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Addendum to last month's article

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 CLOAD and RUN. For full details, check our RAINBOW ON TAPE ad on Page 243.

NEXT MONTH: Just for fun, our highly popular Games Issue in August will include a great variety of programs which have been submitted in recent months — shoot-'em-ups, catch-me-if-you-cans and treasure hunts galore. A new disk utility allows you to RUN, RENAME, PAGE, LOAD and KILL disk files with just the touch of a key. Also, a great little do-it-yourself project which adds a key for shifting between upper- and lowercase on your CoCo.

Combined with other terrific features, our regular columns and hardware and software reviews, THE RAINBOW will be more fun than a barrel of monkeys. Look to THE RAINBOW for the best information on the Color Computer anywhere!

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LETTERS TO THE RAINBOW

First Edition

Editor:

I have an idea for your upcoming anniversary issue that you may like.

I was told that THE RAINBOW started off as a two-page newsletter. Since many CoCo owners were not a part of that beginning, me included, I thought it would be nice to see some reprints of the "early RAINBOW." You may not think this is a big deal, but I would be more than happy to see how the #1 CoCo magazine got its start. I think others share this curiosity as well as I do.

Allen Huffman
Broaddus, TX

Editor's Note: Great idea, Allen. So, for Allen and all of you helping us celebrate our fourth anniversary, we've reprinted our very first issue in its entirety in this issue (see between pages 98 and 99) — a little birthday treat from all of us to all of you!

WEAVING MAGIC

Editor:

I have not seen this reason for owning a CoCo: It figures out my knitting patterns and creates lovely designs I can knit on my knitting machine! There are several of us in central Florida who have knitting machines and also own a CoCo. Both machines are fascinating.

Thanks to Triple-D Software in Layton, Utah, we machine knitters have a computer program that will figure stitches, rows, increases/decreases required for any size knitted piece. It displays all figures in inches, centimeters, stitches and rows.

I'm not into programming, but I enjoy learning the magic of my computer. Thanks for such a helpful magazine that not only entertains with "one-liner programs," but also informs and teaches novices like me.

Ruth Anderson
Lakeland, FL

SAFE SAILING

Editor:

I think the *WEFAX* [February 1985, Page 42] program is the most brilliant piece I have ever worked with.

Another use this program will have is for the multitude of boats and ships that do not have weather facilities on board and request them from the Maritime Mobile Net, a net of amateur radio operators on 14.313 MHz. every day for about 20 hours each day. The country of Haiti has lost the cable service of weather from the U.S., but now we will be able to provide them the needed information from the results of your program in addition to the teletype information from the World Meteorological Organization.

Thanks again from the rest of the world for sharing your program with us.

Donald J. Kay
Key West, FL

ACCOLADES ABUNDANT

Editor:

I would like to thank the staff of THE RAINBOW for an outstanding publication performance. However low the opinion of the general public of the CoCo, there is no support for any other single computer in the form of your publication.

I recently worked at a Radio Shack store. Being a CoCo-nut, I was the salesperson to whom prospective CoCo buyers were directed. I tried to keep a copy of THE RAINBOW around. It was a major sales point of the computer. Beginning CoCoists were always directed to THE RAINBOW.

Of the software and hardware producers with whom I have been in contact, first prize goes to Phil Zwartz of PXE Computing.

Second prize goes to PBJ. The *Word-Pak* 80-column board has brought the CoCo up from the ranks of toys and game machines. I have received excellent verbal support over the phone.

Many thanks to Falsoft for publishing *The Complete Rainbow Guide to OS-9*. I finally lost my fears of OS-9 and found I could do more than just `dir /d0`. I could get so lost even PWD or PXD would report "Path name not found." Not anymore. Now, if we could have a book just a little more descriptive of BASIC-09.

Stuart Brooks
Fredericksburg, VA

DISKS GETTING DUSTY?

Editor:

I can't believe what I'm seeing more and more of in CoCo-related publications. Precisely, the phrase that appears at the head of Michael Repasy's excellent game article, "Run For Your Life" (April 1985, Page 18).

The phrase is "... unplug the disk controller." I didn't pay $600 plus for drives, cables, controllers, etc. to have programmers tell me, "You can't use it here!" If Mike wants me to use (or sometime, buy) his programs, he should write them for disk users and include a tape modification.

F.C. Caswell
Taipei, Taiwan

TESTING, TESTING

Editor:

I would like to correspond with and have several persons test a printer utility program. Give brand and model of your printer. Only the first several respondents of each printer type will be answered. No phone calls please. Write to me at Try-O-Byte, 1008 Alton Circle, 29501.

John M. Gregg
Florence, SC

SOLICITING ALLOWED

Editor:

I have written a series of programs to assist with the tracking of income(s) and expenses. I would like for some of THE RAINBOW readers to evaluate the series. In

exchange, the evaluators may keep the programs.

Interested readers may write to me at NorriSoft, 842 Fair Avenue, 46176.

Brian Norris
Shelbyville, IN

HINTS AND TIPS

Editor:

I am sure many of your readers welcomed R. Bartly Betts' column on Page 73 of the May 1985 issue. The *BYTESCRN* loader program will provide many of them with their first look at the excellent 51-by-24 text screen which the CoCo is capable of producing, and readers will no doubt employ this in many of their BASIC programs.

For those like me who find readability is improved by using black letters on a white screen, Line 40 in the loader program may be changed and the desired white screen will result.

```
40 PMODE 4,1:SCREEN 1,1
```

This may also be achieved when the green screen is displayed with the SCREEN 1,1 command and SCREEN 1,0 will switch back to green.

Michael E. Fahy
Central City, PA

ONE PERSON'S TRASH, ANOTHER'S TREASURE

Editor:

A good source of keyboard switches can be found in discarded electronic 10-key calculators. I even shortened and reused the plastic case for my keypad. The finished product is just the right height to line up with my CoCo's keyboard.

I really enjoy your magazine, especially the information published in your readers' letters.

M.F. Johnson
Tucson, AZ

DOUBLE YOUR PRINT

Editor:

Here is a tip I discovered quite by accident for *Spectaculator*. (I have the ROM Pak and a LPVII.) It will cause the sheet to be printed in double-width characters. Of course, you can print only half the number of columns per page. First save the worksheet to tape, then in the first cell to be printed enter ET mode. Next, press SHIFT ↑ (up-arrow key) then ENTER. This prints a ← (left-arrow key) to the screen only and puts the printer in the double-width mode.

I found that even after deleting the reverse arrow, the printer remains in the double-width mode but turning its power off momentarily will restore it to normal.

Ralph Bueckman
St. Louis, MO

BOOT UP

Editor:

I have had my CoCos since the 'D' version came out. They have been very good to me and they have grown along with me.

I have just begun to use my OS-9 system and have had a hard time finding out about it. Only with a lot of sleepless nights and guessing at the meanings of the instructions can any novice even get started.

A few months ago, I read in your publication that there was no easy way to boot up OS-9 with *O-Pak*'s Hi-Res screen. This is not true. I have a start-up file that brings up the Hi-Res screen first thing. Listed below is how I do it.

```
build startup

shell hires
xmode /p baud=4
tmode .1 -upc
echo
echo OS9 sdisk drivers installed
echo 6 ms /D0 /D1 40 track DSDD
xmode /t2 baud=3
tsmon /t2&
echo remote time sharing in
progress
printerr
```

If this works for me, how about the rest of the world?

Bruce T. Verstegen
Tinton Falls, NJ

INTERFACING SOLUTION

Editor:

I am writing in regard to Melvin Sharp's letter in the April 1985 issue [Page 8] in which he gave the story of his interfacing hardship with the Epson printer.

I highly recommend the Smith Corona D-200 printers. I borrowed one from a friend and had no problems with it. It comes with both an RS-232 and Centronics interface and the Smith Corona printer cable plugs right in. All you have to do is set some switches in the back.

The D-200 has an advantage or two over the Epson, too. One is it has the near-letter quality mode which is nice looking. It is also fast (160 cps) and has a bunch of different graphics modes.

Concerning company support, Smith Corona has been great. I have a daisy wheel printer from Smith Corona (an L-1000) and have found them to be very helpful. When problems developed while trying to use *VIP Writer* and some printer functions, the Consumer Affairs and Technical Service departments were very helpful. They even have an 800 number to call.

I hope this will help the others in the CoCo Community avoid some of the unnecessary problems of interfacing their computer. Keep up the good work, I haven't missed an issue in over two years.

Bill Hurlbutt
Etna, NY

BOUQUETS

Editor:

Congratulations to RAINBOW for producing the finest CoCo magazine on the market and to Richard White for the most informative articles! His latest series on spreadsheets has been an enormous help in showing our employees how versatile spreadsheets really are.

I would like to pass on one word of caution to users of Radio Shack's *Spectaculator* spreadsheet. If the 99th row contains data and you insert a row, the data in Row 99 will *fall off the spreadsheet*! I discovered this after inserting numerous rows and losing weeks' worth of data.

After finding this apparent bug, we purchased *DynaCalc* and discovered what a *real* spreadsheet is. The differences are too numerous to list, but suffice it to say that comparing *Spectaculator* to *DynaCalc* is like comparing an adding machine to a CoCo! In addition to supplying a fine piece of software, Computer Systems Center gives pleasant, helpful telephone assistance when needed.

Radio Shack produces a fine home computer, but they could learn a lot about software from independent software producers.

Ralph M. Greco, Jr.
Vice President, Greco Bros., Inc.
Providence, RI

NEW OWNERS OF ENDICOTT SOFTWARE

Editor:

We would like to take this opportunity to let the readers of THE RAINBOW know we have sold our company, Endicott Computer Software. The new owners are Hugh and Candy Christian of Huntsville, Ala.

We have tremendously enjoyed the past three years of our association with THE RAINBOW, and particularly appreciate doing business with the many loyal RAINBOW readers who have been our customers.

We'd like to encourage your readers to continue to patronize Endicott Computer Software. Hugh and Candy are excited about being involved in the CoCo market and are looking forward to helping our customers in any way possible. They plan to attend the Chicago RAINBOWfest and meet as many folks in person as possible.

Again, our thanks to all who have made our business such a success and our experience with the CoCo such a pleasure.

Guy and Pat Endicott
Huntsville, AL

NOT QUITE COMPATIBLE . . .

Editor:

This letter is to correct my last letter [May 1985, Page 8] about the compatibility of the 6847-T1 Video Display Generator. Although the local Motorola distributors assured us it was 100 percent compatible; this was not the case.

I apologize for any inconvenience I may have imposed. With all the interest and hackers, there should be a hardware

modification out soon. I've been told you can order the new chips directly from a Radio Shack store as a replacement unit.

Gary McConville
Douglasville, GA

. . . BUT WORKING ON IT

Editor:

Referring to Gary McConville's letter on Page 8 in the May 1985 RAINBOW that claims the new Motorola VDG chip (the 6847-T1) is "pin for pin" compatible with the old 6847, this contradicts the data my company has received from Motorola. The information about the 6847-T1 clearly shows it has a different pin configuration.

Spectrum Projects is currently investigating a satellite adapter board to retrofit older CoCos with the new VDG chip. The main advantage of this new chip is true lowercase letters instead of reverse video. Also, the new 26-3134B and 26-3136B CoCo 2s will fully support the double speed poke.

Bob Rosen
President, Spectrum Projects
Woodhaven, NY

INFORMATION PLEASE

Editor:

I'm modifying games in BASIC so I can play them on my CoCo 2, but I ran into trouble when I came across these random statements:

```
N=INT(1945*RND(0)+1
X=INT(10*RND(0))
```

It says in *Going Ahead with Color Basic* that in RND(X), 'X' has to be greater than '1'. What do I use for these statements?

Daniel Pardue
Gretna, LA

Editor's Note: RND (1) will generate a random number between 0 and 1. Just change 0 to 1.

MUSICAL ACCESSORY

Editor:

I have never seen a better magazine than this for the CoCo. The first thing I read every month is the "Letters To Rainbow" section.

Being a musician (mainly keyboardist), I use my CoCo as a sequencer for patterns of notes, also as a synthesizer with the *Synther 7* program. What I want to know is if anybody out there has found a way to interface the CoCo with a synthesizer, such as those by Korg or Roland. I would like to use my CoCo as a sequencer for a synthesizer. If anybody has any information on how to do this, I would greatly appreciate it. Write to me at 474 Montague Avenue, R3L 1T7.

Ric Miller
Winnipeg, Manitoba

UNIVERSAL PROGRAM

Editor:

First let me say that I read your magazine religiously. It is full of useful information. My complaint is that it comes out only once a month!

My question involves compatibility between the CoCo and other (ahem!) computers (Apple, Atari, Commodore 64, etc.). Is it possible to transpose the listings from those programs to the CoCo? I have a CoCo 64K and have a lot of friends who have the other computers. Is it possible to do this via modem at 300 Baud rate and/or by simply getting the listing from their system and hand typing it into my CoCo? Do I need to get hold of a Commodore 64 instruction manual to see how that BASIC compares to Extended Color BASIC?

I also have a cassette recorder and will soon have a 300 Baud modem and would like to be able to download as well as upload with those friends to get an interesting array of new programs. Is there some sort of universal program or listing that will allow this?

Tim Jay
St. Petersburg, FL

Editor's Note: You can transfer any program in ASCII to any other computer or vice versa. Unfortunately, not all BASIC commands are the same on the computers you mentioned. Some conversion (maybe a lot!) will be required. You need a terminal program to transfer the data.

COCO S.A.T.

Editor:

I have called several software companies in search of a scholastic aptitude test (S.A.T.) educational program that will run on my CoCo 64K disk or cassette. There are several for other computers.

I would like to hear from any CoCo users or software companies that have S.A.T. programs to run on the CoCo. Write to me at 38 Butler Road, 06473.

Ray Davis
North Haven, CT

IDENTIKIT CRISIS

Editor:

I have been having trouble with D. and R. Delbourgo's *Identikit* program (October 1983, Page 306). The construction part of the program runs perfectly, but I can't get it to print out on my Gemini-10X printer.

I wrote to the authors but they stated they were unfamiliar with Gemini printers and could not help. I wrote to Star Micronics and received a cursory "we can't help you" form letter from them.

Does anyone out there in RAINBOW land know what the Functional Control Coding is that will make the *Identikit* program print out on a Gemini-10X printer? If you can help me, please write to 204 Anchorage Road, 90744 or call (213) 835-9855.

William H. Lake
Wilmington, CA

LET'S MAKE A DEAL

Editor:

I am trying to find the September and December 1982 back issues of THE RAINBOW. Since you do not carry those back issues, I am asking anyone who sees this letter and who would like to sell those two issues to write to 131 Bennett Road, 13031, or call (315) 487-8806.

I love THE RAINBOW and I hope you continue for years to come.

Tim D. Hunt
Camillus, NY

JUST A 'PLANE' OL' MISTAKE

Editor:

. . . What a boo-boo the Tom Mix Software ad people have made with the *P51 Mustang Attack Flight Simulator* advertisement on the inside cover of the April RAINBOW. Goodness, where is the final quality control?

General C. Chenault, of the Flying Tigers, must be turning over in his grave to see his beloved P40 War Hawk being reduced to the status of the fierce Mustang . . . Of course, the P51 would fly rings around the P40 but between the two, the old War Hawk has many more romantic tales.

Jim Franklin
Paducah, KY

Editor:

. . . pictured is the P40 War Hawk! An entirely different (shark toothed) fighter (in the Free Philippines Air Force markings yet . . . What! Not the good ol' U.S.A. insignia?) . . .

Keep up the good work, RAINBOW, but watch those ads!

Duncan Class
Kitchener, Ontario

Editor:

. . . not nitpicking, but the airplane on the back of the front cover is not a P51 Mustang. It is a Curtiss P40 (Flying Tiger).

Charles E. Baker
Bakersfield, CA

. . . MORE PLANE PECCADILLOES

Editor:

This letter is a reply to those who purchased *P51 Mustang Attack Flight Simulator* and attempted to use it over the Radio Shack Modem II. Several people have reported having problems using *P51* with the Modem II.

Last weekend I purchased a Modem II to see for myself. Everything would usually work fine through the sync routine, but upon entering the game, the Modem II would drop the phone line after about 30 seconds. The problem appears to be that the modem is performing a "space disconnect." According to the Modem II manual on Page 15, a space disconnect will occur when the remote terminal sends a "space" for three seconds or more, or when your computer sends a "space" for 1.5 seconds or more.

A "space" is merely a continuous LO. The

P51 sits dormant in a LO state for about ⅛ second each update. A LO is never sustained for anywhere near 1.5 seconds, but the ⅛ second space seems to have a cumulative effect on the Modem II which causes it to think it should drop the line.

I tried changing the data format so the program would be HI while in the dormant state but it did not help. For reasons that are difficult to explain, it is impossible to transfer data in the fast, efficient manner that *P51* requires without having one of the computers remaining LO for periods of up to ⅛ second. Thus, there is no software modification to *P51* which will cure the "space disconnect" syndrome in the Modem II.

I am currently investigating the possibility of a simple hardware modification to the Modem II that will disable the automatic space disconnect feature. As of April 1, I have not been made aware of any problems with any other model of modem. I can guarantee that *P51* will work on any of the inexpensive manual modems such as the Radio Shack Model I, Muraphone MM-100 or a J-CAT.

