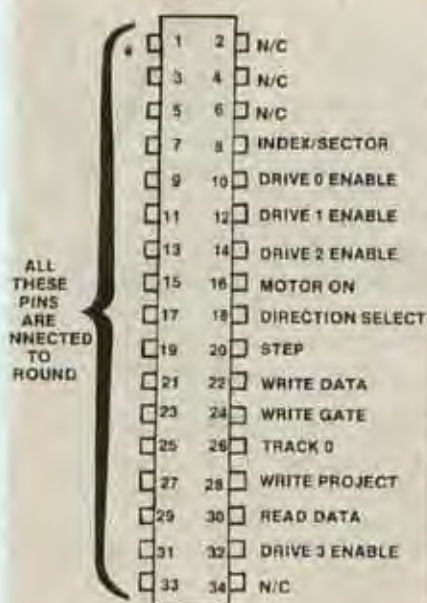


Figure 1  
34-pin disk drive  
connector pinout

Note: Looking at the DISK CONTROLLER edge connector, pin #1 is the top right-hand pin

pin #32 (for double-sided drives only). Since this pin is connected to the controller, it gives us access to the second side of a disk drive. All the hardware is there to use the second side, providing you have double-sided drives.

Today, the price of double-sided drives is so low that in some cases it is cheaper to buy a double-sided drive from another company than it is to buy a single-sided drive from Radio Shack. More and more people already have them and are not using the second side because Disk BASIC does not allow them to do so. I will show you a couple of ways to access the second side. One is software and the other is hardware. Use the method that suits you best. Either way, you will want to build the project if you have double-sided drives.

***"There are two ways to change the mask byte in software. One is to burn the new mask byte into an EPROM. The second is to use the 64K mode of the computer and make the changes in RAM."***

The first thing to do to use the double-sided drive is make sure you have one! You must connect it to the Radio Shack controller. Remember, I said there were pins missing in the Radio Shack cable and that will give us problems.

The side select pin is only present on a four-drive cable, and then only on the fourth drive. You must add another connector for every double-sided drive you are adding to your system. (They are available at your nearest Radio Shack Computer Center.) The connector is a 34-pin edge card connector. If you don't know how to install it on your cable, ask your dealer to do it for you. Have him press the new connector about an inch and a half away from the old connector.

The disk drive now has to be configured to which drive number you want. There are jumpers inside the drive you must set. In the owner's manual of the drive there will be instructions on how to do that.

Now you have a double-sided drive on line, but you will still need a way

to access it. The first way is in software. The way Disk BASIC selects the drive is by using four "mask" bytes. Each byte contains the necessary data in order to activate that drive number. There are four bits that control each of the output pins as seen in Figure 1.

In the controller, there is a memory-mapped byte that controls the output of these pins. It is at \$FF40 or 65344. Try this:

POKE 65344,1

The select light on Drive 0 turned on.

Now try the values two, four and 64 instead of one. This will turn on drive numbers 1, 2 and 3, respectively. The last value of 64 activates Drive 3 (if you have four drives), but remember on our double-sided drive that is the side select. By changing the values on the four mask bytes we can access the second side of the drive. By changing the mask data, you can access the second side of the drive as another drive.

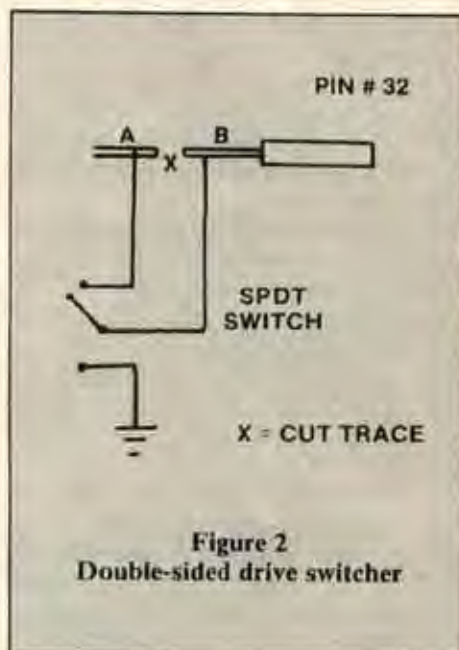


Figure 2  
Double-sided drive switcher

Example: If you have one single-sided Radio Shack drive and one double-sided drive with the right changes to the mask byte, you will have three drives on line. The Radio Shack drive is the first, the first side of the double-sided drive is the second and the second side of the double-sided drive is third. If you had two double-sided drives, it would be as if you had four separate drives. Two double-sided drives is the maximum you can have with Disk BASIC because there are only four mask bytes.

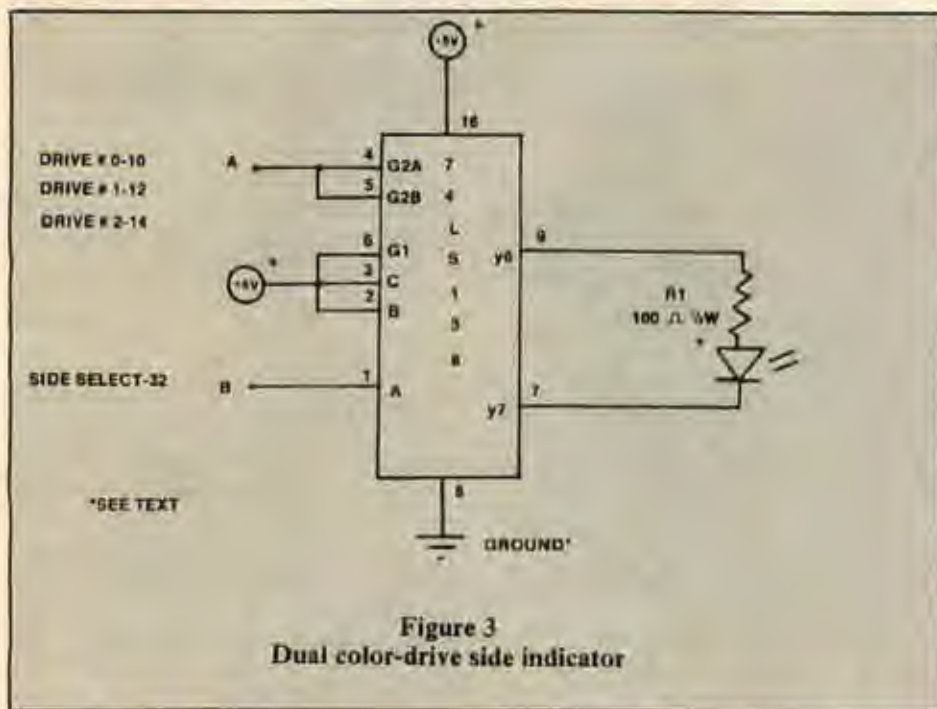


Figure 3  
Dual color-drive side indicator

There are two ways to change the mask byte in software. One is to burn the new mask byte into an EPROM. The second is to use the 64K mode of the computer and make the changes in RAM. I'll leave that part up to you, but what I will do is tell you how to change the mask byte.

The four mask bytes correspond to four drives. Since we are using the last drive number as a side select, we can no longer use it as a drive but only as a side select. That leaves us with three other mask byte values. The values are 1, 2 and 4. The side select value is 64. Any combination of this will work (maximum of four).

First example: Your first drive is a Radio Shack single-sided drive. You want it to be Drive 0, so the value of the first mask byte is '1.' Your second drive is a double-sided drive; they will be Drive 1 and Drive 2. The second mask byte will be '2' and the third byte will be 65. The fourth byte will be untouched.

Second example: You have two double-sided drives. Drive 0 will be the normal side of the first drive; Drive 1 will be the normal side of the second drive. Drive 2 will be the second side of the first drive and Drive 3 will be the second side of the second drive. The four mask bytes are 1, 2, 65, 66.

Radio Shack has two versions of DOS: 1.0 and 1.1. The memory address of the four mask bytes for DOS 1.0 is \$D7AA (55210); the address mask

bytes for DOS 1.1 is \$D89D (55453), plus the next three bytes for the other three values.

If all that doesn't thrill you, you can select the other side by adding a small switch to your disk controller. Figure 2 shows how to hook up the switch to your controller. You must cut the foil between points 'A' and 'B.' Drill a suitable hole in the cover of the controller to mount the switch. When the switch is in the up position, the normal sides of all double-sided drives are accessed. When the switch is in the down position, the second side is accessed. Never change the switch when doing I/O to disk since it will ruin both sides. Again, remember, you must not use the fourth drive on a four-drive connector.

To some, it is easier to install the switch than to do it in software, but it is a little more difficult to manually flip the switch. In any case, visual cue as to what side of the disk you are really on is almost a necessary option.

Figure 3 is a schematic for a circuit that will tell you what side of the drive you are using by lighting a different color LED for each side. This circuit goes inside the disk drive and replaces the "active drive" select LED. The heart of the circuit is the Radio Shack Tri-Color LED (part #276-035). This LED glows one of three colors. We will be using only two of these colors, red and green. The circuit uses a 74LS138 decoder.

When no drive is selected, the two outputs used are logical level one and the LED is off. When the drive question is selected, the 'A' (drive select) input goes low, therefore activating the chip. If the 'B' (side select) is high (first side of the drive), the Y7 output goes low. This will cause a positive voltage to appear across the Tri-Color LED which makes the LED glow red. If the 'B' input is low, the Y6 output goes low in which case there will be a negative voltage across the LED. Then the LED will glow green. When the 'A' input is high (drive not selected) the chip is disabled and both Y7 and Y6 are high the LED will be off. I put red as the first side because it is the color of a single-sided drive. That way when I see green, I automatically know I'm on the other side.

There are just a few things to consider when hooking up this circuit inside the drive. The first is where to get the five volts and ground needed to run the circuit. The easiest place to get a ground is pin #1 of the drive cable connector. Pin #1 is on the side of the connector that has all the pins connected together. They are all the odd-numbered pins. The drive connector pins are numbered on each end.

Five volts can be taken from the Vcc pin of any 74LSXX chip. Use a voltmeter to check the voltage. This is either pin #14 or #16 depending on how many pins there are on that chip.

The second thing to watch for is to make sure the 'A' input matches that of the drive selected. This means if the 'A' wire goes on Drive 0, make sure the drive configuration block is set to Drive 0, otherwise the LED will never light.

The actual construction of the circuit can be done on a small perf board. Tape or glue down the board in an unused area of the disk drive. Make sure the board doesn't get in the way of the disk that enters the drive. Remove the old LED. Replace it with the new one. Use tape or glue to hold it down.

Now, try the drive and access the first side of the drive. The LED should glow red. If it is green, reverse the wires that go to the LED. When all is OK, the LED will glow red for the first side and green for the second side. This way you will always know which side of the drive the software is accessing.

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# Memory On A STRINGS\$ BU

One of the most powerful string functions available in Extended BASIC is the INSTR (in-string) function. This function searches for the first occurrence of String 1 in String 2 and returns the position at which the match is found. If no match is found, it returns a zero.

This may be difficult to grasp at first, so let's look at some examples in order to illustrate the function:

```
1. A=INSTR ("ABCDEFGG","C")
2. A=INSTR ("ABCDEFGG","CDE")
3. A=INSTR ("ABCDEFGG","X")
4. A=INSTR (2,"ABCDEFGG","CDE")
5. A=INSTR (5,"ABCDEFGG","CDE")
```

**Example 1** — In this first example, the value of 'A' will be set to three since the character 'C' is located in the third position of the string "ABCDEFGG"

**Example 2** — In this case, the value of 'A' will also be set to three since the string "CDE" starts at the third position of the string "ABCDEFGG"

**Example 3** — Here is a case where 'X' is not contained in the string "ABCDEFGG," so the value of 'A' is set to zero, meaning no match was found.

**Example 4** — You can add a numeric value (must be less than the length of the string being tested) at which

*(Jorge Mir is a certified public accountant and controller of a Fortune 500 Corporation. He publishes most of his original work through THE RAINBOW)*

point you want to start the search. In this case, the computer will start searching at Location 2 (the 'B') of string "ABCDEFGG" to see if the string "CDE" is contained within it. The value of 'A' will be set to three in this example since a match will be made and "CDE" starts at Position 3 of the string being tested.

**Example 5** — In this example, the computer will start searching at Location 5 (the 'E') to see if "CDE" is contained in the rest of the string. The value of 'A' will be set to zero since "CDE" is not contained in that section of string being tested.

You can use string values in the program step rather than the actual strings. Here is an illustration:

```
10 X$ = "ABCDEFGG"
20 Y$ = "CDE"
30 Z$ = "X"
40 A = INSTR (X$,Y$)
50 B = INSTR (X$,Z$)
60 PRINT A
70 PRINT B
```

If you run this program, the screen will show a three (the value of 'A') since Y\$ was found in X\$ starting at Location 3, and a zero (the value of 'B') since Z\$ is not contained within X\$.

This is powerful stuff! But, how do you use it in your program? Here are some examples. Let's assume you h

# dget

By Jorge Mir

data file containing names and addresses which have been stored in string values from N\$(1) to N\$(100) and you want to find out if there is anyone in the file who lives in Atlanta, Georgia. The subroutine might look like this:

```
1000 INPUT "KEYWORD: ";K$
1010 FOR X = 1 TO 100
1020 IF INSTR (N$(X),K$) = 0 THEN 1040
1030 PRINT N$(X)
1040 NEXT X
```

When the computer reaches this subroutine, you will be prompted for a "keyword" (Step 1000). In this case you will enter the word ATLANTA. The subroutine then goes into a loop, testing each of the 100 items in memory. Step 1020 tests to see if the word "Atlanta" (stored in K\$) is contained in the string N\$(X). If it is not, it will return zero and the program jumps to Step 1040 where it continues to the next name and address. If it is contained in the string N\$(X), it will then continue with Step 1030 and print that name and address record on the screen.

Please note that in the case above all records containing the word "Atlanta" will be printed on the screen, so if there is an Atlanta, Florida in the file, it will also be printed. Likewise, if someone's name is Atlanta, or if there is a street named Atlanta, those will also be printed. If you want to avoid this, you can type the keywords ATLANTA, GEORGIA, thus restricting the search further.

The INSTR function can also be used to conserve space in a program. For example, let's assume your program contains a menu from which the user is to select an item. The subroutine might look like this:

```
2000 CLS
2010 PRINT " A - ITEM ONE"
2020 PRINT " B - ITEM TWO"
2030 PRINT " C - ITEM THREE"
2040 PRINT:PRINT"     YOUR CHOICE?"
2050 I$ = INKEY$ : IF I$ = "" THEN 2050
2060 ON INSTR("ABC",I$) GOTO 2100,2200,2300
2070 GOTO 2050
2100 PRINT " YOU CHOSE ITEM ONE":END
2200 PRINT " YOU CHOSE ITEM TWO":END
2300 PRINT " YOU CHOSE ITEM THREE":END
```

Steps 2000-2040 print the menu on the screen. Step 2050 assigns a value to I\$ equal to the key pressed on the keyboard (if no key is pressed, it repeats the step until a key is pressed). Step 2060 determines if the key pressed is an 'A,' 'B' or 'C.' If it is one of these keys, the program will continue with step 2100, 2200 or 2300. If it is not any of these three keys, Step 2070 will return to the start of the loop at Step 2050.

The function can also be used to conserve memory space by compacting data into strings and later being able to separate the data. Let's assume you want to add certain information to the name and address file referred to in a previous example. In addition to variables N\$(1-100), you can also create variables I\$(1-100) to store the added data, but this will use up a lot of memory. Instead, you can add the data to variables N\$(1-100) using a specific code in order to indicate where the name and address data ends and the added data begins.

Let me illustrate how this could be done. Suppose you want to code each name and address file to indicate whether it belongs to a friend (code 1), a relative (code 2) or a business associate (code 3). In addition, you want to indicate whether a Christmas card was received (code 4), or sent (code 5).

Here is the way the data could be compacted:

```
3000 FOR X = 1 TO 100 : PRINT N$(X)
3010 INPUT "TYPE (1-3) : ";T$
3020 INPUT "XMAS CARD RECEIVED (Y/N)";I$
3030 IF I$="Y" THEN CR$ = "4" ELSE CR$ = ""
3040 INPUT "XMAS CARD SENT (Y/N)";I$
3050 IF I$="Y" THEN CS$ = "5" ELSE CS$ = ""
3060 N$(X) = N$(X) + "/" + T$ + CR$ + CS$
3070 NEXT X
```

Step 3060 compacts the data by adding the '/' to indicate where the name and address ends and the codes start. If you had indicated that the record was a business associate from whom a Christmas card was received, it would look like this:

NAME AND ADDRESS/34

To select specific names and addresses through a subroutine, you have created the variable C1\$ containing a '3' and the variable C2\$ containing a '4' because you want to search the name and address file to find all business

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associates who have sent you Christmas cards, then print such names and addresses. Here is what the subroutine would look like in order to accomplish this:

```
4000 FOR X = 1 TO 100
4010 A = INSTR (NS(X),"/")
4020 IF A = 0 THEN 4060
4030 IF INSTR (A,NS(X),C1$) = 0 THEN 4060
4040 IF INSTR (A,NS(X),C2$) = 0 THEN 4060
4050 PRINT LEFT$(NS(X),A-1)
4060 NEXT X
```

In steps 4010-4020, we find out if the record has been coded. If the character "/" is not contained in the string it means it has not been coded and the program goes to the next record.

In steps 4030-4040, we find out if both codes are contained in the record by examining the character contained in variable NS(X) starting at the spot in the record where "/" was found. If neither of these codes is found the program advances to the next record.

In step 4050 we print the record, except we exclude character "/" and the codes that follow, only printing name and address. In other words, we print the left portion of the record up to the character prior to where "/" is located.

Now, let's complicate this matter further. Let's assume the name and address record which is all contained in a single string contains a "\$" to indicate separations between name, city, state and ZIP code (since you want the record printed in the usual format rather than in a single line). In this case, NS(X) would look like this:

```
JOE SMITH$1234 MAIN STREET$ANYTOWN, WI 53530/34
```

In order to print the record in the regular name and address format, steps 4045 and 4055 would be added to the subroutine and would look like this:

```
4045 N=INSTR(NS(X),"$"): IF
N=0 THEN 4050 ELSE
MID$(NS(X),N,1) =
CHR$(13):GOTO 4045
4055 N=INSTR(NS(X),CHR$(13)):
IF N=0 THEN 4060 ELSE
MID$(NS(X),N,1)="$":GOTO
4055
```

In Step 4045, we replace each "\$" with a carriage return (a carriage return) until all have been replaced. In step 4055, we restore the "\$" in their original spot before continuing to the next record.

On the other hand, if you wanted to print the name and address file in single line format, instead of inserting a CHR\$(13) where each "\$" is located, just insert a blank space (either a CHR\$(143) or " " would do the trick).

There are many other uses of this function which can simplify and compact your programs considerably, thus conserving valuable memory. You should become familiar with it by writing your own subroutines in various forms and for various purposes. You will soon recognize its many uses when you sit down to write that huge program that will do everything for you.

Install a *SHIFT-lock* key  
on your *CoCo's* keyboard

## The Permanent Shift

By David Geoffroy and Norman Racine

After owning a TRS-80 Color Computer for some time, I have discovered a way of modifying the computer to make the use of uppercase lettering more practical.

To use the computer in typewriter form, as in word processing, I noticed it did not have a *SHIFT-lock* key, as does a typewriter. I found it was so simple to install a *SHIFT-lock* key I wondered why I hadn't done it sooner. For installation, all that's needed is a push on/push off key switch (Radio Shack #275-1565) and two wires. If desired, connectors (Radio Shack #64-49) can be installed on the wires to make disconnection possible if the cover is taken off again. (A note of warning: Modification will cancel your warranty.)

First, unplug the computer and remove the screws from the bottom. It is best to turn the computer upside down to remove the screws. Next, turn the computer back over, remove the cover and unplug the keyboard from the main board.

There are 16 pins on the keyboard connector. Pin #3 on the keyboard is missing — it is an unused ground. Now solder one end of the wires to pins #8 and #16 of the keyboard.

After soldering the wires to the pins, it is necessary to drill a hole in the lid



to the left of the left *SHIFT* key. Due to a post, the hole cannot be straight across from the *SHIFT* key, but will be just a little up. Also, the keyboard lies under the lid a little, so don't try to locate the switch too near the edge of the opening.

Now that the hole has been drilled, install the switch. Next, solder the wires to the switch. It makes no difference which wire goes where. Now, plug the keyboard in, put the top back on, install the screws and it's all done.

The *SHIFT-lock* key is useful for upper- and lowercase word processing, and it is great for listing programs. When listing programs, type *LIST*, push



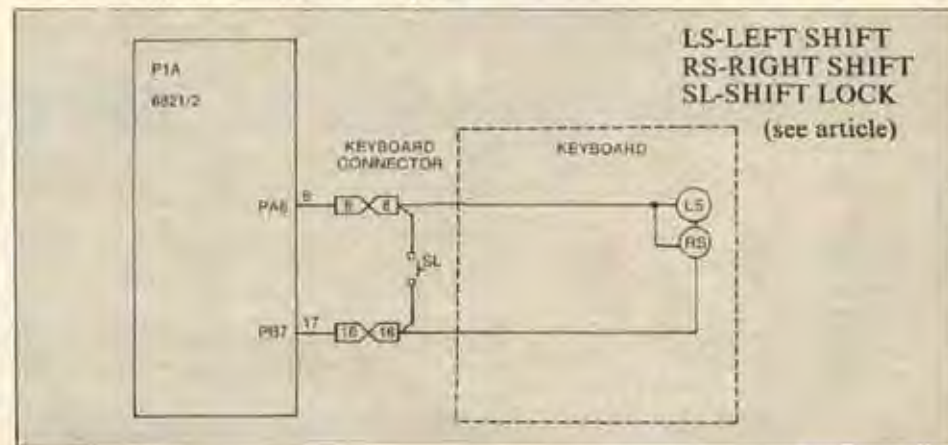
the *SHIFT-lock* key and then the *ENTER* key. When the '@' key is pressed, the listing will stop. By pressing any key again, and then the '@' key, there will be a few more lines listed.

A word of caution, though: The *SHIFT-lock* key is not labeled, but the *SHIFT-lock* key is red and does extend higher than any of the other keys. With a little effort it's easy to memorize where and what the key does.

(For anyone having questions concerning this project, Mr. Geoffroy may be contacted at 4700 28th Avenue, Sacramento, CA 95820.)

David Geoffroy is a veteran of the United States Air Force. He lives in Sacramento, Calif., and works for the city repairing traffic signals. He has owned a *CoCo* for about four years now and enjoys it very much.

Norman Racine is interested in hardware and utility programs; he does assembly language and *BASIC* programming. He works for National Business Systems and owns a *Color Computer*.



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# Mastering The DRAW Statement

By Joseph Kola  
Rainbow Contributing Editor

**W**e have been working with the DRAW statement and proving to one and all that beginners can master it without special effort. Today, while you are brimming with confidence, we will create an interesting design.

As you work through this tutorial, do not hesitate to stop and run off on a tangent when you get an idea. Pursue it! You can always return to this article and pick up where you left off. Your ideas are too precious to relegate to the back of your mind. Truly, a discovery you make on your own is more important than those which you may glean from this tutorial.

Key in lines 0, 10, 500 from Listing 1. Look at Figure 1. It is a design worked out on graph paper. Each box is one unit long. The star is the point of origin. You must begin drawing the design at some location.

At the starting point, go up and to the right two units, E2. Following along, you can readily see that to advance further, you must go right two units, R2. The next line traces down and to the right. You might go two

*(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)*

Figure 1:



units, F2. If you do, you have a choice of traveling in three directions — up and to the right, E4; down and to the right, F4; down and to the left, G2.

Although you may create the complete design using any of the three routes, you are likely to choose E4 followed by R8F4E2R2F2G2L2H2G4L8H4G2L2H2, returning to the point of origin (Line 15 of Listing 1).

If you began with E2R2, rather than stopping at F2, you could have continued four more units in the same direction, F4. Put another way, F2F4 or, simply, but no less correct, F6. Using this alternate routing, R8E6R2F2G2L2H6L8G6L2H2, brings us to the starting point (Line 20).

Line 25 creates the same design another way. First the left unit is created (trace it out). BR6 moves us to start creating the large central unit. BR16

moves us over to create the right unit. In order to get back to the starting location, we must move left as many 'B' units as we advanced to the right. BR6+BR16=BR22. The opposite direction of BR22 is BL22.

Key in Line 15. Type RUN, examine then hit the BREAK key. Ditto for Line 20.

Since we plan to use the design repeatedly, we can avoid keying the same line over and over again, which is boring and subject to error. We put the design into a string and call it with the variable, AS. For practice, you could do this with Line 15 or 20. The instructions to CoCo are omitted. Line 25 and the directions are enclosed in quotation marks (" "). To make the line appear on the screen, a new line 30, is created. This line has the instructions to CoCo within quotation marks.

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(<sup>\*</sup> <sup>\*</sup>), telling CoCo where you want the design to appear and in what size. Concatenating '+', AS tells CoCo what design to display.

Key in Line 30, type RUN, check and then hit the BREAK key. Key in Line 40. This demonstrates how AS is used to put a design element above the three on the screen and one below them. Now, we have five designs in a column.

Suppose we add a design at the left side. Key in: 50 DRAW"BM50,70"+AS and type RUN. This location was a lucky guess! It connects nicely. We'll make two more units underneath which give us a total of three design units. Then we'll make a unit farther to the left. This means the next row will have two units side by side; one beginning at horizontal 0, and the other at 50. Hit the BREAK key and add to the end of Line 50 :DRAW"BM0,90"+AS+"BR25"+AS and RUN.

If you left out +"BR25", you would have lost the second unit. Delete it and see! Do you know why?

The first AS at "BM0,90" ended at 49,90. If you merely added another +AS, it would print in the same location. How could you solve it? Move the starting location over by inserting +BR25 between the ASs.

Can you think of another way? If you edited out BL22 from the end of Line 25, and RUN, you will note that it must be pushed to the right to avoid overlap. If you added BR3 to the end of Line 25, it would be just right. Try it and see! Then hit the BREAK and change BR3 back to BL22.

Add to Line 50 :DRAW"BM50,110"+AS and RUN. It is decided to have five columns, which will begin at horizontal 0, 50, 100, 150, 200.

Why did we have to move "BR25" rather than the "BR50" that you would expect? Change the +BR25 to +BR50 and see the second AS disappear. Now RUN. What happened?

Moving it over 50 units printed it over the middle piece. Hit the BREAK key. To see that this is so, change +BR50 to +BR49 and RUN. Can you see it now? Hit BREAK and change it to +BR25.

Change the size in Line 30, S8, to S4 and RUN. Now change +"BR25" to +"BR50" and RUN.

In other words, size S8 is twice the size of S4, so the design needs to be moved over half the number of units required in S4. We don't really care why CoCo does what it does. All we want

to know is what it does.

Hit the BREAK key and change L30 back to S8 and Line 50 back +"BR25".

Whether or not you understand if the correct shift is matters little. You can always work it out by trial and error to get the solution.

Without peeking at the listing, can you add four units to the right side make it a symmetrical display? Try and see (Line 60).

Suppose you wanted to make five design units across the top of the screen at horizontal 10. Line 70 shows one way.

Suppose you wanted to make five similar five units at the bottom to keep the symmetry of the display. Line 80 shows you a second way.

The technique in Line 80 is long but it is easy to figure out. Although not as elegant as the solution in Line 50, it is perfectly adequate. Just as long as the result is satisfactory, any method is fine.

Line 70 was a little tricky. O/S (Out of String Space) error message forced us to insert a pair of DRAW statements to overcome this problem.

This could be partially overcome by adding 5 CLEAR 500. When planning to use strings, play it safe and CLEAR 500.

Finally, in Line 70, if you change the first ':' to '+' and delete DRAW, you will find it OK. But, if, in addition, you change the second ':' to '+' and delete DRAW, you will get an L/S (String Too Long) error message.

It is time to introduce the 'A' option of DRAW. The 'A' option allows you to draw a design around a point (location). A0 prints the design as you conceived it; A1 prints it from the same starting point but 90 degrees clockwise, perpendicular to A0 but above it. A2 prints a further 90 degrees clockwise, radiating in the opposite direction of A0; A3 places it 90 degrees further along in the clockwise direction to be opposite to perpendicular, A1.

This may sound confusing but it is well worth the effort to add this feature to your store of useful knowledge.

Key in lines 0, 5, 10, 20, 500 from Listing 2. Notice that Line 20 draws the same element used in Listing 1. If you trace it out on graph paper, you will discover that the starting point is at the opposite end.

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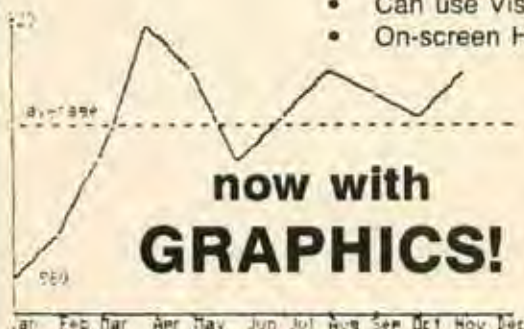
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practice creating a familiar design and stimulate you to go off into uncharted territory.

Key in the first part of Line 30: 30DRAW"54BM12B,96"+A5 and RUN. You should have the same old design unit. If in doubt, hit the BREAK key and temporarily change S4 to S8. Now RUN and you will be able to see it better. When your design is OK, change back to S4. After S4 insert A0, the first 'A' option. This is the default option. You get it whether you like it or not, unless you advise CoCo otherwise. RUN.

Now, change A0 to A1 and RUN. See? It is perpendicular. Do the same to get A2 and A3 to see all four possible

options at work. If you have trouble visualizing the rotation, temporarily add:

```
25 LINE(12B,0)-(12B,191), PSET
```

Run through the 'A' options a few times to observe what is what. When you are satisfied, delete Line 25. Did you notice that A0 radiates out to the left of the starting location; A1 radiates upward; A2 radiates to the right and A3 radiates downward in this example?

Hit the BREAK key. Make sure that Line 30 is A0 and add at the end of it, "+A1"+A5. We told CoCo, in addition to the original design element, we also wanted one radiating upwards.

Now, RUN and hit the BREAK key.

Let's tell CoCo to add the new element to radiate to the right. Add Line 30 "+A2"+A5, RUN and hit BREAK key. Now, add and check last option. Did you note when you instructed CoCo to change the orientation of the design element that information must be enclosed in quotation marks (" ")?

Caution: A0 is not necessarily in same quarter (radiating left), but can be in any location depending on the one in hand. Anyway, it isn't a bad design. What else can we do?

You could create more designs on blank parts of the screen. Hint: Choose an arbitrary set of location points BMx,y and after you create the end design, move it over to its final rest place by trial and error.

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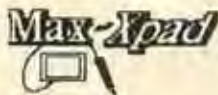
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*"We don't really care why CoCo does what it does. All we want to know is what it does."*

Why do I frequently insist on trial and error? According to "Kolar's Law" no matter how well you calculate a plan it rarely is correct because you are too make changes, modifications and enhancements, throwing your figure awry. So, you may just as well ease your design into its berth. Visualize a bundle of tugs nudging and pushing an ocean liner into its berth. Push a little this way. Nudge a bit that way. Ease it into its dock.

Key in Line 50. We want to superimpose the same enlarged design on our creation, RUN and check. If you are curious, you could add one 'A' option at a time. Note that once you use 'A' option, every time you check options in each new DRAW line you must indicate an option, even A0, the default option.

To illustrate the concept, delete Line 50 and RUN. Sorry about that. What happened was that the last instruction CoCo received was A3 at the end of Line 40. It began Line 50 with the downward design; then it went upward; the right; and again, downward.

reated A3, the downward element, ce. Of course, you could change A3 A0 in Line 50 and correct it. Now, you RUN, you will see that the second downward element is facing left. But, is it easier to insert the A0 in the it place?