During the development of *P51*, I used a pair of Muraphone MM-100s. During preliminary software testing I gave a copy of *P51* to several people in a local Color Computer club; they all had Modem I's or J-CATs. Then, I sent a copy to Tom Mix and tested it over long distance phone lines. It worked fine with their Hayes Smartmodem 1200.

One purpose of this letter is to warn those with Modem IIs that *P51* will not work over your modem! I sincerely regret this unforeseen problem and hope we can come up with a simple hardware modification to the Modem II.

Brian Bruderer
(author of P51*)*
Grand Rapids, MI

BULLETIN BOARD SYSTEMS

Editor:

I wish to inform your readers of a new BBS. Its name is INFOEX-80. It is not run specifically for the Color Computer, but as the Sysop of the Color Computer section, I have collected a good number of excellent (public domain) programs that can be downloaded. We also encourage users to upload programs for other users to enjoy. The phone number is (205) 887-7919. The board is run 24 hours a day.

Jeff Thorne
Auburn, AL

Editor:

Compunet BBS of St. Petersburg is now in service. It is run on a 64K CoCo with an 'E' board and two double-sided, double-density 40-track TEAC disk drives, which give us lots of room for our downloads, movie reviews, messages, text files and so forth. Our BBS is open to everyone. The board runs 24 hours a day, seven days a week and features downloading, uploading, text files, a trivia board, a message base, color graphics for certain terminal programs, news reports from around the world, weather forecasts and more. It supports 300/1200 Baud. Phone (813) 321-0397.

Emery Mandel
St. Petersburg, FL

Editor:

CoCo Extraordinaire is online 24 hours a day, seven days a week. We have multiple download menus and multiple message bases (and even one for Sysops of CoCo BBSs). Our data files include newsletters from the Cook County Color Computer Club as well as other general information. We also have a library of solutions to many CoCo Adventure games. The phone number is (312) 720-0796. Our mailing address is 56 Oakhurst Road, 60443. We are located just south of Chicago.

Joe Piotrowski
Matteson, IL

Editor:

Central Oklahoma Computer Organization, Inc. operates an open forum BBS, the CoConet, which can be reached at (405) 376-1494, 24 hours a day, seven days a week. The system contains CoCo and FLEX operating system programs for downloading with no user connect fees.

Robert Helms
Midwest City, OK

Editor:

I operate a BBS in Irving called CoCo II. The BBS number is (214) 438-2412 and is open to all CoCo users. The board is open from 7 p.m. to 10 a.m. It has downloading, message exchange and much more.

Terry Luttrell
Irving, TX

Editor:

I would like to announce that a new BBS called The CoCo Bean, dedicated to the enhancement of the CoCo community, is online. It has the ability to up- and download software and text files, send and receive messages, and deliver the latest CoCo news. Our current features include practical, utility, game and Adventure programs, and a machine language tutorial for beginning programmers. It is online from 6 p.m. to noon PST at (206) 533-7186.

Paul F. Lankow
Aberdeen, WA

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

G.C. Greiner, Sr.
Mesa, AZ

A FULL LINE OF QUALITY MODEMS

Choose an affordable Radio Shack modem that

Open the Door to an "Electronic Village"

Adding a telephone modem to your computer takes you to the door of a new age in information transfer, to an "electronic village" where the latest news, most recent stock prices, farm futures, scholarly materials and more are always at your fingertips.

And there's never been a better time than now to use your Radio Shack® or Tandy® computer as the key to this new age. With our full line of modems, you can choose the one right for your home or business and get "on line" in a hurry.

With one of our modems and Videotex software for your computer, you can use community bulletin boards to set up an electronic "garage sale" or chat with a neighbor. Send E-Mail or join an information service to research a report, read the news and more. There are even services that let you shop without leaving your house. But whatever you decide, a Radio Shack modem is the first step.

Save Time with Our AC-4 Acoustic Coupler

Our AC-4 Acoustic Coupler (26-1179, $119.95) is perfect for travellers. Just dial the telephone number you want, place the phone handset into the AC-4 and you're ready to go. It's perfect for use in a hotel room, client's office or wherever direct connection to a telephone wall jack is impractical.

The AC-4 operates at 300 baud, with full and half duplex capability and originate and answer modes.

Save on a Sale-Priced Modem II This Month

Our Direct-Connect Modem II is a programmable, auto-answer, auto-dial modem —and it's on

MAKES GETTING "ON LINE" EASY.

fits your needs and never be out of touch again!

sale this month for just $119.95 (26-1173, Reg. $199.95).

Our Basic 300-Baud Modem is Under $60

Our DCM-3 Direct-Connect Modem (26-1178, $59.95) makes data transfer especially affordable for the home computer user. It plugs into a modular jack for full duplex capability.

Our High-Speed Modem Is Value Packed

Finally, a full-featured 1200-baud modem that's value priced. Move up to 1200-baud transmissions and save money on long distance phone bills and information service connect time every time you use the DC-2212.

The DC-2212 (26-1176, $399.95) dials and answers the telephone, receives and transmits information and hangs up when the call is completed.

The DC-2212 is a direct-connect modem for Bell 212A-compatible synchronous or asynchronous operation.

See Them Today

Stop by your nearby Radio Shack Computer Center, participating store or dealer for a first-hand look at our modems.

Radio Shack
The Technology Store™
A DIVISION OF TANDY CORPORATION

Send Me a Free Copy of Your 1985 Computer Catalog.

Mail To: Radio Shack, Dept. 86-A-67
300 One Tandy Center, Fort Worth, Texas 76102

Name _____

Address _____

City _____

State _____ Zip _____

Telephone _____

Prices apply at Radio Shack Computer Centers and at participating Radio Shack stores and dealers. All modems FCC registered. Use modems only with Bell-compatible equipment. Direct-connect modems are not for multi-line use without optional extra controller.

I am not sure exactly why, but there seems to be a feeling around here that there is something very special about this Fourth Anniversary of THE RAINBOW. Now, all birthdays are important, but this one is something else — a sort of a feeling that makes it a bit more special than the previous anniversaries.

It *could* be that we are entering our fifth year of publication. There are all sorts of statistics that show if a business lasts for five years, it will "make" it. Well, we've not only lasted — but we are stronger now than at any other anniversary in our history. Maybe that is it.

Somehow, though, I feel this, while certainly important, is a bit mundane. No, it is not mundane that we believe we are in a good position and we know we will be here supporting the CoCo for years to come! That's important. (And, as a matter of fact, I am glad we don't have to keep telling you that, either. No one seems to question whether THE RAINBOW will be part of the CoCo Community a year, two or more from now.)

Maybe it is that we're expecting some exciting things from Tandy in our fifth year. We certainly are. And, while there is a lot of excitement around about what is coming (and it *is*), somehow I do not think that is it, either.

It may be our observation of the other home computer systems around. Most of you have heard about some of them: Adam, Commodore 64/128, Amiga, Macintosh and "Jackintosh" (the new Atari machine under the auspices of Jack Tramiel).

Stewart Alsop, in one of those "insider" newsletters, reports that "the C-64 is dying of sclerosis" and that the C-128 is "a dog of a computer." That leaves Commodore with the Amiga, which was announced in June of last year but has yet to see the light of day. If it does, I hear it will be priced around $1,500 — a bit steep for a home computer.

What will happen to Atari? I *do* know no one was allowed to touch the prototypes of the Jackintosh at COMDEX and that software firms are being charged $5,000 for a "development version" of the new computer. The machine is supposed to sell for $1,000 or so. Therefore, that's not exactly encouraging to people who might want to write software.

The Macintosh itself? Have you heard that it is now a business machine? That's what Apple says. A Macintosh office? CoCo gives you more power and a lot more speed. If it is big-time power you want, load up on Tandy 1000s and 2000s. *That's* power!

Yet CoCo lives! Not only does it live, but it has an energetic marketplace, new programs coming all the time, new hardware and continued interest from Tandy Center. If all that wasn't enough, the new CoCo will probably be with us in about six months — and look for something that'll really knock your socks off. But, remember, assuming Tandy keeps its policy of upward compatibility going (which I have every reason at this point to believe it will), a new CoCo will be able to share at least a goodly number of the things that made our favorite computer great in the first place.

Yes. I think that is why I am approaching this anniversary and entering this fifth year with a special feeling. Over these past five years there have been a lot of pretenders to the throne but the message is clearer now

Telewriter-64™

the Color Computer Word Processor

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

THE ORIGINAL

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

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

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

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

...one of the best programs for the Color Computer I have seen.
— Color Computer News, Jan. 1982

TELEWRITER-64

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

64K COMPATIBLE

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

64 COLUMNS (AND 85!)

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

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

RIGHT JUSTIFICATION & HYPHENATION

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

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

FEATURES & SPECIFICATIONS:

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

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

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

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

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

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

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

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

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

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

...truly a state of the art word processor... outstanding in every respect.
— The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

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

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

To order, send check or money order to:

Cognitec
704 Nob Street
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.

RAINBOW CERTIFICATION SEAL

than ever before: CoCo reigns supreme!

• • •

Another thing about which I am excited is the "Ultimate Program" which appears in this issue.

When I was a little boy, I read a Captain Marvel comic book in which the Captain went back in time, stepped on the ground in prehistoric times by mistake, and ended up changing the world. When he got back to the "present," he found everything was vastly different.

It seems the Captain (in between shouting SHAZAM!) stepped on some spore when he was in the "past" and it changed all of history. This concept has, frankly, always intrigued me.

So what would be the "Ultimate Program"? It would be a program that would allow us to "What If?" everything and anything. It obviously has some educational value (teaching both history, cause and effect), has lots of philosophical connotations and, generally, is a lot of fun to deal with.

I asked Bob Tyson to come up with a program on a general subject of his choice (he took two, one very serious; one for fun) and constructed a "What If?" program. We call it the "Ultimate Program" because, I think, it deals with the ultimate issues that affect us all — life and death, war and peace. Indeed, the whole history of mankind.

I believe you will enjoy Bob's program and I encourage you to take some time to change the face of history by doing World War II over again. What if there was no two-front war? What if the United States had not entered the conflict? What if the Russians had stayed out?

And, for your pleasure, there is another What If? too — this time involving a stock car race. Enjoy these programs; they are part of our special Anniversary Issue gift to you.

But, let's take it a step further, because I am very interested in this. My idea is that we should set up a whole series of programs that would trace the history of humankind, bringing in as many What If? situations as possible. I see a whole series of programs tracing the timeline from prehistory to the present day — even though the present day might be vastly different from what it is now.

Willing to try? Take just one point in time and develop a lot of possible consequences with even more choices. Write a program and send it to us. If yours is chosen, we'll send you a check for $1,000. But remember, one of the things that we will be looking for is the ability (your willingness, how well it runs and "user friendliness") to create a whole series of programs from your one example.

If we do this, we'll break one rule we've held for years now as a one-time shot — and we will publish a series of the "Ultimate Program." (You know we do not publish software. We're in the magazine business. We do not compete with our advertisers. It isn't fair for us to do so.) If you are selected, we'll give you a contract and even pay royalties based on sales. In any event, all material sent to us becomes our property and none can be returned. Please send them in to us by August 15, 1985. We may publish some of them in THE RAINBOW or a book, much like our Adventure or Simulations books.

But that is not what I am trying to do here. What I am trying to do is create a whole *system* of programs which could allow someone to move, step by step, through history, changing events and following alternate "timelines." The final version will paint the grand scale of history for you to manipulate. It is a big undertaking. An "Ultimate Program."

If you are interested, write us for a copy of my original plan for this concept. It may make things a little more clear.

• • •

It would be totally unfair to close this without mentioning a lot of people who have contributed to the success of THE RAINBOW during the past year — and the years that made the past one possible. I *do* hate to run lists of people, because I always leave someone out by mistake, but it is, to my mind, even more unfair not to thank the many people who have helped me.

First, to all the people who work here (and in our West Coast Office), and work so hard to bring you a great CoCo magazine. It is not just the editorial and art people who physically produce THE RAINBOW, but the business, subscription, advertising, mailing, typesetting and printing people who make it possible. You've met many of them at RAINBOWfests, but there are a bunch who pretty much stay put and work. Thanks to everyone and all of you for a magnificent job well done.

To those many members of the CoCo Community who work every day making the CoCo better. This list is a long one, but they are people who make this a bright, shining and great adventure to be in. So thank you to Bob Rosen, Eugene Alban, Dennis and Rosie Lewandowski, Bernie Appel, Darryl Davis, Dennis Derringer, Shelia Flathers, Leslie Foster, Laurie Golson, Ken and Jeanne Kaplan, Dennis Kitsz, Debbie McAllister, Barry Thompson, Wendel Meskler, Gordon Monnier, Joanne Trottier, Barbara Ott, Barbara Salavarria, John Waclo, Dave Lagerquist, Gerry Alexander, Mark Yamagata, Steve and Cheryl Blyn, Susan and Gary Davis, Linda and John Nielson, Larry and Margaret Preble, Mark Randall, Van Chandler, Don Stanfield, Rich Parry, Fred Ray, Jim Webb, Steve Bjork, Frank Brandon, Bob Albrecht, Fred Scerbo, Jan Zucker, Allen Curtis, Richard and Arlene Don, Tom and Dan Nelson, Tom and Giesle Mix, Pat and Guy Endicott, Ron and Mona Krebs, Richard Ramella, Wayne Day, Andre DeLadurantaye, Ken Elder, Peter Dibble, Ed Juge, Joanne and Michael Chintis, Dean Rector, Joe Sweeney, Phil Keller, Lane Lester, Art Flexser, Tom Nefeldt, Don Leffler, Mel Heftner, Tom Roginski, Marty Goodman, Gregg Hall, Bill Chapple, Dick White, Frank Hogg, Danny Humphress, Bob Friedler, Eric Tilenius, Mike Miller, Mike Himowitz, Tony DiStefano, Phil Kitchen, Joe Kolar, Steve Latham, Bob Delbourgo and all his "Down Under" family, Mel Gulden, Pat Baldwin, Tom Delker, Don Dollberg, Tom and Barb Kelly, Mike Plog, Tom Szlucha, Don Inman, Julie McGee, Jorge Mir, Bob Kamman, Bob Elmore, DeJuanna Cameron, Bill and Doris Vergona, Dale and Esther Puckett, Bill and Sara Nolan, Paul and Sue Searby, Khank Nguyen, Jack Knott, Joel Hoeffer, Paul Hoffman, Earl Johnson, Ben Stokes, Dave Hooper, Dick Moore, Jack Torres, Ken Klosinski, John Ross, Tom Scott, Larry Perry, Fred Crawford, Dan Buress, Jeff Preston, Ben Burnett, Ray Parsons, Charles Brown, Roger Schrag, Norm Shelton, Bob Tyson, Colin Stearman, Dan Eastham, Frank Thompson, Sandy Trevor, Mark Hulsizer, Fran Purcell, Amy Arutt, Geoff Wells, Larry Wilder, Bartley Betts, Jim Hayden, Lee Earle, Pat Jones, William Schmacher, Craig Stephens, Scott Handly, Bill Vergona, Howard Cohen, Lynne Roberts, Darren Croft and Jay Hoggins, Al Timme, John and Lynn Steiner, Ira Baxter, John Hatten, Dan

(continued on Page 161)

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 BOP! 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!!!

WHAT THE REVIEWERS SAY

"AUTOTERM is the Best of Class."
Graham, *RAINBOW*, 6/83

"The AUTOTERM buffer system is the most sophisticated — and one of the easiest to use..."
Banta, *HOT CoCo*, 9/84

"Almost a full featured word processor..."
Ellers, *RAINBOW*, 11/84

RECOMMEND 32K to 64K
Tape-to-Disk Upgrade $23
You Keep the Cassette

CASSETTE $39.95
DISKETTE $49.95
Add $3 shipping and handling
MC/VISA/C.O.D.

PXE Computing
11 Vicksburg Lane
Richardson, Texas 75080
214/699-7273

Please hire the mentally retarded. They are sincere, hard working and appreciative. *Thanks! Phyllis.*

PARENTS!
GET A KID
HOOKED
ON COMPUTERS

Send for our unique **LOGO STARTER** program. Use it with your 16K Color Computer and Color LOGO from Radio Shack. (Cat. No. 26-2722)

Teachers agree: LOGO is the best way to introduce children to computers. Now, with **LOGO STARTER** you won't have to read a book or instruction manual. Just load the **LOGO STARTER** tape.

Your child will draw exciting designs right from the start. You won't waste your time on a lot of tedious typing. And your child will be on the way to computer literacy. **$13.95**

LEAD A CHILD FROM LOGO TO BASIC

Our two **QUIZ KIDS** programs let you lead a child from LOGO to BASIC. Using LOGO, the child types answers to the computer's questions, just like BASIC.

LOGO SHAPES use simple shapes such as circles and squares. **LOGO STARS** displays five constellations from the northern sky and is an exciting introduction to the stars. Reviewed Rainbow, May '85. Requires Color LOGO.