At any rate, we have a pleasing sign. But, since we superimposed S12 its over S4, what do you say we superpose S8 on the whole mess and see at we come up with?

Key in Line 60 and RUN. It is really

a repetition of the design in Figure 1 rotated in four directions in three sizes.

As a point of information, the instructions to CoCo could be in any order. Line 60 could have been written "BM128,9658A0CL", just so all the hot scoop was enclosed within quotation marks (" "). CL is the default color and is included just to illustrate the point.

Line 40 was not used. It was included for you to substitute it for A\$ and cycle through the 'A' options to reinforce in your mind what happens when the basic

element is radiated right instead of left. Notice that what was A2 using A\$ is now A0 using BS.

This tutorial should have given you food for thought. You are invited to get out the old graph paper, plot out your own design element and run it through its four 'A' option paces. Create! Experiment!

CSAVE a copy of Listing 2 for next month. We will add the same design unit in the four diagonal directions, H, E, F and G.

#### Listing 1: LISTING 1

```

Ø 'LISTING1
5 CLEAR 5ØØ
1Ø PMODE4,1:PCLS:SCREEN1,1
15 DRAW"S8BM1ØØ,7ØE2R2F2E4R8F4E2
R2F2G2L2H2G4L8H4G2L2H2"
2Ø DRAW"S8BM1ØØ,9ØE2R2F6R8E6R2F2
G2L2H6L8G6L2H2"
25 A$="E2R2F2G2L2H2BR6E4R8F4G4L8
H4BR16E2R2F2G2L2H2BL22"
3Ø DRAW"S8BM1ØØ,11Ø"+A$
4Ø DRAW"BM1ØØ,5Ø"+A$:DRAW"BM1ØØ,
13Ø"+A$
5Ø DRAW"BM5Ø,7Ø"+A$:DRAW"BMØ,9Ø"
+A$+"BR25"+A$:DRAW"BM5Ø,11Ø"+A$
6Ø DRAW"BM15Ø,7Ø"+A$:DRAW"BM15Ø,
9Ø"+A$+"BR25"+A$:DRAW"BM15Ø,11Ø"
+A$
7Ø DRAW"BMØ,1Ø"+A$+"BR25"+A$:DRA
W"BR25"+A$+"BR25"+A$:DRAW"BR25"+
A$
8Ø DRAW"BMØ,17Ø"+A$:DRAW"BM5Ø,17
Ø"+A$:DRAW"BM1ØØ,17Ø"+A$:DRAW"BM
15Ø,17Ø"+A$:DRAW"BM2ØØ,17Ø"+A$
5ØØ GOTO5ØØ

```

#### Listing 2: LISTING 2

```

Ø 'LISTING2
5 CLEAR5ØØ
1Ø PMODE4,1:PCLS:SCREEN1,1
2Ø A$="H2L2G6L8H6L2G2F2R2E6R8F6R
2E2"
3Ø DRAW"S4AØBM128,96"+A$+"A1"+A$
+"A2"+A$+"A3"+A$
4Ø B$="E2R2F6R8E6R2F2G2L2H6L8G6L
2H2"
5Ø DRAW"S12AØBM128,96"+A$+"A1"+A
$+"A2"+A$+"A3"+A$
6Ø DRAW"S8AØBM128,96"+A$+"A1"+A$
+"A2"+A$+"A3"+A$
5ØØ GOTO5ØØ

```

#### Listing 3: SHUTTLE

```

Ø 'SHUTTLE
1Ø '(C) 1984, J. KOLAR
3Ø PMODE3:PCLS:PMODE4
4Ø A=9Ø:B=86:R=76:P=1.7Ø
5Ø DIM S(7),T(7)
6Ø CIRCLE(8,8),8,1:CIRCLE(7,7),8
,1
61 DRAW"BM8,8NBU3L6U5R1ØD1ØL1ØU5
"
7Ø GET(Ø,Ø)-(16,16),S,G
72 CIRCLE(38,8),6,1:PAINT(4Ø,8),
1,1
73 GET(3Ø,Ø)-(46,16),T,G
8Ø PCLS:SCREEN1,1
9Ø FOR Q=.15 TO .Ø5 STEP -.1
1ØØ FORZ=1TO6.55 STEPQ
11Ø C=Z:C=4Ø-(C)*P*27Ø-R^2
115 K=LOG(C^2)*COS(R)/COS(R^2)
12Ø X=INT(A-6+R*COS(C)):Y=INT(B-
8+R*SIN(K))
13Ø PUT(X+36,Y+1Ø)-(X+52,Y+26),S
,OR
135 PUT(X+36,Y+1Ø)-(X+52,Y+26),T
,AND:SOUND1ØØ,1
14Ø X=INT(A-6+R*SIN(K)):Y=INT(B-
8+R*COS(C))
15Ø PUT(X+36,Y+8)-(X+52,Y+23),S,
OR
155 PUT(X+36,Y+8)-(X+52,Y+23),T,
AND:SOUND1ØØ,1
16Ø NEXT Z,Q
17Ø PLAY"V2ØØ3L8EEFFABO4L16CCO3F
AL8FFAAL4FEL2CP4V25L8FFAABO4CL16
EEDDL8CCO2AAL4FEL2CP4V2ØØ2L8EEFF
AAO3V25L16CCO2BAV2ØL8FFDDL4CV15O
1BO2DL2C"
18Ø PCLS:GOTO9Ø

```

# The CoCo Gallery

1st  
PRIZE



Robert Centurelli  
**Skyline**

This month's first prize winner is a serene reflection of the Big Apple drawn using *Graphicom II*. Robert lives in Plainville, Conn.



2nd  
PRIZE

John Poole  
**A Reef Scene**

From Titusville, Fla., John sends the Gallery a subaqueous second prize winner drawn using *Graphicom II*'s pan and zoom mode.

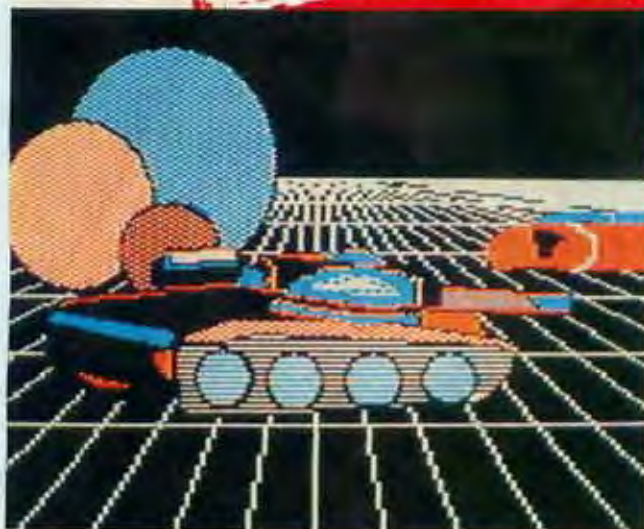
3rd  
PRIZE



Jeff Steinmetz  
**Shuttle**

Jeff lives in Minneapolis, Minn., and used *CoCo Max* to draw a profile of the Space Shuttle using the upper and lower portions of the *CoCo Max* screen.





**Charlie Fulp**  
**CompuWar**

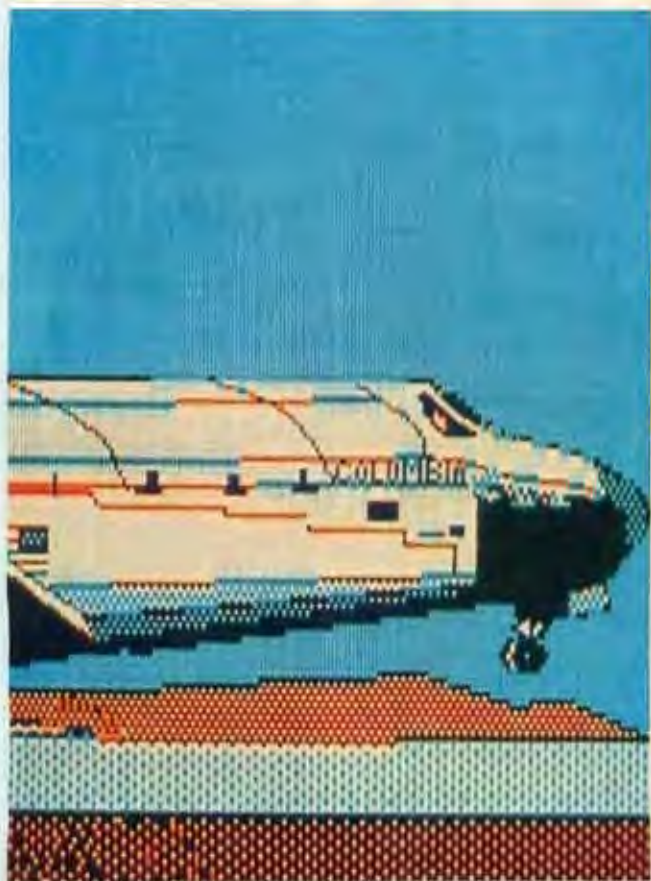
Charlie drew the grid and light cycles of his futuristic warscape using Extended BASIC. The tank and spheres were drawn using *CoCo Max*. Charlie lives in South Boston, Va.



SEATTLE SKYLINE

**Betty Ann White**  
**Seattle**

Betty Ann used the DRAW, LINE and PAINT commands of *PMODE4* to create this stylized portrait of the Emerald City's skyline on a sunny day. Betty Ann lives in Kirkland, Wash.



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We will award a first prize of \$25, a second prize of \$15 and a third prize of \$10. Honorable mentions also will be given.

# RAINBOW

Give us your best! Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's Scoreboard column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your full name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW. ★ Current Record Holder

|                                                                              |                                                          |                                                                      |                                                                                                                                                                                                                                       |                                                                                    |                                                                                                                                                                  |                                                                                                         |                                                                                                                                                |                                                                               |                                                                              |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                             |                                                                         |                                                                                |                                                                                                                                                                                                                                                                    |                                                                                                            |                                                                                                                      |                                                                                          |                                                                               |                                                                      |                                                                            |                                                                          |                                                                                                                                                                                                                                            |
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| <b>ASTRO BLAST</b> (Mark Data)<br>35,600 ★Chris Morris, Colonial Heights, VA | <b>ATOM</b> (Radio Shack)<br>41 ★Erk Huffman, Delran, NJ | <b>BASEBALL</b> (Radio Shack)<br>525-50 ★Bob Dewitt, Blue Island, IL | <b>BATS AND BUGS</b> (THE RAINBOW)<br>24,600 ★Michael Rosenberg, Prestonburg, KY<br>8,450 Bill Martin, Myrtle Beach, SC<br>7,200 Leslee Bishop, Salt Lake City, UT<br>5,220 Brian Cook, Dixon, IL<br>4,000 Jon Hobson, Plainfield, WI | <b>BATTLE OF MIDWAY</b> (Aik Royal)<br>1009-259 ★Matt Hazard, Columbia Station, OH | <b>BLOC HEAD</b> (Computerware)<br>41,975 ★Michael Hebb, Victoria, Australia<br>27,000 Rodney Mullineaux, Gig Harbor, WA<br>23,500 Paschal Wilson, Kenilwood, LA | <b>BREWMASTER</b> (NOVASOFT)<br>98,675 ★Chris Cope, Central, SC<br>9,150 David Hart, Salt Lake City, UT | <b>BUSTOUT</b> (Radio Shack)<br>15,520 ★Brett DuPont, Oregon, OH<br>14,500 Wayne Dewitt, Blue Island, IL<br>13,500 Ken Dewitt, Blue Island, IL | <b>BUZZARD BAIT</b> (Tom Mix)<br>3,091,700 ★Blossom Mayor, East Greenbush, NY | <b>CALIXTO ISLAND</b> (Mark Data)<br>112 ★Luisa Della Monica, Sacramento, CA | <b>CANYON CLIMBER</b> (Radio Shack)<br>285,800 ★Beverly Herbert, Placentia, CA<br>162,500 Michael Sileo Jr., Glendale, NY<br>140,500 Todd Wall, Durham, NC<br>128,200 Stephanie Asselin, Baie-Comeau, Quebec<br>8,900 George Frausto, Blue Island, IL | <b>CAVERN COPTER</b> (THE RAINBOW)<br>2,431 ★Jay Beam, Louisville, KY<br>1,335 Pierre-Jean Ouillette, Granby, Quebec<br>1,245 Sean Corner, Summit, NJ<br>1,213 Doug Schwartz, Glendale, AZ<br>968 Michael Mefferd, Wren, OH | <b>CHAMBERS</b> (Tom Mix)<br>104,200 ★Blossom Mayor, East Greenbush, NY | <b>CLOWNS &amp; BALLOONS</b> (Radio Shack)<br>15,130 ★Brett DuPont, Oregon, OH | <b>COLOR BASEBALL</b> (Radio Shack)<br>668-0 ★Christian Roch, Granby, Quebec<br>254-0 Chris Reynolds, Richmond, KY<br>250-0 Rih Mowers, Robinson, PA<br>167-0 Keith Townsend, Kokomo, IN<br>155-0 Bart Ankrum, Atlanta, KS<br>158-0 Toby Jacobs, Bellefontaine, OH | <b>COLOR CAR</b> (NOVASOFT)<br>525,650 ★Dan Bouges, Niantic, CT<br>154,600 Scott Cunningham, East Lyme, CT | <b>COLORPEDE</b> (Intracolor)<br>133,036 ★Mariano Frausto, Blue Island, IL<br>23,450 George Frausto, Blue Island, IL | <b>COSMIC INVADERS</b> (Spectral Associates)<br>16,400 ★Mariano Frausto, Blue Island, IL | <b>CRYSTLE CASTLES</b> (ThunderVilain)<br>83,257 ★Craig Hoffmann, Kenosha, WI | <b>CUIBER</b> (Tom Mix)<br>10,550 ★Rodney Mullineaux, Gig Harbor, WA | <b>DALLAS QUEST</b> (Radio Shack)<br>93 ★Robert Sunderland, Sacramento, CA | <b>DEFENSE</b> (Spectral Associates)<br>56,722 ★Brett DuPont, Oregon, OH | <b>DEMOLITION DERBY</b> (Radio Shack)<br>119,800 ★David Delhaupl, Calgary, Alberta<br>109,100 Charles Bowen, Imperial Beach, CA<br>79,100 David Cross, Springdale, VA<br>44,000 Joseph Dehn, Tucson, AZ<br>32,900 Lee Dorn, Eau Claire, WI |
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| <b>DEMON II</b> (THE RAINBOW)<br>21,925 ★Keith Schuler, Merritt Island, FL<br>12,475 Rhett Bagwell, Saskatoon, Saskatchewan | 10,075 Frank Canepa III, Santurce, Puerto Rico<br>1,800 Bryan Ecker, Lusby, MD | <b>DEVIL ASSAULT</b> (Tom Mix)<br>64,741 ★Eugene Little, Pierceland, Saskatchewan | <b>DOODLEBUG</b> (Computerware)<br>825,370 ★Susan Ballinger, Uxbridge, Ontario<br>66,770 Sean Colson, East Lyme, CT | <b>DOUBLE BACK</b> (Radio Shack)<br>337,990 ★John Denn, Hobart, IN<br>285,570 Timothy Bishop, Jacksonville, FL<br>269,350 Marc Prouff, Williston, VT<br>258,400 Alfredo, New York, NY<br>235,110 Lee Dorn, Eau Claire, WI<br>219,720 Jeff Lahala, Essex Jct., VT<br>181,150 Michael Brennan, Calgary, Alberta | <b>DOWNLAND</b> (Radio Shack)<br>20,300,400 ★Adam Peterson, Portland, OR<br>69,345 Alain Cyr, Valcourt, Quebec<br>67,458 Chris Mitchell, Byron, GA<br>67,141 Cliff Farmer, McGregor, TX<br>65,145 Jeanine McCuen, Rutland, MA | <b>DRACONIAN</b> (Tom Mix)<br>353,550 ★Jamie Spreng, Dartmouth, Nova Scotia<br>241,290 Kristopher Staller, Ft. Wayne, IN<br>200,240 Joe Neuman, Sacramento, CA<br>132,400 Tony Cross, New South Wales, Australia | <b>FOODWAR</b> (Arcade Animations)<br>165,900 ★Chris Cope, Central, SC<br>74,120 Jim Partridge, Clinton, CT | <b>FROGGER</b> (Comsoft)<br>15,860 ★Erk Huffman, Delran, NJ<br>12,000 Nicolo Freedman, Wellesley, MA | <b>GALAGON</b> (Spectral Associates)<br>219,670 ★Brian Wagner, Lawrence, KS<br>214,920 Tony Smith, Gig Harbor, WA<br>185,740 Arnold Smiter, Los Angeles, CA<br>144,710 Brendon Smith, Coral Springs, FL<br>135,180 Mario Asselin, Baie-Comeau, Quebec<br>97,790 Miriam Kavis, Los Angeles, CA | <b>GHOST GOBBLER</b> (Spectral Associates)<br>68,200 ★Steven Allen, Sharpsburg, MD<br>34,270 Glen Blodreau, Otterburn Park, Ontario<br>32,260 Jean-Pierre Boliclar, Asbestos, Quebec | <b>GLAXXONS</b> (Mark Data)<br>19,146 ★Terry Moore, St. Catharines, Ontario | <b>GOLD RUNNER</b> (NOVASOFT)<br>144,150 ★Chris Cope, Central, SC<br>85,800 Dan Bouges, Niantic, CT<br>65,600 Sean Colson, East Lyme, CT | <b>GUARDIAN</b> (Quasar Animations)<br>4,350 ★Jason Forbes, Mexico, NY | <b>ICEMASTER</b> (Arcade Animations)<br>14,525 ★Jean-Pierre Boliclar, Asbestos, Quebec | <b>THE INTERPLANETARY FRUIT FLY</b> (THE RAINBOW)<br>37,000 ★Scott Perkins, Port Orange, FL<br>27,500 Lee Dorn, Eau Claire, WI<br>28,000 Eric Foss, Cochran, Alberta<br>25,500 Michela Gaboniat, Foxboro, MA<br>25,000 Andrew Barlas, Sulphur, OK | <b>THE JUNGLE</b> (THE RAINBOW)<br>568,660,000 ★Jeff Lawrence, Cambridge, Ontario<br>459,351,041 Denise Morin, Hudson, MA<br>4,560,144 Jon Hobson, Plainfield, WI<br>4,134,000 Brandon Duncan, Benion, KS<br>1,669,162 Jay Andrachko, Yuma, AZ |
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| <b>JUNIOR'S REVENGE</b> (Computerware)<br>8,020,000 ★Ian Stewart, Lynwood, Perth-Australia<br>3,386,000 Chris Morris, Colonial Heights, VA<br>789,300 Richard Wasmann, Marion, OH<br>705,700 Tony Smith, Gig Harbor, WA<br>112,300 Jeff McClure, Washington, PA | <b>JUNKFOOD</b> (THE RAINBOW)<br>1,187,520 ★Larry Thomas, Menominee, MI<br>1,079,600 Jean-Francois Morin, Loretteville, Quebec<br>336,930 Jon Hobson, Plainfield, WI<br>309,460 Shirley Black, Quinon, AL<br>206,940 Rhett Bagwell, Saskatoon, Saskatchewan | 119,200 Annermarie Stoer, Deventer, The Netherlands<br>112,720 Jamie Spreng, Dartmouth, Nova Scotia | <b>KATERPILLAR II</b> (Tom Mix)<br>158,317 ★Ulwe Steingens, Essen, West Germany<br>135,467 Thomas Tiggebeck, Essen, West Germany<br>97,735 Sabine Barghoiz, Essen, West Germany | <b>KEY BOMBER</b> (THE RAINBOW)<br>29,052 ★Tony Boring, Armagn, PA | <b>THE KING</b> (Tom Mix)<br>1,670,900 ★Yolanda Farr, Sayre, PA<br>1,003,400 Tim Rueb, Atlanta, GA<br>543,400 Doug Tower, Colonial Heights, VA<br>337,600 Kirk Carter, Cooper City, FL<br>301,100 Tom Harrison, Pittsfield, MA<br>26,450 Ken Dewitt, Blue Island, IL | <b>KRON</b> (Oregon Color Computers)<br>33,000 ★Chris Cope, Central, SC | <b>LANGER</b> (Spectral Associates)<br>224,000 ★Tom Mahoney, Centerport, NY<br>208,350 David Carver, Galena, OH<br>165,750 Glenn Dolick, Burlington, Ontario<br>162,500 Bryan Ball, South Lyon, MI<br>157,500 Dan Bouges, Niantic, CT<br>110,350 Chip Beasley, Colonial Heights, VA | <b>LASERWORM &amp; FIREFLY</b> (THE RAINBOW)<br>25,775 ★Jason Forbes, Mexico, NY<br>19,780 Jim Partridge, Clinton, CT<br>13,834 Dean McWhorter, Argyle, NY | <b>LUNAR ROVER PATROL</b> (Spectral Associates)<br>136,700 ★Lori Day, Arlington, TX | <b>MADNESS &amp; THE MINOTAUR</b> (Radio Shack)<br>240 ★Chris Mitchell, Byron, GA | <b>MARATHON</b> (THE RAINBOW)<br>307,790 ★James Sheedy III, Tonawanda, NY | <b>MAZELAND</b> (Chromastik)<br>21,060 ★Todd Knapp, Prairie du Chien, WI<br>8,550 Brian Cook, Dixon, IL | <b>MEGA-BUG</b> (Radio Shack)<br>7,930 ★Ron Haines, Nepean, Ontario<br>3,998 Christopher Romance, Massapeque Park, NY<br>3,693 Jim Partridge, Clinton, CT<br>1,085 Larry Cowles, Westport, VA | <b>MICROBES</b> (Radio Shack)<br>491,100 ★David & Alan Heckler, Hartselle, AL<br>237,550 Todd Bartels, Coal Valley, IL<br>178,550 Apollo Latham, Rich Square, NC<br>144,350 Theodor Latham Jr., Rich Square, NC<br>101,950 David Bernekow, Elkhorn, WI<br>97,950 Ivan Cattell, Laguna Hills, CA | <b>MISSILE BARRAGE</b> (THE RAINBOW)<br>2-1 ★Joe Calcaterra, Ridgewood, NY | <b>MONSTER MAZE</b> (Radio Shack)<br>316,000 ★Mohamad Behery, Clemson, SC<br>215,110 Steven Allen, Sharpsburg, MD<br>206,180 Richard Flore, Clemson, SC<br>200,020 Terry Steele, Summertown, TN<br>200,000 Jason Pfeiffer, Germantown, NC<br>75,230 Ivan Cattell, Laguna Hills, CA |
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# SCOREBOARD

**JON HOPPER (Computerware)**  
 80,280 \*Rodney Mullinsaus, Big Harbor, WA  
 1, DIG (Computerware)  
 259,750 \*Ellen Ballinger, Uxbridge, Ontario  
 100,650 Biagio Di Lorenzo, Montreal, Quebec  
 901,100 Ross & Daniel Mehlman, Todd Boehm,  
 Nashville, TN  
 875,870 Ann-Marie MacKay, Port Hardy,  
 British Columbia  
 520,650 Thomas Henry, Boca Raton, FL  
 531,570 Tony Cross, New South Wales,  
 Australia

**JUPIES (MichTron)**  
 981,700 \*Jon Blow, San Diego, CA  
 345,100 Brian Wolfgram, Freehold, NJ  
 285,600 Stephen Zamonski, Ewing, NJ  
 137,000 David Craft, Roanoke, VA  
 114,800 Barry Stanton, North East, PA

**ITHOUSE (MichTron)**  
 23,730 \*Brian Wolfgram, Freehold, NJ  
 14,663 Aaron Repahn, Tucson, AZ

**C-TAC (Computerware)**  
 14,425 \*Alfredo, New York, NY

**NGUIN (THE RAINBOW)**  
 46,250 \*Paul Wegorn, Carp, Ontario  
 25,336 Kirby Smith, York, PA  
 22,670 Gary Bedford, Piqua, OH  
 14,552 Matt Funk, Hanover, PA  
 14,640 Michael Nelson, Lancaster, PA

**IANTOM SLAYER (Mod Systems)**  
 1,326 \*Susan Ballinger, Uxbridge, Ontario  
 124 Chris Morris, Colonial Heights, VA

**PELINE (THE RAINBOW)**  
 1,332 \*Kent Prehn, Carol Stream, IL  
 1,162 Mike Garozzo, Morrisville, PA  
 925 Andy Green, Whitehall, PA  
 483 Susan Ballinger, Uxbridge, Ontario  
 405 Joe Bronas, Onstedwood, KY

**ANET INVASION (Spectral Associates)**  
 59,600 \*Terry Steele, Summerfield, NC  
 52,450 Ian Loopyky, Blumenort, Manitoba  
 32,350 Susan Ballinger, Uxbridge, Ontario  
 10,750 Saul Kirsch, Rananana, Israel  
 9,950 Michael Derman, Tel-Aviv, Israel

**LARIS (Radio Shack)**  
 171,862 \*Thomas Leveseur, Rockland, ME  
 133,726 Ed Meyer, Vancouver, British Columbia  
 112,535 Brett Ankom, Atlanta, GA  
 97,450 Jay Beam, Louisville, KY  
 87,810 Ron Sujkowiak, Bay City, MI

**ALTERGEIST (Radio Shack)**  
 6,000 \*Billy Fairfull, Charleston, SC  
 4,900 Kristine Haines, Nepesin, Ontario  
 4,885 Frank Canepa III, Santurce,  
 Puerto Rico

4,830 Lisa Ballinger, Uxbridge, Ontario  
 4,830 Joel Peacock, Thousand Oaks, CA  
 4,200 Bryan Ecker, Lusty, MD

**JOYAN (DataSoft)**  
 785,000 \*Ben Collins, Clemson, SC  
 546,000 Jeff Connel, Winona, MN  
 250,350 Richard Hawkins, Cleveland, TN  
 978,450 Christopher Romance, Massapequa  
 Park, NY

900,250 Daniel Belisle, Montreal, Quebec  
 140,450 Beverly Herbers, Placentia, CA  
 111,000 Nancy Herbers, Placentia, CA  
 80,150 Bart Nigro, Tempe, AZ  
 8,500 Hiram Eparza, Blue Island, IL  
 4,600 George Frausto, Blue Island, IL

**3PCORN (Radio Shack)**  
 45,210 \*Mike Norris, Columbia, SC  
 41,910 Nicole Freedman, Wellesley, MA  
 36,500 Barry Stanton, North East, PA  
 34,900 William Blaine III, Gallipolis  
 Ferry, WV

32,430 Chris Bosk, Temple, TX  
 26,350 Ivan Cattlett, Laguna Hills, CA  
 16,450 Frank Wood III, Niverville, NY

**PROJECT NEBULA (Radio Shack)**  
 2,005 \*Christopher Romance, Massapequa  
 Park, NY

**YRAMID (Radio Shack)**  
 220/112 \*George Fairfield, Victoria,  
 British Columbia  
 220/112 \*David Oelhaupf, Calgary, Alberta  
 220/114 Chris Mitchell, Byron, GA

**Q-HERD (THE RAINBOW)**  
 1,958,950 \*Bruce Baltzer, Hanover, Ontario  
 61,290 Sean Conner, Summit, NJ

**QUIX (Tom Mix)**  
 907,320 \*Andrew Norris, Mississauga, Ontario  
 525,833 Clayton Foxworth, Florence, SC  
 447,353 Stephane Asselin, Baie-Comeau,  
 Quebec

323,373 Jean-Francois Lauzier, Asbestos,  
 Quebec

271,965 Nicole Freedman, Wellesley, MA

**RAAKA-TU (Radio Shack)**  
 50 \*Ryan Devlin, Louisville, KY  
 50 \*Todd Knapp, Prairiex du Chien, WI  
 40 Robbie Haines, Nepesin, Ontario

**RACER (THE RAINBOW)**  
 150.9 \*Frank Canepa III, Santurce,  
 Puerto Rico

90.2 Chris Neal, Webash, IN

**RADIO BALL (Radio Shack)**  
 4,510,740 \*Les Dorn, Eau Claire, WI  
 3,709,810 Stephan Zamonski, Ewing, NJ  
 1,738,150 Mickey Emberton, Indianapolis, IN  
 1,529,200 Benoit Laroche, Montreal, Quebec  
 1,511,640 Kelly Dion, Cap-de-la-Madeleine,  
 Quebec

**REACTOIDS (Radio Shack)**  
 5,257,295 \*Gary Bedford, Piqua, OH  
 73,240 William Blaine III, Gallipolis  
 Ferry, WV

**RETURN OF THE JET-1 (ThunderVision)**  
 538,432 \*Matt Griffiths, Stilwell, KS  
 429,180 Jean-Francois Brunseau, St-Hubert  
 Quebec

203,500 Jamey Maumus, New Orleans, LA

**REVERSE (THE RAINBOW)**  
 7 \*Jon Hobson, Plainfield, WI

**ROAD RACE (THE RAINBOW)**  
 91.7 \*Bill Martin, Myrtle Beach, SC  
 576.6 Eric Clarkon, Missouri City, TX  
 706.1 Michael Hebb, Victoria, Australia  
 1212.4 Michael Maters, Wsuskau, WI  
 2158.5 Steven Roth, Fannyystelle, Manitoba

**RUN FOR YOUR LIFE (THE RAINBOW)**  
 20,000 \*Ryan Devlin, Louisville, KY

**SAILOR MAN (Tom Mix)**  
 596,700 \*Jeff Picketts, Brantford, Ontario  
 570,500 Aaron Samuels, Monument, CO  
 535,900 Scott Sherman, Woodstown, NJ  
 488,600 Paul Kenyon, Phoenix, AZ  
 435,700 Andy Daler, Medford, OR  
 232,000 Brian Baggell, Maumee, OH

**SANDS OF EGYPT (Radio Shack)**  
 80 \*John Allocca, Tonkars, NY  
 80 \*Bob Dewitt, Blue Island, IL  
 82 Jeff McKay, Travis AFB, CA  
 97 Phil Zarlos, Dallsatown, PA  
 98 Aaron Durkac, Lansing, MI  
 102 Clyde Siverd Jr., Saratoga Springs, NY

**SEA DRAGON (Adventure International)**  
 39,000 \*Brian Wolfgram, Freehold, MI  
 12,000 Ken Dewitt, Blue Island, IL

**SHAMUS (Radio Shack)**  
 82,940 \*Jon Blow, San Diego, CA

**SHENANIGANS (Mark Data)**  
 98 \*N Wakelin, Mt Lebanon, PA  
 103 Chris Cope, Central, SC

**SHOOTING GALLERY (Radio Shack)**  
 227,840 \*Cliff Farmer, McGregor, TX

**SKING (Radio Shack)**  
 01.00 \*Scott Clevenger, Fairmount, IN  
 01.00 \*Billy Fairfull, Charleston, SC  
 01.10 Mike Scharf, Fremont, OH  
 01.12 Sean Conner, Summit, NJ  
 05.85 John Hopkins, Greenville, SC

**SLAY THE NERUIS (Radio Shack)**  
 472,667 \*Jim Herbers, Placentia, CA  
 221,496 Shirley Herbers, Placentia, CA

**SLAKER (THE RAINBOW)**  
 1.24 \*Luanne Ashby, Phoenix, AZ  
 1.26 Dan Sobczak, Mesa, AZ  
 1.37 Susan Ballinger, Uxbridge, Ontario  
 1.50 Andy Green, Whitehall, PA  
 1.59 Balju Shah, Deep River, Ontario

**SOLO POKER (DataSoft)**  
 1,100 \*Carol Staker, Moscow, ID  
 690 Robert Peterman Jr., Newton, TX

**SPACE ASSAULT (Radio Shack)**  
 19,065 \*Steven Allen, Sharpsburg, MD

**SPACE RACE (Spectral Associates)**  
 83,422 \*Mark Donahue, Alexandria, VA  
 11,600 Mario Asselin, Baie-Comeau, Quebec

**SPEED RACER (MichTron)**  
 126,750 \*Jack Manzullo, Saginaw, MI  
 121,260 Paul Kenyon, Phoenix, AZ  
 115,410 Jean-Francois Pigeon, Villefontel,  
 Quebec

111,200 Mike Rebbecchi, Somerville, NJ  
 109,440 Dan Bouges, Niantic, CT  
 96,000 Chris Cope, Central, SC

**STAR BLAZE (Radio Shack)**  
 9,000 \*Gary Bedford, Piqua, OH  
 7,950 Matthew Daley, Binghamton, NY  
 7,950 Mike Mercal, River Grove, IL  
 4,500 Ted Barkley, Whitehall, NY

**STELLAR LIFE-LINE (Radio Shack)**  
 119,030 \*Brian Shaber, Boise, ID  
 101,430 David Barnekow, Elkhorn, WI  
 73,950 Lori McCullar, Brazil, IN  
 62,390 Andrew Lawrence, Cambridge, Ontario  
 39,210 Alfred Stiva, Cranston, RI  
 20,580 Matt Shaffer, Reading, PA

**STORM ARROWS (Spectral Associates)**  
 263,850 \*Arnold Snitzer, Los Angeles, CA

**TEMPLE OF ROM (Radio Shack)**  
 837,600 \*David Oelhaupf, Calgary, Alberta  
 673,800 Sonya Hurst, Richmond, CA  
 620,800 Rhea Jerrard, Olympia, WA  
 463,400 Glenn Alfrey, Olympia, WA  
 268,500 Carol Elliot, O'Leary, Prince  
 Edward Island

**TIME BANDIT (MichTron)**  
 1,025,210 \*Terry Moore, St. Catharines, Ontario  
 359,980 Kristopher Staller, Ft. Wayne, IN  
 88,940 Brian Wagner, Lawrence, KS  
 68,390 Jamie Spreng, Dartmouth, Nova Scotia  
 27,890 Jason Forbes, Mexico, NY  
 24,770 Stephanie Michel Morgan, Centerville,  
 OH

**THE TOUCHSTONE (Tom Mix)**  
 226,840 \*Kristopher Staller, Ft. Wayne, IN

**TRAILIN TAIL (THE RAINBOW)**  
 273,390 \*Jerry Dill, Grafton, MA  
 119,705 Diego Gallina, Summit, NJ  
 105,300 Jerry Dill, Frankfort, MI  
 102,920 Phil Parent, Smiths Falls, Ontario  
 94,810 Jean-Marc Parent, Smiths Falls,  
 Ontario

**TRAPFALL (Tom Mix)**  
 50,078 \*Lori Day, Arlington, TX

**TUT'S TOMB (Mark Data)**  
 169,960 \*Nicole Poulott Coors, Mobile, AL  
 169,760 Jerry Austin, Baraboo, WI  
 164,380 Biagio Di Lorenzo, Montreal, Quebec  
 163,060 Michael McCafferty, Oceanside, CA  
 158,000 Chris Russo, Miami, FL

**WHIRLEBYRD RUN (Spectral Associates)**  
 40,850 \*Glen Blodese, Otterburn Park,  
 Ontario  
 30,100 Dan Durga, Flint, MI  
 16,900 Stephane Asselin, Baie-Comeau,  
 Quebec

**WILLY'S WAREHOUSE (Intracolor)**  
 183,500 \*Alan Morris, Chicopee, MA  
 93,700 Craig Kuiper, Miami, FL  
 48,900 Stephane Asselin, Baie-Comeau,  
 Quebec

**ZAXXON (DataSoft)**  
 2,068,900 \*Dave Levors, Oak Forest, IL  
 2,057,800 Chris Oberholtzer, Lexington, MA  
 1,700,000 Biagio Di Lorenzo, Montreal, Quebec  
 1,510,000 James Quadrella, Brooklyn, NY  
 665,000 Andy Green, Whitehall, PA  
 137,000 Bob Dewitt, Blue Island, IL  
 115,000 Thomas Bacon, Grayling, MI  
 91,600 Ronald Simmonds, Winnipeg,  
 Manitoba

78,600 Jay Anoraschko, Yuma, AZ  
 65,000 Michael Bronnan, Calgary, Alberta  
 35,400 Mariano Frausto, Blue Island, IL

— Debbie Hartley

# 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 and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

## IN 'SEARCH' OF THE RIGHT NAME

### Scoreboard:

In the "Scoreboard" column, you have both *Sea Quest* and *Sea Search* listed. These are both the same game, and should only be listed once. I guess Mark Data changed the name for some reason. The current name is *Sea Search*.

Brett Noble  
Redlands, CA

**Editor's Note:** Mark Data did change the name. From now on, *Sea Quest* will be referred to as *Sea Search*. Thank you, Brett.

## UNTRUE STATEMENT

### Scoreboard:

In a recent issue of RAINBOW, I noticed someone stated that the scepter was useless in *Pyramid*. You can wave the scepter at the bottomless pit and a bridge will span across the pit to the hall of gods.

I also need help in killing the gargoyle with the candle in *Raaka-Tu*. Please send any information to 1615 Highland Ave., 53545.

Todd Harris  
Janesville, WI

## KEY TO TREKBOER

### Scoreboard:

Here are a few tips for those of you having trouble with the Adventure *Trekboer*, by Mark Data Products.

To open the cabinet you must get the key from the manual. Once you open the cabinet, you must examine it three times to get everything out.

When you are on the planet Aridak (the desert planet), to get the liquid, type GET LIQUID WITH BEAKER. To find the wrecked starship when you arrive through the teleport, type S, S, S, S, E. To go back to the teleport, type N, E, W, N.

I have almost finished *Trekboer*, but I can't get out of the large underground complex on the Garden planet. I would appreciate it if someone could tell me.

If anyone needs some tips or all the answers to the following Adventures, write to 181 Geoffrey Rd., Chittaway Pt., Wyong 2259. The games are *Pyramid*, *Bedlam*, *Madness and the Minotaur* and *Trekboer*.

Oh! What is the canteen for?

Tony Cross  
New South Wales, Australia

## HORSIN' AROUND

### Scoreboard:

The games *Sands of Egypt* and *Dungeons of Daggorath* are driving me crazy! In *Sands of Egypt*, I can't even find the pool. Can anyone please send me the solutions? They would be greatly appreciated. My address is 622 Perdido Dr., 75043.

Here's a hint for those of you with *Dallas Quest*. Start the game and get the bugle. Go east until you reach the horse. Examine the horse and the tree. Then examine Lucy and ride the horse; that will give you the first clue. Go back down and get the shovel (go north until you reach the barn).

When you're in the pasture, just move around until the cattle start to stampede toward you. When that happens, play your horn and dig up whatever the cattle uncovered. After that, go into the study and then the grass field and find your way to the airfield. The rest is up to you!

Eric Hedstrom  
Garland, TX

### Scoreboard:

For anyone who is having trouble with *Dungeons of Daggorath*, here are some hints. Watch the speed at which the monsters travel and time your hits so the computer will hit them the moment they enter your block. It also helps to keep useless treasure, such as dead torches, in front of you.

Also, I have found another ring on the fourth level. It's a Joule ring. I won't tell you to what it incants, but to find out, just look in your old, trusty "Webster's Dictionary."

The Elvish sword and Mithrel shield are also found on the fourth level. To get these, kill all the scorpions and wraiths first, then go after the massive galdrogs who carry the sword, shield, Joule ring and a Scer scroll.

I hope I have been of help. For more information or help with *Black Sanctum*, *Raaka-Tu*, send a SASE to 210 Spry Hollow Ln., 43081

Chris D.  
Westerville, OH

### Scoreboard:

If you are having trouble with *Sands of Egypt*, here are a couple of hints.

To drain the pool you need the scepter which is at the base of the pyramid. If you made it to the underground river, you have to go to the boat and type FLOAT BOAT. You need the rope to tie the boat up the archway and you need the shovel to run the boat.

For those of you who are having trouble with the mummy, the first thing you do or you get into the archway is type TRANSLATE HIEROGLYPHICS, then place the scepter on the mummy. The place should shake and reveal a crack in the wall. Get the ladder then go back to the archway.

Does anyone know how to find the treasure in *Sea Search*? I have already found the ring, the anchor, the silver and the pea. Somebody please help!

I have solved *Shenanigans*, *Black Sanctum* and *Dallas Quest*. If you need help send a SASE to 19695 Barnett Rd., 70791.

Dustin Maxfield  
Zachary, LA

### Scoreboard:

For anybody who plays Adventures, here are some of the games I have solved: *Black Sanctum*, *Sea Search*, *Calixto Island*, *Shenanigans* and *Bedlam*.

In *Shenanigans*, when you are in the cave and you hear a voice saying "Sean," type SEAN.

For *Bedlam*, try putting the pill in the meat and then give it to the dog. Also, when you stumble over something in *Sea Search* type GET SHOVEL.

For any more help, write to me at R 6, Box 293, 26505.

Doug Wilbur  
Morgantown, WV

## CAR STOPPER

### preboard:

I need help with the Adventure game *Poltergeist*, from Radio Shack, on the screens with the large housing development. You hold the joystick button down while the cars are being drawn up (before the cars come) and keep it held down, the cars will never show up.

Glen Button  
Cheshire, CT

## SHENANIGANS

### Scoreboard:

I need help on *Shenanigans*. Any answers or solutions would be appreciated. Every time I go into the pub, I get kicked out.

I can help on *Calixto Island*. My phone number is (602) 889-7551, or you can write to 333 W. Dakota St., 85706.

Aaron Repath  
Tucson, AZ

### Scoreboard:

I need help with the Adventure game *Shenanigans*. I can't seem to get past that stupid snake in the cave. If anyone can help me, please write to 8113 E. Whitton Ave., 85251.

Chuck Kiefer  
Scottsdale, AZ

Editor's Note: No shirt, no shoes, NO SERVICE!

Editor's Note: Examine the clover fields more closely.

## FREEBIES

### preboard:

I have been noticing that more and more people are writing in with questions on how to solve certain Adventures. There are also people who offer solutions for money. Well, I am a CoCo Adventure addict, and I have solved quite a few. They include: *Atlantis*, *Black Sanctum*, *Blackbeard's Island*, *Calixto Island*, *Dallas Quest*, *Major X*, *Pyramid*, *Raaka-Tu*, *Sam Diamond*, *Shenanigans*, *Sleuth*, *Sands of Egypt*, *Sea Search*, *Syzygy*, *To Preserve Quandie*, and *Trekboer*. If any of you would like help of any kind, write to me at 110 Ashley Drive, #31. I can also be reached at (803) 654-112, but please call after 6 p.m. I don't like it that you send money, but a SASE would be nice.

If there is anyone out there who has solved *Jaron*, I would appreciate it if you would send me some hints. I would also love to hear from any of my fellow CoCo-nuts. Happy Adventuring!

John Allen  
Clemson, SC

## DARTH LIVES ON

### preboard:

I need help with the 3-D graphics Adventure *Syzygy*, from Spectral Associates. I can't just about finish the game, except I can't kill Darth Vader and I can't get past the second force field on one of the lower levels (I believe it is Level 3). I can get all the treasure, including the communicator, but I can't seem to kill Darth Vader. Anyone who can help, or needs help, please call me at (203) 634-0680, or write to me at 31 Fiesta St., 06450.

Here is a hint. You need the string and blanket to survive the fall from the cliff.

Mike Sengstock  
Meriden, CT

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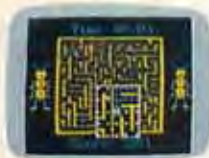


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**Disco Floppy Disk Controller**, a disk controller for CoCo or CoCo 2 with gold contacts on all connectors, shielded metal box for low RF noise, four 28-pin sockets, internal mini-expansion bus interface and 16 MHz high speed master clock. CRC Computers, 1720 Charette, Duvernay Laval, Quebec, Canada H7E 4L9, \$99.95

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**Hardcopy**, a 64K screen print/graphics dump utility requiring at least one disk drive but capable of supporting four with keyboard or joystick input. Compatible with *Graphicom* and *Graphicom Part II*. *Hardcopy* loads standard 6K images and *CoCo Max* pictures. Capable of supporting Hi-Res in all four *Graphicom* display modes; there is also black-and-white or gray scale printing. Users should specify printer when ordering. Computize, Inc., P.O. Box 207, Langhorne, PA 19047, disk \$29.95 plus \$3 S/H

**War of the Worlds**, a 64K joystick-driven Adventure in three chapters. Suitable for group play, each chapter contains more than 200 situations. Possible are save game option and master control option which resumes play at the point where you left off. Triad Pictures Corp., P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, cassette \$18.95 per chapter or \$39.95 for complete three chapter edition plus \$3 S/H

**Soccer Statistics Package**, a 32K sports utility requiring a disk drive. Possible are mid-season entry, updates and additions, correct and review all stats in file, correction on all input screens; raw dump to the printer for the player, goalie and opposing team's files; summary of the player, goalie and opposing team's stats. Also, summary of 16 individual player and 10 goalie stats; tracking of 14 goalie stats; and 19 opposing team stats. Sugar Software, 1710 North 50th Avenue, Hollywood, FL 33021, disk \$29.95

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**Latin Translator**, a 32K ECB utility package requiring a disk drive for the teaching or learning of Latin. Based on the first semester course followed in the book *First Year Latin* by Charles Jenney, Jr., Roger V. Scudder and Eric C. Baade, it requires some fundamental knowledge of Latin but examples are given within the manual and the program itself. Joe Pottinger, 13 Pauline Ln., Rolla, MO 65401, disk \$14.95 plus \$2 S/H

**Q.D.S. A/B-4**, a disk driven system consisting of Hard Drive Special: floppy drive controller and two double-sided, double-density Remex RFD disk drives. The controller has gold plated edge card connectors, absence potentiometers and dual selectal ROM sockets. The dual Remex RFD 480 drives run up to 5 ms track to track speed and have a special circuit Quattro Data Systems installed on the drive board to intercept the drive select signal from the controller and change it to a single signal; the double-sided drives act like four separate single-sided drives allowing users without a DOS that supports double-sided drives to use both sides of the drive. Quattro Data System, P.O. Box 180071, Austin, TX 7870071, controller \$120, dual drives \$3

**RS23210**, a utility program to increase the flexibility of the RS-232 port with any custom peripheral or homemade project such as robotics, ROM burner and any RS-232 peripheral not set specifically for the CoCo. Racine, 52 S. Birmingham, Tacoma, WA 98405, cassette \$30

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ys for access and command execution, ie program allows multiple copying, lling and info printouts for whole or rtial directories. All XMODE pa- meters can be set at the touch of a ngle key and the necessity to type long athnames has been eliminated. Spec- um Projects Inc., P.O. Box 21272, 93- i 86th Drive, Woodhaven, NY 11421, sk \$39.95, plus \$3 S/H

oCo Solver, a 32K utility requiring disk drive or 16K for cassette users use as an equation generator, a mini ta file manager, programming tutor d advanced programmable calculator. tions include utilities to kill files on ata disk, erase, copy and a monitor PEEK at memory. Compatible with OS as well as Disk BASIC. JJJ iterprises, P.O. Box 110841, Nashville, N 37211, disk for 32K or cassette for K \$79.95

pine Align Cushion, designed to be ied with standard secretarial chairs or at seats without back supports, this gled, well-padded cushion is meant o reduce "desk distress" of the lower ack. Spine Align, 345 So. McDowell lvd. #209, Petaluma, CA 94952, 9.95 plus \$2.50 S/H

aseball Statistics Package, a 32K orts utility requiring a disk drive. ssible are mid-season entry, update d additions; correct and review all ats in file; correction on all input reens; and raw dump of data to the nter for the player, pitcher and pposing team's files. Also, summary the player, pitcher and opposing am's stats; tracking of 21 individual ayer stats with 18 cumulative stats per ayer; tracking of 15 individual pitcher ats with 11 cumulative totals per tcher; compilation of total team mmary of 16 separate stats; and mpilation of total pitching summary 11 stats. Sugar Software, 1710 North th Avenue, Hollywood, FL 33021, sk \$29.95

asketball Statistics Package, a 32K orts utility requiring a disk drive. ssible are mid-season entry, update d additions; correct and review all ats in file; correction of input screens; w dump of data to the printer, for e player and opposing team's files; mmary of the player, opposing team d 17 individual player team stats, so, tracking of 22 individual player ats with 18 cumulative stats per

player; and compilation of opposing team summary of 19 separate stats. Sugar Software, 1710 North 50th Avenue, Hollywood, FL 33021, disk \$29.95

Football Statistics Package, a 32K sports utility requiring a disk drive. Possible are mid-season entry, updates and additions; correct and review all stats in file; correction on all input screens; raw dump of data to the printer for the player and opposing team's files; summary of the player and opposing team's stats; and tracking of 90 individual player stats. Also, summary of 63 individual cumulative stats per player; summary of 17 cumulative team and 28 cumulative opposing team stats; team summaries of 87 stats; comparative summary printouts of 63 stats for your team; and 62 stats for the opposing team. Sugar Software, 1710 North 50th Avenue, Hollywood, FL 33021, disk \$29.95

Thunder RAM, a 256K memory up- grade board for the Color Computer requiring a disk system. Features include the emulation of a 40-track RAM Disk, speed up to 30 times faster than an ordinary floppy disk drive, a full 60K print spooler and storage of up to 30 Hi-Res screens in memory at one time. Users can create BASIC programs up to 128K long. Spectrum Projects, Inc., P.O. Box 21272, 93-15 86th Street, Woodhaven, NY 11421, \$119.95 plus \$3 S/H

Cosmic Paint, a 32K graphics system requiring at least one disk drive (two are recommended) and an analog joystick (Radio Shack), a mouse or a touch pad. Commands reside in an icon grid featuring scrolling, lines, rectangles, boxes (3-D), detail mode, circles or ellipses, painting, sketching, a disk menu, magnification, a wrench (for fixing mistakes), erase, mask patterns, dump to printer, text and select (to modify portions of the screen). Cosmic Software, 515 Beverly West, Sherwood, AR 72116, disk \$20

Teacher Pak, a 16K collection of four programs for teachers designed by teachers. *Dister*, a statistical analysis utility for lists of numbers such as, but not limited to, grades. It works out averages, sample, and population standard deviations and variances. Possible are both printed and on-screen distributions. *Grader* allows users to choose straight percentages or weighted grading. *Alpher* produces printed or on-screen alphabetized lists of names or words. These lists may be saved and used with *Grader* and *Seater*. *Seater* produces printed seating charts for classrooms of almost any size.

Teacher Pak Plus, requires 32K and contains all of the above with *CoCo Testum* for an 80-column printer with underline function to create and print tests. Possible are the creation of multiple choice, fill in the blank, short answer, true/false and matching tests. Tothian Software, P.O. Box 663, Rimersburg, PA 16248, *Teacher Pak* cassette \$34.95, *Teacher Pak Plus* cassette \$47.95

Color Computer Machine Monitor—CCMM, a full-featured debug machine monitor that interfaces with the ROM-resident operating system(s) and device configuration(s) of CoCo and CoCo 2. The command facilities include: LIST/EDIT of registers, memory and program; EXECUTE of program (sub)rou- lines under monitor supervision; TRACE of RWM Resident program instructions; BREAK-Point on control sequencing; ACCESS-point on data addressing; self-relocatable, Position Independent Code (P.I.C.); CoCo dependent [2K] and stand-alone [4K] Versions. Published by Real Computers and Intelligence of Santa Clara, Calif., and distributed by The Zellerbach Group, Unit 216, 1335 Pacific Avenue, San Francisco, CA 94109, disk CCMM 16/D program(s) \$16.95, manual CCMM 20/S \$9.95, tape CCMM 17/T program(s) \$14.45, manual CCMM 20/S \$9.95

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's reviewers for evaluation.

— Monica Dorth

## Consumer Wish List

*Editor:*

I've found that as a consumer of software for the Color Computer I need to know the following: 1) Is the program position independent? (I will not buy one that is not.) 2) Is the program ROM independent? (Again, I will not buy one that is not, as I have different CoCo systems at work and at home.) 3) Does the program provide an easy return to BASIC? (or OS-9, as the case may be.) Some programs, especially games, take over the computer and require it to be shut off in order to return to BASIC. I then have to reload all of my defaults and external hardware registers. 4) I need to know whether or not a backup can be made. 5) If the program is a graphics program, does it store the results in a manner consistent with loading to a BASIC graphics screen? (Or is it like *Art Gallery*, where the tape cannot be used by any other program?) 6) Will it work with all larger RAM sizes? 7) If the product is a program pack with a port in it, what is the port address or address range? 8) Does the program require a special interface, the Multi-Pak or a specific printer? 9) Does the program pack require 12 volts? (One of my systems has 12 volts, the other does not. Some of my ports will not work on the CoCo 2.) 10) Does a driver for a device conflict with certain other software?

I feel that if the above information could be included in a review a consumer can make an informed choice.

Larry Robinson  
Bloomington, IN

---

### CENTIPEDE ABC's & 123's

*Editor:*

We would like to thank RAINBOW and Stephanie Snyder for the thoughtful and thorough review of *Centipede ABC's & 123's*

in the June 1985 issue (Page 205).

Somehow the price change we reported to you didn't make it into the review. For the record, *Centipede ABC's & 123's* are now sold on one cassette for \$18, not the \$25 listed at the end of the review.

Ms. Snyder hit upon something in her review which no one here at Triad, nor any of the 400-odd preschools using the program saw: the need for a shorter game option to accommodate the shorter attention span of 2-year-olds. Future versions of the program will incorporate such a feature. Thanks!

Stan Osterbauer  
Triad Pictures

---

### ADVENTURUS SUPREMUS 4.6B

*Editor:*

I would like to thank RAINBOW for the positive review of *Adventurus Supremus 4.6B* in the June 1985 issue [Page 221]. However, there are a couple things that I would like to comment on.

First, I feel the mention of R-rated actions is out of place. The one action that causes death is meant as punishment for vulgarity, and the other action uses proper English. I feel that these actions are at very most PG-rated and are less offensive than many things most children have seen in PG-rated movies. I even talked to the reviewer about this, and he agreed I am probably right in this.

Second, the use of the OK prompt is meant to be humorous by being slightly smug. Also, since all the verbs are listed, the only problem should be in finding a working verb/noun combination, so such a simple prompt is justified.

All things considered, I found the review to be thoughtful and positive, although the remarks about R-rated actions did disturb me a little. Also, keep up the good work, because everyone involved with the Color

Computer benefits from the thoughtful competent reviews you publish.

Michael Marcell  
Bacchus Computer Softw

---

### MULTIPLE CHOICE TEST

*Editor:*

First, I wish to thank you for your consideration and review of our *Multiple Choice Test* program [August 1985, P. 202]. I have always appreciated your fair and honest reviews of other products, and I hope we at D&D Software can make grade.

*Multiple Choice Test* has been developed for a specific need, and as an alternative for those who can use it to meet their need. We are very explicit in our advertising to what our programs will do and we believe our programs 100 percent. At \$29.95, I feel we have given teachers a viable alternative.

In response to the review by Mr. McGar it strongly stressed what the program would not do and has no balance of its capabilities. A review should at least mention the features of a program so the customer can make his or her own mind as to its benefits a use by comparing the assets and liabilities of the program.

As to the "bug" found in saving a test why would anyone go to the trouble of making up a test and not giving it a filename before saving it, especially when there is a specific prompt to do so? Nevertheless, an error trap to cover this situation should occur. If there are bugs in any of our software, individual hardware problems, operator problems, or special software needs, our customers can assist you that we will be there to help.

Dale Lit  
D&D Softw

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## Practical Programming In Pascal Makes Learning Pascal Easy

PASCAL is much more than a programming language. It was conceived by Niklaus Wirth as an academic tool to teach structured programming techniques. As such, most texts on the subject are written with the computer science major in mind, and are extremely academic and technical. For a novice programmer, it can be a strenuous if not insurmountable task to try to learn the language for practical purposes from such a text. Kent Porter's *Practical Programming In Pascal* bridges the gap.

Inside the flashy red, soft cover of this book (which will make it easy to find in the pile of documentation that always accompanies computer ownership) is a very well organized text. Also, due to Mr. Porter's smooth writing style and thorough knowledge of PASCAL, all 266 pages are incredibly easy to read and understand.

In the first four chapters you will be introduced to the history of PASCAL and the benefits of structured programming, then be taken from a description of the bare basics through the step-by-step development of a program using PASCAL's excellent looping and decision making abilities.

The development of the program from statement purpose to final product is, of course, accompanied a technical discussion of the parts of the program as they are constructed. As the book progresses, this process is repeated, developing more and more complex programs while readers learn more and more features of this powerful programming language. By the time you finish it, you will have a practical knowledge of PASCAL and have learned structured programming techniques which you can apply regardless of the language you are using.

This brings me to BASIC09. This book was written by Mr. Porter as "An Introduction to Computer Programming" and has much general programming information demonstrated in PASCAL. In that BASIC09 is an enhanced BASIC with added PASCAL-like features, they are very similar. If you are having some difficulty understanding some of the features of BASIC09 like parameter passing, defining data types and complex data structures, this book will help. If it is a PASCAL study guide, however, and it should be studied along with the use of a PASCAL compiler.

In summary, if you are just beginning, this book will get you started in the right direction. Get yourself familiar with one of the available PASCAL compilers and use *Practical Programming In Pascal* as your study guide. You'll be writing PASCAL programs in no time.

If you already program in PASCAL at an intermediate level, the book will be useful for review purposes. Since it is structured as a study guide, it is not particularly suited for use as a reference manual, but it is fully indexed.

(New American Library, 1633 Broadway, New York, NY 10019, \$14.95)

— James F. Taylor

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TIMEX 1000, OSBORNE, others

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#### One-Liner Contest Winner

*Windows* demonstrates some of the CoCo's "windowing" capabilities. Enter `PMODE4:PCLS` before `RUNNING`.

#### The listing:

```
1 PMODE4:SCREEN1,1:PMODE0:X=RND(
255):Y=RND(191):R=RND(50):C=RND(
4)-1:CIRCLE(X,Y),R:POKE178,C:PAI
NT(X,Y),,1:PMODE0,2:X1=RND(255):
Y1=RND(191):LINE(X,Y)-(X1,Y1),PS
ET:PMODE0,3:POKE178,C:LINE(X,Y)-
(X1,Y1),PSET,BF:PMODE0,4:LINE(X,
Y)-(X1,Y1),PSET,B:GOTO1
```

Mark Werdin  
St. Ignatius, MT

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

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PCM has gone through quite a number of changes lately! We've extended our coverage to include the newest Tandy computers, increased our number of pages, and because our old name sounded a bit stuffy (" — The Magazine for Professional Computing Management"), we changed it to the more reflective and friendlier "PCM — The Personal Computing Magazine for Tandy® Computer Users."

Now, we cover five of the most exciting computers on the market, as well as the most productive — the highly popular Model 100; a brand new portable, the Tandy 200; and Tandy's new MS-DOS computers, the Tandy 2000, Tandy 1200 and Tandy 1000.

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## Data Bank Organizes Data With Or Without OS-9

My previous experience with serious microcomputer databases was the Model II's *PROFILE II* and CoCo's *Pro-Color-File*, so I knew this package wasn't a game I'd be playing with the kids.

*Data Bank* has many of the same features I was already used to: user definable data to be stored, the input screen(s) and report layouts to the screen or printer. It does include all basic math functions so the computer will automatically make calculations for you.

Validation of input lets you be sure you're only putting numbers or letters (even numbers or letters between specified limits) in fields you define as numeric, alpha-numeric, date or reserved for computer generated math answers. This eliminates lots of unhappy hours at report time.

You will receive an unprotected disk and a 29-page manual. A tutorial database is included to help get your feet wet.

*Data Bank* operates in the OS-9 environment with at least one drive. It does take advantage of extra drives. You do need 64K, but you do *not* need the OS-9 system. The package allows you to load and run from BASIC.

I ran the program from my version 1.0 of Radio Shack Disk BASIC without any problem and went directly into the tutorial. The wide screen is very impressive but sometimes a little hard to read from a TV screen.



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Everything was explained clearly between the man and screen prompts until I got to the part where you change your display format, and I found I didn't have lowercase. Also, repeatedly I found myself outside the tutorial database and having to completely exit the program and start over — that's really frustrating.

Anyone not familiar and comfortable with the OS-9 environment will be completely baffled by some of the problems they'll run into such as suddenly finding the tutorial is no longer in the active directory, strange error messages and having no lowercase input. Shell commands and error messages are explained somewhat in the manual but BASIC users are very restricted without a real OS-9 system.

*Data Bank* lets you delete records (and restore them if you make a mistake), compress data files to eliminate dead space, selectively transfer (archive) records, and restructure your records if you later find a need for change — this is impossible or tricky in other programs.

I was impressed with the ease with which new files can be set up. You'll be prompted on the screen for many things I've had to search for in other programs.

Reports are easily formatted, and you can specify totals and break points. I didn't follow through myself, but it's easy to imagine a checkbook application with subtotals for various expense items so you would have your figures all organized and in one place for the IRS next April 15.

I was disappointed that *Data Bank* doesn't seem to have an option for conditional sort. For instance, sort and print all records whose ZIP code is higher than 69999. Also, no provision was made for easy label printing.

This is a pretty powerful database manager which means you'll need to spend some time learning how to master its abilities so they'll work for you. No one should expect to go into any program of this caliber without expecting to invest some serious time.

OS-9 isn't really needed, but BASIC users will save themselves a lot of frustration giving this one a wide berth. Otherwise, I can recommend this without qualification to anyone who wants to get all that disorganized data sorted out and stored in order.

(Computerware, P.O. Box 668, Encinitas, CA 92024, requires 64K, disk \$79.95 plus \$2 S/H)

— Bob Doornik

### One-Liner Contest Winner . . .

This one-liner is called *Rowboat*. If the water comes up red instead of blue, press the Reset button and run the program again; repeat if needed to make the water blue.

```
Ø PMODE4,1:PCLS:SCREEN1,1:FORA=Ø
TO255STEP2Ø:CIRCLE(A+1Ø,164),1Ø,
,7,Ø,.5:NEXT:DRAW"BM175,168M192
,144L119M9Ø,169BM132,144NG25E2ØF
3G42BM133,144ØR4":POKE178,2:PAI
NT(Ø,191),,5:PLAY"L4CCL8.CL16DL4
EL8.EL16DL8.EL16FL2GO4L8CCO3GGEE
CCL8.GL16FL8.EL16DL2C":RUN
```

Garry Sittler  
Jacksonville, FL

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



## Cyrus World Class Chess Is A New Dimension In Chess

Do you enjoy playing chess? If not, would you like to? Or would you just like to sit back and watch the computer play a game by itself?

If you answered "yes" to any of the above questions, *Cyrus World Class Chess* is what you're looking for. *Cyrus* requires at least 16K RAM (a joystick is optional). After inserting the cartridge, the title screen appears for a short moment, then the chessboard appears with the chess pieces automatically placed in position — white at the bottom of the screen and black at the top. You are now ready to play.

If you have never played chess before, you will find the manual most helpful. It gives an in-depth explanation of the rules of chess and the types of moves each piece makes. Even if you're an expert at chess, there are some options that *Cyrus* has to offer in order to make your game more interesting and challenging.

When the chessboard appears, you will see a small green square flashing on and off inside the square at the bottom-left corner of the board. This square, known as the marker, indicates to the computer the piece you want to move. The four arrow keys are used to move the marker around the board.