LOGO SHAPES $14.95 **LOGO STARS** $14.95

Both programs on one cassette **$22.50**

SPEED READING

Busy executives! Students! Increase reading speed dramatically. Best available speed reading program for the CoCo. Reading material appears on the TV screen at the speed you select, training you to read faster. You can even change speed while reading. Complete with 6 different text selections and a quiz for comprehension, plus a drill to improve visual span & perception. **$17.95**

WILD PARTY

A naughty, sexy computer game for 2 to 6 couples. (Write us - we'll send a copy of the Review.)

"Would definitely liven up most parties."
—Rainbow Magazine **$27.95**

DO SOME REAL
ENGINEERING
ON YOUR CoCo

BOILER SIMULATION is a detailed tutorial on the dynamic simulation of industrial processes, a must for Control Engineers.

STEAM TABLE gives steam properties in superheat, saturated and subcooled regions.

Both programs available Sept. '85. Write for information and a 20% early-bird discount coupon.

All programs on cassette tape for 16K Color Computer. Ext'd BASIC not required. Prices include postage (PA resid. add 6%). Send check to P.O. Box 210, Jenkintown, PA 19046

b & b software

BUILDING JULY'S RAINBOW

Explore Our Fourth Anniversary Issue . . . Examine Our Very First . . . And, Meet Mr. Rainbow . . .

Prospect, Ky., May 16, 1985, Rainbow Logbook . . . The July 1985 issue is being put to bed, as we say: delivered to the printing plant. About the only thing left is my column. The third Chicago RAINBOWfest is only a few hours away. A brief moment to reflect.

We've come a long way since the premier issue of THE RAINBOW was printed on the trusty Line Printer VII. This fact is brought home to me as I spot a small gray plastic box I've never noticed before. The label on it reads "RETURN THIS FONT CARTRIDGE TO EDITORIAL LASERJET AREA." I allow as how this must be what someone has designated the office space I have just entered. I have ventured into this technological twilight zone to get a quick printout and, I must admit, the LaserJet is a marvel to me. It's responsible for the spiffy new look our listings have in this issue. I do hope you like the new look because we're hooked on the LaserJet printer; we have two now and have designs on acquiring more.

This is only one of so many changes that have taken place over the past four years leading up to this fourth anniversary issue. For a sampling of how it used to be in the earliest days of THE RAINBOW, take a look between pages 98 and 99. That's right! As a little fourth birthday gift for you, we've reprinted our very first issue, on the same paper stock, although just slightly reduced in size to fit inside the magazine better. We are proud of our "roots" and hope you enjoy adding Vol. I, No. 1 to your collection.

Who's that on the cover, you ask? Well, you might say he created the spark of inspiration that ignited THE RAINBOW as a tiny newsletter and then propelled it like a bottle rocket into an international computer magazine. Yes, that's Lonnie Falk, Rainbow's editor and publisher. Lest he be accused of immodesty, let it be known that it was my idea to feature the boss on the front of our anniversary issue. I talked it up and coaxed him into it — at least until he realized that what's right is right, and then there was no turning back. Meet "Mr. Rainbow."

"Can you believe it, 2,220 articles?" I asked our senior editor, Courtney Noe. (He believed it.) Well, that's how many THE RAINBOW has delivered these past four years. Check our fourth year comprehensive index, which begins on Page 229, and see for yourself. Leslie Foster even references any subsequent corrections in the original article entries in our index, a nice touch. And, in response to popular demand, all Rainbow On Tape programs are indexed, by filename, since the inception of the tape service, April 1982. We hope you like the improved index — and, if you don't have last year's anniversary issue which contains an index to our first three years, a limited quantity of separately-bound three-year indexes are available from our back issue department.

A couple of tidbits from our survey at the Irvine, Calif., RAINBOWfest: Of those responding, a whopping 85 percent have 64K and a growing 19 percent segment of those surveyed say OS-9 is the operating system they *use most*! OS-9 is coming on strong, and Dale Puckett's *The Complete Rainbow Guide to OS-9* is an excellent introduction. And, speaking of introductions, if you still haven't added your name to our subscription department, why not use this fourth anniversary occasion to give yourself a special present? Here's a quick and easy way: Call (502) 228-4492; ask for Deidra, introduce yourself and tell her Jim sent you.

— Jim Reed

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RAINBOW Magazine - (November 1984)

"The DEFT Systems people have put together a package which is a complete Pascal and/or assembly programming environment that is reasonably priced and works like a champ.

"DEFT Bench and DEFT Pascal remain an excellent example of what can be accomplished in the CoCo world. The entire package gives you all the necessary tools to learn Pascal. If you already know Pascal, there it gives you a total development environment. Nothing is missing, there is nothing else to buy.

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A celebration of our heritage in song . . .

4th Of July Musicfest

By T.C. Taulli

Fourth of July Musicfest contains eight of America's most-loved patriotic songs.

Featured are "America," "Anchors Aweigh," "The Marines' Hymn," "The Field Artillery Song" (a.k.a. "The Caissons Go Rolling Along"), "Yankee Doodle," "Stars and Stripes Forever," "The Star-Spangled Banner" and "America the Beautiful." There are also two Hi-Res screens to embellish the vibrant music.

The program requires 16K Extended Color BASIC. All you have to do is type in the program, RUN it and an enumeration of the songs will play. Select the song by entering the number corresponding to the title desired.

(T.C. Taulli is the author of the game Do or Die *and is a member of Color America Users Group.)*

The listing: MUSFEST

```
10 CLEAR 400:GOTO 2000
20 ' 4TH OF JULY MUSICFEST
30 ' VERSION 1.1
40 '
50 X=0
100 PMODE3,1
110 SCREEN 1,1
120 PCLS 5
130 LINE(0,X)-(255,X+12),PSET,BF
140 X=X+24
150 IF X>145 THEN 170
160 GOTO 130
170 LINE(0,0)-(99,84),PSET,BF
180 LINE(0,0)-(99,84),PRESET,B
190 PAINT(2,2),3,5
200 DRAW"BM0,84C3R97"
210 DRAW"BM0,0D83"
220 DRAW"BM0,0R97"
230 Y=6
300 U=8
310 CIRCLE(U,Y),3,5
330 U=U+16.25
340 IF U>99 THEN 370
350 GOTO 310
370 U=17
380 Y=Y+9
390 CIRCLE(U,Y),3,5
400 U=U+16.25
410 IF U>94 THEN 430
420 GOTO 390
430 Y=Y+9
440 IF Y>81 THEN 460
450 GOTO 300
460 RETURN
470 'THE STAR-SPANGLED BANNER
480 PLAY"V31O2T2"
490 A$="L8.;F;L8;D;O1;L4;B-;O2;D
;F;L2;B-;L8.;O3;D;L8;C"
500 B$="O2;L4B-;D;E-;L2F;L8;FF;O
3;L4.D;L8C;O2;L4B-"
510 C$="L2A;L8GA;L4B-;B-;FD;O1;B
-;O2;L8.F;L8D;O1;L4B-;O2DF;L2B-;
O3;L8.D;L8C;O2"
520 D$="L4B-;D;E-;L2F;L8FF;O3;L4
.D;L8C;O2;L4B-;L2A;L8GA;L4B-;B-;
F"
530 E$="D;O1;B-;O3;L8DD;L4DE-;F;
L2F;L8E-D;L4C;DE-;L2E-;L4E-"
540 F$="L4.D;L8C;O2;L4B-;L2A;L8G
A;L4B-;DE-;L2F;L4F;B-B-;L8B-;A;L
4GGG"
550 G$="O3;C;L8E-D;C;O2;B-;L4B-;
A;L8FF;L4.B-;O3;L8;C;D;E-;L2F;O2
"
560 H$="L8;B-;O3;C;L4.D;L8E-;L4C
;O2;L2B-"
570 PLAY A$+B$
580 PLAY C$+D$
590 PLAY E$+F$
600 PLAY G$+H$
610 RETURN
620 RETURN
630 'AMERICA
640 PLAY"T2V31O2"
650 A$="L4;G;G;A;L4.;F#L8G;L4;A;
B;B;O3;C;O2;L4.;B;L8;A"
660 B$="L4G;A;G;F#L3.;G;L4;O3;D;
D;D;L4.;D;L8C;O2;L4;B;O3"
670 C$="C;C;C;L4.;C;O2;L8;B;L4;A
"
680 D$="B;L8;O3;C;O2;B;A;G;L4.;B
;O3;L8;C;L4;D;L8"
690 E$="E;C;L4;O2;B;A;L3.;G"
700 PLAY A$+B$
710 PLAY C$+D$
720 PLAY E$
730 RETURN
740 'THE MARINES' HYMN
750 PLAY"T4V31"
760 A$="L4;O2;C;E;L2;G;G;G;G;L3;
G;L4;O3;C;O2;G;P4;E;F"
770 B$="L2;G;G;L4;F;L3.;D;L1;C;P
4;L4;C;E"
780 C$="L2;G;G;G;G;L3.;G;L4;O3;C
;O2;G;P4;L4;E;F"
790 D$="L2;G;G;L4;F;L3;D;L1;C;P4
;L4;O3;C;O2;B;L2;A"
800 E$="F;A;F;L3.;G;L4;A;G;P4;L4
;O3;C;O2;B;L2;A;F"
810 F$="L4;A;L3.;O3;C;O2;L1;G;P4
;L4;C;E;L2;G;G;G;G;L3.;G"
820 G$="L4;O3;C;O2;G;P4;L4;E;F;L
2;G;G;F;D;L1;C"
830 PLAY A$+B$
840 PLAY C$+D$
850 PLAY E$+F$
860 PLAY G$
870 RETURN
880 'ANCHORS AWEIGH
890 PLAY"O2;T5;V31"
900 A$="L1;G;C;L2;E;G;L3.;A;L4;E
;L1;A;O3;C;L2;D;O2;G;O3;L1;C"
910 B$="O2;A;L2;O3;C;O2;A;G;A;B;
O3;C;O2;F#;A;O3;D;C;L4;O2;B;P4"
920 C$="L2;G;F;D;L1C;L4;E;G;L3.A
;L4;E;L1;A;O3;L1;C;L2;D;O2;G"
```

```
93Ø D$="O3;L1;C;O2;A;L2;O3;C;O2;
A;G;A;B;O3;C;L4;E;P8;L8;G"
94Ø E$="L4;F#;G;O3;D;P8;O2;L8;G;
L4;F#;G;L1;O3;C"
95Ø PLAY A$+B$
96Ø PLAY C$+D$
97Ø PLAY E$
98Ø RETURN
99Ø 'THE CAISSON SONG
1ØØØ PLAY"V31T4O2"
1Ø1Ø A$="L4;G;L8;G;G;L4;G;P4;P1;
L4;D;L8;D;D;L4;D;L2;G;L4;G;E"
1Ø2Ø B$="L2;G;L4;G;E;L2;G;L4;G;E
;L4.G;L8;A;L4G;E;L2;G;L4;E;F"
1Ø3Ø C$="L4;G;L2;F;L4;D;G;L2;F;L
4D;L1;C;P4;L4G;E;L2;G;L4;G;E"
1Ø4Ø D$="L2;G;L4;G;E;L4.;G;L8;A;
L4;G;E;L2;G;L4;E;F;G;L2;F;L4;D"
1Ø5Ø E$="G;L2F;L4;D;L1;C;P4;L4;G
;G;L2;O3;C;C;O2;G;L4;G;G"
1Ø6Ø F$="L4.;A;L8;B;O3;L4;C;O2;A
;L1;G;L4;O3;L4;C;L2;C;O2;L4;B"
1Ø7Ø G$="A;A;B;O3;C;L1;D;P1;O2;L
4;G;G;O3;L2;C;C;O2;L1;B"
1Ø8Ø H$="L3.;A;L8;B;O3;L4;C;O2;A
;L2;G;L4;E;F;G;L2;F;L4;D"
1Ø9Ø I$="G;L2;F;L4;D;C;P4;G;G;G;
G;E;F;G;L2;F;L4;D;G;L2;F"
11ØØ J$="L4;D;L1;C"
111Ø PLAY A$+B$
112Ø PLAY C$+D$
113Ø PLAY E$+F$
114Ø PLAY G$+H$
115Ø PLAY I$+J$
116Ø RETURN
117Ø 'YANKEE DOODLE
118Ø PLAY"T4V31O2"
119Ø A$="L4;F;F;G;A;F;A;G;P4;F;F
;G;A;L2;F;E;L4F;F;G;A;B-"
12ØØ B$="A;G;F;E;C;D;E;L2;F;F;L4
.;D;L8;E;L4;D;C;D;E;L2;F"
121Ø C$="L4.;C;L8;D;L4;C;O1;B;L2
;A;O2;L4;C;L4.;D;L8;E"
122Ø D$="L4;D;C;D;E;F;D;C;F;E;G;
L2;F;F"
123Ø PLAY A$+B$
124Ø PLAY C$+D$
125Ø RETURN
126Ø 'AMERICA THE BEAUTIFUL
127Ø PLAY"T2V31O2"
128Ø A$="L4G;L4.;G;L8;E;L4E;G;L4
.;G;L8;D;L4;D;E;F;G;A;B;L3.G"
129Ø B$="L4;G;L4.G;L8.E;L4;E;G;L
4.G;L8;D;L4;D;O3;D;C#;D;E"
13ØØ C$="O2;A;L2;O3;D;L4;O2;G;O3
;L4.;E;L4;E;D;C;L4.;C"
131Ø D$="L8;O2;B;L4;B;O3;C;D;O2;
B;A;G;O3;L3.;C;L4;C"
132Ø E$="L4.;C;O2;L8;A;L4;A;O3;C
;L2.;C;L8;O2;G;L4;G;G"
133Ø F$="A;O3;C;O2;G;O3;D;L3;C"
139Ø PLAY A$+B$
14ØØ PLAY C$+D$
141Ø PLAY E$+F$
142Ø RETURN
143Ø 'STARS AND STRIPES FOREVER
144Ø PLAY"O2;T5;V31"
145Ø A$="L2;G;G;L4;F;E;L2;E;L4;D
#;L1;E;P4;L4;D#;E;L2;E"
146Ø B$="L4;D#;E;L2;G;L4;E;G;L1;
F;L2;D;D;D;L4;C#;D"
147Ø C$="L2;D;L4;C#;D;L1;F;P4;L4
;E;D;E;L1;G;L2;A;A"
148Ø D$="L1;D;P4;L2;G;G;L4;F;E;L
2;E;L4;D#;E;L1;E;P4"
149Ø E$="L4;D#;E;L2;E;L4;D#;E;F;
E;D;O1;B;O2;L1;D;L4;C;P4"
15ØØ F$="L2;C;C;L4;O1;B;O2;C;L2;
E-;L4;D;C;L1;O3;C;O2"
151Ø G$="L4;C;D;E;G;C;D;E;G;P4;P
4;E;L1;D;C"
152Ø PLAY A$+B$
153Ø PLAY C$+D$
154Ø PLAY E$+F$
155Ø PLAY G$
156Ø RETURN
```


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See reviews in:
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```
2000 K$="":N=0:CLS3:PRINT@5,"4TH
 OF JULY MUSICFEST";:PRINT@41,"B
Y T.C. TAULLI";
2010 PRINT@76,"(C) 1985";
2020 PRINT@160,"(1) THE STAR-SPA
NGLED BANNER"
2030 PRINT"(2) AMERICA"
2040 PRINT"(3) THE MARINES' HYMN
"
2050 PRINT"(4) ANCHORS AWEIGH"
2060 PRINT"(5) THE CAISSON SONG"
2070 PRINT"(6) YANKEE DOODLE"
2080 PRINT"(7) AMERICA THE BEAUT
IFUL"
2090 PRINT"(8) STARS AND STRIPES
 FOREVER"
2100 PRINT"(9) QUIT"
2110 K$=INKEY$
2120 IF K$<>""THEN2140
2130 GOTO 2110
2140 N=VAL(K$)
2150 IF N=9 THEN 2360
2160 IF N<1 OR N>8 THEN 2110 ELS
E 2180
2170 GOTO 2140
2180 GOTO 2210
2190 ON N GOSUB 480,640,750,890,
1000,1180,1270,1440
2200 GOTO 2000
2210 CLS 3:PRINT"WOULD YOU LIKE
A GRAPHICS       SCREEN (Y/N)?";
2220 K$=INKEY$
2230 IF K$="Y" THEN 2260
2240 IF K$="N" THEN 2280
2250 GOTO 2220
2260 R=RND(2):IF R=2 THEN GOSUB
50 ELSE GOSUB 2460
2270 GOTO 2190
2280 G=0:CLS
2290 R$=STRING$(10,CHR$(191))
2300 W$=STRING$(12,CHR$(223))
2310 B$=STRING$(10,CHR$(175))
2320 PRINT@G,R$;W$;B$;
2330 G=G+32
2340 IF G>480 THEN 2370
2350 GOTO 2320
2360 CLS:END
2370 IF N=1 THEN PRINT@228,"THE
STAR-SPANGLED BANNER";
2380 IF N=2 THEN PRINT@236,"AMER
ICA";
2390 IF N=3 THEN PRINT@231,"THE
MARINES' HYMN";
2400 IF N=4 THEN PRINT@233,"ANCH
ORS AWEIGH";
2410 IF N=5 THEN PRINT@232,"THE
CAISSON SONG";
2420 IF N=6 THEN PRINT@233,"YANK
EE DOODLE";
2430 IF N=7 THEN PRINT@230,"AMER
ICA THE BEAUTIFUL";
2440 IF N=8 THEN PRINT@228,"STAR
S AND STRIPES FOREVER";
2450 GOTO 2190
2460 PMODE 3,1
2470 SCREEN 1,1
2480 PCLS 3
2490 A$="C5;U4;R5;U30;R60;U1;R5;
D1;R60;D30;R5;D8;L29"
2500 B$="H13;L50;G13;L29;U4"
2510 DRAW"BM60,81"+A$+B$
2520 LINE(205,80)-(195,191),PSET
,BF
2530 LINE(50,80)-(60,191),PSET,B
F
2540 PAINT(71,84),5,5
2550 A$="C5;L2;D2;R2;D2;R2;D2;R2
;D2;D2;D2;L2;D2;L2;D2;L17"
2560 B$="D2;L1;D41;G15;R93;H15;U
42;L19"
2570 C$="U2;L2;U2;L2;U7;R2;U2;R2
;U2;R2;U2"
2580 DRAW"BM116,70"+A$+B$+C$
2590 PAINT(111,90),5,5
2600 A$="C3;H20;U22"
2610 DRAW"BM137,150"+A$
2620 RETURN
```


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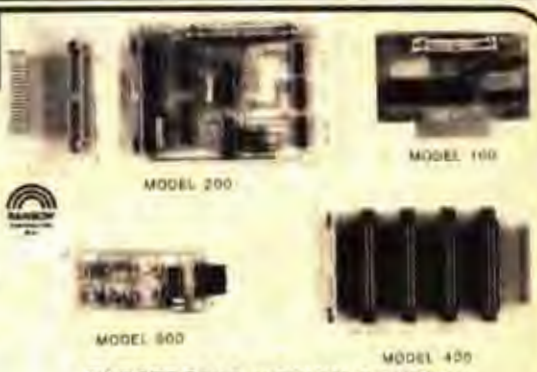

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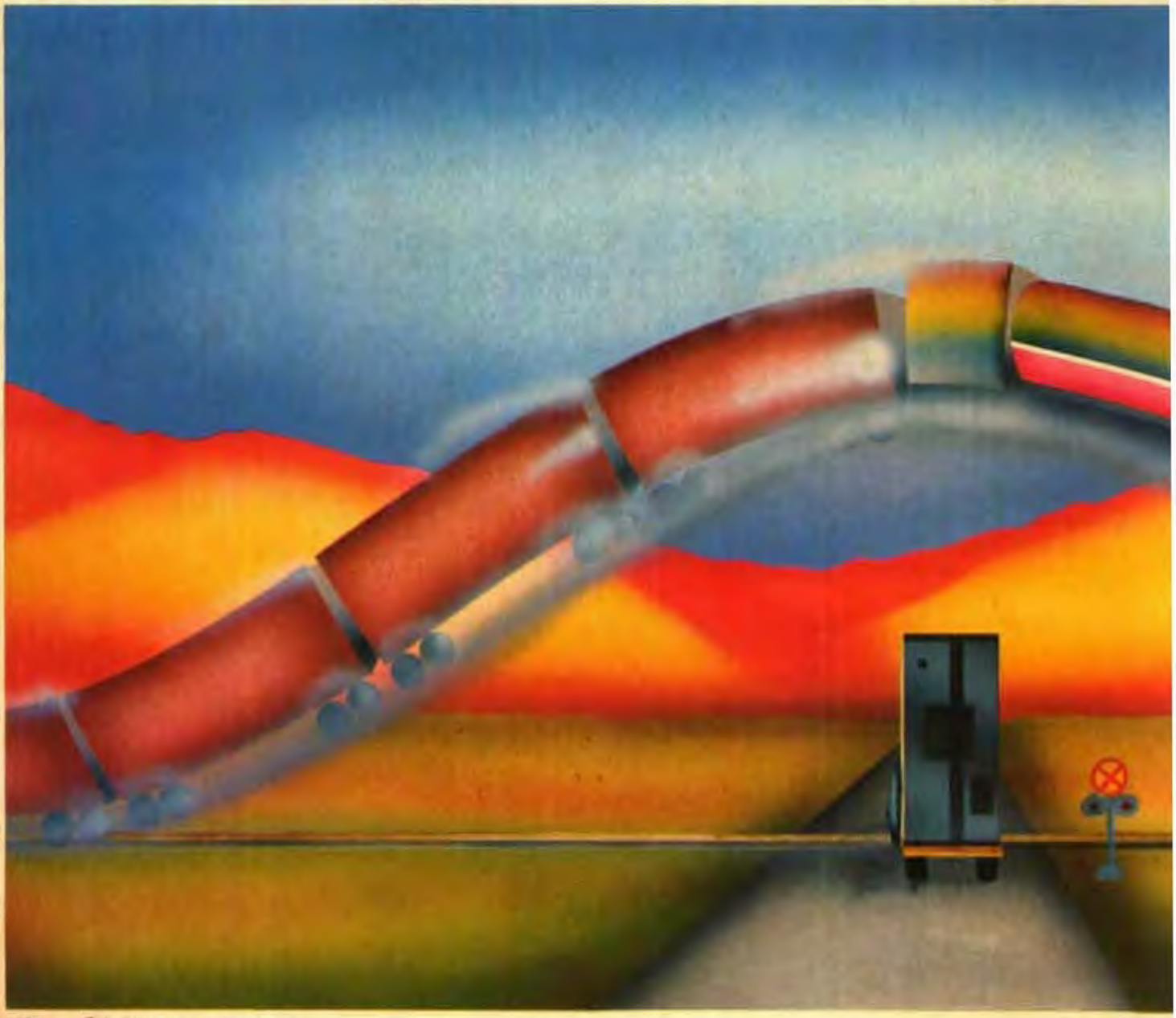

Track

By Colin J. Stearman

With the dramatic price reduction of disk drives and the increased capacity they offer, it is only natural to wish CoCo could make use of them. The CoCo 2 now has 40-track drives as standard, and double-sided and 80-track drives are readily available.

As you know, Disk BASIC only uses 35 tracks on a single-sided disk, giving 68 granules of storage space. Each granule contains nine sectors with 256 bytes of information in each. In this article we will explore how we can make use of all 40 or 80 tracks on our drive and make CoCo use both sides of a double-sided drive.

Double-Sided Drives

The best way to make use of double-sided disk drives is to fool CoCo into thinking that each side of the disk is a separate drive. There are two approaches to this. One is to revise the DOS (Disk Operating System) in the disk controller and the other is to actually modify the disk drive interface. Let's look at the DOS revision first.

Revising the DOS

If you followed my earlier series called "Cooking with CoCo," you should be familiar with how to revise your DOS and move the result to an EPROM. To demonstrate the DOS revision here, we will move the DOS into "all RAM" on our 64K CoCo and modify it there.

Inside the DOS is a table of four bytes which tell CoCo how to access each of the four possible drives. The values in Table 1 are combined with other data and sent to the controller port at address $FF40. If you inspect this table you will find it contains the following:

Table Entry	Value	Drive
1	0000001	0
2	0000010	1
3	0000100	2
4	0100000	3

Table 1

This table starts at 55210 in DOS 1.0 and 55453 in DOS 1.1. I have shown the value in binary because it shows the pattern better. Bits 0, 1, 2 and 6 exactly correspond to four control lines coming out of the disk controller to the drives. These lines are on pins 10, 12, 14 and 32, respectively. These lines are called the drive select lines and Disk BASIC selects which drives see which line by simply removing pins in the plug on the ribbon cable as appropriate. This works, but presents us with a problem as you'll see shortly.

Disk drives are surprisingly standard on their pin assignments. Pins 10, 12 and 14 are the select lines from drives 0, 1 and 2. However, pin 32 is used to select the disk side on double-sided drives.

Most drives employ jumpers on the circuit board inside the drive to determine which drive select line is seen by

(Colin Stearman is currently a systems engineering manager for Boston Digital Corp., which manufactures computer-controlled milling machines. He is an electronics engineer with an interest in all aspects of computers and owns two Color Computers, a Sinclair ZX-80 and an IBM PC.)

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the drive, so for the drive to be able to be configured for any drive number and employ the side select signal, the ribbon cable must deliver *all* four signals to it. Therefore, it is essential you replace the Radio Shack ribbon cable from the controller to the drives with one which has all the pins in the drive plugs. The supplier who sold you the double-sided drives should be able to furnish this cable.

Now that we can get all four signals to any drive, the table can be modified to deal with double-sided drives. Bit 6 is used to select side 0 or 1, and bits 0 and 1 select which of the two drives to use. If you use double-sided drives, obviously the maximum number of actual drives is two.

Some thought also needs to be given to how the drives are to be numbered. Remember that only disks written on Side 0 of either drive will be compatible with a standard Radio Shack disk system. I have found Table 2 to be the best arrangement.

Drive	Side	Designation
0	0	0
1	0	1
0	1	2
1	1	3

Table 2

To get this arrangement the table will become:

Table Entry	Value	Drive
1	0000001	0
2	0000010	1
3	0100001	2
4	0100010	3

Table 3

The advantage of this configuration is the DIR0 and DIR1 will work just like a standard two-drive system, but with the added advantage that DIR2 will be on the back of the disk in Drive 0 and DIR3 on the back of Drive 1. Of course, other combinations are possible. Listing 1 will put your 64K CoCo in all RAM mode if necessary and modify as in Table 3. When the program finishes, try doing DIRs to each drive to check for successful patching.

The advantage of this DOS patching technique is that it is fairly simple to implement. However, if you use programs which contain their own DOS, this patch has no effect. The VIP series of programs is an example of this. To access the double-sided capabilities of your drive independent of the software, a hardware approach is the only solution.

Revising the Hardware

To achieve the same effect in hardware, the drive select signals output from the controller must be logically manipulated. We know from Table 1 the pattern which the controller normally puts out to select each drive; Table 3 shows what we would like the drives to see.

A circuit using a quad AND gate chip will perform this logic for us. In order to be completely "FLEX"ible, a switch is included to defeat the circuit. This is necessary because FLEX (and other CoCo DOSs) can deal with double-sided drives without hardware modifications.

Figure 1 shows the circuit. It is best mounted on a small circuit board inside the drive case where both the signals to be intercepted and a five volt supply are available. It is only necessary to intercept signals destined to reach pins 10, 12, 14 and 32; all others pass through to the drive as before. The selector switch can be mounted on the case back panel. The jumpers on each drive should be set to DS0 and DS1, respectively.

Also some brands of drives have head load solenoids — if your drive audibly clicks when accessed you have this feature. If you have two such drives I suggest you make the heads load when the motor is turned on, not when the drive select is activated.

This does mean that both drive heads load whenever either disk drive is accessed, but also saves a lot of wear and tear (not to mention noise) when both drives are sequentially accessed as when doing a COPY. This is achieved by removing the jumper on the disk circuit board from the "HS" position and placing it in the "HM" position.

40-Track Access

Many of you were disappointed when you discovered my DOS modifications in the "Cooking with CoCo" series did not fully incorporate 40-track drives into BASIC. Of course, there was a good reason for it. There are some very definite compromises which must be made before all 40 or 80 tracks can be used fully by BASIC. Let's discuss what they are and why, then you can decide whether or not to go ahead with them.

On Track 17, Sector 2 is a byte map which keeps track (pun intended!) of the used granules on the disk. This map is called the GAT (Granule Allocation Table). On a standard disk there are 35 tracks. One is used for the directory, leaving 34 for data. Each track is split into two granules. Hence, there are 68 granules on a disk, so the GAT has 68 entries.

The data stored in each entry tells the DOS whether the associated granule is available and if not, the data stored in the byte provides a chain of granules which comprise the particular disk file. When the DOS accesses a disk, the GAT is read into memory and written back as necessary when access is finished.

Therefore, there are four areas in RAM set aside for the four granule tables associated with drives 0-3. Because of some additional overhead there are 74 bytes in memory needed for each GAT. Immediately we can see the first problem. If we go to 40, or worse, 80 tracks, the granule count goes to 78 and 158. There's no room in RAM for the larger GATs.

This is where we arrive at the compromises. We can either reduce the number of drives usable and hence the total amount of RAM space needed for the GATs, or we can overlay the GATs for each drive in the same storage area and make sure we never open files on different drives simultaneously. (Multiple files may be open on the same drive, however.)

If you have DOS 1.0 the decision is easy. Because of some nasty bugs in the DOS, it is very unwise to ever have files open simultaneously on different drives. This makes the second choice the obvious one.

If you have 40-track drives it is possible to store three complete GATs in the available 296 bytes in RAM. The 296 is derived from 4*(68+6): the number of drives times the GAT length plus six bytes overhead. For the 40 tracks 3*(78+6) results in 252 bytes being required, so by limiting the maximum number of drives to three we can have files open simultaneously on different drives because we can store three GATs at once in the available 296 bytes (assuming we have DOS 1.1, that is). However, if you have two double-sided 40-track drives, then you will want to use all four drives and must opt for compromise two, whether or not you have DOS 1.1.

80-Track Access

For those of you with the new 80-track drives, the problems are worse. First, one GAT plus overhead requires 164 bytes (79*2+6). Second, the routine which decides how to assign granules to a file only works up to 127 granules. Third, there is only room in the directory for 128 names, even though there are 158 granules on the disk. Let's take each problem in turn.

With each GAT requiring 164 bytes of RAM and only 296 available, we have little choice but to overlay the GATs for each drive and never open files on more than one drive at once if we wish to use all 80 tracks. But if we were to limit ourselves to 72 tracks, then the GAT would need 148 bytes and two could be stored in the 296 available bytes. As a result, we could allow up to two drives and also allow files to be open simultaneously on both. This may be a desirable compromise for some with DOS 1.1.

The granule allocation routine in DOS is quite clever. It allocates granules so they cluster around Track 17, the directory track. Therefore, as a disk fills up, granules are allocated evenly towards the outer and inner tracks centered about Track 17. Unfortunately, this routine cannot handle more than 127 granules; 80 tracks has 158 granules and 72 has 142, so this routine must be changed. I have replaced it in these circumstances with a simple routine which allocates granules starting at Track 0 and working linearly to the highest track.

There is nothing we can do about the third problem. The original DOS only uses nine sectors for the directory names, with eight names per sector. This patch already expands it to the remaining 16 sectors in the directory track, but this still only allows 128 names (8*16). This is not as bad as it seems. Although theoretically the 80-track drive can store 158 one-granule files, rarely are all files on the disk just one granule long. So, the available storage on the disk is 158 granules or 128 files, whichever comes first.

The Patch Program

Listing 2 is the program to use to patch your DOS for the desired drive type. It puts the DOS in all RAM and patches it according to your instructions. It will properly patch both DOS 1.0 and 1.1, and change *all* BASIC commands to correctly deal with the number of

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tracks available. The syntax of the BASIC commands is not altered in any way.

It has been further designed to patch a DOS modified by the "Cooking with CoCo" articles. The syntax of the BASIC commands DSKINI and BACKUP were modified by this patch.

Unfortunately, the parameter which checks for the maximum allowable track value cannot be patched here. This is because this data tends to move around in memory depending upon how you configured the patch. Check Line 374 on Page 84 of the September 1984 issue and change it to CMPB #72 or CMPB #80, reassemble and repatch (if you use the 72- or 80-track system). This will allow the necessary number of tracks for both the modified commands. Check that article to see the format of the DSKINI command to select the number of tracks.

Moving the GAT

One solution to the limited space for the RAM storage of the GATs exists: move its storage somewhere else where there is room for all the bytes. Because of the previously mentioned bugs in DOS 1.0, this option only exists for DOS 1.1 owners.

The very first question for DOS 1.1 owners who run Listing 2 concerns the address for the GAT — $800 is the normal place and will be used if no value is entered. The problem is deciding where to put the GAT. In the worst case, if you have four 80-track drives then you would need 656 bytes to store all four GATs, thus allowing multiple files to be opened simultaneously on all four drives. There is no such amount of protected storage in the RAM, but if you intend running in all RAM you could move the GAT storage up high in memory at or above $E000.

In any case, I leave it entirely up to you where you locate the GAT storage. The program makes no tests to see that you have provided sufficient room or that the space is in fact available. It does assume when you enter a value other than $800 that there is sufficient room for all four GATs plus overhead bytes. You can calculate the amount of storage needed from 4*[(# of tracks-1)*2+6].

Compatibility

One of the primary considerations before changing BASIC to handle the 40/80-track drives is that of compatibility. Obviously if you have 80-track drives and modified BASIC, you will not be able to read standard Disk BASIC disks. Because of the closer spacing of the tracks this was probably true even before you modified the DOS.

If you have 40-track drives it is not so bad. You will be able to read and write disks formatted on the standard DOS without any trouble. If you format a 40-track disk which you wish to use on a 35-track system, then run the program in Listing 3 *immediately* after formatting. This will prevent the upper five tracks from being used, therefore maintaining compatibility. Remember, only run this program on a blank disk since it will not work if there is anything stored on the disk.

Wrap Up

I hope this article has given you some insight into how to better use your disk drives. It is my understanding the new white drives for the CoCo 2 have 40-track capability. Try formatting a disk with the DOS patched for 40 tracks. The system will soon tell you if you do not have 40 tracks available!

I have tested the patches on 40-track drives but do not own an 80-track unit. I would like to thank RAINBOW reader Gino Latino of Melbourne, Australia, for help in this area.

If you run into problems with these patches I'd be pleased to hear from you. Just write me with a clear definition of the problem and include a stamped, self-addressed envelope (both are essential if you wish a response from me). My address is 143 Ash Street, Hopkinton, MA 01748.

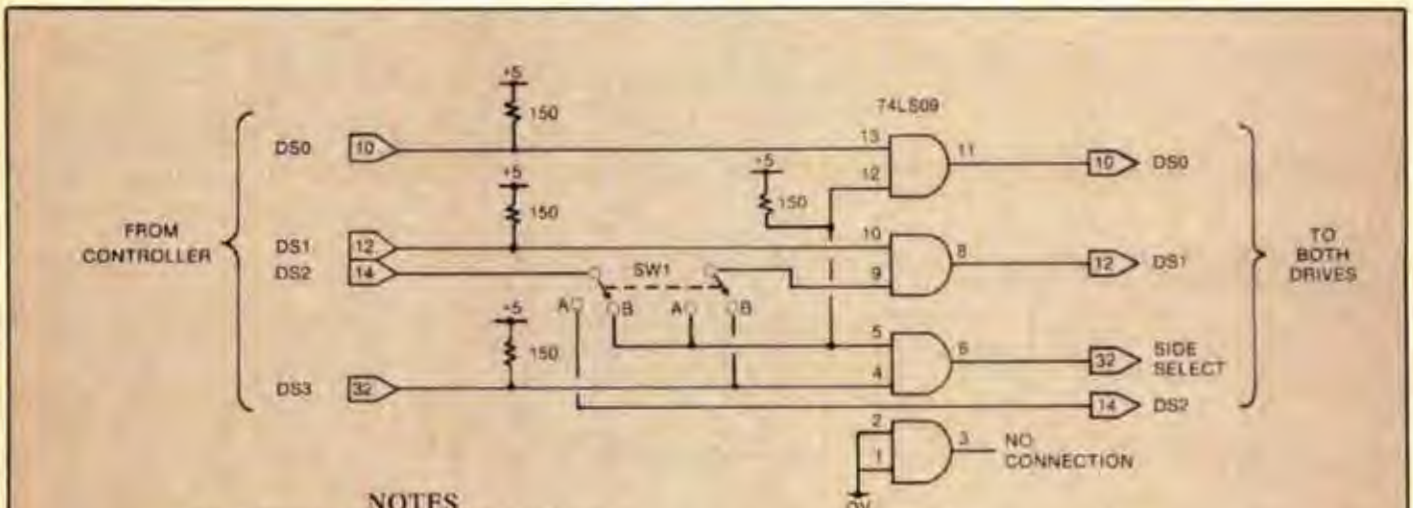

Figure 1

Listing 1: DBL SIDE