To move a chess piece, first bring the marker onto the square occupied by the piece you want to move. Secondly, press ENTER and the piece will start to flash, then use the arrow keys to move the piece to its new square and press ENTER again. The joystick may be used for the same purpose.

If you attempt to make an illegal move, an error signal sounds, and you must move again. Also, if you have taken control of a piece but then decide not to move it, return it to its original square and press ENTER. The piece is returned and the marker may be moved to another piece. When you have completed your move, *Cyrus* computes the reply and then makes its move.

*Cyrus* always lets you move first and play white. If you want to play black, press 'M'; *Cyrus* will then move first. It is possible to have black at the bottom of the screen by pressing 'I' to invert the board.

Other than the chessboard itself, there are several other displays. By pressing the space bar, the message display appears. The message display shows a record of the moves made so far in the game. It records the moves with

the use of a letter-number system. Each column is given a letter name (A through H), and each row a number (1 through 8). The level at which you are playing is also shown on this display. The levels (one through nine) represent the amount of "thinking" time that *Cyrus* is allowed before each move. *Cyrus* plays better if it has more thinking time per move. The time spans range from two seconds to three and a half minutes.

There are three additional levels: adaptable, infinite and problem. When playing on the adaptable level, *Cyrus* takes roughly the same amount of time as you. When playing on the infinite level, *Cyrus* will normally compute until you tell it to move by pressing 'M.' On the problem level, *Cyrus* searches for a way to force checkmate in five moves or less.

The other displays show numerous commands and options you may use during the game. For example, you can watch the computer play by itself by pressing 'D.' It is also possible to take back a move by pressing 'B.' If you cannot decide which move to make, press 'H' and the computer will give you a hint.

*Cyrus* is such a versatile game and has so many options that it would take days to explain them all. Although I am not a master at chess, I enjoy playing it every so often, and *Cyrus* is by far the best video chess game I have ever seen.

(Radio Shack stores nationwide, 16K Program Pak, \$39.95)

— David So

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Hint . . .

### Machine Language Offset Loading

If you want to load an ML file at a location higher than the addresses in the file, type the command LOADM (or LOADM for disk) "filename", (new address-old address). If you want to load a file at a lower location, type the command CLOADM (or CLOADM) "filename", (new address-old address)+65536.

## Metric Mind Performs Well At Teaching Conversions

Have you heard the recent radio commercials about the new "Thirstbuster" bottles of cola? It seems that the world of metrics is upon us again. This time in the new three-liter size. Gee, how many eight ounce servings can I get out of this one? How many calories per bottle would that be? I had better get the old *Metric Mind* out and start practicing again. I am referring to *Metric Mind* by Creative Technical Consultants Software. *Metric Mind* is a drill and practice program to assist students in learning conversion between metric and English units of measurement.

*Metric Mind* is written for a CoCo or CoCo 2 with Extended Color BASIC and at least 16K of RAM, and it comes on cassette. With a 16K machine, you must first perform a PCLEAR 1 before loading the program. If you also have a disk drive attached, you may have to unplug the drive from the computer before loading the program so as not to receive an OM Error.

After loading the program and typing RUN, a menu displaying five choices appears. They are as follows:

- 1) Conversion table
- 2) Prefix table
- 3) English to metric problems
- 4) Metric to English problems
- 5) Estimating in metrics.

Menu choices one and two simply display conversion tab and metric prefixes.

When you select either of these choices you are prompted for a skill level of from one to five with five being most difficult. A skill level of five will display all of conversion tables and prefixes. There are a total of different conversion formulas for converting things like inches to centimeters or miles to kilometers. There are even a few exotic formulas like 1 Joule = .24 calories. Just this at only two calories per bottle you'll now be consuming 8 Joules. Feeling a bit heavy?

Selecting menu option three or four brings us to the nitty gritty of *Metric Mind*. Here you'll get a chance to strut your stuff. The program now prompts you for your name and a skill level and proceeds with a series of conversion problems. You are presented with word problems such as "If Puff The Dragon is 5 miles long from head to tail, how many kilometers long is he?" You are then given two chances to provide the correct answer.

Since the program is to teach metrics, not math, your answer may be within plus or minus two percent of the correct and it will be accepted. After 10 such problems you are asked if you would like to try again or return to the main menu to select another option or skill level.

The last menu option, "Estimating in metrics," simply presents you with some common objects like a stop sign and requests that you estimate its size in some metric unit. All in all, *Metric Mind* performs well and does what is advertised to do: drill and practice.

(Creative Technical Consultants, 16-8 Sangre de Cristo, P.O. Box 652, Cedar Crest, NM 87008, 16K cassette \$17.95)

— Larry A. Birkenf

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Tape \$21.95 (16K required). See July '83 review.

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## One-Liner Contest Winner . . .

*Gemslash* produces slashed zeros on Star Micronics dot-matrix printers (such as the Gemini-10X and 15X) which don't normally have this character. It works by downloading a bit image of the character into the printer, which will then use this new character in place of its usual zero. To return to the normal zero (for text applications) switch the printer off and back on.

## The listing:

```
1 CLS:PRINT"GEMINI SLASHED-ZERO
:PRINT"TURN PRINTER ON: PRESS e
ter":EXEC44539:A$="":FORX=1TO20
READY:A$=A$+CHR$(Y):NEXTX:PRINT
-2,A$:DATA27,42,0,27,42,1,48,0,
2,34,65,16,73,4,65,34,29,27,36,
:END
```

John R. Cur  
Louisville, KY

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

## Battle of the Bulge: A Tactical Game Of World War II

The fog has kept Allied aircraft tied down in England weeks. The advance on the Rhineland and into Germany stalled in the forests of Belgium. American and British troops will have to spend Christmas in the mud and snow, held down by scattered German resistance.

Suddenly SS Panzers attack! Where have all those Tiger tanks come from? Who is guarding the Third Army fuel dumps? Where is Patton?

On December 16, 1944, the Battle of the Bulge starts in the Belgian town of Bastogne. Hitler has massed 27 divisions, including nine armored, by pulling troops and armor from the eastern front. German forces drive westward through the Ardennes forest. The Allies must hold out until the weather clears and air strikes can resume. Hitler's great counter offensive of the war will decide the fate of Europe.

*Battle of the Bulge* is a strategic war game for one or two players. This game recreates the last German attempt to break through the Allied advance across Europe that ended with the invasion of Normandy in June 1944. You command your troops and tanks, call in artillery support, engage in combat and wait for the weather to clear. The object of the game is for the Axis forces to capture the town of Liege, on the Meuse River, or break through Allied lines and cross the river. The Allies must hold out until December 31.

The game begins with a display of the battlefield. A resolution map shows rivers, forests, roads and towns. A single screen of text introduces the game and asks whether you want to play against the computer. If you so choose, the computer will take the Axis side and make the first move.

Players alternate turns moving their entire forces, with each move focusing on a local battle screen. A map displays a small region of action and gives the moving unit's name, combat strength and movement range. The map area is composed of text and graphics characters that represent various terrain features and unit types (knowing the difference between armored and infantry divisions is very important). Towns are represented by a single letter; water is a solid blue block. Allied troops are beige, Axis troops are magenta, etc.

You move your units with the arrow keys. The troop movement is accompanied by sound and costs from one to four on roads to four points in mountain terrain. Moving through water stops the unit for that turn.

Artillery support can be called in by any infantry unit that has an average level of strength remaining. You move the cursor over the target with the arrow keys. The maximum range is five grid positions. Firing at random in a three-by-three grid about the target, each barrage produces a distinctive sound. A direct hit reduces the enemy's strength by one. Even bridges can be destroyed by artillery fire. Sometimes offers a temporary tactical advantage.

Other commands at your call include intelligence reports on local forces, an expanded map of the region, complete strength of your forces, and requests for artillery support, or air strikes if available.

Help is provided for new players. The '@' key calls up a sequence of four screens that review the unit designations and give brief descriptions of commands. A separate map sheet is provided with the instruction sheet to help you visualize the whole field of play.

Combat begins by moving onto an opposing unit's square. The outcome depends on the two units' relative strength, type of terrain they occupy (or moved from) and a random factor. Losing units either retreat or are eliminated when their strength is reduced to zero.

The game blends the capabilities of the CoCo with the action and strategy of good war gaming. The elements of movement and fire power are well-balanced and the final objective is sometimes difficult to obtain.

The computer play of the Axis divisions doesn't effectively use artillery fire. Only a few random shellings are made during the first round of play. After that, the Axis forces conduct a respectable Blitzkrieg, moving relentlessly toward their goal. It can be frustrating to chase a Panzer battalion that has broken through the lines.

A typical game requires one and a half to two and a half hours. The time passes quickly, but there is no provision for saving a partially completed game.

I don't usually like "involved" war games, but *Battle of the Bulge* is an exception. The action is intense, the play is challenging and the outcome is never certain. The historical battle was won when the skies finally cleared and air strikes wiped out the last German Panzer threat. The computer game may rewrite history.

(Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, cassette \$25.95, disk \$28.95)

— Stuart Hawkinson

### One-Liner Contest Winner . . .

*Alphabet* is a good program to teach children how to use the keyboard. It puts a letter on the screen at random and waits until that key is pressed.

#### The listing:

```
Ø CLS:X=RND(26)+64:PRINT@271,CHR
$(X):FORT=1TO999999:A$=INKEY$:IF
A$=CHR$(X) THEN SOUND 2ØØ,3:GOT
O Ø:ELSE IF A$<>" THEN SOUND 5Ø,
3:NEXT T:ELSE IF A$="" THEN NEXT
T
```

Will Cotter  
Redway, CA

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

## CINC PAC — Battle of Midway For Victory At Sea

By H. Larry Elman

A few months ago I single-handedly sank the entire Royal Navy in the English Channel; shortly after that, I found a way to mishandle even U.S. Marines into frequent surrender. So the RAINBOW editor, reacting the way any normal government ruler would, gave me an extra star or two and sent me off to command at Midway. Of course, one of the first ridiculous things I succeeded in doing was landing an entire Squadron of B-17 "Flying Fortresses" on the deck of the USS Yorktown. (This is comparable to driving a Boeing 747 airliner through your local car wash.)

Midway was one of the more crucial battles of this century and has become the focus of tremendous study by tacticians, strategists and war-gamers. There are a number of computer games available based on this battle; one of the best is Ark Royal's *CINC PAC — Battle of Midway*. (For the civilians among us, CINC PAC stands for Commander-in-Chief, Pacific Fleet. It is pronounced as if spelled sink-pack.)

In this game, the computer commands the Imperial Japanese Navy, while you command three aircraft carriers, a few squadrons of aircraft and three shore bases (two of which are almost totally useless). Your biggest advantage is the fact (as in the actual battle) that the Navy can read the Japanese code, enabling you to set an ambush.

Believe me, if you fight this battle without using that asset, your Color Computer will cream you! I know; it has beaten me more times than I will publicly admit.

If you have not tried war games (or "Battle Simulations" as some of their authors prefer to call them), then you have probably missed one of home computing's more challenging intellectual pursuits. You need not be either a militarist or a history nut to enjoy these descendants of chess.

War games can be broken into a number of subcategories, of which two are worth a short digression. Some war games are based on a particular historic event; *CINC PAC — Battle of Midway* is of this type, while chess is not. All

war games involve some sort of map for a board. I computer war games use a low resolution, semi-graph screen. Again, the comparison with chess is appropriate.

A small number, *CINC PAC — Battle of Midway* among them, utilize the highest resolution available on the monitor to provide a map board which looks like it came from a geography text. Of course, the selection of that type of display implies dedication of much larger computer storage just for the map.

Most semi-graphics war games can be programmed in BASIC; *CINC PAC — Battle of Midway* uses BASIC input/output and logic, but has machine language control over the displays. Another difference between semi-graph and high resolution games is that the rules for navigation and movement can be more generalized in high resolution. The price paid for this is the user no longer simply moves pieces with arrow keys, but must think through the angles and directions for his movement and/or his fire.

I have seen semi-graphics simulate the tactics of a particular time quite well, but I was unprepared for how well Steve Berry was able to model the subtleties of land and air warfare at Midway and "shoe horn" it into the Color Computer's 32K. In this game, the user can be as if he is there — the displays are that well done, even the pauses between moves have the suspense of "the next move."

As with most such games, I found the instructions to be brief. There is no way to enter your initial game later than a week before the battle; the instructions suggest you do that time to practice fleet maneuvers. I did, but became a bit miffed because by the time I finished the practice and had gotten acceptably proficient I had destroyed almost a third of my fleet in operational accidents! The only way to do was start over at the NEW GAME point and watch the idiot box while pressing SKIP MOVE. I had passed the wasted week. This process left my fleet intact. After that, of course, I simply saved the new situation and worked from it.

One of the reasons I lost so many assets during the game was a few bugs in the program. I phoned Ark Royal and requested software support. During most of the phone calls they were unaware that I was reviewing the game for RAINBOW, so I can state quite confidently that the software support to the general customer is excellent.

There seem to be two main problems. The lesser is the lack of a logic trap to prevent overloading a platform (carrier or land base); if more than nine squadrons of pl

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THINC — W —

landed on any platform it is possible to hang the gram and watch your fleet sail off to never-never land. Use the normally prudent player is unlikely to put more than five squadrons on any one platform, this bug is considered very minor.

However, a somewhat related bug is the ability to lose control over a carrier by attempting to exit the Launch Planes sequence improperly. To correct that, simply replace line 1186 of the main program with:

```
5 IF A$="S" THEN 1196 ELSE IF A$>"1" OR A$>"9"
  OR IF VAL (A$)>(UC+1) THEN 1185
```

This patch is simplicity itself on the disk version but somewhat inconvenient on the tape version. Ark Royal if you get a copy that is *not* marked with a red 'X' should contact them for replacement; copies with a red 'X' will already have had the patch inserted. With the patch inserted, you can abort Launch Planes by typing 'N' and the keyboard is locked against the non-numeric keys which is known to cause the bug.

Another minor difference likely to occur in the patched version concerns Ship's Bells. In all versions, the program returns the Admiral (you) back from coffee breaks by sounding the time with Ship's Bells. Later versions sound somewhat like "Victory at Sea" than earlier ones; the do-it-yourselfer can improve the early version by a higher pitched tone in lines 1357 and 1359 and by a smaller time delay in line 1358. I mention this not as a bug, but as a small example of the mood-setting touches which make this game stimulating.

There is another anomaly in the program; whether to call it a "bug" is a judgment call. Every U.S. unit on the screen (possibly even some enemy units) has a tiny interruptible blinking light. Sometimes after combat, a downed unit will continue to blink; a ghost which can be battle-sighted. I considered it a radar sighting for my search units. The screen shows about 3,000 miles of Pacific Ocean, but combat sightings are at distances more like 100 miles. Accurate navigation improves your score. On the other hand, in one game I wasted three days' use of two B-17 squadrons chasing these ghosts. Personally, I feel the presence of the ghosts provided the touch of uncertainty led in a combat game.

If you want a game more challenging than ones which are totally on the arrow keys or the joystick, consider *C PAC — Battle of Midway*. It is good enough to call itself a battle simulation, and it is fun enough to call it a game.

Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238; requires 32K, tape \$27.95, disk \$30.95

Hint . . .

### Automatic Lowercase

To move automatically to lowercase, type POKE 202,0. To switch back to all caps, type POKE 202,1.

## CoCo Gains Power And Speed With 500 Pokes, Peeks 'N Execs

This comprehensive book, *500 Pokes, Peeks 'N Execs* by Kishore M. Santwani, will provide you with hours of PEEKing, POKEing and EXECuting.

The soft cover book contains 68 pages, all chock-full of useful information for the CoCo user.

The use of the various commands listed will allow you to enhance the capability of your BASIC programs without having to resort to complicated machine language routines.

We are all familiar with the high-speed POKE and other often-used PEEKs and POKEs frequently found in the pages of RAINBOW. This book contains a wealth of others that will amaze and amuse you.

The book is well structured into various sections which deal with cassette, disk, printer, etc., and each command is followed by the expected result and an appropriate remark as to what it can be used to accomplish. Here in one easy-to-use source are all the various PEEKs and POKEs you will likely ever need. No more searching through scraps of paper and past issues of RAINBOW to find that "handy POKE I can't remember."

The book contains many useful commands and routines too numerous to list here, but suffice it to say that almost anything from *Auto-Start* to *Zaxxon* plays is covered. Other useful commands to provide key beeps and screen print are included as well as key disables, memory bank switching and recovering lost BASIC programs.

In summary, this is a unique book which contains information which took a great deal of research to collect. Many of the commands listed have been, until now, relatively guarded by those "in the know." It will help unravel the many POKE, PEEK and EXEC commands of the CoCo to help you gain the power and speed of assembly language through BASIC. It will help you reach greater heights in successful programming and professionalize your work. I believe you will find *500 Pokes, Peeks 'N Execs* worth the price.

(Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, \$16.95 plus \$3 S/H)

— Jerry Semones

Hint . . .

### Cold POKE

If for some reason you want to simulate a cold start up, type POKE 113,0 and ENTER, then press the Reset button. (The usual EXEC 40999 doesn't work properly if your computer is in the 64K mode.)

## Practice Your Math Skills With *Mathfun*

*Mathfun* is an educational program designed to give the user practice in basic mathematical skills. This program randomly generates numbers, between two digits and five digits, which the player must either add, subtract, multiply or divide.

After loading *Mathfun*, which requires a Color Computer with Extended BASIC, the title screen appears. The player is then asked to enter his/her name, up to eleven letters in length. The main menu is displayed and shows the types of mathematical equations available. To make a selection, press '1' for addition, '2' for subtraction, '3' for multiplication, '4' for division, '5' for a mixture of problems, or '6' to terminate the game. If addition, subtraction, or a mixture is chosen, 10 problems will be given to the player to solve. If multiplication or division is chosen, then seven problems will be given. After making a selection from the main menu, a skill level must be selected by pressing '1,' '2' or '3.' If the player arrives at the skill level menu and decides that he would like to change his selection from the main menu, he may press 'C' to return to the main menu.

For each problem, the player types in his answer and presses the ENTER key. The program then tells the player whether the answer is correct or incorrect, and an

appropriate tune is played based on the results. Should a player wish to end a round before it is completed, the round can be aborted by entering a special code when the program asks for the answer. This code is 0110110 (if '0' is the capital letter 'O,' not zero).

At the end of each round (a set of seven or 10 problems) a summary of that round is displayed. The display includes the number of correct answers out of the number of problems and the percentage of correct answers. The summary takes into account the total number of problems the round is supposed to present (seven or 10) even if the round is aborted. However, the final summary only takes into account the attempted problems. After reviewing the round summary, press ENTER to continue. At this point the main menu will reappear.

The final summary is displayed only after the player presses '6' on the main menu to end the program. The number of correct answers out of the number of attempted problems is shown, along with the percentage of correct answers. The number of rounds which were aborted is displayed.

*Mathfun* has excellent sound effects but could use some improvement in the graphics department. It is definitely a useful program for students in third grade through middle school and possibly high school.

(Compugram, Box 26663, Richmond, VA 23261, cassette \$10)

— David

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## Space Web Teaches Strategy And Reasoning Skills

As you beam through hyperspace going many times the speed of light, you see something in the distance. As your ship gets closer, the faint object begins to take shape. You see something familiar about the object, and as it gets closer, the terror grips you.

"Oh no," you yell, "it's the dreaded space web." As the web surrounds your ship, you know that your only hope of escape is to change the color of the web walls to the same color and make the web dissolve.

So, you're not in the newest ship of the 21st century. You're not even in the next *Buck Rogers* episode. You're playing *Space Web*, the newest creation from Spectacular Software. *Space Web* is a 32K high resolution game that requires joysticks.

The scenario is as follows: Your objective is to escape the dreaded space webs that inhabit hyperspace as you attempt to pilot your spaceship to its destination. To do this you must change all of the sides of the web to the same color which is displayed at the upper right-hand portion of the screen. Each time you hit a side of the space web you change its color.

## Submitting Material To Rainbow

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

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 SASE to: Submissions Editor, THE RAINBOW, The Falsoft Building, Prospect, KY 40059. We will send you some more comprehensive guidelines.

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

The joystick is used to control the direction of your ship. When you are the farthest away from a wall, you must move the joystick in the direction you want the ship to go. You must go to an adjacent wall. In Level one you can bounce off of a wall three consecutive times before your ship will be destroyed. As you get to the higher skill levels the amount of consecutive times you may bounce on a wall decreases.

There is also a time limit on each level of play. The time is the same on each level, but as you reach the higher levels the clock moves faster.

*Space Web* seems to be a game for the younger generation (about 8-10 years old) because it teaches strategy and reasoning skills which are very essential. Also, the first time that I played the game, I got to Level six (there are only nine levels).

Many improvements are needed to make this game a good one. One suggestion would be to make it more of a shoot-'em-up, while still teaching strategy and reasoning skills.

I find *Space Web* to be tedious, but a good learning game. It isn't outstanding like the new games that we have been seeing lately. I will give it three stars — an average rating.

(Spectacular Software, P.O. Box 363, Mansfield Center, CT 06250, cassette or disk \$19.95 plus \$1.50 S/H)

— Pat Downard

## E.T.T. Electronic Typing Teacher by CHERRYSoft

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With the sentences provided by ETT learning to type can be fun. Over 1000 variations chosen because they include every letter in the alphabet. You can also create your own practice sets. This outstanding program was written by a certified teacher and professional programmer and comes with a ten page student manual-study guide. Requires 16K Extended Basic.

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## Multiple Choice Test Fits Specific Needs

Teachers, what is the best way to prepare a multiple-choice test? D & D Software believes that *Multiple Choice Test* is the answer. I wish I could say the same. Writing multiple-choice tests is inconvenient at best. Any program designed to make the job more convenient has potential. I'm sorry to say that *Multiple Choice Test* simply doesn't make the grade in my book. The program has many limitations and anyone contemplating its purchase should look very closely. You may find that it isn't right for you.

The program aids in the writing, printing, storage and grading of multiple-choice tests. One section allows you to enter test questions, choices and correct responses. It is this section which is most restrictive. The program allows questions to be a maximum of 96 characters long. This is far too short for many of the questions I regularly use on this type of test. The second restriction is in the number of possible choices. There can be only three. All of the multiple-choice tests I have seen recently have four or five answers from which to choose. If the program allowed two choices, it might be useful for true/false-type tests, but three choices is what you get and that is unnecessarily restrictive. Each answer choice can be up to 64 characters long which is less of a problem than the length limitation placed on questions.

The ability to edit questions hardly exists. That is unless you consider reentering an entire question as editing. There is no provision for using pieces from two or more questions to form a new test, so you cannot keep blocks of questions and build tests from them. There is also no provision for mixing the order of questions on a test or of mixing the order of the answer choices for each question. It would be handy to be able to do either of these things so that different versions of the same test could be produced with security.

The production or printing of the tests is another problem. There is no provision for changing the standard format which is: no left margin, one line between questions and the first answer choice and one line between answer choices. The program doesn't compress three lines of answer choices onto one line to save space, so a 50-question test will take something like eight pages to print. This is not counting the answer sheet.

There are two other main options in addition to those above. The first allows one person at a time to take a test on the computer. That could be useful under certain circumstances. The last option has the potential of being the most useful.

The program allows rapid entry of student responses to a test. This allows you to grade tests using the computer. There is little real advantage to using the computer for grading tests. But, since the answers are stored for each student, there is the possibility of using the data gathered in this way for test analysis.

Overall, the program operates somewhat sloppily. The main menu jumps every time it is presented. This is apparently due to the addition of choices to the menu after the original program was written. There is also a bug in the file save routine. If you hit the ENTER key in response to the filename prompt when the test is to be saved, the program enters an endless loop and the only way you just entered is lost.

There is certainly a need for a good, flexible multiple-choice test generating program in the educational community. Right now a good word processor will do the job, but something better suited to the job would be welcome. *Multiple Choice Test*, however, is not that program. Unless your test writing needs specifically fit the program, I would recommend a good word processor.

(D & D Software, Rt. 2, Box 47, West, MS 39192, 321 disk \$29.95)

— Donald L. McGee

### BASIC COMPILER

WASATCHWARE believes that users of the Color Computer deserve the right to use all 64K of RAM that is available in the computer, and have fast machine language programs that use the full potential of the 8089 microprocessor. That is why the BASIC compiler, called MBASIC, was developed. Here are some of the reasons that make this compiler one of the best bargains in this magazine:

- Programs can use all 64K of RAM for other program storage as well as for large numbers of variables and arrays like A(20000)
- Full floating point arithmetic expressions with functions
- STATEMENT and CALL commands allow for structured programming and more independent program development
- Full sequential and direct access disk files allowed
- BASIC source and M.L. output I/O to disk, tape or memory

#### COMMANDS SUPPORTED

1. I/O Commands
 

|       |        |        |     |       |       |
|-------|--------|--------|-----|-------|-------|
| CLOSE | CLOADM | CSAVEN | DIB | DRIVE | DIRKS |
| DEKOS | FIELD  | FILES  | GET | INPUT | KILL  |
| LSET  | OPEN   | PRINT  | PUT | REK   |       |
2. Program Control Commands
 


|         |        |      |      |            |       |
|---------|--------|------|------|------------|-------|
| CALL    | END    | EXEC | FOR  | STEP       | NEXT  |
| GOSUB   | GOTO   | IF   | THEN | ELSE       | ERROR |
| ON...GO | RETURN | STOP |      | SUBROUTINE |       |
3. Math Functions
 

|     |     |       |       |         |     |
|-----|-----|-------|-------|---------|-----|
| ABS | ASC | ATN   | COS   | CVN     | EOF |
| EXP | FIX | INSTR | INT   | LEN     | LOG |
| LOC | LOF | PEEK  | POINT | PPPOINT | RND |
| SGN | SIN | SQR   | TAN   | TIMER   | VAL |
4. String Functions
 

|       |          |        |       |         |  |
|-------|----------|--------|-------|---------|--|
| CHR\$ | INKEY\$  | LEFT\$ | MID\$ | RIGHT\$ |  |
| STR\$ | STRING\$ |        |       |         |  |
5. Graphic/Sound Commands
 

|        |        |        |       |        |       |
|--------|--------|--------|-------|--------|-------|
| COLOR  | CLS    | CIRCLE | DRAW  | LINE   | PAINT |
| PCLEAR | PCLS   | PLAY   | PMODE | PRESET | PSET  |
| RESET  | SCREEN | SET    | SOUND |        |       |
6. Other/Special Commands
 

|      |         |       |       |        |      |
|------|---------|-------|-------|--------|------|
| DATA | DIM     | LLIST | MOTOR | POKE   | READ |
| REW  | RESTORE | RUN   | TAB   | VERIFY | DLO  |
| DST  | ISHFT   | LEGB  | PCOPY | PMODD  | PTY  |
| REAL | SREG    | SVP   | VECTD | VECTI  |      |

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## Personal Finance System or Checkbook Organization

By Dennis A. Church

*Personal Finance System* is a disk-based checkbook filing program with some additions, requiring a 32K CoCo. It comes in a half sheet-sized envelope with a single diskette and 111 pages of legible, clearly-written documentation.

My first hour of working with the program led me to the conclusion that it had a bug. It would not allow the creation of the user's own checkbook file. When I called Computerware, they were friendly and aware of the problem. My original program disk was sent and returned with the "debugged" program in a week and a day.

*Personal Finance System* or *PFS* consists of 12 individual checkbook programs in BASIC which are constantly being swapped as the program is used. Generally this is no problem as they load quickly and the full range of options remains available, through menus, from any program in memory. The BREAK key is generally disabled. There are times, especially in the Loans/Investments section, when the program indeed broke, but typing RUN quickly returned the program to full function without loss of data. The program is protected, and the user is instructed to make a backup of the original disk for use.

The meat of *PFS* is the checkbook file function. This

creates a file of your checking account transactions that includes check (or deposit) number, date, payee, amount and budget account. The checking account balance is constantly updated and displayed when entering transactions. When entering checking or deposit information, any item can be revised before adding it to the record by simply choosing the number next to the item. You then replace that item with corrected data.

You also have the options of dropping the entire entry, adding it to the record, returning to the menu or continuing with the next transaction. Listing pre-authorized deductions or ADT withdrawals is taken care of by clever numbering. The documentation suggests using 99990-99999.

*PFS* periodically and automatically writes new data to disk. There is no "save records" option accessible to the user. When first using *PFS* you should select Change Startup Information from the menu. This introduces a menu that allows you to select or initiate a new checkbook file, set the printer Baud rate, determine the number of disk drives you want to use and choose whether or not to automatically load the indicated checkbook file. With a single disk drive, the documentation says up to 1,300 check and deposit transactions can be accommodated on the program disk. Using more drives for data-only disks gives 3,000 transactions on each disk.

Another process that must be undertaken before serious data entry is to customize the Budget/Expense categories to reflect your own financial situation. There are 48 possible accounts with which you must classify each check or deposit entry. There is a demonstration file on the *PFS* disk.

On the last page of the documentation is a sample

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printout of the accounts for this file. It shows account names, budgeted amounts, expenditures/deposits for the months and the amount over or under budget along with a summary of all figures. You will need to plan all account categories (including income) and amounts, then enter them into the Accounts/Budgets/Balance section of the program. The amounts may be changed easily. After checks are entered, the category names may not be changed, since they are tied to the data in the checkbook entries.

An interesting aspect to check entry is the feature that allows you to divide the amount of a single check if expenditures fit into more than one category. You may record the same check number as often as necessary, changing only the account category and the amount (to reflect only the portion of the check falling into that category).

The utility of the checkbook program lies in the fact that you can organize your income and expenditures by category. At the end of the year or quarter you may see totals of expenditures in tax deductible areas (contributions, for instance) or reports of sources of income (provided you deposited them in the checking account). The account balance can also be used in reconciling the bank statement with the checkbook.

Those summaries are all available as printouts only. Without a printer, some of the most useful options are unavailable to you. When "Print the Reports" is selected the records are automatically sorted and saved by date. You can then request deposits, expenses or account summaries for any range of dates. You may also limit the report to any specific account.

Before describing what is essentially a second, independent part of PFS, perhaps I should comment on the practice

of using the computer to do what your checkstubs have been doing for years. If you're wondering whether to be using a program like this you need to realize that will be recording every transaction twice: once in checkbook and once later on, sitting in front of the Computer. Is it worth it? You need to answer several questions.

Do you need easy access to expense summaries at time? Are you trying to stick to a rigorous monthly budget? Is it time you pinned down exactly where your money is going, and is it important to know if that pattern suddenly changes? Are monthly summaries of your financial transactions important to you? If your answer is yes, PFS will do well for you.

This package contains more, however, that may increase its worth to you. Two additional options on the main menu are Compute Loans and Compute Investments. This is my specialty, so I asked a friend who is an insurance investment counselor to explain some of the terms to me. Selecting these options loads a program that will compute a total of 18 different aspects of loans and investments. These include principal, payment, last payment, real terms and annual terms for loans.

The program will print out a mortgage loan amortization table and a declining interest loan table. The Investments module includes computations of the value or future value of an investment or regular deposits, amounts of investments needed for regular withdrawals, and nominal and effective interest rates. It will also generate a printout table of earned interest on an investment. If you understand all these terms easily, you best know your need for a program that quickly and easily computes them. That is not to say the average person can't find use in them. I have computed that if I want to have a decent retirement income I had better boost my IRA deposits dramatically.

*Personal Financial System* is a well-written checkbook record entry program, with handy extra features. It is clear, though not exhaustive, documentation and effective error handling. Its use of disk access does a good job of fitting large data areas and program features into 32K.

(Computerware, P.O. Box 668, Encinitas, CA 92024, disk \$27.95)

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### One-Liner Contest Winner

*Happyface* is a graphics animation program that shows an animated head with moving lips. This should entertain the kids for hours.

### The listing:

```
Ø PMODE4:PCLS1:SCREEN1,1:COLOR4:
CIRCLE(128,96),96,,.9:CIRCLE(75,
6Ø),15:PAINT(75,6Ø):CIRCLE(18Ø,6
Ø),15:PAINT(18Ø,6Ø):CIRCLE(128,8
4),15:FORR=1TO9:FORX=.Ø2TO.4STEP
.Ø2:CIRCLE(128,138),49,,X:NEXT:F
ORY=.4TO.Ø2STEP-.Ø2:CIRCLE(128,1
38),49,1,Y:NEXT,Y,R
```

Doug Wylie  
Mentor, OH

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



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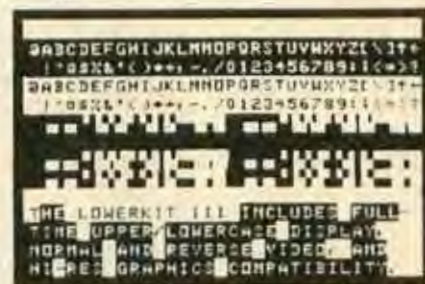
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Take 15 minutes. Put the Lowerkit in. A Lowerkit is simple, reliable — and it's always there. You flip on your machine, and Lowerkit's bold lettering greets you.

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And now, the new Lowerkit III includes a reverse screen switch as well. Big, bright green letters on a black background.



Original Color Computer Display



LOWERKIT III Display (reverse video, too)

Four years ago, the Lowerkit made history and set the standard in Color Computer lowercase. For example, game and education programs from Sugar Software have Lowerkit display options. Spectrosystems' ADOS supports the Lowerkit; so does Cer-Comp's TextPro. Cartridge Scripsit looks beautiful with a Lowerkit. Spectrum Projects, Cheshire Cat and many others have developed beautiful alternate character sets which you can download from Micronet, burn into an EPROM, and snap into your Lowerkit.

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All programs require a printer and a minimum of 32K and 1 disk drive but will take advantage of 64K and 2 drives. Each package features a hi-res 51 x 24 black on green screen.

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## Handycode — An Efficient Way To Keep Data Private

*Handycode* is an encryption program for the storage of small lists of information. Most people at one time or another have a need for the safe storage of sensitive or personal data. *Handycode* is just the program they need.

With *Handycode*, they can enter a list of such things as passwords they wish to keep secret, phone numbers they wish to keep private or even confidential records from their office.

When *Handycode* is LOADED and RUN, a standard screen page with a prompt for encryption or decryption is displayed. Having entered your choice, you will be asked for your secret password needed to gain access to the list. If you choose to encode, you will be allowed to enter your list which will be saved in coded form to tape or disk. If, however, you choose to decode, the program will immediately search for your file and proceed to decode it, listing it on the screen as it does.

*Handycode*, written for 16K ECB, is just what it claims to be: an efficient way to keep your information safe. The only real drawback is when using the disk version, you must rename the file before working with another list. I feel the author could have improved on the product by allowing the user to input the filename of his or her choice.

(V. Baumann, P.O. Box 415, Hammond, IN 46325, 16K ECB, cassette \$18.50, disk \$19.50)

— Stephen J.

### One-Liner Contest Winner . . .

This one-liner is a mini word processor which runs on a 16K ECB CoCo. The program prints only one line at a time, but you don't have to worry about splitting a word in the middle.

### The listing:

```
10 CLEAR 500:PRINT #-2,CHR$(26)
LINE INPUT D$:L=LEN(D$):FOR X=1
TO L:M$=MID$(D$,X,1):PRINT #-2,
M$:IF X>70 AND M$=CHR$(32) THEN
10 ELSE NEXT X:GOTO 10
```

Elizabeth Ligo,  
Miami, FL

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

## Create Animated Graphics With *Animator Junior*

*Animator Junior*, a recent release by Triad Pictures Corporation, is a simplified version of their 64K *Animator Commercial* program which was designed for commercial use. *Animator* is a graphics/animation program that allows the user to create animated graphics for enjoyment or BASIC program use. The *Animator Commercial* program was reviewed in the January 1985 issue of THE RAINBOW. *Animator Junior* uses 16 cels or 500 frames which gives you one and one half minutes of continuous animation. *Animator Junior* requires 16K of memory and uses "semigraphics" low resolution graphics.

I encountered two problems in using this program. First, the program will not work with a disk system connected to the computer. The problem is not the amount of memory needed to operate the program, but the location in which the machine language program resides. The program does not claim to work on disk systems, but I feel the user should be informed in the documentation that the disk must be removed. Personally, I feel the program could be adapted very easily to a disk system by adjusting memory locations.

The second problem was a syntax error in Line 0 of the BASIC *Loader* program. For my computer, the problem was a PCLS4 statement that should have been PCLS 4. This error caused other problems by preventing the machine language subroutines from being loaded until the computer was reset. The documentation attempts to help you with these loading difficulties, however, this problem was not mentioned.

The program uses four menu options to develop low resolution animation. The CEL-STUDIO is where you create the screens (or frames) in your animation. A cel

is a simple drawing and contains one frame. Using the arrow keys to move the cursor around the screen, you draw your picture using various colors. You can move from cel to cel by using the left- and right-arrow keys. A help screen is always available to assist you with color changes and erasing. You can write on the screen using the CoCo's letters by pressing the '@' key. There is also a "copier" that allows you to copy the contents on one cel to another. This is good for continuity.

Once the cels have been created, you sequence them. This is where you put the show together. This is like shooting an animated cartoon on film. You select a cel, shoot a frame of "film," select another cel, shoot it, etc. Then, when the frames, or cels, are displayed in sequence, you create an illusion of motion. The SEQUENCE option also has a help screen to assist the user.

To see your creation, use the DISPLAY option. The display option allows you to view your film one time or you can select a continuous option. This is a nice feature and opens up many options to the user.

The final menu selection is the CASSETTE LAB. Here is where you can SAVE and LOAD previously created shows. The documentation gives instructions for using the created animation in your BASIC programs. Also, two demo programs are included on side two of the tape. The first demo is a "slide show" presentation of a little man "waving." The second demo is a simplified demonstration of the piston action in an internal combustion engine.

Aside from the loading problems I encountered, *Animator Junior* is a well-developed and professionally written piece of software. I would consider this excellent educational software and just plain fun for anyone. The price is great and affordable for all. For program developers, you could create some fantastic title screens and menus with the help of *Animator Junior*.

(Triad Pictures Corp., P. O. Box 1299, Sequim, WA 98382, cassette \$16)

— J.D. Ray



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## THE SAILOR MAN

TAPE \$29.95  
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## GAMES

The first screen objective is to catch enough of Elise's knees (three full screen Shaped Things) to fit in the squares on the Saborian's boxes. If you can't lose your punch just so, you can take the punching bag over to smash the boxes down and, with a little bit of luck, ride on **Bigbadguy's** back! This will give you a lift (but not much) over to catch all those Reefs!

You must avoid contact with **Bigbadguy** who is actively pursuing you. You must also be careful of **Oldguy** who will appear at higher difficulty levels to check on you. (Either avoid the flying bottles or punch them with the fist button) to keep from being knocked into the water.



The second screen objective is to collect enough notes to play Elise a little love song. You may jump all over and over the other end of **Fairyqueen** **berger's** bookshelf to fly up a dock and over two decks if you manage to catch hold of **Smalwick** **kid's** grab handles. Follow a light and away you go!

The third screen objective is to collect enough letters (shown by Elise's cross for H-E-L-P) to complete a letter at the way to the cave's nest where Elise is waiting you. Beware of the **Crab**, however, who thinks you are after her eggs!

On all screens, eating a can of collect goods (labeled 'C' for Collins) and grasped by punching the can just right will give you amazing speed, strength and ability and allow you to send **Bigbadguy** into the air with a single punch.

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**The Sector Inspector** — Alphabetize, backup, and printout directory, repair crashes, LLIST basic programs, name disks, read in and edit 23+ gran, 3-swap backups, and more. Has 35-page manual and gran table print program. . . . .

\$29.95  
Disk

## NEW! EDUCATIONAL FACTPACK

FACTPACK is a set of 3 programs designed for home or school use. The programs provide drill practice with basic addition, subtraction, multiplication and division facts and are appropriate in grades 1-6. Each program requires a Extended BASIC Color Computer. Disk drive and printer are optional.

Requires 32 K Ext. Basic

Tape \$24.95

Disk \$29.95

## TEACHER'S DATABASE II

Teachers' Database (TDB) is a program designed to allow a teacher to keep a computer file of information about his/her students.

The program requires a 64K Color Computer and at least one disk drive. This complete revised program includes all of the capabilities of the original TDB plus many new features:

- Information on as many as 100 students, or more, may be in the computer at one time
- Each student may have as many as 20, or more, individual items of data in his/her record
- The program has many easy to follow menus
- Records may be easily changed, deleted, or combined.
- Information about students may be numerical or text.
- Records may be quickly alphabetized or reordered based on their contents.
- Records may be sorted by various criteria.
- A full statistical analysis of scores may be done and sent to the printer.
- Student test scores may be weighted, averaged, changed to a percentage or chart to a letter grade.
- Individual student progress reports and class gradebook sheets may be printed.
- Three methods of data entry speed the task of typing in student grades and test results.
- The program may be easily customized to work with any printer.
- Student seating charts may be created and printed.
- Graphs of student test results may be created using the computer's high resolution graphics screen.
- Grade distribution can be displayed numerically or as a histogram.

Requires 32K Ext. Basic

Tape \$39.95

Disk \$42.95

## VOCABULARY MANAGEMENT

Requires 16K Ext. Basic or 32K for printer output.

The Vocabulary Management System (VMS) is a series of programs designed to aid a parent or teacher in helping children to learn and practice using vocabulary and spelling words.

11 programs that comprise the VMS include a full feature data entry/edit program, three print output programs and 5 vocabulary/spelling game programs. The system's many outstanding features include:

- As many as 300 vocabulary words and definitions may be in the computer's memory one time.
- Words and definitions may be saved on disk or tape.
- Remarks and/or comments can be saved with word files.
- A disk loading menu allows students to load disk files without typing file names.
- Word lists may be quickly alphabetized.
- The three printer segments allow you to create and print individualized tests, puzzle word-searches and worksheets.
- The printer segments allow full use of your printer's special features.
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TAPE \$39.95

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6. Practice converting mixed numerals to mixed numerals.

### EQUIVALENCE

1. Definitions of terms and review of finding equivalent fractions.
2. Practice finding equivalent fractions.
3. Practice finding sets of equivalent fractions.
4. Review of finding if one fraction is equal to, not equal to, less than or greater than another.

### LOWEST TERMS

1. Review of placing fractions into lowest terms by dividing the greatest common factor (GCF) of the numerator and denominator.
2. Practice finding the GCF of pairs of numbers.
3. Practice placing fractions into lowest terms by finding the GCF of the numerator and denominator.

32K EXT BASIC

TAPE \$30.95

DISK \$35.95

## MATH DUEL

MATH DUEL is a challenging mathematics game that pits you against the computer in a game of wits. You must use all of your knowledge of factors, multiples and prime numbers to develop a strategy that allows you to get other more numbers and thus more points than the computer. The game is deceptively simple. You select the size of the playing field that is composed from 8 to 100 numbers. You must then choose numbers that will give you the maximum number of points and the computer the least number of points. There are only 6 rules.

32K EXT BASIC

TAPE \$24.95

DISK \$29.95

# SIMULATIONS

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WORLDS OF FLIGHT (WOF) is a "view" oriented flight simulation for the TRS-80 Color Computer, written entirely in Machine Language. "View" oriented means that the pilot may determine his or her position by actually viewing the surrounding landmarks as opposed to using instruments which sense navigational references. This is a major departure from "instrument only" simulations which can be achieved through BASIC programs. Most instrument maneuvers and procedures may be practiced. The craft is a light-weight, single-engine airplane with low wings. A nose wheel which is both steerable and retractable is also modeled. Some aerobatics are possible including sustained inverted flight, aileron rolls, spins and stalls.



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## Color Disk Manager — A Virtual Disk Saver

By Lewis R. Jansen

In the two years that I have had my disk drive, I have occasionally had a disk go bad. This has ranged from a single sector on the disk being trashed to most of the directory track getting erased. The latter happened only once but, fortunately, the Granule Allocation Table (GAT) survived. I was therefore able to rebuild the disk.

Good computer habits include making sure you have at least two copies of every program, preferably on different disks. Nobody is perfect, however, and I often have only one copy of something or only one copy of the latest update. What happens when you get a problem with the disk? Unless you know the Color Computer DOS well enough to rebuild a directory, you are probably stuck.

Enter *Color Disk Manager* from Sugar Software. This utility is pretty much an extended disk-zap program. By extended, I mean that this program supports 37 different commands. For a better picture, I'll go through some of them and give a brief description of each.

**LOAD SECTOR** loads a sector into memory from anywhere on the disk, and **LOAD TRACK** does the same thing, but for a disk track.

**SAVE SECTOR** saves a sector to the disk, and **SAVE TRACK** does the same for a track.

**LOAD FILE ADJUSTED** loads an entire file from disk removing header bytes if necessary. (Header bytes are used on binary files to tell BASIC where they are supposed to be loaded.)

**LOAD FILE NORMAL** loads the file into memory but leaves the header bytes (if any) intact.

**SAVE FILE** saves a file to disk, and allows you to change the start and exec addresses of machine language files.

**SAVE MEMORY BLOCK** saves a block of memory as a machine language file on the disk.

**BACKUP** is one of the more useful commands. It allows you to back up any number of tracks on the disk. You can back up anywhere from one track to an entire disk. If it is unable to read a bad sector, it will notify you and put a sector full of carriage returns (ASCII 13) in place of that sector, then continue.

**DIRECTORY** does a directory of the disk, gives you the number of free granules and the number of free bytes. If the number is below 65535.

**FILE MAP** gives you a list of the tracks, sectors, and granules occupied by the file that you specified.

**RAPID SCAN** lets you look around on the disk. It displays the current sector in ASCII and lets you move around on the disk with the arrow keys. The left- and right-arrow keys change the current sector, while the up- and down-arrows change the track. This is handy if you want to either search for something or look at a particular sector.

**ALLOCATION MAP** displays all of the granules on the disk showing the track and first sector for each, and tells you which granules are in use.

**INITIALIZE** allows you to erase and reformat any range of tracks and will handle tracks above the 35th.

**APPEND SECTOR** appends a sector from the disk to the end of the memory buffer. Used primarily in recovering crashed files.

**CHANGE DRIVES** allows you to change which drive is being used. It is possible to set one drive as the Input drive and another as the Output drive. Commands which read from a disk do so from the Input drive. Commands which send output to disk send it to the Output drive. At the start, *Color Disk Manager* has both the Input and Output drives set as drive 0.

**RECOVER FILE** recovers a file from the disk, provided that the Granule Allocation Table is still intact.

**GO TO ADDRESS** acts like an EXEC from BASIC. Control of the computer is passed to the routine at the memory address that you specify.

**MOVE MEMORY BLOCK** allows you to move a block of memory to a different spot.

**DECIMAL TO HEX** and **HEX TO DECIMAL** allow numeric conversion for you and **EXAMINE MEMORY** lets you look at, and change if you want, an area in memory. You specify the location to start at and can move around with the up- and down-arrow keys. Memory can be displayed in Hex, decimal or ASCII.

**ASCII DUMP** dumps the contents of memory starting at the address you specify to the screen in ASCII form. During the dump, you can pause or exit at any time.

**CHANGE FORMAT** changes the default output format.



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## Cassette Tape Tester Affords Security For Data

The review copy of *Cassette Tape Tester (CTT)* arrived — on a disk marked "Generic Mini-Floppy Disks" — with no real name or address, no real documentation (the page of instructions is a printout from the disk itself) and no indication of what CoCo configuration it is meant for, beyond a penciled note "16K tape or disk" on the upper right-hand corner of the instruction sheet. As it happens, you need no more than that.

When you LOADM the program you learn it was written by Bill Nethken and distributed by Free CoCo Software. They hope if you like the program you'll send them whatever sum you think it is worth. I like the concept. The distributors should welcome the private circulation of backup copies, as it would multiply their chances of seeing some return on their investment without multiplying their investment, but they have retained copyright on the program and anyone caught selling it would be subject, quite rightly, to prosecution.

The program itself is simple enough. It writes a stream of data to a previously erased tape and then reads the data back to determine whether the tape is faulty. The instructions are clear about how to do this.

How well does *CTT* work? Well, it does what it claims to do. I found it reported a bad read about one time out of five on the same tape, but who is to tell what transient hobble in the power supply might have contributed to that? The instructions recommend you test the tape twice; a few more tries will hurt nothing. After using the program a cold start will be necessary, as it does lock up the computer.

*CTT* affords some additional security for data stored on tape, and even those who have gone entirely over to disk may find this helpful if they use cassettes for any purpose, such as archival backups of disks. And who can complain about the price?

(Free CoCo Software, Box 2231, Westover, WV 26502, machine language, 16K cassette or disk. Contributions accepted.)

— R.W. Odlin

### Hint . . .

#### 64K Memory Upgrade: CoCo 2 With Eight RAM Chips

Install a set of 4164 64K RAM chips in place of the eight 16K RAM chips near the lower right corner of the board. On U.S.-made CoCo 2s, solder together the two adjacent PC board holes marked W1 next to the 6822 chip. On Korean-made computers, connect the two holes together in the white box marked 64K.

default can be either Hex or decimal. An option lets choose whether or not to be prompted for the format; a command offers both.

FROM TO RAM turns the 64K mode on and then copies ROMs to RAM; EXEC ROMPAC turns on the 64K mode, moves a file from the buffer to the memory that ROM pack would normally occupy, and then executes

APE LOAD loads the next file from tape into the buffer. If it is a binary file that resides in the same memory Disk BASIC's variable and buffer storage area (\$600-0), you will be asked if you want the program converted to will load and EXEC properly from a disk.

KIP FILE searches the cassette for the next end-of-block. It doesn't verify the cassette data like SKIPF, but it can be used in the middle of a cassette file without trouble.

LOAD GRANULES loads a range of granules from the disk into the buffer as a file.

WRITE PROTECT ON-OFF lets you enable/disable software write-protect switch. When enabled, any command that writes to the disk will abort.

There are also two subroutines included with the program. By typing TRKF/SUB you will find out what file is on a given track and sector and typing HIDEGRN/SUB will protect/unprotect a granule from BASIC. HIDEGRN is handy for hiding a bad granule from BASIC when the granule of the disk is still good.

On to the 29-page manual which came with *Color Disk Manager*. In a word, excellent. I didn't find any major typographical errors and everything is thoroughly explained. All of the commands are explained, as well as anything you need to know in order to effectively use the program. It does not, however, re-explain Chapter 11 of the *TRS-80® Color Computer Disk System Owners Manual & Programming Guide* which you get when you buy your first disk drive system. I suggest you read that chapter before reading the *Color Disk Manager's* manual.

There are two things that really should be added to this manual: an index and table of contents. I would find myself poring through the manual in search of the description of a command, when an index could have told me the exact page immediately.

The program itself is menu driven. In other words, you enter a choice from the current menu, or hit BREAK to get the next menu. There are four different menus, and you can only move to the next; there's no going back. Of course, when you go past the last one, you go back to the first. I found it irritating to have to go through three menus to get back to the one I just passed. Another thing should be added for going backwards. That's the only blemish I had with the program.

All in all, *Color Disk Manager* is a professional package. It does require a 32K Color Computer (minimum), but I believe that 32-64K has now become the standard for CoCo systems. Should you buy this program? It depends on your needs. If you can never remember to make sure you have backups of programs, then I suggest you get it. For \$35, it provides a lot of insurance against losing your hours of work.

Sugar Software, 1710 North 50th Ave., Hollywood, FL 33021, 32K disk \$34.95 plus \$1.50 S/H

## ANIMATOR COMMERCIAL Creates Eye-Catching Displays

I can remember in grammar school how I used to draw little stick figures on the page margins of my textbooks and flip the pages rapidly to produce crude animation.

*ANIMATOR COMMERCIAL* provides the 64K Color Computer owner with a color animation studio of limited capability.

Two versions of the program are supplied on the cassette which is not copy-protected. One is the semigraphics version, while the other employs a screen resolution of 128 by 96.

After you `LOAD` the `BASIC` program and run it, the tape recorder loads in a machine language subroutine. After it loads, you are greeted with `!!! ERROR IN 1`. The Line number 164 referenced in Line 1 does exist but the `ML` routine seems to interfere with the stack or some essential pointers. If you type `RUN` again it seems to work without problems.

Demos are provided to allow you to see right away what can be done with *ANIMATOR COMMERCIAL*. In the Hi-Res mode, 12 screens or cels are available, while the semigraphics mode has 100 screens.

In *ANIMATOR COMMERCIAL*, you draw the

background and copy it to other cels and make changes or additions to produce motion effects.

The graphics editor allows you to set points, draw or circles and paint, using one of two available colors of four colors each in the Hi-Res mode. The semigraphics version lets you put eight color graphics block characters on the text screen.

Creating cels can be a long and tedious job with a mispossibly spoiling many hours of work, but the editor has a very useful feature that allows you to view each add or change in artwork before it becomes finalized.

Once the cels you have drawn are to your satisfaction you use the sequencer to program which cels will be displayed and for how many seconds (one through ten seconds range). After all this work you are finally rewarded with the fruits of your efforts.

Except for the aforementioned bug, the program produces simple slide shows and animation-like effects. Rapidly viewing the cells gives the best effect but it does last very long (only two seconds when run from start to finish), but you may include an auto repeat that continually repeats the cel display for as long as you want. That two-second show is in sharp contrast to the ten or four minutes it takes to save or load the cels from cassette storage.

Simple instructions are given for appending animation cels to your own programs, but due to the amount of memory required to contain the cels, your program will have to be fairly short to take advantage of this feature. You must be very careful that your program doesn't overflow memory containing the cel data.

The documentation is very well-written with step-by-step instructions that are easy to understand and get you going in the minimum amount of time.

As a draftsman and artist with some professional animation experience, I find it hard to imagine anyone actually using this program to produce professional commercial animation as the name and advertisement claim. I do believe it has a lot of potential for use as a titler for homemade videos and for producing eye-catching sales displays.

Retailing at \$50 a copy, *ANIMATOR COMMERCIAL* is expensive, but for those interested in learning the fundamental aspects of animation, it may be just what you are looking for.

(Triad Pictures Corp., P.O. Box 1299, Sequim, WA 98382, cassette \$50)

— J. Michael Now

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- \$49<sup>95</sup> (plus \$3<sup>00</sup> shipping)

#### SP-3 INTERFACE for MOST OTHER PRINTERS:

- 300-19,200 BAUD rates
- External to printer — No AC Plugs
- Built in modem/printer switch—no need for Y-cables or plugging/unplugging cables
- \$64<sup>95</sup> (plus \$3<sup>00</sup> shipping)

Both also available for RS-232 and Apple IIC computers.  
Co Co Serial Cables 15 ft.—\$10.  
Co Co RS-232 Cables 15 ft.—\$20. Other cables on request.

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#### Hint . . .

### 64K Memory Upgrade: CoCo 2 With Two RAM Chips

The two-RAM chip CoCo 2s use the new 4466 RAMs (or the NEC uPD41254) for the 64K upgrade. Install a pair of these in place of the two 4416 RAM chips located between the gray sockets; connect the two holes together in the white 64K box on the left side of the board.

## Missile Math Is A Winning Tool

When I first received *Missile Math* and saw it was written by the Middletown Educational Software Association, I wondered if it was written by a group of teachers. Being a teacher myself, I thought how great it would be to have teachers writing educational software because they would know what is needed in the classroom. The only thing better than having teachers write the software, in my mind, would be to have students, supervised by teachers, writing

I was pleasantly surprised when I called MESA about the question I had concerning the program to find that it was, indeed, written by students; a third year high school computer programming class which, for their final project, decided to write and market a program. This is the first of their efforts and I am looking forward to seeing their future projects.

*Missile Math* is written for 32K Extended Color BASIC using either a cassette or disk drive. It comes with an eight-page instruction book that not only tells you how to run the program but also gives ideas on how to use it in a classroom, hints on what to do if things don't work right and an evaluation form to send back to MESA after you have used the program for a while. They have also included a "summary of key functions card" which can be placed beside the computer when the program is being used.

When you get *Missile Math* you are instructed to make a backup copy to use, then either CLOAD and/or RUN the program. After an initial display of a missile destroying a city, there are three choices you can make: 'I' for instructions, 'R' to review addition tables and 'S' to start the game.

*Missile Math* is a drill and practice game with a tutorial section designed to aid elementary students in addition. In the game, students have 12 cities they protect by correctly answering addition problems. There are 10 levels of problems ('A' through 'J') ranging from simple facts to four digits added to four digits with carrying in all columns. These problems are shown at the bottom of the screen along with a display showing the number of "smart bombs" they have.

Students can acquire smart bombs in the five hardest levels by going through a two-minute drill answering addition facts. They receive up to five bombs which can then be used in the game if they get stumped on a problem.

After the problem is displayed, a missile descends toward a city. During the first part of the game they descend slowly, but as the game progresses the missiles descend faster and faster. To get rid of the missile before it destroys anything, the correct answer must be typed in and ENTER pressed. The missile will stop as soon as a key is pressed but there is only fifteen seconds to finish the answer before the missile continues to descend and destroy a city. If students get the answer right and press ENTER in time, the missile is destroyed. If they get the answer wrong, or take too much time, a shield or city is destroyed. This continues until all cities are destroyed or they press 'Q' to quit. When

either of these things happen, the score is displayed and students are asked if they want to play again.

Besides being able to destroy missiles with smart bombs, it is also possible to receive help in answering problems by pressing the 'H' key in every level but 'A' and 'B', which are facts levels. If the 'H' key is pressed in levels 'C' through 'E' students can page through tables where they can find answers to facts and then return to the same problem to finish it.

In levels 'F' through 'J', when the 'H' key is pressed, a lively tutorial with numbers moving around the screen appears, displaying answers and demonstrating how to carry if the sum of a column more than 10 is shown. Students are then given a new problem.

The students in my sixth grade class just love these kinds of programs. I had a couple of them come to my house to test their reactions and was not really surprised. Anything that has action, movement, color and sound immediately appeals to them and *Missile Math* has plenty of it all. A tutorial with a game that is similar to the popular game *Polaris* is a winning combination for getting students interested in doing math.

*Missile Math* covers the subject of addition in small steps allowing for students of all ages to have an enjoyable experience with the computer. The only suggestions for improvement that I have would be to include a menu where the speed of the missiles could be controlled, the number of cities limited and where an amount of time for playing the game could be set. I think if these suggestions became part of the program it would be easier for students to use *Missile Math* as a tool for competition and improvement between themselves and the clock. It would also give the program a little added versatility in a classroom where there are not many computers per student and time on the computer is a critical factor. I do not believe these areas of concern are serious enough to dismiss this program from consideration. *Missile Math* is a fine program to have and use.

I like *Missile Math* and would recommend it as a program worth the money it costs for several reasons. It is well-done and impressive. The graphics are effective. The scope and sequence of the curriculum are well thought out. The tutorial for levels 'F' through 'J' is very catchy. The manual that comes with the program is complete. And finally, I am very impressed with a teacher who would take the time and effort to not only teach computers and computer programming, but who would go the extra mile to provide direction and stimulation for students to start a business and achieve something with what they have learned.

(MESA, Middletown High School, Valley Road, Middletown, RI 02840, tape \$24, disk \$26)

— Tom Nedreberg

Hint . . .

### To Hex With Decimal

To convert a hexadecimal number to decimal on an Extended BASIC machine, type PRINT &Hxxxx. To convert from decimal to Hex, type PRINT HEX\$(yyyyy). Note that "xxxx" is a Hex number between 0000 and FFFF, and "yyyyy" is a decimal number between 0 and 65535.

## File 64 Is A Great File System For Cassette Users

*File 64* from Owls Nest Software is an excellent file system for those owners of 64K Color Computers without disk systems. The program will produce and maintain a data file of up to five fields (subcategories). The information may be sorted, modified, added to or deleted as desired.

Your data may be displayed on the screen or sent to your printer. The program is very easy to learn and comes with a brief but adequate set of instructions as well as a backup program tape for those who don't want to figure out how to make their own backup copy.

A database, for those not familiar with the term, is a computer file system that allows the user to store various related pieces of information (such as inventory, record collections, etc.) so they can be located and sorted in various ways and printed on the screen or on paper in an easy-to-use form. Some databases are quite complex and provide the user with so many options that they are almost computer languages in themselves.

*File 64* is a database in its simplest form. It files, sorts and retrieves information much like a simple card file. The nice thing about such filing programs is they can be used fairly quickly and *File 64* is no exception.

On the plus side, *File 64* is extremely easy to learn. (Owls Nest Software has used extensive prompting so anyone who has used a file system before could probably use *File 64* without reading the directions. The instructions are written, however, and worth the 10 minutes or so it takes the user to read.)

After loading the program, the user sees a menu which is self-explanatory. The first-time user will head for the Input Data section and then will be asked to define up to five fields for his file system. If, for example, the file is of names and addresses, the first field would be name, the second, street address, and so on. After defining the fields, the user types in the specific data and returns to the main menu to locate, modify, delete, sort, save, list, show or print the materials. The screen always prompts for the action or actions that should be taken next.

*File 64* will hold up to 250 records. A single record may be up to 250 characters long. The program converts 64K CoCo into a true 64K computer and holds all data in memory until it is saved to cassette. Since the program is written in BASIC, if the user should accidentally hit the BREAK key, or, for some reason, an error message, the user is told to type GOTO 5 and the data in memory will still be there as the program restarts.

Sorting is very fast through the use of a machine language routine. The documentation claims that a file of 200 records can be sorted on three field levels in less than 20 seconds.

As simple as it is, *File 64* lacks a number of things one would have liked to see in such a system. There is no way to add data from various fields to form a summary file. The program is set at a printer Baud rate of 600 and the user must do some poking to get it going at the popular higher rates. The report (printout) is limited to one form.

As a longtime disk user, I was a little bit skeptical as to how fair I could be to return to cassette and rely on a tape-based file program. I was quite impressed with how well *File 64* operated and how easy it was to learn. Owls Nest Software has done a very good programming job and has put together a very neat and easy cassette-based file system. The user should remember that this is not a super fancy relational database system but performs exactly as advertised as an easy-to-use file system. What more do you ask?

(Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363  
64K cassette, \$24.95)

— Brian Jai

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### Hint . . .

## What's Your ROM Version?

With all the talk about new ROMs, you may be wondering exactly which ROM you have. If you have an older CoCo with Extended BASIC, just read the version number of your Extended BASIC at the top of the screen on power up. Then, to see which Color BASIC ROM you have, type EXEC 411.75 and press ENTER.

If you have the new ROMs, Extended BASIC will be version 1.1 and Color BASIC will be Version 1.2.

On the CoCo 2, Color BASIC will always be Version 1.2 or 1.3 (which are functionally identical).

## Golf Handicaps Keeps League Statistics Up To Par

*Golf Handicaps* is not a game and is a serious attempt to provide a golf league secretary (or individual) a means of computing golf handicaps for a group of players. The size of the group is adjustable, but the program user must enter into the program to modify the program line for changing numbers to suit the situation.

While the program was written to conform to the Southern California Golf Association (NCGA) rules, the program is open to modification to any local rules since the material is supplied unprotected. Modification, however, would require some knowledge of programming. Unfortunately, in this part of Pennsylvania, the NCGA rules were not available to refer to in doing this review. The best source of input came from the golf pro at the local public course. He noted that *Golf Handicaps* should be very helpful to golf leagues in which different courses are used throughout the season. *Golf Handicaps* provides for the use of the course rating which may or may not be used for the course.