```
1 '     ----- LISTING #1 -----
1Ø ' DOUBLE SIDE DISK DRIVE BASI
C REVISIONS
2Ø ' COPYRIGHT 1985 C.J.STEARMAN
3Ø ' This will change the drive
access table
4Ø ' for 2 double sided drives.
5Ø '*****************************
**************
6Ø CLEAR 2ØØ,32511
7Ø 'RAM RELOCATION PROGRAM
8Ø DATA 26,8Ø,142,128,Ø,166,132,
183,255,223,167,128,14Ø,224,Ø,39
,5,183,255,222,32,239,28,175,57
9Ø FOR A=32512 TO 32536
1ØØ READ CODE:POKE A,CODE
11Ø NEXT A
12Ø 'PUT COCO INTO ALL RAM IF NE
CESSARY
13Ø A=PEEK(&HEØØØ):POKE&HEØØØ,55
:IF PEEK(&HEØØØ)<>55 THEN EXEC 3
2512
14Ø POKE&HEØØØ,A
15Ø VER$=CHR$(PEEK(&HC14Ø))+CHR$
(PEEK(&HC141))+CHR$(PEEK(&HC142)
)
16Ø IF VER$="1.Ø" THEN V=Ø:GOTO
19Ø
17Ø VER$=CHR$(PEEK(&HC153))+CHR$
(PEEK(&HC154))+CHR$(PEEK(&HC155)
)
18Ø IF VER$<>"1.1" THEN PRINT"SO
RRY, DON'T RECOGNIZE YOUR DOS":S
TOP ELSE V=1
19Ø POKE 5521Ø+V*243,Ø1
2ØØ POKE 55211+V*243,Ø2
21Ø POKE 55212+V*243,65
22Ø POKE 55213+V*243,66
23Ø PRINT"ALL DONE"
```

Listing 2: 40-80

```
180 .....52
430 .....154
660 .....57
END .....131
```

```
1 '  ----- LISTING #2 -----
1Ø ' 4Ø/8Ø TRACK BASIC REVISIONS
2Ø ' COPYRIGHT 1985 C.J.STEARMAN
3Ø '*****************************
**
5Ø CLEAR 2ØØ,32511
6Ø DEF FNUB(X)=INT(X/256)
7Ø DEF FNLB(X)=X-256*FNUB(X)
8Ø 'RAM RELOCATION PROGRAM
9Ø DATA 26,8Ø,142,128,Ø,166,132,
183,255,223,167,128,14Ø,224,Ø,39
,5,183,255,222,32,239,28,175,57
1ØØ FOR A=32512 TO 32536
11Ø READ CODE:POKE A,CODE
12Ø NEXT A
125 'PUT COCO INTO ALL RAM IF NE
CESSARY
13Ø A=PEEK(&HEØØØ):POKE&HEØØØ,55
:IF PEEK(&HEØØØ)<>55 THEN EXEC 3
2512
14Ø POKE&HEØØØ,A
15Ø VER$=CHR$(PEEK(&HC14Ø))+CHR$
(PEEK(&HC141))+CHR$(PEEK(&HC142)
)
16Ø IF VER$="1.Ø" THEN V=Ø:GOTO
19Ø
17Ø VER$=CHR$(PEEK(&HC153))+CHR$
(PEEK(&HC154))+CHR$(PEEK(&HC155)
)
18Ø IF VER$<>"1.1" THEN PRINT"SO
RRY, DON'T RECOGNIZE YOUR DOS":S
TOP ELSE V=1
19Ø CLS
2ØØ DIM PT(22,1)
21Ø FOR I =Ø TO 22
22Ø READ PØ$,P1$
23Ø PT(I,Ø)=VAL("&H"+PØ$):PT(I,1
)=VAL("&H"+P1$):NEXT
24Ø ' DOS1.Ø,1.1 PATCH ADDRESSES
25Ø DATA C7Ø8,C735'GRANULES
26Ø DATA C78B,C7BB'GRANULES
27Ø DATA C7AØ,C7DØ'GRANULES
28Ø DATA C7BF,C7EF'GRANULES
29Ø DATA CC4C,CD26'GRANULES
3ØØ DATA CDD9,CEB5'GRANULES
31Ø DATA D35F,D44D'GRANULES
32Ø DATA D1BØ,D29D'TRACKS
33Ø DATA D572,D65F'TRACKS
34Ø DATA D595,D682'TRACKS
35Ø DATA D446,D534'TRACKS-1
36Ø DATA C72A,C75A'GRANULES (OR
1 IF OVERLAYING GAT)
37Ø DATA C8FC,C9AA'MAXIMUM ALLOW
ABLE DRIVE #
38Ø DATA CDC7,CEA3'MAXIMUM ALLOW
```


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```
ABLE DRIVE #
39Ø DATA CDED,CEC9'MAXIMUM ALLOW
ABLE DRIVE #
4ØØ DATA D16D,D25A'MAXIMUM ALLOW
ABLE DRIVE #
41Ø DATA D43D,D52B'MAXIMUM ALLOW
ABLE DRIVE #
42Ø DATA C6A5,C6D2'MAXIMUM SECTO
R # FOR DIRECTORY
43Ø DATA C72D,C75D'GAT BASE ADDR
ESS
44Ø DATA CØ73,CØ7D'GAT BASE ADDR
ESS+Ø*(GRANS+6)
45Ø DATA CØ76,CØ8Ø'GAT BASE ADDR
ESS+1*(GRANS+6)
46Ø DATA CØ79,CØ83'GAT BASE ADDR
ESS+2*(GRANS+6)
47Ø DATA CØ7C,CØ86'GAT BASE ADDR
ESS+3*(GRANS+6)
48Ø IF V=Ø THEN  GS$="8ØØ" ELSE
INPUT"GAT STORAGE ADDRESS IN HEX
($8ØØ)";GS$
49Ø GS=VAL("&H"+GS$)
5ØØ IF GS=Ø THEN GS=&H8ØØ
51Ø INPUT"4Ø, 72 OR 8Ø TRACKS";T
RACKS
52Ø IF TRACKS<>4Ø AND TRACKS<>72
AND TRACKS<>8Ø THEN 51Ø
53Ø GRANS=(TRACKS-1)*2
54Ø FOR I=Ø TO 6
55Ø POKE PT(I,V),GRANS
56Ø NEXT
57Ø INPUT"PATCHING 'COOKING WITH
 COCO' DOS(y/N)";X$ :IF LEN(X$)=
Ø THEN X$="N"
58Ø X$=LEFT$(X$,1)
59Ø IF X$="n" THEN X$="N"
6ØØ IF X$<>"N" THEN65Ø
61Ø FOR I =7 TO 9
62Ø POKE PT(I,V),TRACKS
63Ø NEXT
64Ø POKE PT(1Ø,V),TRACKS-1
65Ø IF GS=&H8ØØ THEN 73Ø
66Ø 'CHANGE GAT STORAGE LOCATION
 AND INTIALIZATION
67Ø POKE PT(18,V),FNUB(GS):POKE
PT(18,V)+1,FNLB(GS)
68Ø FOR I=Ø TO 3
69Ø X=GS+I*(GRANS+6)
7ØØ POKE PT(19+I,V),FNUB(X):POKE
 PT(19+I,V)+1,FNLB(X):POKE X,Ø
71Ø NEXT
72Ø POKE PT(11,V),GRANS+6:GOTO81
Ø
73Ø IF TRACKS=8Ø THEN PRINT"8Ø T
RACK SYSTEMS MAY NOT HAVE   FILE
```


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```
S OPEN SIMULTANEOUSLY ON 2  DIFF
ERENT DRIVES. DOING SO WILL GARB
LE YOUR DISKS. YOU MAY HAVE MULT
IPLE FILES OPEN ON THE SAME DRIV
E HOWEVER":MX=3:GOTO76Ø
74Ø INPUT"DO YOU WANT TO BE ABLE
 TO OPEN  FILES SIMULTANEOUSLY O
N         DIFFERENT DRIVES";A$
75Ø IF A$<>"Y" THEN MX=3 ELSE IF
 TRACKS=4Ø THEN MX=2 ELSE MX=1
76Ø PRINT"MAXIMUM LEGAL DRIVE NU
MBER IS"MX
77Ø FOR I=12 TO 16
78Ø POKE PT(I,V),MX
79Ø NEXT
8ØØ IF MX=3 THEN POKE PT(11,V),1
 ELSE POKE PT(11,V),GRANS+6
81Ø POKE PT(17,V),18
82Ø IF TRACKS<72 THEN 92Ø
83Ø 'REVISE GRANULE ALLOCATION R
OUTINE
84Ø DATA 34,1Ø,63,84,27,9,63,8Ø,
4C,81,8E,24,27,2Ø,F3,35,1Ø,1F,89
,2Ø,28
85Ø OS=V*&H3Ø
86Ø FOR I=&HC794 TO &HC7A8
87Ø READ V$
88Ø VP=VAL("&H"+V$)
89Ø POKE I+OS,VP
9ØØ NEXT
91Ø IF X$="Y" THEN PRINT"DON'T F
ORGET TO PATCH THE        REVISED
 DSKINI/BACKUP MAXIMUM    TRACK V
ALUE PER ARTICLE TEXT.
92Ø PRINT"ALL DONE"
```

Listing 3: 40-35

```
1 '    ----- LISTING #3 -----
1Ø CLS
2Ø CLEAR1ØØØ
3Ø PRINT@6,"4Ø TRACK -> 35 TRACK
"
4Ø PRINT@43,"CONVERSION":PRINT
5Ø INPUT"DRIVE NUMBER";DR
6Ø IF DR<Ø OR DR>3 THEN 1Ø
7Ø DSKI$ DR,17,2,A$,B$
8Ø IF LEFT$(A$,78)<>STRING$(78,2
55) THEN PRINT"DISK NOT EMPTY, C
ANNOT CONVERT":STOP
9Ø MID$(A$,69,1Ø)=STRING$(1Ø,Ø)
1ØØ DSKO$ DR,17,2,A$,B$
11Ø PRINT"DISK NOW COMPATIBLE WI
TH 35     TRACK RSDOS.  DISK NOW
 HAS"
12Ø PRINT FREE(DR);" GRANULES"
```


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Look, Ma No Switch!

By Tony DiStefano
Rainbow Contributing Editor

Before I get into this month's project, I want to thank my readers for being so good about calling me only on Monday nights. I have had many interesting calls, and not all on problems relating to my projects, either. Some just call me to discuss theory and hardware.

For all new readers to this column, let me explain what I am talking about. I have set aside Monday nights for people to call me about problems they might encounter in putting my projects together. My number [in Canada] is (514) 473-4910. If by chance you want to write me a letter, by all means do, but if you want a written answer please include a self-addressed, stamped envelope, otherwise I'll take it as just a point of interest. But please keep the calls to Monday nights.

The next thing on the agenda is a piece of software/hardware I had the pleasure of trying — the *CoCo Max* drawing package. The software part is great. The hardware part is used to read the joystick (or in this case, a mouse) more precisely than the CoCo's internal joystick connection.

In my case, it was no problem to connect this ROM pack-looking adapter to CoCo; I have a Radio Shack Multi-Pak Interface. I just plug it in and away we go. This, however, might be a problem to users who have a disk drive and no Multi-Pak Interface: they both plug into the Expansion Slot on the side of the CoCo.

In order to have both the disk drive controller and the joystick connected together without a Multi-Pak, you need an adapter. These adapters (better known as 'Y' adapters), don't come cheap. I did an article on how to make a 'Y' adapter for your CoCo in the July 1983 isssue ("Build A 'Y' Adapter For Your Disk Controller," Page 176). If you don't have it, call up RAINBOW to get a back issue. This adapter will work with the *CoCo Max* and isn't nearly as expensive.

(Tony DiStefano is well-known as an early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.)

On with the Project

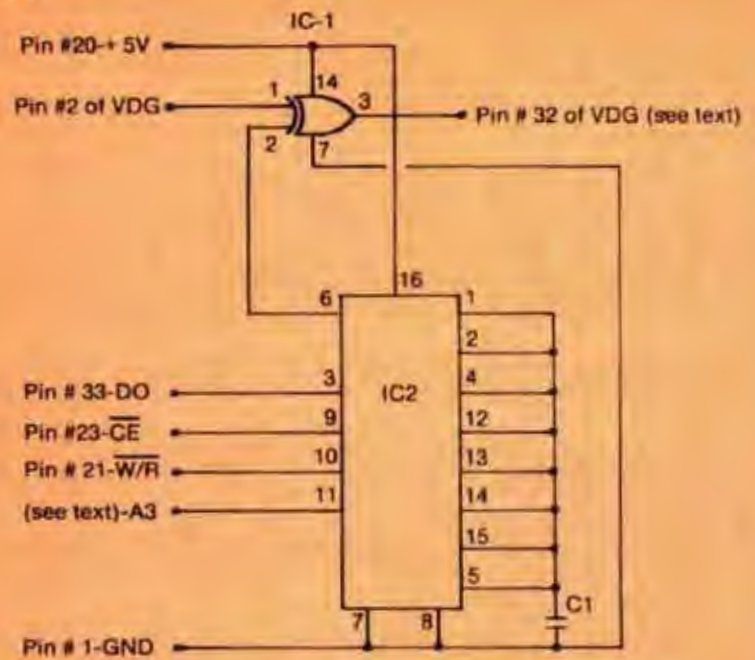
Once upon a time, long, long ago in a place far, far away I did a project on how to get inverse video on the CoCo. For those of you who are not familiar with the term "inverse video," let me explain: When you turn on the CoCo, you are greeted with a green square on the screen with black letters inside — the "normal" screen. When you enter in lowercase letters, you get this black square with a green letter in it. That is how you can tell it is lowercase.

Anyway, the project was a modification so that the computer would show a totally black screen with green uppercase letters. The lowercase letters were black with a green square. Whatever was green before was now black and whatever was black before was now green. Consequently, the term "inverse video."

Included with the circuit was a switch so you could switch between inverse video and normal video. I also said if there was enough interest I would come up with a circuit that would let you do the switching (the part of the physical switch) in software. There was; I did; here it is.

This month, I will show you the circuit and how to connect it so a simple POKE command will switch you between normal and inverse video. If you have an EPROM burner and know how to modify the DOS, you can have it built into the DOS. In order to build this

Figure 1



All wires connect to the PIA except where noted (see text)

circuit, you will need the standard kit builder's paraphernalia. You must also be unafraid of digging into your CoCo. As far as I know, this circuit will work on any version of the CoCo family.

The first part, as usual, is the circuit. Find in Figure 1 the circuit for this electronic switch. It consists of two chips and one capacitor. In order to understand how this circuit works, you must first know a little about the chips I used. The first chip is the 74LS86. This chip is a quadruple 2-input exclusive-or. Exclusive means one or the other but not both. This short truth table will help explain.

Input A	Input B	Output
L	L	L
L	H	H
H	L	H
H	H	L

H = High level (1) L = Low level (0)

In my circuit I used the 'B' input of one of the four gates as the inverter control. When 'B' is high the output is inverted with respect to the input 'A'. When 'B' is low, the output is the same with respect to the input 'A'. This is nothing new and it has been done before. A 74LS86 is almost always used for this purpose. If you were to put a switch here, you would have an inverted controller, switchable by hand. My circuit goes one further.

The next chip is a little more tricky. What is required from this part of the circuit is a type of switch action with memory, which means memory mapping (remember last month?).

This puts theory to good use. Inside the CoCo there are two possible areas we can use: either the keyboard PIA (MC6821 or MC6822) or the DAC (Digital to Analog Convertor) PIA. They are mapped at $FF00 (65280) and $FF20 (65312), respectively. (I'll go into the differences between the two later.) Both of these I/O areas are 32 bytes long. The functions these I/O areas control (the PIA) require only four bytes, and the other 28 bytes are memory mirrored. What this chip does is decode this area into two halves. This becomes either $FF10 (65296) or $FF30 (65328), depending on what PIA you hook it up to.

In order to do this, we need four signals. The first is the chip enable from the PIA that selects the 32 bytes. The next is the Read/Write line, to make the memory mapped byte a write-only byte. The next signal needed is address line #3, which is the address line needed to get us the two halves of the area. The final signal needed is a data line so we can write a signal to control the 74LS86 and latch it. All this adds up to a one-bit latch that can be changed by software; our one output needed to feed the 'B' input (control) of the 74LS86.

The chip used is a 74LS151. This chip is a one-of-eight Data Selector/Multiplexer. Although the chip is not known for its latching capabilities, my good friend and co-worker Larry Callahan and I worked out a way to latch the output with the input by using a small capacitor. By feeding the output to all of the inputs but one with a capacitor, it acted as a latch with the last input as a control. We then used the inverting output as a latched bit to control the input 'B' of the 74LS86.

When a zero is written to chip it is remembered by the capacitor and other inputs. When a 1 is written to the same location, it is remembered as well. That is all there is to it. For more information on these and all the "74LS" family of chips, refer to *The TTL Data Book* by Texas Instruments. By the way, the value of the capacitor is a mere 100 PF at 50 volts.

To construct this circuit, I used a little piece of perf board one-half inch by two inches and stuck it on top of the PIA using double-sided tape. I ran the wires along the sides to the proper pins of the PIA and the VDG (MC6845). I soldered directly to the pins of the PIA and VDG, though, some like to use a socket so as not to damage the components themselves.

All of the wires just need to be connected but, there is one pin that has to be lifted out of its socket; that is pin #32 of the VDG. If your VDG is not soldered in, just remove it, bend the pin up on an angle, replace the chip back in its socket, and then solder your wire to the lifted pin. If your VDG is soldered in, you will have to cut the pin using a sharp, pointed knife. Be careful not to damage the adjacent pins. If you use a socket, bend the pin of the socket and solder your wire to the bent socket pin. Solder all the wires to the perf board according to the schematic diagram. Solder all the wires to their respective pins on the PIA.

All the pins except A3 solder to the PIA. There are several places to get A3. It is pin #22 on the cartridge connector, pin #12 on the CPU (MC6809E), pin #5 on either ROMs or pin #19 on the SAM (MC6883). This brings us to the PIA.

Which PIA should you use? Well, that all depends on whether you want the screen to go back to the inverse mode when you hit Reset. If you put the circuit on the DAC PIA, the software switch will stay in the same position until you turn off the computer or change it. If you put the circuit on the keyboard PIA, the screen will default to the inverse mode every time you hit the Reset key. The choice is up to you.

The poke will be the same, though the addresses will be different depending on which PIA you use. If you have it on the DAC PIA the address to POKE into is $FF30 (65328) and the keyboard PIA has the address set to $FF10 (65296). From now on, if you want to change the state of your screen from one to the other, and the circuit is connected to the DAC PIA, all you have to do is:

```
POKE 65328,0 for Inverted Video
POKE 65328,1 for Normal Video
```

for the keyboard PIA, the command is:

```
POKE 65296,0 for Inverted Video
POKE 65296,1 for Normal Video
```

This modification should not interfere with the normal operation of the computer. It will only invert text in the text mode. None of the graphics mode will be affected and none of the colors of the PSET or PRESET will be changed. One more thing! The chips for this project are not available from Radio Shack, but most electronics parts mail order houses have them. There is nothing special about these chips. If you can't find them, try JDR Microdevices, 1224 S. Bascom Avenue, San Jose, CA 95128. The telephone number is (408) 995-5430.

In closing, I would like to say I have been getting a few letters from readers who are interested in making a computer storage scope using the CoCo. The average price for such a scope starts at about $10,000. The hardware that goes into one also costs big bucks.

To try to make a project of one in this column is not quite possible. First of all, the CoCo is not a fast enough computer to make it worthwhile. Second, the hardware required would run up a bill I don't have the means of paying. And last of all, the time it would take to develop a schematic, you would be lucky to get it by 1999. But keep your ideas coming.

Parts List

Part	Description
IC-1	74LS86
IC-2	74LS151
C1	100pf 50V
Miscellaneous	Perf board, Wire, 14-pin socket, 16-pin socket

(A note to the "Adding A Numeric Keypad To Your CoCo" (April 1985) article. A reader sent in a letter saying that you can get a keypad for this project from California Digital, P.O. Box 3091 B, Torrance, CA 90503, 800-421-5041 or 213-679-9001. The item is: HITEC 15-key numeric keypad.)

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Take This Message, Please!

By Steve Blyn
Rainbow Contributing Editor

Functional literacy has been defined as the ability to apply reading, writing, speaking and listening skills to problems and tasks of a practical nature encountered in everyday life.

Computers can offer students many opportunities to attain and maintain these skills. One of the skills included in functional literacy is the ability to receive and write a clear message. This month's article will focus on this skill.

Our program will present a form for taking a telephone message. The student's task is to complete the information necessary to communicate the message from one person to another.

Sounds simple, doesn't it? Just write down the information the caller gave you. Like many other tasks, this is simple only after you have mastered it.

You really have to live with children to appreciate the kinds of errors they can make when taking a telephone message. One common mistake is that children will forget to ask either for the name of the caller or the caller's telephone number. (This, of course, only happens when they answer an important call for you!) "I didn't know I had to ask for his telephone number. I thought you knew everyone's number," says your child.

Children also often omit the important part of a phone message. It takes time and practice as well as some maturity for children to learn this, much the same way reading teachers devote a lot of time to teaching the related skill of recognizing the main ideas of paragraphs and stories.

The features we feel would make a phone message complete are:

1) The date and time of the message
2) To whom the message is directed
3) The name and phone number of the caller
4) A summary of the message

Program lines 180-240 ask the child to record the date and time as well as the caller's name and telephone number. The strings at the end of the lines represent the information that will be saved in the data file.

The actual message gets entered on Line 260. Lines 270-310 question whether the message is correct. We felt it wise to give the child a chance to redo the message if he is not satisfied with it.

This program's foremost purpose is to enable the student to write clear messages to and for others. To accomplish this end, the program also presents a means to save and retrieve these messages. A file for each message will be created for future reading and evaluation.

Provision has been made for either cassette or disk storage. The beginning of the program asks which form of storage you will be using. The device #1 is used for disk and #-1 is used for cassette by the CoCo. Lines 60-90 will let you select either tape or disk storage.

The user may also select to either write a new message or look at a previous message. When selecting filenames for this or any program, there are two rules to remember.

1) Limit your filename to eight letters or less. A file extension of "/DAT" will automatically be included on disk files.

2) Do not call two programs by the same name. A disk drive will overwrite and wipe out the first program if you give another the same name.

(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.)

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Takes advantage of an expanded 64K computer. Makes an additional 8K or RAM available. Create a buffer for a printer spooler that is as big as 32K - Copy ROM cartridges to disk. Rainbow review July '83.

DISK UTILITY 2.1 (Spectrum) (Disk) **$24.95**
Multiple-featured tool - User friendly - Fast disk I/O for format, copy & backup. Utilize a directory window to selectively sort, move, rename and kill files. Examine a files contents, the Granule table, also finds the size, load & entry addresses of all programs. Single command execution of both Basic & ML programs. Reviewed Oct. '84.

COCO CHECKER (Spectrum) (T/D) **$19.95**
Something's wrong with your CoCo and you just don't know where the problem is? Or even how to run test to find the problem?? CoCo CHECKER is your answer! Will test: ROMs, RAMs, PIAs, VDG, Joysticks, Clock speeds, Printer, Disk Drives and Controller - Also test the Keyboard and cassette. Reviewed Jan. '84.

SPIT-N-IMAGE (Spectrum) (Disk) **$29.95**
Super upgrade from Disk Omni-Clone! Backup any non standard Disk with ease. We haven't found any disk yet that it can't handle! Don't be caught without a backup ever again! Beats most 'copy protection'.

SCHEMATIC DRAFTING PROCESSOR (Disk) **$29.95**
Save time and design professional looking diagrams using a 480x540 worksheet, w/6 viewing windows and over 30 electronic symbols w/10 definable symbols! Print hard copy & save to disk. Reviewed Jan. '84.

HARDWARE

CoCo II 64K Computer *limited quantity* **$169.95**
DOS Switch - For J&M and RS controllers ■ No Soldering or trace cutting necessary! ■ All Gold Contacts - Allows switching of any combination of 24 pin and 28 pin proms by moving one jumper.

For J&M Controller	$21.95
For RS Controllers	$31.95
JDOS Rom 1.11	$39.95
with RS DOS 1.1	$49.95
with JDOS 1.11	$62.95
RS DOS Rom 1.1	$37.95

**JDOS ROM comes with manual.*

Prom Switcher All gold contacts, no soldering. Fits ALL CoCo I's and CoCo II's. Switch any combination of 24 and or 28 pin PROM's **$21.95**

RS-232-C Serial Port Switches

Two position	$24.95
Three position	$29.95
Four position	$34.95
Five position	$39.95

GRAPHIC UTILITIES

MASTER DESIGN (Derringer) (Disk) **$28.95**
TEXT designer editor - Generate graphic lettering. Multiple font sizes, features: shadows, thickness and special patterns for creative backgrounds also includes LETTER HEAD UTILITY that interfaces with TELEWRITER 64. Screen Dump for all dot matrix type printers (7 & 8 bit) and more! Reviewed July '84.

COCO MAX (Spectrum) (ROMPAK) **$69.95**
Includes Icons - Pull down menus - Graphic editing Font styles - Point & Click method! You can Spray, Brush or Fill with any Color, Shading or Pattern!! Use Rubber Band Lines & Shapes (square, rectangle, Circle, ellipse, etc.) or even Caligraphy Brushes!! Trace Edge, Invert, Brush Mirrors, UNDO & FAT BITS Joystick input - 256x192 resolution! Needs the Multi Pak or 40 Pin 'Y' cable. "Gotta see to believe"!

GRAPHICOM (Spectrum) (Disk) **$23.95**
The original - Advanced - CoCo graphic development tool with sophisticated editing, preview animation telecommunications and printer support. Hi-Res and much more! With GRAPHICOM JOYSTICK ... $48.95

BJORK BLOCKS (SPECTRUM) (T/D) **$33.95**
Powerful graphic utility developed by Steve Bjork. Use for designing screens in your on games or just for your own pleasure. Has a very efficient storage routine for graphics information. (64K animation!)

SCREEN DUMP - UTILITIES

GEMINI EPSON (Derby City) (T/D) **$13.95**
The LOWEST priced GEMINI EPSON screen dump for the CoCo ANYWHERE! But has all the advanced options of the higher priced programs! Super fast ML compiled from Basic. Very user friendly - Menu driven. Also compatible with GRAPHICOM & BJORK BLOCKS. Any baud rate - Standard & Reverse Images - Full or Quarter page pictures - High Speed Poke option - Nice Buy!

PP-115 COLOR DUMP (Derby City) (T/D) **$21.95**
The FASTEST and HIGHEST QUALITY CGP-115 P/P screen dump. Completely menu driven - Works in ALL PMODES and compatible with GRAPHICOM. Will dump any image on any one of the graphics pages! Reverse PMODEs 4 and 2 and 0 images. Exchange any color for another color in PMODEs 1 or 3! Print out largest possible picture. Delete background option. Review Feb '84.

SPEECH – MUSIC – GAMES

SPECTRUM VOICE PAK (CoCo I/II) **$67.95/$77.95**
The VOICE PAK is a simple to use, complete phoneme based voice system, that employs the 'VOTRAX SC01' speech synthesizer chip. It provides for unlimited vocabulary! Automatic or user supplied inflection! Plus four programmable levels of pitch! Comes with Word Manager that constructs and edits custom user dictionaries & a text to screen scanner translator that can be used either interactively or under the users program control! With a single line of Basic code, the VOICE PAK will add speech to any of your Basic programs! RAINBOW review Nov. '84.

TERM TALK (Spectrum) (T/D) **$37.95/$47.95**
The COMPLETE talking terminal program. In addition to printing incoming & outgoing text on the screen it is capable of speaking the text! An ASCII based communication program that features: Download programs & text files. Save & load buffers to tape or disk, split or full screen, normal or reverse display. Fill buffer before logging on, re-define any communication protocols. Reviewed in March '1984.

COCO BINGO (Spectrum) (Tape) **$24.95**
The same as the popular game of BINGO but this one will talk! Comes with: 20 Bingo player cards & 200 markers plus complete documentation on rules. Also includes 3 timing levels of play, ball count and a pause control. Compatible with disk. N 32, B 2.

FINAL COUNTDOWN (Spectrum) **$24.95**
A beserk General has started the FINAL COUNTDOWN!! He has aimed the missile at MOSCOW! Your mission is to stop the launch and prevent the impending World War III. Has multiple voices for added realism!!

MUSICA (2 Spectrum) **$39.95**
4 voices simultaneously - Play music easily from a Basic program - Block copy music - No hardware and 100% machine language - Easy vibrato effect - High resolution display - Output sheet music to printer and input from keyboard or joystick - 30 page book describing how to: Exchange a waveshape between any voice, at any point - Control the loudness of each voice individually - and much - much more! Try it!

COLOR BIORHYTHM (Derby City) (T/D) **$12.95**
For the CGP-115 Printer Plotter. Find your Highs & Lows! Full 4 color printout that features: A years complete analysis printout & one month page. Fully color coded for easy understanding - Every months analysis contains a complete sine wave chart and a full, color coded, breakdown of the daily codes.

PENTAY (Derby City) (T/D) **$19.95**
The same classic game of skill published by PENTE GAMES INC. and Co-Authored by Gary Gabriel and Tom Braunlich! Play a basic two player game or try the more advanced tournament rules. The program is not protected in any way and is in straight EXT. BASIC code. The reason for this is because you may want to modify the code to add features or enhancements like many of the users, that I have heard from in the past few months, the ones that want to find out how it is done. Don't be fooled though! PENTAY is a game that is a Hi-res, 4 color, graphics program - with graphic text and speed that can & will more than surprise you! (Let me know if it helps.)

BLACKJACK ROYAL (Spectrum) (T/D) **$24.95**
A Hi-Res graphics, casino blackjack simulation and card counting tutor. Includes: Double down, splits, surrender, insurance bets, 1-8 decks, burn cards, shuffle frequency and more! Reviewed August 1983.

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

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

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

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

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

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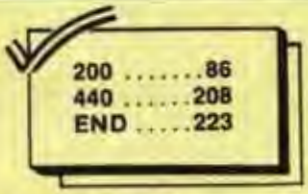
The routine on Line 320 saves the message as a file. The routine on lines 360-390 retrieve any file that was previouly saved. Lines 400-430 print out that message on the screen. You can have the messages sent to a printer if the device #-2 is used on these lines or an additional set of similar lines. For example, Line 430 could be changed to have the output on both screen and printer by including:

```
430 PRINT"MESSAGE:";F$:PRINT#-
    2,"MESSAGE:"F$
```

Messages are made by a caller to the student who records and saves it. The message is presumably retrieved by the third person for whom it was intended. This would most probably be the teacher or parent. At this point, the messages taken by the student can be analyzed for completeness and clarity.

The results of this program are best tested by having children answer real telephone calls and take messages. This, however, can also be done by role playing with several children. You can be the pretend caller one time and the answerer/recorder the next time. Sample phone conversation cards of typical phone calls could also be easily made for a single child to practice the skill of recording a message.



The listing: MESSAGES