Use of the course rating allows for equating the level of difficulty of the course and the players' scores. Thus, the scores for team members are computed against the course rating, and the difference between the rating and score becomes part of the pool of differentials used to arrive at the handicap. The program provides for the entry of differentials out of which the 10 lowest are selected to arrive at the handicap.

As an example, after the program has been loaded and the data file called up, each player would have a set of differentials in the file and a handicap computed up to that point in time. Now, as a new set of scores is entered, the result of the latest round of golf, the program allows the previous handicap to be used to adjust the score and then also compute a new handicap. The author warns the user that it may take two to three minutes for each player's history to be updated. (A machine language routine to handle the math would really speed up the procedure.) The program will supply the user with printouts of the player's name, team number (if used), gross score for that player's play, the old handicap (from last entry), any adjustments required for bogies, the new handicap and a place for "remarks" to be entered. The print routine is designed for an Okidata 82a with 600 Baud transfer rate. The author has provided for the user to get automatically the number of copies of the printout the user might need by entering the number at the prompt.

A printout of the differentials table for each player is also available as a selection from the menu. Corrections to the table are provided for in the program, so if a wrong score is entered for a player, it is no problem to correct.

The program was written by a golf buff because it has some traps and hazards. However, a user can play around with it and establish an NCGA handicap. The first major hazard is the all too brief instructions (a two-page printout). The actual program is filled with REMARKS which provide additional insight into its operation. Since the program

is supplied unprotected, it is possible (nay, necessary) to run a printout of the program for the additional information.

The second hazard occurs in entering the original data to establish individual files on each player. If the user should enter more than 20 differentials, the program goes "out of bounds" and all the data is lost. While it does not affect the program, the method of entry of data is a little strange in that after a score is entered, the information remains on the screen and the next entry is written over the last entry.

The program is supplied on tape, but is designed to be used with a disk drive and tape unit. When exiting the program, the data file of players and their scores is saved to the disk and two backups of the program and data file are saved to tape. The double save to tape is insurance, but if a disk unit is online, backups to disk are much faster.

About the only option this program did not include was getting a tee time at a public course! While it may not interest every golfer, it should be of special interest to golf league secretaries with a Color Computer.

(Don Hug, 1111 Terra Way, Roseville, CA 95678, tape \$35, disk \$39)

— Robert E. Foiles

```

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## CoCo Enters A New World With *The Magic Box*

What's so magic about *The Magic Box*? Well, like magic it will allow you to read Level II BASIC program tapes from a Model I or III into your trusty CoCo. The *Box* part of this magic is a special cable that plugs into the right joystick port of the CoCo and the earphone jack of the cassette tape recorder. So what you get when you buy this package is a cassette tape, the cable and a four-page instruction sheet.

The instructions are quite clear and point out the many differences between the CoCo and the Model I/III computers. Paramount of course, is that while the CoCo uses a 6809 microprocessor, the Model I/III use a Z80, and for that reason machine language or "system" tapes from the Model I/III cannot be read. In fact, the CoCo's BASIC and the Model I/III's BASIC are also different versions of Microsoft's BASIC and some modifications to the programs after loading into the CoCo are often required.

The instructions do a good job in pointing out these differences and how to deal with them. Also noted is that Model I/III tapes load into the CoCo best when using a Radio Shack CTR-80A tape recorder. I can certainly

attest to that statement! I could not get any Mod programs to load at all with my Radio Shack CTR-80A tape recorder that I normally use with my CoCo. Luckily I had a CTR-80 on hand from my old Model I days it worked just fine.

A very good calibration technique is used with *The Magic Box* software to get the critical volume setting just right when loading in the Model I/III programs. As you may or may not know, the Model I is notorious for pain sensitive volume settings. The authors of *The Magic Box* were wise to recognize this problem and include a solution with the software.

I loaded in several Model I programs with little difficulty but had to edit several lines to get the text to display correctly on the TV screen. This is because the Model I/III use 64 characters per line while the CoCo uses 32. Other than that, and some other commands unique to the Model I/III that had to be converted to CoCo lingo, it worked beautifully.

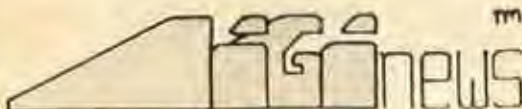
By the way, when the CoCo encounters one of these unique commands, it highlights it by inserting asterisks before and after the command. It's pretty simple from that point to locate these bugs and edit them out.

Another point to remember is programs using graphics will also come out looking pretty weird. That's because of the different graphics capabilities of these computers. The Model I/III have 1,024 PRINT @ positions while the CoCo has 512. This makes it a real challenge to convert some of these programs to work on your CoCo.

In spite of the many differences between these computer systems, *The Magic Box* offers a viable solution to those who have the patience to modify BASIC programs. It provides the CoCo user with a whole new spectrum of software. So dust off those old Model I/III tapes and witness the magic.

(Spectrum Projects, Inc., P.O. Box 21172, Woodhaven, NY 11421, \$24.95 plus \$3 S/H)

— Jerry Semo



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### One-Liner Contest Winner . . .

This program will alphabetize a set of strings. First enter the number of strings to be sorted, then enter the strings one by one. (Note: Be sure to include the spaces shown in the listing.)

#### The listing:

```
Ø CLS: INPUT "#"; N: DIM A$(N), B$(N)
C(N): FOR X=1 TO N: INPUT "$"; A$(X): NEXT X
NEXT: FOR X=1 TO N: FOR Y=1 TO N: IF A$(X) > B$(Y) THEN C(X)=C(X)+1: NEXT Y, X ELSE:
NEXT Y, X: FOR X=1 TO N: B$(C(X)+1)=A$(X): NEXT: FOR X=1 TO N: IF B$(X)="" THEN NB$(X)=B$(X-1): PRINT B$(X): NEXT X
SEPRINT B$(X): NEXT
```

James Fowler  
Glen Burnie, MD

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

## CoCo Talker Speaks For Itself

If you have a voice pak then you should not be without *CoCo Talker* from Computerware. No matter what brand your voice pak, Computerware probably has a version that is compatible. The version I will be reviewing is for the Radio Shack *Speech-Pak*.

*CoCo Talker* comes in an attractive package with an 11-page manual. The first page gives warranty information and requests that you not pirate Computerware's software. The other 10 pages contain complete instructions as well as programming examples.

The disk I received contained seven files. These included a text-to-speech translator, an exceptions dictionary for the translator, a manager which allows the user to alter the dictionary, and a "Talking Head" program. To get into the translator, you simply type RUN "SPEAK". You are greeted with a menu which allows you to enter text and have it spoken.

One note here: Although this program worked flawlessly, the instructions gave no information on how to use phonemes. Computerware also neglected to include a list of phonemes in the package. This is a major drawback since phonemes are required to edit the dictionary.

Another option which the translator allows is *echo*. After choosing this option, you may return to B and from there each alphanumeric character that is printed on the screen will also be spoken. Simple keystrokes allow you to toggle this mode on and off and also switch between word and letter echo. In my opinion, this is where the software shines!

Even if you don't use the echo, the translator may be used with simple *USR(X)* functions. The translator includes a dictionary of exceptions which it checks before speaking each word. If it finds the word to be spoken in the dictionary, it will use the predefined phonemes to speak the word. If not, it uses a standard phonetic algorithm for the voice. I found the translator did an excellent job and rarely did I find it necessary to intentionally miss a word for better pronunciation.

The Talking Head program is, of course, the most interesting of all of the programs. It is actually just the translator attached to the graphics subroutine which makes a Res graphics head's mouth move as the computer speaks. Although it is very entertaining, I can think of no practical uses for it. Note here that you must have a disk system for the Talking Head program. All of the other software works with cassette.

Overall, I would highly recommend *CoCo Talker* to anyone who has a voice pak. I congratulate Computerware and Frank Delargy for an excellent utility, but I feel the package does have one major flaw. If you don't know anything about the use of phonemes in voice synthesis, that is, the software will be completely useless to you because the instructions are very sketchy in that area. Furthermore, you will be unable to alter the dictionary as it also needs phonetic input. (This is not a software flaw — everything worked fine — this is merely a lack of documentation which I am sure will be remedied.) Even with this drawback, *CoCo Talker* is an excellent addition to anyone's software library.

(Computerware, P.O. Box 668, 4403 Manchester Avenue Suite 102, Encinitas, CA 92024, tape \$21.95, disk \$24.95)

— Rick R...

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### One-Liner Contest Winner . . .

This one-liner is for disk clean-up time. When your disk is full of useless files, instead of typing the *KILL* command over and over, use *Killprog*.

#### The listing:

```
Ø CLSØ:PRINT" HIT @ THEN ENTER  
OR DIRECTORY":PRINT@67," HIT /"  
HEN ENTER TO END ";;PRINT@224,"  
ROGRAM NAME/EXT: ";;LINEINPUTA$  
PRINT@485," ANY KEY TO CONTINUE  
";:IFA$="/"THENCLS:ENDELSEIFA$=  
@"THENDIR:EXEC44539:GOTOØELSEKI:  
LA$:EXEC44539:GOTOØ
```

Bob Kult  
Marshfield, W

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

## ACDITS Does Inventory For Your Disk Files

Aurora Computing Disk Information and Transfer system, or *ACDITS*, will assist you in organizing your disk files and transferring disk to tape and tape to disk. The program (actually two programs on the system disk) requires a minimum of 32K and a disk drive.

*ACDITS* works flawlessly in performing the three functions described:

- 1) The creation of a disk information file on each disk in your library that contains detailed information about that disk. This file can be output to the printer or screen. Labels can be printed for each disk jacket.
- 2) A catalog can be created of all your disk files. An entire catalog can be output to the screen or printer. While working with a catalog file you can search, delete or append.
- 3) Transferring files from tape to disk or disk to tape. In the tape to disk mode you can either transfer an entire tape to disk or transfer a single file. In the disk to tape mode only one file can be transferred at a time.

In order to make a disk information file for a disk it must have at least one free granule. You will be asked input a date (up to 12 characters), a disk ID number (0 to 255) and a disk name. The computer will then read the directory and write a file to the disk. Information about a particular disk can be printed to the screen or printer. The information printed includes the filename/extension, the start, end and EXEC addresses of machine code programs, the disk ID and the number of granules the file uses, all sorted by filename. If your output is to screen you can use the arrow keys to scroll through the information. For files sent to the printer you are asked for an appropriate Baud rate (300, 600, 1200 or 2400).

In creating a catalog mode you can create one big catalog for all your disks or a catalog for each category of disks that you have, i.e., utilities, Adventures, games, etc. Each catalog file will contain the same information about each disk as the Disk Information File mentioned above.

A catalog can be output to the screen or printer. When output is sent to the printer the computer will automatically page files after each 50 have been printed. It will not number the pages, though; this would have been nice.

The Search function will tell you which disk(s) a particular file is on. You will be provided the same information mentioned in the Disk Information File. The search function works fine but you are required to type the entire filename, including extension. It would have been nice if you were allowed to type in part of a filename. Individual Disk Information Files can be appended to a catalog file at any time.

You are given two options for deletion of information. You can delete an individual file from a catalog or, if you wish, you can delete an entire disk from a catalog. In this second mode all files will be deleted that have the disk number entered.

Attractive labels can be made for your disk jackets. The

files are printed out three across in vertical, alphabetical order. At the top of the label the number of free granules remaining on the disk and the disk ID number are printed as a title.

The Tape to Disk option will allow you to either transfer all files on a tape automatically to disk or you can be selective and make a decision as each file is loaded in from tape. This portion of *ACDITS* is a separate program and can be used by itself if you wish. You are limited to transferring files of no more than 24K.

The Disk to Tape option allows transfer of files included in a Disk Information File to be transferred to tape. It is not a stand-alone program and files must be included in *ACDITS* file before they can be transferred.

*ACDITS* is a relatively easy program to use and seems to be designed so you won't easily lose data. Most of the time it is user friendly, but there are some areas where this could be improved. As mentioned earlier, when entering filenames you must use a backslash (\) between the filename and extension. If you try to enter a filename using a period (.) *ACDITS* will not accept it. This proves to be quite irritating if you are used to using the period. Another area that could be improved is the Search function. To search for a file you have to type it in exactly as it appears in a catalog. It would have been nice if you could just type part of a filename and search for all occurrences of that particular string. One other thing that would be nice is for automatic page numbering on printouts of more than one page.

That's enough criticisms. All in all, *ACDITS* is a good program for disk file cataloging. I have two other similar programs that have some nicer features but they don't have the file transfer capabilities that *ACDITS* does. *ACDITS* comes on disk with eight pages of documentation. If you're looking for a program that does the things I mentioned above, then this is a reasonably priced program to take care of those needs.

(Aurora Computing, 49 Brookland Ave., Ontario, Canada L4G 2H6, disk \$19.95)

— Michael Hunt

### One-Liner Contest Winner . . .

This program uses the CoCo's fast screen printing capability to create optical illusions with your own name (or any string).

#### The listing:

```
1 P$="T255BA#AG#GFFEE-DC#C":CLS4
:INPUT"NAME";A$:CLS3:FORN=1TO2:PL
LAY"O5BP255":NEXT:PLAY"O4"+P$+"O
3"+P$:FORN=1TOLEN(A$):PRINTMID$(
A$,N,1);:PLAY"O2P1"+P$+P$:NEXT:F
ORN=1TO99:PLAY"V31O2BB":B$=B$+"
":FORM=1TO250:PLAY"V8O5B":PRINTA
$+B$;:NEXTM,N
```

Steve Sward  
Bellevue, NE

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



## VIEW-EDIT: A Dynamic Approach To Image Processing

By Dan Downard

Recently, a review appeared in THE RAINBOW (June 1985, p. 197) for VIEW-II and CoCoGrey, a complete SSTV receiver for the CoCo. SoftCircuits has introduced a set of image processing programs called VIEW-EDIT that make this combination hard to beat for 8.5-second slow

VIEW-EDIT requires a disk-based 64K CoCo and one tick. Disk BASIC is recommended, but ADOS will work well. It is not necessary to have the CoCoGrey medium resolution adapter, but I would highly recommend its use. CoCoGrey is a hardware modification that gives you 128-by-192 resolution.) The software is non-protected, so you can make as many copies as you wish for your own use. The documentation consists of an attractive 16-page booklet that is above average in explaining the functions of the program.

The best way to describe VIEW-EDIT is to point out some of the high points of the program. It is truly an image processing system, not just another graphics program.

VIEW-EDIT pictures are stored in an 8K format with one byte representing two pixels on the screen. Two 128-

by-128 screens are available for editing; these screens are called buffers. At any time during the editing process a 16-level gray scale can be called by positioning the cursor at the bottom-left of the screen. With this feature the current gray level for the cursor can be changed at will.

The menu is joystick driven by positioning the cursor next to the function desired. Depressing the firebutton activates that particular function. A Help function is available in case you need to refresh your memory on the function in question.

Define is the heart of any function selection. Define allows the selection of the area of the image you wish to process. After you Define the area, you can either use it as a Stamp or a Window. A Stamp, as in many other graphics programs, allows the duplication of the defined area to another portion of the image. The Window mode allows processing on a restricted part of the image. Of course, you can Define the entire image as the Window and perform functions on the whole working buffer.

An Undo function allows the cancellation of the previous operation. This is really nice for making changes if things didn't work out the way you planned.

A multitude of functions can be performed on the Stamp buffer. It can be flipped horizontally or vertically, rotated, shrunk, expanded, inverted, blanked or filled with one of 16 gray levels. These features allow the generation of tremendous graphics designs from scratch.

The whole scheme of operation amounts to defining your stamp using a rubber band rectangle. This same rubber band technique is used to place the stamp at any position on the screen. Hence, there are actually no shrink and

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expand functions, as these features are automatic. A status line is included at the bottom of the screen for maintaining the correct aspect ratio of the Stamp image.

A Text function allows the generation of up to nine characters at a time. Characters are placed on the screen with the same rubber band method as in graphics editing. This is one of the weak points of the program, as only coarse block lettering is available. At the same time, this type of lettering is common for slow scan transmissions due to the need for contrast.

Fatbits allows individual pixel editing by expanding the screen so each pixel can be set to a distinct gray level. A picture could be created by this method, but it is very tedious to say the least.

Lines and circles can be generated using rubber band techniques with the joystick. As in all other features, the function in question is generated in any one of 16 gray levels using the drop-down palette of colors, or gray levels.

The features that really distinguish *VIEW-EDIT* from other graphics programs are the image processing functions. One has already been mentioned, Invert. A pixel-by-pixel, gray-scale inversion can be performed on the Stamp buffer, giving you a video negative.

In addition, several filters are available, including low pass, high pass, notch and peak. A histogram of the image can be generated at any time. The results of these filters are unique for their intended purpose, or just to create some very interesting effects. The filter commands require some experimentation, but make the whole program worthwhile.

One feature that is outstanding is Scan Edit. It is normal to have misplaced scans during any slow scan transmission. Using Scan Edit, any horizontal scan can be isolated and moved to align it with the rest of the picture. This is the first time I have ever seen this feature in a program, and it is invaluable for the slow scan enthusiast.

Brightness and contrast of the digital image can be adjusted by two additional functions. First, a histogram displays the current level, then you are allowed to alter it as you wish.

As *VIEW-EDIT* is a disk-based software package, standard disk commands are included such as SAVE, LOAD, KILL, DIR and QUIT. The default drive can be changed using the New Drive command. One drive is necessary for the software, but the remaining space is just adequate for storage of a few pictures. Two drives make life a little easier.

All of the pictures are given an extension of "PIX." When any disk command is encountered, a menu appears of the pictures on the default drive. The picture is selected by placing the cursor next to the name. The PIX extension is omitted on all menus.

If you already have the *VIEW-II* software, a program is included to merge all of the necessary programs onto one master disk.

I think *VIEW-EDIT* is a dynamic approach to image processing with a small personal computer. Those who enjoy this type of activity, for ham radio or for any other similar hobby, should consider this package a necessary addition to their software library.

(SoftCircuits, Inc., 401 S.W. 75th Terrace, North Lauderdale, FL 33068, disk \$24.95)

## For Masochistic Madness Play *Warehouse Mutants*

While playing *Warehouse Mutants*, I found it difficult to imagine being a warehouse caretaker fighting off de intruders. But it doesn't take a lot of imagination to e playing the game. As a matter of fact, the fast pac *Warehouse Mutants* does not allow its players a lo time to think about anything but survival.

The game is very arcade-like with its excellent graf and movement. It begins with you in the middle of a r of square crates, more like blocks, and a mutant in of the four corners of the screen. The object is to kil of the invaders before they get to you. They move tov you swiftly and the only way to destroy them is to sn crates against them. And, as if the first four mutants ai enough to deal with, there are eight more at ran locations waiting to break out of their crates and a in the chase. Fortunately though, the flashing, cr invaders can be destroyed before they break out by pus their crates into a wall or zapping them with the firebut But, before you know it, if you survive long enough, will be confronted by a warehouse full of mutants.

To survive the game, each of the destructive creat must be zapped before the player gets hit four times a four hits ends the game. The difficulty comes in fin time to strategize a plan for killing the mutants w constantly avoiding them. The most success I had invo first killing off a few of the creatures, then moving s crates around to form a blocked off area. Stopping blocked off area can drive several mutants into a swir madness long enough for you to map out more strat Also, getting a lot of them into a concentrated area be good since the 50 points awarded for killing one mu is doubled for each additional one killed with the s block. Therefore, if you kill three mutants in a row, will get  $50 + 100 + 200 = 350$  points. Killing eight mut with one crate is worth 6,400 points, which would be honorable total game score itself.

If you are able to kill all of the mutants in a scr you move on to a faster and harder screen. Whatever you have left are kept and a bonus hit is earned e time you get through a screen without getting hit. game also includes a pause feature by hitting the CLR key. Pressing the SHIFT and "?" keys simultaneously allow you to skip any screen if pressed when the scr is just starting.

Although I achieved much more frustration t gratification from playing *Warehouse Mutants*, I still fo myself wanting to play continuously. Something about pesty mutants, which more often than not got the l of me, seemed to bring out a masochistic streak! Need to say, it usually proved futile as I was tortured time a time.

(Tom Mix Software, 4825 Bradford N.E., Grand Rapids MI 49506, 16K tape \$24.95, 16K disk \$27.95)

— Philip S. H

## Count To 100 Provides Preschool Fun With Math

*Count To 100* is designed for preschool, kindergarten first grade level children. It can be used to reinforce math concepts for up to third grade remedial level. It is a menu-driven program that requires a minimum of assistance once the program is loaded.

The selection of control features eases the operation of the program by allowing a one-key selection of: Returning to menu, Voice on/off, Upper range limit, Help function, Pause option.

*Count To 100* is useful in sequential counting, counting forwards (even or odd numbers), counting by fives or 10s, counting backwards, if you so desire. All but the counting backwards option are supported by manual input flashcard modes. The flashcard mode allows you to count along with your CoCo, while the manual mode fires that you key in the next number.

The voice option of the program is guaranteed to work with *The Voice* speech synthesizer; other synthesizers may work but are not guaranteed to perform.

We tested the *Count To 100* with our preschooler, who just turned five, our kindergarten superstar, who just turned and our second grader who doesn't care about anything except what it eats hay and wears a saddle. The only problem encountered was finding enough time to let "ol' Dad" review this package. The flashcard mode provided an interesting competitive game, and the pause control feature provides more than sufficient help and a chance to gather your wits when things get out of control.

The tape version we had loaded several times with no problems of any kind. The documentation provided was clear and very adequate with specifics and examples available if needed.

The package is obviously well thought out and provides necessary functions for a useful math learning tool. For the price, the quality and interest that it generated in math practice and learning, it could be said that "You can count on it!"

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— Tony Compton

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## CORRECTIONS

**"Play Your Favorite Games With No Wires Attached"** (June 1985, Page 105): Jim Shaver tells us there are a few errors in the schematic diagrams, and that the parts list was left out. Here is the parts list, with Radio Shack catalog numbers in parentheses:

|            |                                                                           |
|------------|---------------------------------------------------------------------------|
| C1-C3      | 0.1 mf (272-135)                                                          |
| IC1, IC3   | 74LS240 octal buffer                                                      |
| IC2        | 7402 quad NAND gate                                                       |
| IC4, IC5   | 4066 CMOS quad bilateral switch (276-2466)                                |
| IC6        | 4011 CMOS quad 2-input NAND gate (276-2411)                               |
| IC7        | 7805 voltage regulator (276-1770)                                         |
| J1, J2     | 9-pin D-sub connector plug (276-1537)                                     |
| J3         | 1/8" miniature phone jack (274-251)                                       |
| LED1-LED10 | T-1 1/4 red LED (276-041)                                                 |
| P1, P2     | Joystick plug with cable (AW-2894; order from Radio Shack National Parts) |
| R1-R10     | 10K 1/4 watt (271-1335)                                                   |
| R11-R20    | 1K 1/4 watt (271-1321)                                                    |
| R21-R38    | 47K 1/4 watt (271-1342)                                                   |
| R39, R40   | 1 megohm 1/4 watt (271-1356)                                              |
| SW1-SW3    | SPST toggle (275-624)                                                     |

The 74LS240 and 7402 chips are not available from Radio Shack, but can be had from industrial electronic distributors in major cities.

In addition, these corrections apply to the schematic diagrams on pages 106 and 108:

- 1) In Figure 1, pins 6 and 8 are reversed.
- 2) In Figure 2B, the three leads of IC4 going to ground should be marked '3,' '7' and '9.' In addition, the chip at the bottom of the page should be marked IC5; pins 1, 11 and 14 go to +5 volts.
- 3) In Figure 3, the upper chip should be labeled as a 74LS240 instead of 74LS240.

**"Super Disk Charger"** (June 1985, Page 113): Dennis Bironas tells us that a line should be added in Listing 2 as follows:

```
00105  NOP
```

Also, the POKES in the yellow box at the top of Page 116 apply to Version 1.0 or Disk BASIC. If you have Disk BASIC 1.1, use these POKES instead:

```
POKE &HD29D,40:POKE &HD65F,40:POKE &HD682,4
POKE &HD44C,78:POKE &HC735,78:POKE &HC7BB,7
POKE &HC7D0,78:POKE &HC7EF,78:POKE &HCD26,4
POKE &HCEB5,78:POKE &HD534,39:POKE &HC75A,1
```

**"Geo-Graphics"** (September 1984, Page 177): Joseph Paravati advises us that, although the listing in the magazine is correct, many users have reported they get an ?FC Er in Line 5120 due to an incorrectly typed DATA statement. He suggests the following procedure to find the error:

— Enter PRINT A\$ immediately after the error occurs. This will show the letter or numeral the error is caused by. Check the DATA line containing that letter.

— If more than one character appears, enter PRINT COUNT that number of characters over, and that character is the one at fault.

**"MAIL09"** (June 1985, Page 249): Please refer to P 246 of this issue for the remainder of the listings which were inadvertently left out of this OS-9 feature.

### One-Liner Contest Winner . . .

This one-liner isn't your ordinary shoot-'em-up game. *Cannon* shows a cannon and target on the screen, then asks for an elevation angle. The object is to find the correct angle to hit the target in as few tries as possible.

#### The listing:

```
0 PMODE3:PCLS:N=190:R=RND(150)+5
0:LINE(R,182)-(R+8,N),PSET,B:CIF
CLE(8,N),5:SCREEN1:PLAY"P1":FOR
=1TO5:INPUT"EL":E:SCREEN1:FORT=1
TO99:X=6*T*COS(E/57):Y=(6*SIN(E/
57)-.08*T)*T:PSET(X+8,N-Y):IFY<0
THENNEXTS ELSEIFR-8<X ANDX<R ANI
Y<7THENPRINT"hit"ELSENEXT
```

J.D. German  
Cedar Crest, NM

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



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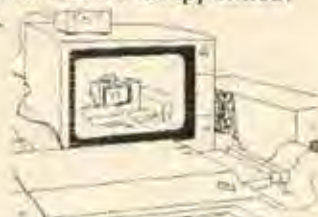
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# RAINBOW Info

## How To Read Rainbow

Please note that all the BASIC programs you will find in THE RAINBOW are formatted for a 32-character screen — they will show up just as they do on a CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes in" with what. If the characters match — your line endings come out the same — you have a pretty good way of knowing that your typing is accurate. We also have "key boxes" to show you the minimum system a program needs. Always read the text before you start typing. Finally, the little cassette symbol on the cover of a program indicates that program is available through our RAINBOW ON TAPE service. An order form for this service is on the right card bound in the magazine.

## What's A CoCo

CoCo is an affectionate name which was first given to the TRS-80 Color Computer by its many fans, users and reviewers.

However, when we use the term CoCo, we refer to both the TRS-80 Color Computer and the TDP System-100 Computer. It is easier than using both the "given" names throughout THE RAINBOW.

## The Rainbow Check Plus



The small boxes that you see accompanying programs in THE RAINBOW is a "checksum" system, which is designed to help you type in programs accurately. The Rainbow Check PLUS will count the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some programs have mark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

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

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

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

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK(35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y:W
60 POKE Z,Y:NEXT
70 IF W=7985 THEN B0 ELSE PRINT
  "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 186, 167, 148, 68, 134
100 DATA 126, 183, 1, 186, 198, 1, 187
110 DATA 175, 148, 58, 48, 148, 4, 191
120 DATA 1, 187, 57, 129, 18, 38, 38
130 DATA 52, 22, 79, 158, 25, 238, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 238, 132, 38, 258, 48, 1, 32
160 DATA 248, 183, 2, 222, 48, 148, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 8
190 DATA 8, 135, 255, 134, 48, 55
200 DATA 51, 52, 41, 8
```

## Using Machine Language

Machine Language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so that you can operate them.

The easiest way is by using an editor/ assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into your CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can sometimes cause problems when you have to set up an **ORIGIN** statement or an **EQUATE**. In short, you have to know something about assembly to hand assemble some programs.

Use the following program if you wish to hand assemble machine language listings:

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

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

## The Rainbow Seal



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

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

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

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to any commercial product, regardless of whether the firm advertises or not.

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

*With a little aircraft technology, you can be in complete control . . .*

# The Joystick Fix-It

By John G. Williams

**T**his program is a solution to a problem which plagues users of the standard Radio Shack joysticks. We all know the sticks are inexpensive and work well enough for most applications. However, they seem to be too sensitive near the center so it is easy to over-control screen objects.

Since I am an engineer on the F-16 fighter program, I'm aware of a method used in its flight control computer to cure that same problem in the aircraft. The pilot commands are received by the computer and shaped by a series of equations to provide the desired airplane motion.

The CoCo can do the same thing for us. All it takes is for the stick command to be multiplied by the absolute value of itself and divided by a constant to retain proper scaling. The stick will then have a slower response near center, but will still have quick action near the extremes.

*Stik Fix* is a demonstration of this capability. RUN the program and slowly move the right stick laterally to see the effect. The screen horizontal axis is the stick motion while the vertical axis is the modified command. (I have put this change into the *Sopwith CoCo* flight simulator roll control, and it makes the action much smoother and easier to manage.)

#### The listing:

```
10 PMODE4,1:SCREEN1,1:PCLS(5):CO
LOR0,5
15 LINE(128,0)-(128,191),PSET:LI
NE(0,96)-(255,96),PSET
20 X=3.2*(JOYSTK(0)-31.5)
30 Y=(ABS(X)*X)/130
40 PSET(128+X,96.5-Y)
50 GOTO20
```



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*Watch out for dog bytes! This canine version of the carnie's classic shell game is a fascinating test of your visual reflexes*

## *Which Way Did That Mangy Mongrel Go?*

**By Brad Nation**

**D**oghouse is a short program to challenge the visual reflexes of everyone from toddlers to adults. The 2,087-byte Color BASIC and machine language program is simple. A dog runs in and out of three doghouses and after it stops you are asked which

*(Brad Nation is a quality assurance failure analyst at Sundstrand Data Control, Inc. He writes programs for fun and profit at home in his spare time.)*

house you think he is in. After each response the dog's speed is adjusted by approximately 30 percent, faster if your answer was right and slower if it was wrong.

Due to the machine language subroutine, the speed of the dog can be varied from as fast as 0.03 seconds to cross the screen from doghouse #1 to doghouse #3, to as slow as 1.9 seconds to cross the screen.

Doghouse was written for any Color Computer, 4K or more, Extended or



Extended BASIC. Please note, users with Color BASIC should replace Line 2 with 2 POKE ML/256:POKE 276,ML-PEEK(256)\*256. This is because the DEFUSR command is not supported by Color BASIC, so the machine language routine's location address must be poked into locations 275 and 276. As an alternative, either system can replace Line 2 with 2 IF (PEEK(32768)=69 AND PEEK(32769)=88) THEN DEFUSR=275:POKE 275,ML/256:POKE 276,ML-PEEK(275)\*256 which allows the program to determine if Color BASIC is present or not. The user will then be able to run on either system.

The 321-byte machine language routine is position-independent so users with 32K or more may want to put the ML routine into higher memory by changing the CLEAR statement in Line 1 to CLEAR 200,32446, and also the value for ML in Line 1.

Also, 4K BASIC users must change the CLEAR statement to CLEAR 200,3774 and change the value of ML to ML=3775. This is due to the smaller memory size.

Type in *Doghouse* and run the program. Operating instructions are provided on-screen. Pressing 'S' when "PRESS 4 TO GO" is displayed will show the speed the dog will run during the next round (100 = fastest and 0 = slowest).

The assembly listing for the ML routine is not included. The routine operates as follows: On entry to the routine, if the passed parameter is equal to '1' (i.e., A=USR(1)), then the dog has started in doghouse #2 and the doghouse doors are opened. If the passed parameter is '2,' then the doghouse doors are closed so the dog can't be seen; if the passed parameter is '3,' then the doors are opened to show the dog. If the passed parameter is any other value (in Line 7 NP equals 1317, 1327 or 1337), then the dog runs to the new location.

(For those having questions about this program, you may write to Mr. Nation at: 15115 N.E. 8th Street, Bellevue, WA 98007.)

#### Listing: DOGHOUSE

```
CLS3:PRINT@137," doghouse game
:;CLEAR 200,16062:PRINT@448:PR
P:ML=16063
DEFUSR=ML' EXTENDED ONLY
FOR I=ML TO ML+320:READ J:POKE
,J:NEXT I:A=USR(1):R$=" GOOD,
J WERE RIGHT! ":C$=CHR$(175):F
OR I=1 TO 5:C$=C$+C$:NEXTI:S=25
PRINT@100,C$;:PRINT@104," PRES
S '4' TO GO "":A$=INKEY$
A$=INKEY$:IF A$="S" THEN PRINT
@0,C$;:PRINT@106," speed =" ;IN
@100-S/1.27);:FORI=1TO900:NEXTI
GOTO4 ELSEIF A$="4" THEN PRINT@
0,C$;:PRINT@107,"GET READY";:
3E A=RND(6):GOTO 5
FOR I=1034 TO 1449 STEP 32:J=R
(8)*16+127:POKE I,J:POKE I+10,
SOUND(255-(I-1035)/2),1:NEXTI:
KE ML+232,S:POKE ML+234,S:FOR
1034 TO 1449 STEP 32:POKE I,17
POKE I+10,175:NEXTI:PRINT@100,
;:FOR I=1 TO 15+RND(15)
NP=RND(3)*10+1307:IF NP=OP THE
7 ELSE A=USR(NP):OP=NP:NEXT I:
USR(2):PRINT@103," WHERE IS TH
DOG?";:A$=INKEY$
A$=INKEY$:G=VAL(A$):IF G<1 OR
3 THEN 8 ELSE A=USR(3):S=PEEK(
+232):G=G*10+1307:PRINT@100,C$
IF G<>NP THEN 10
PRINT@101,;:FORI=1 TO LEN(R$):
INT MID$(R$,I,1);:IF MID$(R$,I
)=" " THEN FOR J=1 TO 50:NEXTJ
:FORJ=1TO500:NEXTJ:S=S/1.3:GOT
4 ELSE SOUND(10+10*I),1:NEXTI
PRINT@101," SORRY, YOU WERE W
NG ";:FOR I=1 TO 11:SOUND 50,1
```

```
:SOUND 75,1:NEXT I:S=S*1.3+1:IF
S<127 THEN 4 ELSE S=127:GOTO 4
11 DATA 189,179,237,193,1,16,39,
0,30,193,2,39,79,193,3,39,67,237
,141,0,233,236,141,0,227,16,163,
141,0,224,39,119,16,44,0,116,22,
0,147,95,231,141,0,212,142,5,47,
175,141,0,201,175,141,0,199,134,
49,183,4
12 DATA 197,134,50,183,4,207,134
,51,183,4,217,142,4,227,49,141,0
,206,141,46,142,5,1,141,41,230,1
41,0,168,39,105,32,70,51,141,0,2
03,32,4,51,141,0,208,142,5,33,14
1,16,142,5,65,141,11,142,5,97,14
1,6,142
13 DATA 5,129,141,1,57,31,50,166
,160,39,22,167,132,167,137,0,10,
167,137,0,20,48,1,32,238,166,160
,39,4,167,128,32,248,57,198,1,23
1,141,0,98,106,141,0,91,141,190,
174,141,0,84,48,30,49,141,0,83,1
41,68,48
14 DATA 136,30,141,218,48,136,27
,32,29,95,231,141,0,65,108,141,0
,58,141,157,174,141,0,51,49,141,
0,65,141,37,48,136,27,141,187,48
,136,28,16,142,202,202,16,175,13
2,48,3,16,142,197,197,16,175,132
15 DATA 134,25,198,25,90,44,253,
74,44,248,22,255,33,141,153,48,1
36,29,141,148,57,5,57,5,57,0,204
,198,198,0,195,194,193,0,128,128
,128,193,0,201,201,204,0,194,193
,195,0,194,128,128,128,0,172,168
,179,164,172,0,168
16 DATA 179,183,191,191,191,187,
179,164,0,191,255,255,255,255,25
5,255,255,191,175,0,191,207,207,
207,207,207,207,207,191,175,0
```

*This practical application gives a simple test of your eyesight to indicate if there's a need to seek professional examination*

# As Far As The Eye Can See

By Robert L. Green

**M**any of us take our precious gift of sight for granted, but misuse, pollution and disease can slowly rob us of our good vision. I'm just a country programmer, but my CoCo can now make my family and friends more alert to vision dangers and seek regular checkups with a doctor of optometry or an ophthalmologist.

*Vision* is the eye-opening program that turns our computer into a health advocate. The first test is for retinal disparity and focus. This "parlor trick" test serves to grab our attention in preparation for the red/green colorblind test. The red/green syndrome is usually a male trait, but that distinction is necessary for traffic signals, other light indicators and for electronic component coding.

For the beginning programmer, *Vision* serves to clearly demonstrate both special CoCo features and some sophisticated techniques. It also provides

*(Robert Green is former president of the TRS-80 Users Group of Atlanta, Ltd., and was selected by Johns Hopkins and Tandy to host the Southeast's first computer-assisted aid to the handicapped workshop and fair. He writes, teaches and does consulting work.)*

that person with a free alphabet (lines 290-560).

Line 20 dimensions the 'A' array for a GET and PUT function later in the program, and also makes STS equal 32 graphics characters to enhance and make more professional the set of

***"Vision is the eye-opening program that turns our computer into a health advocate . . . For the beginning programmer, it serves to clearly demonstrate both special CoCo features and some sophisticated techniques."***

instructions (lines 580-690).

Line 130 sets up the three views of the three colored circles. Line 70 determines the length of time the circles remain on the screen. Line 160 determines the length of time the screen is cleared (PCLS).

The colorblind test begins with 170. Using PSET to color in memory the screen took so long I feared my takers would fall asleep.

Lines 170-180 use loops to replace colored dots at the upper corner of the screen in a 20-by-20. Line 190 GETs the area in the 'A' and stores it for later use.

Line 200 uses loops to replicate SET 'A' array, thus drawing the much faster with no big loss to random coloring.

In Line 30 is the first of the commands using the alphabet (lines 290-560). This technique saves in typing and errors.

Another timesaver is the II (Line 270 for the colorblind test, Line 710 for the instructions), allow quick keyboard one-stroke operation and using the feature as a loop routine permits faster typing of the program.

SOUND is used in Line 250 merely as a prompt to alert the user that the computer is ready with another circle to be discerned.

*Vision* adds a very practical rewarding aspect to the CoCo. It prompts others to contribute projects that can benefit the family and population in general.

190 .....161  
 410 .....75  
 600 .....12  
 670 .....22  
 END .....99

listing: VISION

```

0 ***** VISION *****
1 *** COPYRIGHT (C) 1984 **
2 *** BY ROBERT L. GREEN **
3 *** POST OFFICE BOX 419**
4 *** CLARKSTON, GA 30021**
5 *** PH: (404) 451-9813 **
6 *****
10 CLEAR1000
20 DIMA(20,20):ST$=STRING$(32,CH
R$(150))
30 CLS:PRINTST$:GOSUB580
40 PMODEL,1:SCREEN4,1:PCLS:GOSUB
290
50 FORT=1TO3
50 CIRCLE(100,100),60,3
70 FORX=1TO500:NEXT
30 PAINT(105,120),3,3
30 CIRCLE(100,100),30,4
100 PAINT(100,100),4,4
110 CIRCLE(100,100),10,3
120 PAINT(100,100),3,3
130 FORX=1TO300:NEXT
140 PCLS
150 NEXTT
160 FORX=1TO500:NEXT
170 FORX=0TO21:FORY=0TO21:PSET(X
,Y,RND(9)-1)
180 NEXTY:NEXTX
190 GET(0,0)-(20,20),A
200 FORX=19TO150STEP20:FORY=19TO
150STEP20
210 PUT(X-19,Y-19)-(X,Y),A:NEXT:
NEXT
230 DRAW"S12;C2;A2;BM170,10;"+C$
+O$+L$+O$+R$:DRAW"S12;C4;A2;BM20
0,30;"+O$+F$:DRAW"S12;C3;A2;BM16
5,50;"+C$+I$+R$+C$+L$+E$
240 FORT=1TO2000:NEXT:DRAW"S12;C
4;A2;BM8,150;"+H$+I$+T$+SP$+K$+E
$+Y$
250 FORX=0TO8:SOUND2*(X+1),2:CIR
CLE(80,80),50,X:GOSUB270:FORW=1T
O10:CIRCLE(10,10),W,X:NEXTW:NEXT
X
260 CLS:PRINT"THE END":END
270 I$=INKEY$:IFI$=""THEN270ELSE
RETURN
290 A$="BEHUNU2R4NU2DGL2BGBL6"
300 B$="BEHENR3HER3D4L3BGBL6"
310 C$="BU4ER2FD2GL2HBG2BL4"
320 D$="BEHU2ER3D4L3BGBL6"

```

```

330 E$="BER3U2NL2U2L4BG5BL2"
340 F$="BUR4U2NL3U2BG5BL5"
350 G$="BUR4U3HL2GDRBG3BL4"
360 H$="BUU2NU2R4NU2D2BGBL9"
370 I$="BR2BUU4BU2BD7BL8"
380 J$="BUU3ER2FDBG3BL7"
390 K$="BUE2NH2R2ND2U2BG5BL5"
400 L$="BU5R4D4BGBL9"
410 M$="BUNU4E2F2U4BG5BL5"
420 N$="BUU4F4U4BG5BL5"
430 O$="BEHU2ER2FD2GL2BGBL6"
440 P$="BER3U2NU2L3GNFBG2BL4"
450 Q$="BEHU2ERNDNURFD2GL2BGBL6"
460 R$="BEHERNH2R2NU2D2L3BGBL6"
470 S$="BU2FR2EHL2HER2FBG4BL6"
480 T$="BUR2NU4R2BDBL10"
490 U$="BUU3ER2FD3BGBL9"
500 V$="BUU2E2F2D2BGBL9"
510 W$="BUU4F2E2D4BGBL9"
520 X$="BUE2NH2NE2F2BGBL9"
530 Y$="BUE2NU2F2BGBL9"
540 Z$="BUNR4E4L4BG4BDBL2"
550 SP$="BE4BUBG5BL5" ***SPACER
560 RETURN
580 PRINTTAB(10)"v i s i o n":PR
US, & RED/GREEN COLOR BLINDNESS.
":PRINT" THOUGH AN OPHTHALMOLOGI
ST OR ODSHOULD ALWAYS BE CONSULT
ED, YOURCOCO MAY BE AN INEXPENSI
VE TEST."
590 GOSUB700
600 PRINTTAB(8)"retinal disparit
y":PRINT" WHEN WE FOCUS O
N SOMETHING, WERETAIN THAT IMAGE
EVEN AFTER WE STOP LOOKING AT I

```

*One-Liner Contest Winner . . .*

This one-liner prints a small checkerboard on the Radio Shack DMP-100, Line Printer VII, Line Printer VIII and some other Tandy printers.

To print a full-size (8-by-8-inch) checkerboard, change FOR H=1 TO 1 to TO 9 in two places and FOR J=1 TO 7 to TO 60 in four places.

**The listing:**

```

1 PRINT#-2,CHR$(18):FORG=1TO4:FO
RH=1TO1:FORI=1TO4:FORJ=1TO7:PRIN
T#-2,CHR$(128);:NEXT:FORJ=1TO7:P
RINT#-2,CHR$(255);:NEXTJ,I:PRINT
#-2:NEXT:FORH=1TO1:FORI=1TO4:FOR
J=1TO7:PRINT#-2,CHR$(255);:NEXT:
FORJ=1TO7:PRINT#-2,CHR$(128);:NE
XTJ,I:PRINT#-2:NEXTH,G

```

*James Brittain  
 Liverpool, NY*

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

```

INT:PRINT" THIS PROGRAM QUICKLY
TESTS FOR:RETINAL DISPARITY, FOC
T.":PRINT:PRINT" HOWEVER, THAT
IMAGE NOT ONLY REMAINS ON OUR E
YE'S RETINA, BUTTHE COLORS BECOM
E OPPOSITE!";
61Ø GOSUB7ØØ:PRINT" OUR FIRST T
EST WILL BE THREE CIRCLES. STA
RE AT THEM. THEY WILL DISAPPEA
R AND REAPPEAR TWO MORE TIMES."
62Ø PRINT" AFTER EACH DISAPPEAR
ANCE, YOU SHOULD STILL SEE SOMET
HING. IF NOT, THIS MAY INDICATE
A CONCERNFOR AN EYE CHECKUP.":
GOSUB7ØØ
63Ø PRINT" WHILE LOOKING AT THE
SECOND & THIRD CIRCLES, YOU MAY
SEE THE REVERSED IMAGE APPEAR
AT DIFFER-ENT SPOTS AROUND THE C
IRCLE."
64Ø PRINT" AFTER VIEWING THE 3
RED & BLUECIRCLES, CLOSE YOUR EY
ES & OPEN THEM, LOOKING AT A WHI
TE WALL."
641 PRINT" TRY THIS TEST 3 TIM
ES IF YOU DON'T DO WELL TO COMPE
NSATE FOR THE RANDOM BACKGROUND
COLORS.":GOSUB7ØØ

```

```

65Ø PRINT:PRINT" THIS MAY ALSO I
NDICATE NEED FORA VISION CHECK I
Y AN OPTOMETRIST";GOSUB7ØØ:PRI
TTAB(8)"color blindness":PRINT
66Ø PRINT" AFTER THE 3-CIRCLE TI
ST, YOU'LLUNDERGO A SERIES TEST
FOR RED/ GREEN COLORBLINDNESS."
:PRINT:PRINT" A MULTI-COLORED E
LOCK WILL BE DRAWN AND A COLORED
CIRCLE DRAWNWITHIN IT.":GOSUB7
ØØ
67Ø PRINT" YOU SHOULD BE ABLE T
O SEE THE CIRCLE AND IDENTIFY TH
E COLORS: GREEN WHITE GREEN BLUE
RED WHITEGREEN BLUE RED":GOSUE
7ØØ
68Ø PRINT" TO CHANGE THE (HIDDE
N) COLOREDCIRCLE, HIT THE SPACE
BAR.":PRINT:PRINT" A CIRCLE (I
N THE UPPER LEFT) WILL GROW TO
INDICATE THE PRO- PER COLOR OF
THE TEST CIRCLE.":PRINT" GOOD
LUCK!":GOSUB7ØØ
69Ø RETURN
7ØØ PRINT:PRINTST$:PRINT" >-> H
IT g KEY TO gO ON"
71Ø I$=INKEY$:IFI$=""THEN71ØELSE
CLS:PRINTST$;;RETURN

```

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# RAINBOWTECH



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# Printing Through The Line Feed Patch

By Dan Down  
Rainbow Technical Ed

• I spoke with you at RAINBOWfest and you said you had a patch to add a line feed to the BASIC LIST command. I have a 64K CoCo 2 with Disk BASIC

John Enders  
Marinette, WI

John, we haven't run this program for quite a while, so let's hope it's of some use to the newcomers. It adds a line feed after every carriage return. It also has some other features such as setting your Baud rate. Change 180 in Line 230 to your desired Baud rate. The following version is written for 32K, but will run fine in 16K if you change lines 100, 150, 190, 200 and 210 to 16K addresses by subtracting 16384 from the 32K value. Also, in Line 220, change POKE 360,127 to POKE360,63.

```
100 CLEAR200,32743
110 DATA 52,21,214,111,193,254
120 DATA 38,11,129,13,38,7,190
130 DATA 160,2,173,3,134,10,53
140 DATA 21,57
150 FOR D=32744 TO 32765
160 READ E:POKE D,E:NEXT D
190 POKE 32765,PEEK(359)
200 POKE 32766,PEEK(360)
210 POKE 32767,PEEK(361)
220 POKE359,126:POKE360,127:POKE
361,232
```

(Dan Downard is an electrical engineer and has been involved in electronics for 25 years through ham radio [K4KWT]. His interest in computers began about six years ago and he has built several 68XX systems.)

```
230 POKE150,180
240 END
```

### Forwarding Address

• I found THE RAINBOW in a bookstore in Portsmouth and bought the April and May issues. In both issues, I found what seems to be a mistake on the "RAINBOW Info" page. In the column on "Using Machine Language," if the address is &H7F00 shouldn't I=&H7F80? Then, how do you execute the program? All it does is hang up my machine and I lose everything.

I have enjoyed your magazine, especially the One-Liners. Also, the reviews of the products and software are excellent. Does anyone have anything more on the DMP-105?

John Burns  
Chesapeake, VA

You are completely correct, John, in observing that if you change the CLEAR command for 32K, you should also change 'I', or the starting address of the program. Since we receive a few questions on this program, let's explain it to the non-machine language programmers. First, the program:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE:";B$
40 POKE I,VAL(" &H"+B$)
50 I=I+1:GOTO20
```

### Line 10

CLEAR200,&H3F00 tells Extended BASIC to reserve 200 bytes for string space and

not to let any BASIC program extend address &H3F00 in memory. Since amount of memory in a 16K CoCo is &H3FFF command reserves 256 bytes at the end of the memory for machine language programs. For a 32K/64K computer you can change this part of the command to I=200,&H7F00, since &H7FFF is the highest memory location.

At the same time there is a statement on the line: I=&H3F80 identifies the beginning address of the machine language program. This should be changed to correspond to the lowest address encountered in the assembly listing. If you should change this address, be sure to change the corresponding address in the CLEAR command.

I would suggest deleting Line 10 and adding the following:

```
10 INPUT "BEGINNING ADDRESS:";S$
15 I=VAL(" &H"+S$)
```

This will allow you to pick your own beginning address. It won't protect your program from BASIC, but you should be sure to do this before you run a BASIC program again.

### Lines 20-50

These BASIC commands allow you to input the hexadecimal bytes at each address one at a time. After the byte is input, the address counter 'I' is incremented, and you are ready for the next byte. Keep inputting the Hex bytes until you reach the end of the program.

Just for reference consider the following line output from EDTASM+:

```
7E00 8E 0400 00100 START LDX #5
```



In this case, 7E00 is the address of the ring byte of this instruction. 8E,04 and e the bytes at addresses &H7E00, 701 and &H7E02 respectively. If this is the first line of the program, you would something like this:

```
Change Line 10 of the program to:
:LEARN200,&H7DFF:1=&H7E00
```

Run the BASIC program. The following will appear on your screen:

```
ADDRESS: 7E00 BYTE:
You type: BE (CR)
You will see:
ADDRESS: 7E01 BYTE:
You type: 04 (CR)
```

Go on until you reach the end of the program.

#### Using this program

When you hit BREAK and you will be back at the JOYSTK prompt. Your machine language program will still be in memory, then you save the program. Use the (C)SAVE command in the following way:

```
SAVE "name",start addr,end
addr,execute addr
```

Good luck, and I hope this little program interests you novice ML programmers. Remember where your programs are located. The program will not work for loading in ML programs located below address 7E00 due to conflicts with BASIC. As long as the programs are in upper memory they shouldn't have any problems.

### New, Improved Step Rates Now Faster Than Ever!

Phil Cayton of Texas City, Texas, wrote the May 1985 issue how to speed up the rate of your disk drives. Just to add a tip, it is possible to shorten the delay after the controller turns on the motors waits for them to come up to speed. The DSKCON subroutine calls a delay routine twice before trying to read or write the disk. This program just eliminates one of the calls to the delay routine by changing no operation codes where the first delay routine is called. First, get into the all-RAM mode with the corrected version of the ROMRAM program (READA, instead of READB) from the same May "Downloads" column. Mr. Clayton's step rate line and the following lines can be added to the program for one quick fix. You can also add another program from the SuperRAM program by adding another line as:

```
RUN "MYPROG/BAS"
```

To reduce the wait time on motor start up DOS 1.1:

```
X=54937 TO 54939:POKE X,1B:
NEXT X
```

For DOS 1.1:  
FOR X=551B0 TO 551B2:POKE X,1B:  
NEXT X

Both the step rate increase and the shortened wait time can be added to programs that use the all-RAM mode on their own if they have a BASIC loader that executes the RAM mode. Telewriter-64 in particular benefits if you create a new line in the program U/BAS. Make the new line number 205 and include the step rate and motor wait all on that line. This will make the fixes after it is in the all-RAM mode, before the BASIC loader executes the machine language program. There is a definite improvement.

Jerome P. Cigna  
Rochester, NY

Between you and Phil, we'll have the fastest CoCo disk drives in town, Jerome. Thanks again and keep those tips coming.

You are correct about the ROMRAM program in the May column. Let's see if we can get it right this time.

```
10 *ROMRAM 8/85 RAINBOW
20 CLEAR 999
30 DATA 26,80,190,128,0,183,255,
  222,166,128
40 DATA 183,255,223,167,31,140,224,
  0,37,241,57
50 FOR I=1 TO 21:READ A:A=A+CHR$(A)
  :NEXT I
60 P=VARPTR(A)+1
70 POKE P,126
80 EXEC P
90 PRINT "BASIC IS NOW IN RAM"
```

### Split-second Question

The following is an open letter to the readership sparked by the May issue. "Downloads" had a "how to" donated by Phil Cayton: POKEing to speed disk track to track access time to six milliseconds, however, it was for a 64K machine. Does anyone know what to POKE for the same result on a 32K or less machine? I know it can be done since Peter Stark's Spell N' Fix II does it.

James H. DeStafeno  
Swedesboro, NJ

The only reason it can be done with Spell N' Fix II, Jim, is that this program has a separate DOS on the disk. The constants for track to track access time are in the Disk BASIC ROM and cannot be changed unless you are in the all-RAM mode.

### Keyboard to Joystick Conversion

I was wondering if it would be possible to alter programs in order to use the joystick instead of the arrow keys?

Alf C. Dale  
Seaforth, Ontario

Alf, you did not mention any specific program, so we will deal in generalities. The ASCII codes for the arrow key on the CoCo are:

|             |    |      |
|-------------|----|------|
| Up-arrow    | 94 | \$5E |
| Down-arrow  | 10 | \$0A |
| Left-arrow  | 8  | \$08 |
| Right-arrow | 9  | \$09 |

A BASIC program to detect the right-arrow would look something like:

```
100 A$=INKEY$
110 IF A$=CHR$(9) THEN GOTO . . .
```

To give you an understanding of the JOYSTK function, run the following program from the *Getting Started with Color BASIC* manual:

```
10 CLS
20 PRINT@0,JOYSTK(0); "Right-Horiz
30 PRINT@5,JOYSTK(1); "Right-Vert
40 PRINT@10,JOYSTK(2); "Left-Horiz
50 PRINT@15,JOYSTK(3); "Left-Vert
60 GOTO 20
```

Assuming you are using the right joystick, the equivalent program for detecting a right movement of the joystick instead of the right-arrow would be:

```
100 A=JOYSTK(0)
110 IF A>31.5 THEN GOTO . . .
```

The only problem with this procedure is detecting when the joystick is centered, since JOYSTK returns an integer. In the above example, change 31.5 to 35 and this should give you a little play in the center.

### Making IBM Work for CoCo

I have been the proud owner of my CoCo for about two years. Since I must use the IBM PC at school, nowadays I read a lot about changing the Radio Shack DOS ("Cooking with CoCo" by Colin J. Stearman).

I have been wondering if it is possible to read ASCII files made with an IBM PC and create ASCII files that can be read by the IBM PC so it will be possible to create files with WordStar at school, then finish these files at home on my own CoCo with Telewriter. I have tried it with the Dutch BASICODE, but it is a very complicated way to solve this problem.

Jorgen te Giffel  
Haarlem, the Netherlands

Jorgen, we are aware of at least one program that will transfer ASCII files from an IBM PC formatted disk to a CoCo formatted disk. It is available from Mark Data Products. See their ad in this issue (check the "Advertisers Index" on Page 256 for the page number) and write for a catalog.

## KISSable OS-9

# Cliffhangers In The Micro Soaps

By Dale L. Puckett  
Rainbow Contributing Editor

**R**eporting news from the microcomputer software community is a lot like watching prime time television soaps. On *Knots Landing*, Val saw her babies. But, will she get them? On *Dallas*, Bobby died. How will Ewing Oil survive? And on *Dynasty*, half the cast was killed by terrorists in an obscure nation named Mondavia — but, which half?

Come to think of it, Des Moines and Fort Worth are a lot like Mondavia. The cities may not be obscure, but the people there sure like cliffhangers.

"We're working on several interesting projects," said Andy Ball, a marketing representative at Microware Systems Corporation, the Des Moines company that gave birth to OS-9 and licensed it to hundreds of original equipment manufacturers. "We have negotiated some very interesting deals with some large vendors. I think you'll see some very interesting products from Microware and from the OEMs."

What are these "projects"? Unfortunately, we'll have to wait until later this fall to find out — just like on the soaps. However, Ball did offer a few hints.

"Take a look at what is happening to UNIX and you'll find a big hole opening up in the 68000 market," Ball said. "I just returned from a 16 day visit with several major

European distributors and the OS-9 68K market there is far more mature than in the states. The same is true in Japan. We have licensed hundreds of thousands of copies.

Why all the interest in OS-9 68K? Ball had a few answers. "You can now have a BASIC09 workspace nearly 1 megabyte long. And, real data is stored in eight 16K blocks instead of five. In fact, both real and integer numbers have a much greater range," Ball said. "Because of the large workspace you can build a lot of valid tools with BASIC09. You can also handle bigger jobs because you can work with more data in memory."

Does all this hoopla about OS-9 68K mean the CP/M and the Color Computer will go the way of CP/M?

"Definitely not! We are very much locked into the 68000," Ball said. "We have a large investment in the 68000 OS-9 and so do our customers. Because of this we are going to continue to support it and are working on several new products. For example, our full FORTRAN compiler should be released very soon."

Most of you have probably already read about a lot of the enhancements built into OS-9 68K. You've probably also wondered if you will ever see them in the Color Computer version of OS-9.

"It is our general policy to move technology from one processor to another when possible," Ball said. "This gives our customers a more unified environment when we upgrade to a new chip. It helps us make the different versions of our operating system look the same to the user. Unfortunately, the 64K addressing range available on the 6809 means we cannot make our utilities as good as we would like to and this reality is tying our hands somewhat."

Ball told us that Microware, which made a big name for itself by designing and writing software for dedic-

---

*(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He is the author of The Official BASIC09 Tour Guide, published by Microware and The Official Rainbow Guide to OS-9, published through the Rainbow Bookshelf. He serves on the InfoWorld Software Review Board and is a chief warrant officer in the U.S. Coast Guard.)*

process control systems, was starting to make a big splash in the personal computer marketplace. He predicted they would establish an even bigger beachhead in the war for personal computer supremacy within the next year or two.

"We have made a big splash in the personal computer industry in Japan. And, OS-9 is still popular at Tandy," Ball said. This statement prompted me to ask the "64K question." If OS-9 has been so popular in Japan, why haven't these companies moved it into the U.S. market? Like any good PR man, Ball had the answer.

"OS-9-based machines are so much in demand in Japan that they have had to convert factories to keep up with the two-month backlog," he said. "They can't even think about selling machines here until they catch up at home."

### New Trends Appearing

We noticed several trends emerging in both hardware and software at RAINBOWfest Chicago. In hardware everything is pointing toward hard disk systems that deliver several million bytes of storage at an affordable price. Since OS-9 is a disk intensive operating system, this is a real blessing.

To find out about these trends we interviewed several industry leaders. The first to sit down across from our trusty TRS-80 Model 100 was Steve Odneal of P.R.O. Systems, 10601 West 63rd Street, Shawnee, KS 66203 (913-631-0665). Steve made a name for himself by being one of the first programmers to move FLEX, Technical Systems Company's operating system, to the Color Computer. Now, he has designed the hardware and written the software for the 10-meg hard disk P.R.O. Systems was demonstrating in Chicago.

"It's a full implementation of a hard disk for the Color Computer," Odneal said. "This means the software treats the hard disk as a full-size hard disk. It also means that with OS-9 you can format the entire 10 megabyte drive and wind up with almost 40,000 free sectors. The hard disk controller that comes with the unit also supports up to four additional floppy disk drives, either five- or eight-inch.

"We supply the complete package — everything you need," Odneal added. "OS-9 made the job easy because it let us install our hard disk system by simply adding a new device driver and device descriptor. In plain English, the device driver contains the software that actually communicates with the hard disk. The device descriptor tells OS-9 what our drive looks like. The device descriptor also let us reserve part of the hard disk for Radio Shack DOS programs and another part for FLEX programs."

Using a hard disk with OS-9 really speeds up your work. Steve made his point by loading BASIC09. It took his Color Computer seven seconds to load the program's 22K of code from a floppy. The P.R.O. Systems hard disk loaded it in two seconds.

"Overall, the hard disk is about two and a half times faster than a floppy disk," Steve said. "But, it seems even faster when you are using OS-9 because OS-9 needs to access its directories continuously every time it reads or writes a file."

Oodneal was selling the new slim-line hard disk at a special price of \$995 during RAINBOWfest. On the market he expects it to sell for \$1,295 to \$1,495 — depending on the dealer.

The P.R.O. disk system features a heavy-duty case power supply. Odneal learned how heavy-duty when drive he brought to RAINBOWfest was thrown 12 by a baggage attendant at O'Hare Airport. "We were a it wouldn't work at all after watching it hit the deck it worked flawlessly at the show," he said.

P.R.O. supplies all the software you need to install run its hard disk — drivers for Radio Shack DOS, F and OS-9 and a program that automatically config the drive. They also give you a handful of wild card uti that make it easy to copy and delete files, and per other routine file maintenance chores.

To boot OS-9 or FLEX, you simply run a Radio S Disk Extended BASIC program and type 'o' for OS-'F' for FLEX when prompted. Odneal noted that his version of the software will let you boot OS-9 directl the hard disk. He said it would be available by the you read this column.

But Odneal was displaying only one of the three disks we saw at the show. Brian Lantz stayed throughout the weekend demonstrating his handiwo the J & M Systems booth (15100-A Central Albuquerque, NM 87123, 505-292-4182). He was espec proud of the fact that his drivers for the new J & M megabyte full-size hard disk system give full use of 9's fantastic type-ahead feature. J & M's system feat a full-size five megabyte hard drive and an attractive p

Meanwhile, up in the Users Group hospitality s Martin Nelsen of a new start-up company na Interactive Task Management System, 230 East I Street, West Chicago, IL 60185 (312-293-0549) — IT Inc. for short — was showing off his new Hard D subsystem for the Color Computer. The ITMS drive also a full-size five megabyte model and comes with a and power supply. Its controller card can support additional disk drives. A patch for the Radio Shack ver of the OS-9 C Compiler lets you install C on the di The list price for this unit is \$599.95; they were sel it at RAINBOWfest for \$529.95.

### DynaCalc for OS-9 Available

We received some good news shortly after we ente the exhibit hall at RAINBOWfest Friday evening. Turner of Computer Systems Center in St. Louis, publisher of *Dynamite* and many other programs for Color Computer, pulled me aside and waved a bright g box in the air. Bold white letters in a classy sans e typeface screamed "Tandy" from the side of the b *DynaCalc* for OS-9 had finally arrived at local Radio Sh stores around the nation.

Turner couldn't wait to show me *DynaCalc* runt under OS-9 68K on his QT from FHL. There were more features than we can detail here, but among of things, the version we saw would let you use more t 17,000 rows or columns. And, it was lightning quick. A the demonstration, we made Joe promise to reserve a minutes to discuss OS-9 with us before the weekend over. He went one better and showed up for the interv Sunday with Scott Schaeferle, the programmer who ma *DynaCalc* tick.

We led the interview with another 64K question: A software developer, what do you think gives you advantage?

# Incredible!



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## Multi-User!

Frank Hogg Laboratory announces their Q Terminal (QT) series of multi-user computer systems, designed to run Microwares new OS-9/68000 operating system. The QT offers 32 bit processor power in a compact integrated package which requires only a terminal to operate.

QT hardware features: 68008 processor running at 10 Mhz, 128K bytes expandable to 512K bytes, interval timer for time sharing, 4 serial ports with selectable baud rates from 300 to 19,200, 2 electronics compatible parallel printer ports. Supports 2 double sided double density 96 tpi floppy disk drives and a SCSI (SASI) bus interface for Winchester disk drives. The QT is available as a single floppy (1), a dual floppy (2) or as a single floppy and a 10 or 20 megabyte hard disk (HD). Dimensions: 5 1/2 high, 11 1/2 deep, 9 1/2 wide. Can be mounted vertically or horizontally.

## Software Included!

SOFTWARE included is OS-9/68000, the 68000 version of the proven OS-9 operating System that is both disk and file compatible with standard and for computer versions of OS-9. Basic09 is the 68000 version and is source compatible with the OS-9 version. DynaCalc is the 68000 version of the popular 6809 spreadsheet. Stylograph is the 68000 version of the popular 6809 word processor. Mail merge and speller are the 68000 versions of those programs. Programming tools included are a relocating macro assembler with linkage editor, screen and line editors, and an interactive debugger. The software has a retail value in excess of \$2000 and is INCLUDED free! Programming languages available and under development include C, Pascal, Fortran and Sculptor.

## A Hellava Deal!

The QT is available in four basic configurations. Other configurations are possible and are available. Call for price.

**QT 1**  
128K, single 96tpi double sided floppy and all software **\$1595.00**

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**Note:** The QT can hold 2 half height drives internally (floppy or hard). Provision has been made for hooking up external floppy drives. This allows using large capacity full height hard disk drives in the QT case with floppy drives in another case. You can boot from the hard disk so floppys would only be necessary for program transfers and backup. Removable hard drives are also available. Call or write for complete specifications and prices.

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## BOOKS

NEW Complete Rainbow Guide to OS-9 **\$18.95**

Basic09 Tour Guide **\$18.95**

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"One of the biggest things OS-9 has to offer is its standardization of input and output," Turner said. "Just look at some of the programs that run under Radio Shack DOS. They are all surrounded with controversy about the Color Computer ROM call tables. This controversy just doesn't exist when you use OS-9.

"Besides, OS-9 has saved us a lot of time . . . and time is money," Turner said. "Indirectly, it has also saved our customers a lot of money, too — for the same reason. Additionally, OS-9 lets us write a piece of code once. When we get it right the first time it saves everyone a lot of confusion later on."

Turner then gave us an example of OS-9 efficiency.

"We use the OS-9 'get status' system calls rather than hard code to find the screen size for *DynaCalc*," he said. "One call returns both the number of columns and the number of rows on the screen. Once *DynaCalc* has this information, it automatically sizes itself to fit this screen."

Turner told us that OS-9 also made it much easier for *DynaCalc* to support the many different printers on the market. "*DynaCalc* simply sends its printer output to the standard printer output device (/p) and works with any printer that uses this device.

"The same goes for disk drives. OS-9 *DynaCalc* can store files on any disk drive connected to your computer. Contrast this with the Disk BASIC version of *DynaCalc* which only works with standard hardware like Radio Shack or J & M. We really don't have to worry about any of the low level details when we program with OS-9; we just read from and write to OS-9's standard input/output paths," Turner said.

Turner brought *DynaCalc* author Scott Schaeferle along for the interview and asked him what he liked about OS-9.

"I like the flexibility of its memory management and the way it loads and links modules," he said. "This came in very handy and made it easy for us to install '/sx,' the system execute command which lets you run another OS-9 program without quitting *DynaCalc*. All we had to do was make a system call to OS-9 that puts *DynaCalc* to sleep while the other program is running. When the other program is through, the Shell wakes up *DynaCalc* and you can go back to your spreadsheet work."

Schaeferle, like everyone else we talked to at RAINBOWfest, was impressed with OS-9 68K. He likes the wild card matching, the alphabetized directories and the RAM disk that comes as a standard part of the system. He said he was especially impressed with the 68K Copy utility, which like most of the 68K utilities, uses the wild card feature built into the new Shell.

### Rosen Premier OS-9 Solution

Bob Rosen of Spectrum Projects, 93-15 86th Drive, P. O. Box 21272, Woodhaven, NY 11421, took time out from his busy schedule at RAINBOWfest to talk with us about several of the new products he is aiming at the OS-9 market. He was beaming about the release of his *OS-9 Solution*, a program he feels is a major breakthrough for novice OS-9 users.

"I get letters, I talk to Radio Shack sales managers. And, the calls pour into my company. The average guy who has bought a 64K Color Computer eventually buys OS-9. Then he gets frustrated and puts it back in the box,"

Rosen said. "I think a front-end program like the *9 Solution* is the absolute answer to an OS-9 beg prayers. I think Tandy should pick it up.

"I hope that people who do buy the *OS-9 Solution* Barry Thompson, Tandy's Color Computer programmer, and tell him what they get from the program," he said.

Rosen also expressed concern that the lack of innovation shown in innovative programs would cause software like Jeff Francis of MegaSoft, who designed and released the *OS-9 Solution*, to lose interest in writing programs for the Color Computer. "I'm afraid he'll look elsewhere — like Atari or Amiga.

"I still believe OS-9 has a very good future and we will make every effort to support it at Spectrum," Rosen said.

Rosen had just finished teaming up RAINBOWfest members Downard and Brian Lantz to write OS-9 RAM disk controller for his new ThunderRam, a 256K upgrade for the Color Computer. He believes a RAM disk like this will make the *OS-9 Solution* even more popular.

"You can use the extra RAM memory as a print spooler to hold 30 Hi-Res screens, or to run four 32K programs in the four different banks at the same time."

### A Closer Look at 'the Solution'

So, just what is this *OS-9 Solution* Bob Rosen is putting so hard? Essentially, it is a single program that lets you run any one of 19 individual OS-9 commands with a single keystroke. It stays in your standard execution directory (/d0)/CMDS.

The exciting point, however, is that you almost never need to type a filename or one of those super long OS-9 pathlists. With the *OS-9 Solution* you use the up/down-arrow keys to point to the file you want to work with, then type a single key to tell OS-9 to carry out one of 19 different actions. It sells for \$39.95.

The *Solution* runs on vanilla Color Computer OS Version 1.01 — as well as Hi-Res from FHL and the *Hi-Res Pak* from PBJ. The only catch is that your screen driver must use the standard Radio Shack OS-9 cursor control sequence. Of course, you could always write a program to translate Radio Shack cursor control sequences into XYZ cursor control sequence.

Eight of the utilities can also work on multiple disks. Utilities built into the *Solution* that are not available in the standard issue Color Computer OS-9 CMDS directory include:

- Alphabetize Directory
- GoTo a new Director
- Help screens
- Information about a file
- Jumble order of filenames
- Set Directories

I believe the *Solution* could be very handy for sessions where you are performing a lot of file maintenance. This assignment it will save you a lot of keystrokes.

However, this program is not for all jobs. It is too large to leave in memory all the time with Level I OS-9. For example, you can't run BASIC09 from it. Both programs will not fit in memory.

OS-9 Level II — if it ever comes to the Color Computer — will be a whole new ball game and most everyone

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probably want to boot up into the *OS-9 Solution*. Also, to build pipelines and exercise OS-9's multitasking capabilities, you'll need to use the *Solution's* Z command to escape to the OS-9 Shell.

Overall, this program should make OS-9 a whole lot less scary to the beginner. It may even ease some of the pain of routine file maintenance tasks for the experienced user.

### Put the Mouse to Work

You can't do it just yet, but very soon now you may see a mouse-based editor that runs on Color Computer OS-9. Michael L. Bailey of Cameron, Mo., distributed a few test copies of a full-screen editor named *TED* and a companion text processor for Color Computer OS-9 at RAINBOWfest-Chicago.

To run it, you need a 64K Color Computer with at least one disk drive and the OS-9 operating system. The Color Computer mouse from Radio Shack or a joystick is optional.

I test drove Mike's editor using a joystick and was so impressed I almost ran out to Radio Shack and bought a mouse. The presentation is not as pretty as the high density bit mapped Apple Macintosh *MacWrite* program, but the pull-down menus work the same way. The program was a breeze to use and got me excited about OS-9's future.

Bailey hasn't sold the program to a distributor yet, but I'm betting he will. He is literally on to something very big. Why? Follow the easy steps you use to move a block of text.

Move the cursor into the menu bar and push the mouse button to pull down the "block" menu. Then, move the cursor down with the mouse to the word "BlockKopy." You'll know you're in the right place because *TED* will highlight the word to which you are pointing. Now, push the mouse button again; *TED* will tell you you have gone into the BlockKopy mode at the top of the screen.

Now all you need to do is use the mouse to point the cursor at the beginning of the block of text you want to move and push the button. "Mouse" the cursor to the end of the block and push the button again — the selected text disappears. Next, pull down the block menu again and select the BlockPaste command, then place the cursor where you want the text and push the button on the mouse. The text magically appears in the new location.

The whole process is completely intuitive. After a few minutes with the mouse you don't even think about what you're doing. You just do it. In fact, it is much harder to describe than it is to do.

There are a few little problem areas in the test version we played with but I'm sure they'll be removed before the program is distributed. For example, Bailey needs to add word wrap ability to the program. It irritates me to no end to see a word split in the middle at the end of a line. And, when you use the arrow keys, life would be easier if *TED* would let you hold down the key to auto repeat.

Operation with the joystick was a little erratic — a hardware problem that Bailey warned us about — but it sure gave us a feel for how this editor is going to work. And, Bailey is already thinking about supplying a driver that would let you use the mouse with the special high precision hardware input device that comes with *CoCo Max* — the Color Computer version of *Mac Paint*.

### Yet Another Utility Package

A month or two ago we mentioned that we didn't know whether or not Saturn Electronics Company was still using their OS-9 bulletin board system. We received the answer recently — in the form of program manuals — from Dionysiou at Saturn.

Saturn — also doing business as DSS Peripl Corporation, 62 Commerce Drive, Farmingdale, NY 11735, 516-249-3388 — is selling 22 OS-9 utility programs package named *Utilipak* for \$99. Most of the UNIX standards like *grep*, *mv* and *tr* are in the package, there's even an alarm clock.

The name of Saturn's OS-9 Bulletin Board System is "Co9." To run it you need a 64K Color Computer, disk drives, OS-9 and BASIC09. Co9 was written in BASIC and has 11 commands.

### Questions, Answers, Tips and a Few Listings

Our first tip for the month was contributed by P. Douglas Van Dusen, a U.S. Air Force Tech Sergeant at Holloman AFB in New Mexico. He wrote a short BASIC09 procedure to emulate the *PRINT* command in Radio Shack Extended Color BASIC. It's named *prnt*.

When you run *prnt* you pass two integer parameters — the column and the row where you want the cursor to go. For example, to move the cursor to the top-left hand corner of the screen, you would use a calling sequence like this.

```
DIM column, row: INTEGER
```

```
column := 0
```

```
row := 0
```

```
RUN prnt (column, row)
```

The utility will work with Hi-Res in FHL's *O-Pak* with PBJ's *Word-Pak* when it is running in the Radio Shack compatible mode. It may also run with other OS-9 screen drivers. The only requirement is that the screen uses standard Radio Shack OS-9 cursor control characters.

Tom Wong of Oakland, Calif. wrote to ask how to initialize OS-9's Color Computer graphics mode and control the cursor from within an assembly language program. Let's start with the cursor control problem we just showed you how to do it with BASIC09.

To control the OS-9 cursor you need to send a character sequence to the screen. The first character sent must have a binary value of two. This means binary 0000 0010 and not two in ASCII, which is actually 32 or 0011 0010 in binary.

When the OS-9 screen driver receives a '2', it knows that you are trying to tell it to reposition the cursor. Further, it expects you to follow the '2' with two additional characters. The first character is computed by adding decimal 20 (that's 20 Hex) to your desired column number. The second character must contain the sum of the desired row number and 32 decimal. In BASIC09, Van Dusen did it with this statement:

```
PRINT CHR$(2); CHR$(column+32); CHR$(row+32)
```



nce the BASIC09 PRINT statement sends its output to the standard output path and since the standard output is normally sent to the screen if it hasn't been redirected, the BASIC09 statement above simply sends out the characters to the screen—a binary two, followed by the column number and row number plus 32—exactly what the OS-9 screen driver needs to know.

To do the same thing in assembly language you will have to use the OS-9 I\$WRITE system call. When you make this call, you must pass three parameters in the 6809 registers. Register X must contain the starting address of the data you want to send. Register Y must contain the number of bytes of data you want to send. And, Register Z must contain the number of the path that you want to receive your data.

First reserve three bytes of memory where you are going to place the cursor control string. Something like this should be your job.

```

chNo fcb 1   *** Standard output
PREFIX fcb 2 *** the screen driver prefix character
l rmb 1
y rmb 1
zCol rmb 1
zRow rmb 1

```

Then initialize your data. For example, to move the cursor to the top left-hand corner of the screen try this:

```

lda #0
adda #32
sta col
lda #0
adda #32
sta row

```

In a real program you would probably want to use two additional variables containing the desired column location and row to create a universal subroutine. For example:

```

lda DesCol
adda #32
sta Col
lda DesRow
adda #32
sta Row

```

Now that the data is initialized, you must initialize the registers and send the data to the screen.

```

leax PREFIX, n   *** put addr of Prefix in X-register
ldy #3           *** we want to send three bytes
lda PathNo       *** Get the path number in A-register
OS9 I$WRITE      *** Now make the call
bcs error        *** handle error if carry bit is set
...              *** else go on about your business

```

In a nutshell, that's how to position the cursor in assembly language. In a real program you would most likely put several of the sequences above into subroutines and then call them when you need them. For example:

```

bcr getpos       *** initialize cursor data
bcr setpos       *** actually send data to set position
...              *** continue your application program

```

To tell OS-9 you want to go into the graphics mode, you need to send the character 15 decimal and two additional characters to the standard output path. (This means you could also use the routines above to do the job.) Except this time you will need to store the value of your desired graphics mode in the "DesCol" variable and store the value of the color set you want in the "DesRow" variable. The value you need for these codes can be found in the tables on Page 128 of the OS-9 Commands manual (the red one).

H. Bruce Phillips of Bolingbrook, Ill. contributed a nifty BASIC09 program that will give you a formatted listing of a BASIC09 procedure without the line numbers. To do the job, it reads a file that contains a listing produced by the standard BASIC09 LIST command.

Tom Fields helped with the procedure which is set up to work with an Epson MX-80 printer. Use the following steps, however, before you run it, make sure you have previously saved the procedures you are listing.

- 1) LIST the program to a temporary file named "temp"
- 2) KILL \*
- 3) LOAD *prfile*
- 4) RUN *prfile*

The final listing comes from Steve Roberson of Chandler, Ariz. who works for Motorola Microsystems and does most of his development on the EXORset. His contribution is a procedure he uses in a BASIC09 bulletin board system on his Color Computer. It loads the filenames from a directory into an array. This gives him the ability to list downloads and search a user's directory for mail.

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Steve asked about eavesdropping on a BBS user on the Color Computer screen. I don't believe you can do it, Steve. However, you may want to try redirecting the output of the BBS into an OS-9 TEE filter to send a copy of the BBS output to a disk file, your printer or another terminal connected to the RS-232 bit banger port, since you appear to be using the ACIA program pack for your BBS.

TEE would even let you send a copy of the output to the device /TERM which would put it on the Color Computer screen like you want. However, the operation most likely won't be smooth because of the way OS-9 writes to /TERM. In fact, you will probably receive the data from the BBS in bursts each time you hit the ENTER key on the Color Computer keyboard. Give it a try and let us know how it works out.

Next month the television soaps will be gearing up with a brand new season. Let's cross our fingers and hope we get to see some of that fantastic new hardware that's been hanging on the cliff for so long! Rest assured, if we hear any news, we'll let you know.

#### The listing:

```

PROCEDURE print
  0000  PARAM col,row:INTEGER
  0008  DIM c,r:INTEGER
  0016  c:=col
  001E  r:=row
  0026  PRINT CHR$(2); CHR$(c+32); CHR$(r+32);
  003C  END
PROCEDURE prlist
  0000  DIM prpath,filepath:BYTE
  0008  DIM line:STRING[255]; ans:STRING[1]
  0022
  0023  RUN SetupPrinter
  0027
  0028  REPEAT
  002A    OPEN #filepath,"temp":READ
  0039    OPEN #prpath,"/p":WRITE
  0046
  0047    WHILE NOT(EOF(#filepath)) DO
  0052      READ #filepath,line
  005C      IF LEN(line)>4 AND LEFT$(line,1)≠"P" THEN
  0074        line=" "+RIGHT$(line,LEN(line)-5)
  008C      ENDIF
  008E      WRITE #prpath,line
  0098    ENDWHILE
  009C
  009D    PRINT #prpath,CHR$(12)
  00A7    CLOSE #filepath,#prpath
  00B2
  00B3    RUN query("print another listing? (y/n) ",ans)
  00DD    UNTIL ans="n" OR ans="N"
  00F1    DELETE "temp"
  00F9  END
PROCEDURE query
  0000  PARAM message:STRING[40]; reply:STRING[1]
  0017  DIM ok:BOOLEAN
  
```

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```

E
F      ok:=FALSE
15
16     REPEAT
18         PRINT message;
1E         INPUT reply
13         PRINT
15
16         IF reply="y" OR reply="Y" OR reply="n" OR reply="N" THEN
1B             ok:=TRUE
11         ELSE
15             PRINT "what?"
1E         ENDF
19
21     UNTIL ok
29     END
2B
CEDURE SetupPrinter
2F     DIM prpath:BYTE; ans:STRING
2D
2E     OPEN #prpath,"/p":WRITE
1B     RUN query("skip over perforations? (y/n) ",ans)
46
47     IF ans="y" OR ans="Y" THEN
5C         PRINT #prpath,CHR$(27); "N"; CHR$(4)
5E     ENDF
79
71     RUN query("emphasized print? (y/n) ",ans)
96
97     IF ans="y" OR ans="Y" THEN
AC         PRINT #prpath,CHR$(27); "E"
BA     ENDF
BC
BD     RUN query("double strike? (y/n) ",ans)
DF
E9     IF ans="y" OR ans="Y" THEN
F5         PRINT #prpath,CHR$(27); "G"
93     ENDF
95
96     CLOSE #prpath
9C     END
CEDURE readdir
99     (* loads filenames from directory into an array *)
32     (* contributed by Steve Roberson *)
55
56     DIM path:INTEGER
5D     DIM filename(29):STRING[32]
6E     DIM char:STRING[1]
7A     INPUT "Enter directory name: ",dir$
98     OPEN #path,dir$:READ+DIR
A4     num=63
AC     dn=0
B4 199  fl$=""
BE     FOR x=1 TO 32
D9         num=num+1
DC         SEEK #path,num
E6         IF EOF(#path) THEN 299
F3         GET #path,char
FD         ac=ASC(char)
97         IF ac=0 AND x=1 THEN
1C             num=num+31
28             GOTO 199
2C         ENDF
2E         IF ac>127 THEN ac=ac-128
46         fl$=fl$+CHR$(ac)
54         num=num+(32-x)
64         dn=dn+1
79         filename(dn)=fl$
7D         GOTO 199
81     ENDF
83         fl$=fl$+CHR$(ac)
91     NEXT x
9C 299  CLOSE #path
A5     FOR x=1 TO dn
B7         PRINT filename(x)
C9     NEXT x
CB     END

```

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## OS-9 UTILITY

# MAIL09

## Correction

The following is the remainder of the listings that were inadvertently left out of *MAIL09* (June 1985, Page 249). This was due to an editorial error on our part here at THE RAINBOW, and was not the fault of the author, Timothy A. Harris. Please refer to last month's *MAIL09* Correction (July 1985, Page 266) for listings 2-9. Again, we apologize for any inconvenience this may have caused, either to Mr. Harris or to our readers.

## Listing 10:

```

PROCEDURE alterentry
0000  TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
      :STRING[25]; fname:STRING[19]; address1:STRING; address2
      :STRING; city:STRING[15]; state:STRING[19]; zip:STRING
      [19]; phone:STRING[14]
0069  TYPE indextype=name:STRING[25]; number:BYTE
0070  PARAM label:labeltype
0088  PARAM index(199):indextype
0096  PARAM listfile:STRING[5]
00A2  PARAM indexfile:STRING[6]
00AE  DIM tempname:STRING
00B5  DIM id,fd,numentries,entrynumber:INTEGER
00C8  DIM resp:STRING[1]
00D4  DIM keyname:STRING[25]
00E0  RUN clearscreen
00E4  PRINT "                MAIL09"
0104  PRINT "                Alter Individual Entry"
012C  PRINT "                _____"
0154  PRINT
0156  OPEN #fd,listfile:UPDATE
0162  OPEN #id,indexfile:UPDATE
016E  RUN getindex(id,index,numentries)
0182  PRINT
0184  IF listfile="clist" THEN
0195  INPUT "    Company Name of desired entry  : ",keyname
01C3  ELSE
01C7  INPUT "    Last Name of desired entry      : ",keyname
01F5  ENDIF
01F7  PRINT "                Enter changes where needed or enter"
0229  PRINT "                a '*' to keep a field the same"
0258  RUN findentry(keyname,index,numentries,fd,label,entrynumber
      )
0278  IF entrynumber=-1 THEN
0288  PRINT "Entry does not exist!"
02A1  ELSE
02A5  IF listfile="clist" THEN
02B6  INPUT "Is the Company Name the same ? ",resp
02DD  IF resp="n" OR resp="N" THEN
02F2  INPUT "New Company Name      : ",label.companyname
0315  index(entrynumber).name:=label.companyname
0327  SEEK #id,(entrynumber-1)*SIZE(index)
033A  PUT #id,index(entrynumber)
0348  ENDIF
034A  INPUT "New Last Name          : ",tempname
0369  IF tempname<>"*" THEN label.lname:=tempname
0381  ENDIF
0383  ELSE
0387  INPUT "Is the Last Name the same ? ",resp
03AB  IF resp="n" OR resp="N" THEN
03C9  INPUT "New Last Name      : ",label.lname
03DD  index(entrynumber).name:=label.lname
03E7  SEEK #id,(entrynumber-1)*SIZE(index)
0402  PUT #id,index(entrynumber)
0410  ENDIF
0412  ENDIF
0424  INPUT "New First Name      : ",tempname
0432  IF tempname<>"*" THEN label.fname:=tempname
044A  ENDIF
044C  INPUT "New Title            : ",tempname
046A  IF tempname<>"*" THEN label.title:=tempname
0482  ENDIF
0484  INPUT "New Address 1      : ",tempname
04A2  IF tempname<>"*" THEN label.address1:=tempname
04BA  ENDIF

```

ting 11:

```

DEDUCE addtolist
19 TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
   :STRING[25]; fname:STRING[10]; address1:STRING; address2
   :STRING; city:STRING[15]; state:STRING[10]; zip:STRING
   [10]; phone:STRING[14]
19 TYPE indextype=name:STRING[25]; number:BYTE
19 PARAM label:labeltype
19 PARAM index(199):indextype
19 PARAM listfile:STRING[5]
19 PARAM indexfile:STRING[6]
19 DIM fd,id,numentries,i:INTEGER
19 DIM alldone:BOOLEAN
19 RUN clearscreen
19 PRINT "
   MAIL99"
19 PRINT "
   Add Entries to List"
19 PRINT "
   -----"
19 OPEN #fd,listfile:UPDATE
19 OPEN #id,indexfile:UPDATE
19 RUN getindex(id,index,numentries)
19 alldone:=FALSE
19 SEEK #fd,numentries*SIZE(label)
19 PRINT "
   Enter Data at Prompts"
19 IF listfile="clist" THEN
19 PRINT "
   Hit <ENTER> for Company Name to END"
19 ELSE
19 PRINT "
   Hit <ENTER> for Last Name to END"
19 ENDIF
19 PRINT "
   or to leave another field blank"
19 REPEAT
19 PRINT \ PRINT
19 RUN inputdata(label,listfile,alldone)
19 IF NOT(alldone) THEN
19 numentries:=numentries+1
19 index(numentries).number:=numentries-1
19 IF listfile="clist" THEN
19 index(numentries).name:=label.companyname
19 ELSE
19 index(numentries).name:=label.lname
19 ENDIF
19 PUT #fd,label
19 ENDIF
19 UNTIL alldone OR numentries>=199
19 CLOSE #fd
19 RUN mailsort(1,numentries,index)
19 SEEK #fd,0
19 FOR i:=1 TO numentries
19 PUT #fd,index(i)
19 NEXT i
19 CLOSE #id
19 END
19 INPUT "New Address 2 : ",tempname
19 IF tempname<"*" THEN label.address2:=tempname
19 ENDIF
19 INPUT "New City : ",tempname
19 IF tempname<"*" THEN label.city:=tempname
19 ENDIF
19 INPUT "New State : ",tempname
19 IF tempname<"*" THEN label.state:=tempname
19 ENDIF
19 INPUT "New Zip Code : ",tempname
19 IF tempname<"*" THEN label.zip:=tempname
19 ENDIF
19 INPUT "New Phone Number : ",tempname
19 IF tempname<"*" THEN label.phone:=tempname
19 ENDIF
19 SEEK #fd,index(entrynumber).number*SIZE(label)
19 PUT #fd,label
19 ENDIF
19 CLOSE #id
19 CLOSE #fd
19 END

```

ting 12:

```

EDUCE updatelist
19 TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname

```

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```
:STRING[25]; fname:STRING[10]; address1:STRING; address2
```

```
:STRING; city:STRING[15]; state:STRING[10]; zip:STRING
```

```
[10]; phone:STRING[14]
```

```

0069 TYPE indextype=name:STRING[25]; number:BYTE
007F PARAM label:labeltype
0088 PARAM index(100):indextype
0096 PARAM listfile:STRING[5]
00A2 PARAM indexfile:STRING[6]
00AE DIM add,alter,delet:STRING[11]
00C2 DIM resp:BYTE
00C9 add:="addtolist"
00D9 alter:="alterentry"
00EA delet:="deleceentry"
00FC LOOP
00FE   RUN clearscreen
0102   PRINT "
0123   PRINT "
014C   PRINT "
0175   PRINT "
0177   PRINT "
01A4   PRINT "
01D1   PRINT "
01FF   PRINT "
022B   PRINT "
022D   INPUT "
0257   EXITIF resp=0 THEN
0263   ENDEXIT
0267   IF resp=1 THEN RUN add(label,index,listfile,indexfile)
028B   KILL add
0290   ELSE IF resp=2 THEN RUN alter(label,index,listfile,indexfile)
)
02B7   KILL alter
02B0   ELSE IF resp=3 THEN RUN delet(label,index,listfile,indexfil)
)
02E3   KILL delet
02E8   ELSE RUN entryerror
02EF   ENDIF
02F1   ENDIF
02F3   ENDIF
02F5   ENDL0OP
02F9   END

```

### Listing 13:

```

PROCEDURE createlist
0000 TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
:STRING[25]; fname:STRING[10]; address1:STRING; address2
:STRING; city:STRING[15]; state:STRING[10]; zip:STRING
[10]; phone:STRING[14]
0069 TYPE indextype=name:STRING[25]; number:BYTE
007F PARAM label:labeltype
0088 PARAM index(100):indextype
0096 PARAM listfile:STRING[5]
00A2 PARAM indexfile:STRING[6]
00AE DIM fd,id:INTEGER
00B9 DIM i,entrynumber:INTEGER
00C4 DIM alldone:BOOLEAN
00C8 entrynumber:=0
00D2 alldone:=FALSE
00D8 RUN clearscreen
00DC PRINT "
00FD PRINT "
0125 PRINT "
014E CREATE #fd,listfile
0158 CREATE #id,indexfile
0162 PRINT "
0199 IF indexfile="cindex" THEN
01A2 PRINT "
01D5 ELSE
01DA PRINT "
020B ENDF
020D PRINT "
023E REPEAT
0240 PRINT \ PRINT
0244 RUN inputdata(label,listfile,alldone)
0258 IF NOT(alldone) THEN

```

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```

entrynumber:=entrynumber+1
index(entrynumber).number:=entrynumber-1
IF indexfile="cindex" THEN
  index(entrynumber).name:=label.companyname
ELSE
  index(entrynumber).name:=label.iname
ENDIF
PUT #fd,label
ENDIF
UNTIL alldone OR entrynumber>=100
CLOSE #fd
RUN mailsort(1,entrynumber,index)
FOR i:=1 TO entrynumber
  PUT #id,index(i)
NEXT i
CLOSE #id
END

```

ing 14:

```

EDURE mailsort
  TYPE indextype=string[25]; number:byte
  PARAM bot,top:integer
  PARAM index(100):indextype
  DIM pass,j:integer
  DIM integerchange:boolean
  integerchange:=true
  pass:=1
  WHILE pass<=top-1 AND integerchange DO
    integerchange:=false
    FOR j:=1 TO top-pass
      IF index(j).name>index(j+1).name THEN
        integerchange:=true
        RUN xchange(index(j),index(j+1))
      ENDIF
    NEXT j
    pass:=pass+1
  ENDWHILE
END

EDURE xchange
  TYPE indextype=string[25]; number:byte
  PARAM a,b:indextype
  DIM temp:indextype
  temp:=a
  a:=b
  b:=temp
END

```

ing 15:

```

EDURE mainmenu
  TYPE labeltype=companyname:string[25]; title:string[4]; iname
  :string[25]; fname:string[10]; address1:string; address2
  :string; city:string[15]; state:string[10]; zip:string
  [10]; phone:string[14]
  TYPE indextype=string[25]; number:integer
  PARAM label:labeltype
  PARAM index(100):indextype
  PARAM listfile:string[5]
  PARAM indexfile:string[6]
  DIM creat,updat,disp,prnt,make,one:string[10]
  DIM resp:byte
  creat:="createlist"
  updat:="updatelist"
  disp:="displaylist"
  prnt:="printlist"
  make:="makelabel"
  one:="onelabel"
  LOOP
    RUN clearscreen
    PRINT "
    PRINT "
    PRINT "          MAIL09"
    PRINT "          Main Menu"
    PRINT "          _____"
    PRINT "
    PRINT "          1 -- Create Mailing List"
    PRINT "          2 -- Update Mailing List"
    PRINT "          3 -- Display Mailing List"
    PRINT "          4 -- Print Mailing List"
    PRINT "          5 -- Print Mailing Labels"
    PRINT "          6 -- Print Individual Labels"
  LOOP

```

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```

PRINT "          7 -- Execute Shell Command"
PRINT "          8 -- Return to Selection Menu"
PRINT
INPUT "          Selection : ",resp
EXITIF resp=8 THEN
RUN clearscreen
ENDEXIT
IF resp=1 THEN RUN creat(label,index,listfile,indexfile)
KILL creat
ELSE IF resp=2 THEN RUN updat(label,index,listfile,indexfile)
)
KILL updat
ELSE IF resp=3 THEN RUN disp(label,index,listfile,indexfile)
)
KILL disp
ELSE IF resp=4 THEN RUN prnt(label,index,listfile,indexfile)
)
KILL prnt
ELSE IF resp=5 THEN RUN make(label,index,listfile,indexfile)
)
KILL make
ELSE IF resp=6 THEN RUN ons(label,index,listfile,
indexfile)
KILL ons
ELSE IF resp=7 THEN RUN shellcommand
ELSE RUN entryerror
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDIF
ENDLOOP
END

```

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