```
1Ø REM"PERSONAL MESSAGES"
2Ø REM"STEVE BLYN,COMPUTER ISLAN
D,NY,1985
3Ø CLEAR1ØØØ
4Ø CLS:PRINT"     YOUR  MESSAGE
 CENTER
5Ø PRINTSTRING$(32,255);
6Ø PRINT"WILL YOU BE SAVING MESS
AGES ON  DISK OR TAPE";:INPUT DV
$
7Ø IF DV$="D" THEN DV=1
8Ø IF DV$="T" THEN DV=-1
9Ø IF DV$<>"D" AND DV$<>"T" THEN
 6Ø
1ØØ PRINT:PRINT"DO YOU WANT TO S
AVE OR LOOK AT A MESSAGE    s  O
R  l  ?"
11Ø EN$=INKEY$
12Ø IF EN$="L" THEN 36Ø
13Ø IF EN$="S" THEN 15Ø
14Ø GOTO 11Ø
15Ø CLS
16Ø PRINT"WHAT IS THE NAME OF TH
IS MESSAGE";:INPUT N$
17Ø CLS
18Ø PRINT@7,"PERSONAL MESSAGES";
19Ø PRINT@64,"TO:";:LINEINPUT A$
2ØØ PRINT@96,"DATE:";:LINEINPUT
B$
21Ø PRINT@115,"TIME:";:LINEINPUT
 C$
22Ø PRINT@128," ":'REMOCE THE EX
TRA IGNORED SIGN
23Ø PRINT@128,"CALLER:";:LINEINP
UT D$
24Ø PRINT@16Ø,D$;"'S #";:LINE IN
PUT E$
25Ø PRINT@224,STRING$(192,".");
26Ø PRINT@224,"MESSAGE:";:LINEIN
PUT F$
27Ø PRINT@417,"IS THIS MESSAGE C
ORRECT(Y/N) ?";
28Ø EN$=INKEY$
29Ø IF EN$="Y" THEN 32Ø
3ØØ IF EN$="N" THEN 25Ø
31Ø GOTO 28Ø
32Ø OPEN "O",#DV,N$
33Ø WRITE#DV,A$,B$,C$,D$,E$,F$
34Ø CLOSE#DV
35Ø GOTO 1ØØ
36Ø CLS:PRINT"WHAT IS THE NAME O
F THIS MESSAGE";:INPUT N$
37Ø OPEN "I",#DV,N$
38Ø INPUT#DV,A$,B$,C$,D$,E$,F$
39Ø CLOSE#DV
4ØØ PRINT"A MESSAGE TO ";A$
41Ø PRINT"CAME ON ";B$;" AT ";C$
42Ø PRINT"FROM ";D$;": #";E$
43Ø PRINT"MESSAGE:";F$
44Ø PRINT:PRINT"ENTER TO GO ON O
R 'E TO END"
45Ø EN$=INKEY$
46Ø IF EN$=CHR$(13) THEN GOTO 1Ø
Ø
47Ø IF EN$="E" THEN CLS:END
48Ø GOTO 45Ø
```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The Great Rainbow Simulation Package

Including World War II, Stock Car Racing And A Do-It-Yourself Simulation Generator For Writing Your Very Own Scenarios

One of the many advantages the computer has given us is the ability to make forecasts based upon the entry of facts or variables which we know will affect the outcome. In essence, we are using computers to predict the future.

Given our preoccupation with history and the computer's capacity to predict logical outcomes, wouldn't it be fascinating to see how history would have been altered if a different set of circumstances had occurred?

There are two special Simulations for this Fourth Anniversary issue of THE RAINBOW *which allow you to do just that —* World War II, *a serious program which allows you to control major factors affecting that global conflict; and* Stock Car, *a fun Simulation of the Trans-South Stock Car Race in Darlington, S.C. Also included is an innovative Simulation generator which allows you to create your own scenarios.*

What If? — A World War II Simulation

In this the 40th year since the conclusion of World War II, it is appropriate to reflect upon the global conflict which touched more countries, caused more destruction and death, cost more money, and had more far-reaching effects than any war in the history of humankind.

The map of Europe was changed forever because of the maniacal tendencies of Adolf Hitler, the central figure in world history from 1939 to 1945. Under Hitler's leadership, Gemany intended to create the mightiest empire the world had ever seen. Initial plans called for the occupation of adjoining territories — Poland, Denmark, Norway, Belgium, Luxembourg and The Netherlands. Then, after overrunning France, Hitler expected to use air assaults to force Britain to make "peace." German troops would then defeat Russia, capture the oil fields in the Middle

(Bob Tyson is a senior systems engineer at United Technologies Research Center in West Palm Beach, Fla. He holds a doctorate in physics, and designs and analyzes high energy beam control systems using computer simulations.)

EUROPEAN BOUNDARIES
PRIOR TO WW II
ATLANTIC OCEAN
NORWAY
SWEDEN
FINLAND
ESTONIA
LATVIA
LITHUANIA
EAST PRUSSIA
NORTH SEA
DENMARK
GREAT BRITAIN
NETHERLANDS
BELGIUM
GERMANY
POLAND
RUSSIA
CZECHOSLOVAKIA
FRANCE
SWITZERLAND
AUSTRIA
HUNGARY
ROMANIA
YUGOSLAVIA
BULGARIA
ITALY
ALBANIA
GREECE
SPAIN
PORTUGAL
TURKEY
MEDITERRANEAN SEA
PALESTINE
NORTH AFRICA

East, and Hitler would implement his grand plan for a "New Order."

We are left to wonder what the final outcome would have been if German troops had followed through at Dunkirk in 1942 when the British forces appeared to be hopelessly trapped at the Belgium port. But for some inexplicable reason, the Germans waited, giving the Allies the chance to make their desperate escape.

What if the United States had entered the war two years earlier? Would the war have been shortened, saving countless millions of lives? What if the United States, still healing its wounds from the first world war, had never even entered the European conflict and instead concentrated its efforts in the Asian theater?

What if Hitler had not started a two-front war by attacking the Soviet Union? What if Russia had sensed Hitler's ambitions and launched an all-out assault on Germany earlier in the war. The Russians with their superior numbers would surely have conquered Germany. What if the Russians, fresh from victory, had implemented their version of a master plan and attempted to conquer Europe for itself?

What if the Allied invasion of North Africa had failed?

The possibilities are as intriguing as they are staggering in their perceived footprints on the modern history of Europe.

In this Simulation, let's presume you are the supreme commander of all of the Allied and Axis forces. Hitler would envy you because you have the power to change the goals of any country, even his. You have control over the goals of all ground, naval and aerial forces, as well as their supplies and even the morale of the troops.

We assume you will use your newly found powers more constructively than Hitler did, but that's really up to you.

The Allied combatants include the American, British and French forces. The Soviets originally sided with Germany but joined the Allies after being invaded by Germany in 1941. The Axis powers consist of the German, Italian and Polish armies. Actually 50 countries joined the Allies, and nine formed the Axis, but we've included only the major powers for programming efficiency.

As the Simulation begins, you are given four options:

I — Initialize the scenario. This enters the variables for historical events as they actually occurred. You should choose this option the first time you run the program — unless you want to assign a new set of variables for every single phase of the Simulation.

G — A graphics screen showing the European Theater. Countries occupied by Axis powers are shown in yellow, the Allies in green. As the war progresses, the colors change.

A — Advance the scenario. To move to the next stage of the war, which moves along in three-month sequences.

V — To view or change conditions. This is the most important option in the Simulation because this is where you can make vital decisions affecting the outcome of the war.

This option includes a submenu

World War II Scenario Tables

COMBATANTS
(2nd cell — Y values)

0 American
1 British
2 Soviet
3 French
4 German
5 Italian
6 Polish

REGIONS
(1st cell — X values)

0 Atlantic Ocean
1 Mediterranean
2 British Isles
3 France
4 Germany
5 Italy
6 U.S.S.R.
7 Slavic countries
8 Scandinavia
9 Poland
10 Spain
11 North Africa
12 Palestine

FORCES
(3rd cell — B values)

0 Ground troops
1 Naval forces
2 Air forces
3 Troop morale
4 Supplies

Rainbow Simulation Generator

Simulations make it possible to experience many exciting situations which normally would not present themselves. The best are those that provide as many realistic options as possible and proceed at a realistic pace.

To make it much easier to create your own special scenarios, THE RAINBOW is providing you with a Simulation generator (Listing 1). It's the same generator which runs the subroutines in the *World War II* and *Stock Car* programs.

To conserve memory, blocks of bytes were used to store variables rather than a full array. The reasoning is simple: If you can scale variables between zero and 255, then only one byte is necessary for each variable. If we used floating point numbers, we would need five bytes for each one. Look at Lines 4 and 40: A block of one-byte variables begins at memory byte 28000.

The variables are addressed in this block by assigning three index values to the variable locations 'X', 'Y' and 'B'. These are similar to using a three-dimensional array, except to find the address of the variable you `GOSUB 990` with a particular 'X', 'Y' and 'B' in memory. The subroutine returns a value of AD, which is the offset address you need from the 28000 base. For example, if we want to store the number 76 in the variable indexed by X=2, Y=3, B=0, then type:

```
X=2:Y=3:B=0:GOSUB 990:POKE (AD+AD),76
```

To retrieve the number and store it in Variable A, just reverse the process:

```
X=2:Y=3:B=0:GOSUB 990:A=PEEK(AD+AD)
```

To describe what each 'X', 'Y' or 'B' might mean, we provided the three-character arrays XS( ), YS( ) and BS( ). These are initialized when you load in your scenario. If you really have to have a floating point variable passed between the generator and your scenario,

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"... Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless. October 1983 "Rainbow"

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- FREEDOM to imbed any number of PRINTER CONTROL CODES anywhere. **EVEN JUSTIFIED TEXT.**
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- Automatic justification, automatic pagination, automatic centering, automatic flush right, underlining, superscripts, subscripts, pause point, single sheet paper, and print comments.
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Radio Shack Catalog No. 90-0142
32K DISK ONLY $49.95

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"ONE OF THE BEST" JULY 1984 "RAINBOW"

This high speed MACHINE LANGUAGE program fills all your information management needs, be they for your business or home. And it does so better than any other database program for the Color Computer, featuring machine code, lowercase screens and mail-merge capabilities. Inventory, accounts, mailing lists, family histories, you name it, **VIP Database™** will keep track of all your data, and it will merge **VIP Writer™** files.

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Radio Shack Catalog No. 90-0140
32K DISK $59.95
64K Required for math package & mail merge

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which allows you to view all of the tables one after another by pressing the 'A' key, or to check the status of a specific cell by pressing the 'S' key.

If you want a sequential listing, the tables are displayed first by regions (see the Region Table). A status report extending through five screens will give the number of a country's ground troops, naval forces, air force squadrons, and supply units in that region, as well as the morale level of the troops.

On each screen, you are given the options of (C)hange, (K)eep and (M)enu. If you wish to make a change, simply enter any number from zero to 255. If you keep things as they are, you advance to the next screen. This process continues until you have either completed your inspection of all 13 regions or have returned to the main menu.

When you want to review or make a change in a specific table, the 13 regions are displayed. Just enter the number of the region in which you want to make a change. Next, the seven participating countries (see Combatants Table) are shown. Enter the number of the appropriate country. Finally, you will see a display of the types of military forces (see Forces Table), as well as supplies and morale. Simply press 'C' and change the number that applies.

For exmple, if you want to review the status of German ground troops in France, type 3 for France on the Region screen, 4 for German on the Combatants screen, and zero for ground troops on the Forces screen. Here you could greatly diminish the number of German troops, improving France's odds of withstanding an attack.

You are then returned to the main menu where you should select the option of (A)dvance scenario. Before any conflict occurs, however, you will be shown the goals of the combatants. To have a significant impact on the outcome of the Simulation, you must change a country's overall goals here. The options include remaining neutral, defending all positions, or invading one of the 13 regions.

Of course, if you don't change the goals of any country or order changes in troop development, the war probably will unfold as it actually happened. Why probably? The laws of propagation — or who wins a battle, how many troops are lost, changes in morale, maintenance of supply lines, etc. — are governed by rules that have a slight dependence on probability. It is not possible to program all weather conditions, human decisions, or the mistakes and lucky breaks over a period of six years into a 32K or even a 64K computer.

Programming Information

A subroutine contained in lines 5620-5681 determines the initial goals for each country. When you choose to change goals, the flag (FL) is reset signaling a change in the program. If you merely change the distribution of forces or supplies from the main menu, the flag remains unchanged so goals stay the same, but with a different outcome. After all, could the Allies have captured North Africa if you moved all the troops to Denmark to begin the invasion in 1942?

New goals are determined by the program commands in lines 5571-5672. The basis for these goals was the determination of the Allies to defend themselves or to recapture occupied territory. The Axis' goals were nothing short of world domination.

The 28000 block of data in the Simulation generator (see accompanying story) contains descriptive data for "who has what where." The 'X' index is the region, containing 13 of them from X=0 (Atlantic Ocean) to X=12 (Palestine). The 'Y' index is the countries' forces, including seven nations — from Y=0 (United States) to Y=6 (Poland). Types of military forces are governed by the 'B' index, from B=0 for ground troops to B=4 for supplies.

Other Variables

The B(X) array keeps track of who controls what region. 'X' is the same order as Index X (i.e., 0=Atlantic Ocean to 12=Palestine). If the value of B(X) equals zero, the Allies control it. If B(X) equals one, then it is controlled by the Axis.

The A(Y,15) array is a bit more complicated. The first index, 'Y', is the same as Index Y that indicates a country's forces. The second index tells something about that country. For example, A(Y,0) is the loyalty — zero equals Allies, one equals Axis. Remember, the Soviets changed loyalty when they were invaded by the Germans in 1941. A(Y,1) is the current goal of a country: 100 means to defend all positions; 999 means to remain neutral; 1000 means that the country is under foreign domination; zero through 12 means invade a region. A(Y,2) to A(Y,10) are not used. A(Y,11) is the industrial strength of a nation; A(Y,12) is the technological strength; A(Y,13) is the material strength; A(Y,14) is the energy availability; and A(Y,15) is the morale of the country's troops.

Good luck, and don't blame us if Monty and Patton don't get along!

there are two arrays for you to use — the A(15,15) and B(15) dimensioned in Line 5. The variables that fill the 28000 block and the arrays are all initialized to your starting conditions when you choose 'I' on the menu.

To write a scenario, the following conditions must be met:

— The scenario should be between lines 5000 and 5999 for uniformity and interchangeability. Lines higher than 5999 can be used for diagnostics (such as in Listing 2 for *World War II*).

— Lines 5000-5099 contain a graphics subroutine. You can draw a picture, play music or just give a message. It's sort of a free area for fun and games. It assumes the CoCo default PCLEAR4. The *World War II* routine draws the map of Europe; the Stock Car routine draws the leader scoreboard. This subroutine should always end with a RETURN.

— Lines 5100-5199 include a subroutine that loads all the "literals," such as X$( ) and Y$( ) which pertain to the scenario. It also loads the IX, IY and IB parameters, which are the upper limits of 'X', 'Y' and 'B', respectively. You won't exceed memory requirements if IX*IY*IB<4000. If you need more room, you can CLEAR more room in Line 4 and redefine AQ in Line 40. Don't use this subroutine to set initial condition of the scenario.

— Lines 5200-5299 contain the subroutine for loading all initial starting values into the arrays and the 28000 block.

— A subroutine in lines 5300-5899 contains the "laws of propagation." Whenever you want to change the time sequence of your scenario, you jump to Line 5300. This subroutine calculates all the variables as they would change and stores them. It also prints out special messages. When you exit this subroutine, the generator

(continued on Page 56)

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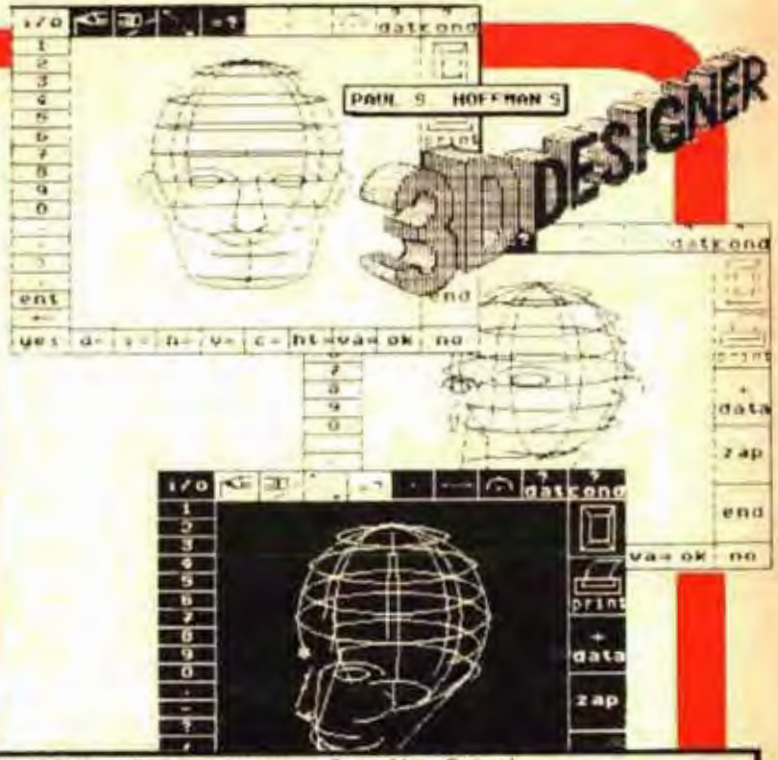

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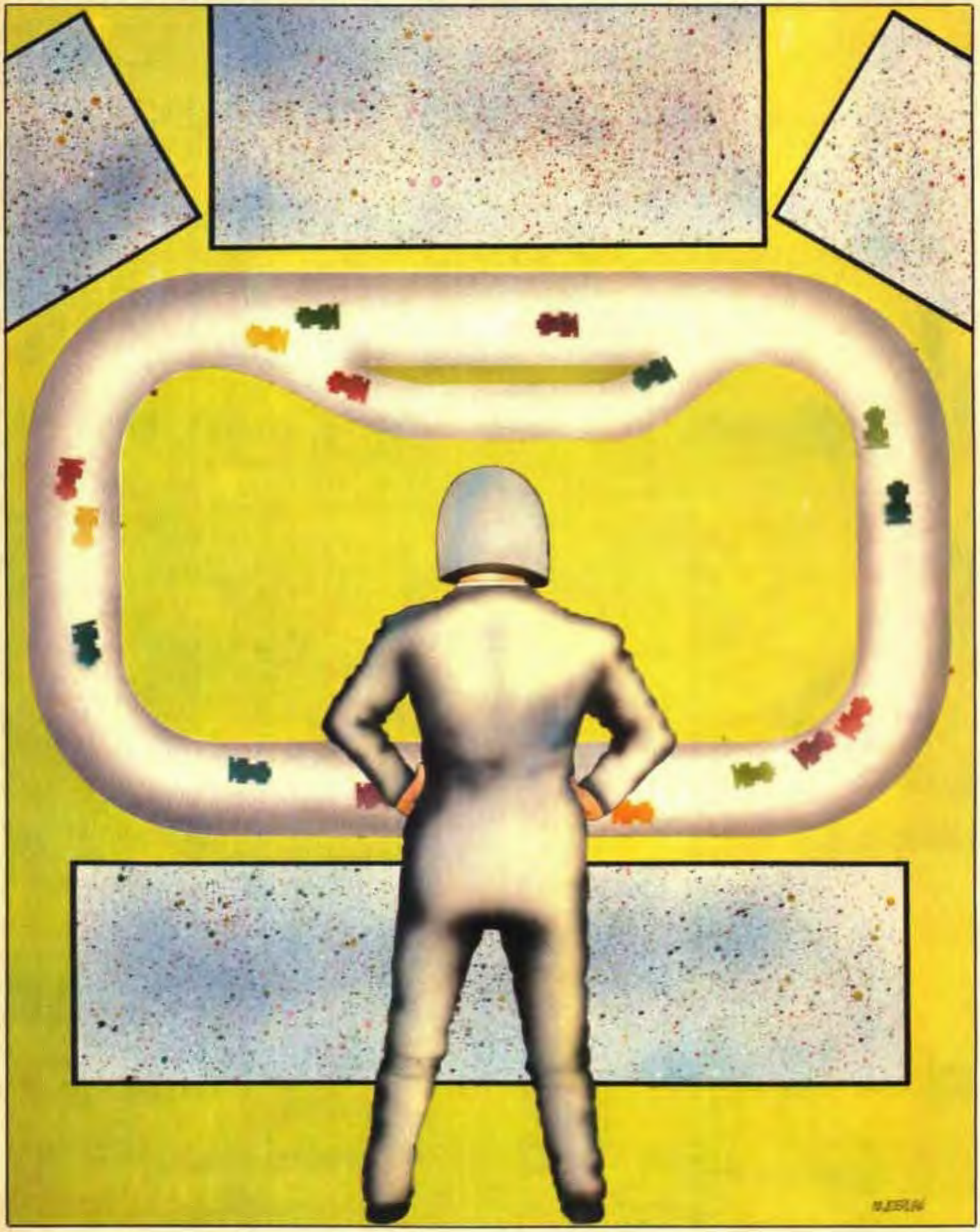


VRRROOOM! VRRROOOM!

The Great Rainbow Simulation Package Continues With A Just-For-Fun Reenactment Of The Trans-South Competition In Darlington, S.C.

Stock Car is the second of two Simulations in this issue which run with the Rainbow Simulation Generator on Page 49.

Start your engines, ladies and gentlemen. You're about to experience 500 miles of grueling stock car racing in an exciting Simulation of the Tran-South Stock Car Race — one of the key races on the NASCAR circuit — run in Darlington, S.C.

You'll control the fates of such fierce competitors as Darrell Waltrip, Buddy Baker and Bill Elliott, along with 12 other serious contenders. Elliott actually won this year's race in April before a crowd in excess of 50,000.

There are 367 laps around the 1.3-mile track. At speeds of approximately 140 to 157 miles per hour, it takes about three hours to complete the race.

Since three hours is an eternity when you are sitting in front of a keyboard, we think you'll want to get involved. Consider yourself the crew chief of all 15 cars, with the ability to determine car speeds, location on the track, amount of fuel, the condition of the various parts of the cars, and when pit stops are necessary.

The main menu will display four options:

I — Initialize the scenario, entering all variables for the race as it actually happened. If you do not initialize the program, you will have to enter new values for every phase of the Simulation.

G — A graphics screen showing the leaders' scoreboard. As the race evolves, the positions of the drivers change.

Stock Car Scenario Tables

LOCATION
(1st cell — A values)

1 Front straightaway
2 Turn one
3 Turn two
4 Back stretch
5 Turn three
6 Turn four
7 In pits

CONDITION
(3rd cell — B values)

0 Location on track
1 Tires
2 Brakes
3 Transmission
4 Engine
5 Fuel remaining
6 Current position
7 Pit on next lap?

DRIVERS
(2nd cell — Y values)

0 Bill Elliott/Ford Thunderbird
1 David Pearson/Chevy Monte Carlo SS
2 Terry Labonte/Chevy Monte Carlo SS
3 Benny Parsons/Chevy Monte Carlo SS
4 Lake Speed/Pontiac Grand Prix
5 Ron Bouchard/Buick Regal
6 Neil Bonnett/Buick Regal
7 Dale Earnhardt/Chevy Monte Carlo SS
8 Ricky Rudd/Ford Thunderbird
9 Buddy Baker/Oldsmobile Cutlass Supreme
10 Geoff Bodine/Chevy Monte Carlo SS
11 Harry Gant/Chevy Monte Carlo SS
12 Darrell Waltrip/Chevy Monte Carlo SS
13 Dave Marcis/Chevy Monte Carlo SS
14 Tim Richmond/Pontiac Grand Prix

A — Advance the scenario. Watch the race which progresses at 30-second intervals.

V — View or change conditions. This is where you come in as crew chief. When you select this option, a submenu is displayed giving you a choice of viewing all cells (or tables) sequentially or changing a specific cell.

If you choose the sequential listing, you will be shown the status of all 15 drivers (see Drivers Table), the operational status of their cars (Condition Table), where they are located on the track (Location Table) and their position in the race.

Let's say you are in the sequential listing and you want to give David Pearson more fuel. When the status of Pearson's fuel is shown, you simply add as many gallons as you want, up to a capacity of 25. If you want to change his location on the track, type in any number corresponding to those in the Location Table.

If you want to change his position in the actual standings, type in any number from zero to 15. You probably will have to change a number of other facts in order for Pearson to hold on to the lead because he will probably run low on fuel later or need new tires, for example.

If you want to change a specific cell to give Pearson more fuel, you would enter '1' from the Drivers Table (or the

(continued from Page 52)

takes over, allowing you to change the scenario or to just watch the action unfold.

— Lines 5900-5929 contain the translator subroutine. As stated earlier, the variables in the 28000 block are POKEd into memory and are confined to one byte. It is here where you determine what something like Troop Strength=21 really means. You enter this routine from a call in the "View or Change" option on the main menu. The value of 'X', 'Y' and 'B' is given and value is placed in the TF variable. If you exit with just TF=0:RETURN then the geneator will interpret the variable literally (i.e., 21). However, if you exit with TF=2:RETURN, the generator will respond by printing whatever A$(TF) says. A$ is simply a message list and can be used any way you like. You can even define it as you go into this subroutine, like this:

```
5900 IF B=3 THEN TF=21
5902 A$(21)=STR$(PEEK(AQ+AD))+" ARMORED
DIVISIONS":RETURN
```

When you load one of the scenarios you see the opening graphics from the subroutine at Line 900 in the generator. After a few seconds, the main menu appears. You should choose 'I' to initialize the Simulation. This choice causes the program to jump to the subroutine that starts at Line 5200 to begin the scenario. Subsequent showings of the main menu will not show the 'I' option, but you can restart the scenario any time you press the letter.

Let's look at some of the variables we can change. Choose "View" from the main menu and then "As One Specific Cell" from the submenu. You will see all of the variables in order and ready to make changes. If you just want to see one variable, then select 'S' from the submenu. You will see the values of the 'X' index, the 'Y' index and the 'B' index. Simply enter a number, and press the ENTER key. Don't enter a new value less than zero or greater than 255. Remember that you are POKEing numbers directly into memory. At any "Keep or Change" option, you also can press the 'M' key to get back to the menu — a good idea if you aren't familiar with the scenario yet.

Choose the "Graphics" option at the main menu to see the display we have provided for the *World War II* and *Stock Car* scenarios. If it's your own scenario, remember to provide an OUT for your graphics subroutine; the command 5099 GOTO 5099 will not work.

second cell), and '5' from the Condition Table (or third cell) and fill his tank.

Programming Information

A block of one-byte variables begins at memory byte 28000 in the Simulation generator. The 'X' index is always zero; it is not used in this application. The 'Y' index is the driver, using numbers from zero to 14 in their starting positions.

The 'B' index is as follows:

B=0 — track location
B=1 — tire condition, zero to 255 (If too low, an accident may occur.)
B=2 — brake conditon
B=3 — gearbox (or transmission)
B=4 — engine condition
B=5 — fuel level in tenths of gallons (A total of 145 means the driver has 14.5 gallons. The cars average four miles per gallon.)
B=6 — current position in the race (one to 15)
B=7 — pit flag (zero for no; one for yes) This will change automatically if the driver's crew wants him to stop on the next lap.

Variables that cannot be changed while running the program are contained in the A(Y,5) array. The 'Y' index is the driver of the car. The second index indicates: zero for miles traveled, one for current speed, two for current lap, three for top possible speed, four for probable crash lap, and five for time remaining in pits. If A(Y,5) equals 1000, then the car is out of the race.

Want To Drive?

That's easy. Just substitute your name in lines 5102 or 5104. If you want a shorter race, change the lap number variable (LS) in Line 5100. If you want a different track, change the lap length variable (LP) in Line 5000 (the Daytona 500, for example, would be LP=2.5:LS=200).

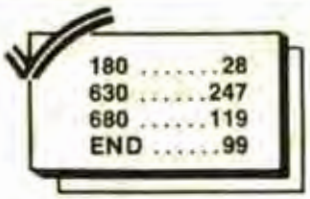
We would wish you good luck, but since you control all the variables you should do quite well!

Loading Instructions

If you are keying the listings in by hand, key in Listing 1 and then key in either Listing 2 *(WORLDWAR)* or Listing 3 *(STOCKCAR)* with Listing 1 still in the computer. Once you've first typed in and saved one complete program, type DEL 5000 and ENTER to get rid of the scenario, then type in the second scenario.

If you have RAINBOW ON TAPE, just CLOAD either *WORLDWAR* or *STOCKCAR* to load in the entire Simulation.

When you're ready to write your own scenarios, load in one of the complete Simulations, type DEL 5000- and ENTER to delete its scenario and type in your new one.



Listing 1:

```
4 CLEAR 1000,28000
5 DIM X$(15),Y$(15),B$(15),A$(30
),A(15,15),B(15)
40 AQ=28000:FLAG=0
50 GOSUB 900 'LOGO
100 CLS(3)
104 GOTO 110
105 PRINT CHR$(230);STRING$(30,C
HR$(175));CHR$(230);:RETURN
106 FOR I=1 TO 50:NEXT:RETURN
110 PRINT@0,STRING$(32,CHR$(230)
);
120 GOSUB 105
130 IF FLAG=0 THEN GOSUB 5100:FL
AG=1
132 GOSUB 105:GOSUB 105
135 IF FL=0 THEN FOR I=1 TO 8:GO
SUB 105:NEXT:GOTO 180 ELSE 140
140 PRINTCHR$(230);"  G  PRINT G
RAPHICS          ";CHR$(230);:G
OSUB 105:GOSUB 105
150 PRINTCHR$(230);"  V  VIEW OR
 CHANGE CONDITIONS";CHR$(230);:G
OSUB 105:GOSUB 105
170 PRINTCHR$(230);"  A  ADVANCE
 SCENARIO         ";CHR$(230);:G
OSUB 105
180 IF FLAG=1 THEN PRINT CHR$(23
0);"  I  ENTER INITIAL DATA <- <
- ";CHR$(230);ELSE GOSUB 105
190 GOSUB 105
195 PRINT STRING$(32,CHR$(230));
200 GOSUB 106:PRINT@480,"      -
 CHOOSE OPTION -       ";:GOSUB
106:PRINT@480,STRING$(31," ");:K
$=INKEY$:IF K$="" THEN 200
210 IF K$="A" THEN 500 ELSE IF K
$="V" THEN 600 ELSE IF K$="I" TH
EN 850 ELSE IF K$="G" THEN 950 E
LSE 200
220 FOR I=1 TO 8:GOSUB 105:NEXT:
GOTO 180
500 PRINT@480,"  ADVANCING SIMUL
ATION";:GOSUB 5300:T=T+1:GOTO 10
0
600 CLS:PRINT:PRINT"VIEW ALL SEQ
UENTIALLY (A)        OR ONE SPEC
IFIC CELL (S)"
601 K$=INKEY$:IF K$="" THEN 601
ELSE IF K$="A" THEN 602 ELSE IF
K$="S" THEN 670 ELSE 601
602 FOR X=0 TO IX:FOR Y=0 TO IY:
FOR B=0 TO IB:GOSUB 608:NEXT B,Y
,X:GOTO 100
608 GOSUB 990:Q=PEEK(AQ+AD)
610 GOSUB 5900 'TRANSLATION
620 CLS:PRINT:PRINT X$(X):PRINT"
  ";Y$(Y):PRINT "   ";B$(B):PRIN
T
```

```
63Ø IF TF=Ø THEN PRINT Q ELSE PR
INT A$(TF)
631 PRINT
635 PRINT"  K  = KEEP":PRINT"  C
  = CHANGE":PRINT"  M  = MENU"
64Ø K$=INKEY$:IF K$="" THEN 64Ø
ELSE IF K$="M" THEN 655 ELSE IF
K$="C" THEN 7ØØ ELSE IF K$="K" T
HEN 65Ø ELSE 64Ø
65Ø RETURN
655 X=IX:Y=IY:B=IB:RETURN
66Ø GOTO 1ØØ
67Ø CLS:PRINT:PRINT"ENTER FIRST
CELL VALUE":FOR X=Ø TO IX:PRINT
X;"=";X$(X):FOR I=1 TO 15Ø:NEXT:
NEXT X
671 INPUT X:IF X<Ø OR X>IX THEN
PRINT"INVALID ENTRY ... TRY AGAI
N":GOTO 67Ø ELSE 675
675 PRINT:PRINT"ENTER SECOND CEL
L VALUE":FOR Y=Ø TO IY:PRINT Y;"
=";Y$(Y):FOR I=1 TO 15Ø:NEXT:NEX
T Y
676 INPUT Y:IF Y<Ø OR Y>IY THEN
PRINT"INVALID ENTRY ... TRY AGAI
N":GOTO 675 ELSE 678
678 PRINT:PRINT"ENTER T..IRD CELL
 VALUE":FOR B=Ø TO IB:PRINT B;"=
";B$(B):FOR I=1 TO 15Ø:NEXT:NEXT
 B
679 INPUT B:IF B<Ø OR B>IB THEN
PRINT"INVALID ENTRY ... TRY AGAI
N":GOTO 678 ELSE 68Ø
68Ø GOSUB 6Ø8:GOTO 1ØØ
7ØØ GOSUB 99Ø:Q=PEEK(AQ+AD)
71Ø GOSUB 59ØØ 'TRANSLATION
715 CLS:PRINT:PRINT"CURRENT VALU
E OF CELL          ";X;",";Y;","
;B:PRINT PEEK(AQ+AD);" WHICH MEA
NS:"
72Ø PRINT:PRINT X$(X):PRINT"  ";
Y$(Y):PRINT "   ";B$(B):PRINT
73Ø IF TF=Ø THEN PRINT Q ELSE PR
INT A$(TF)
731 PRINT
74Ø PRINT"ENTER NEW VALUE":INPUT
 Q:IF Q<Ø OR Q>255 THEN PRINT "I
NVALID ENTRY ... SEE MANUAL":GOT
O 74Ø ELSE POKE AQ+AD,Q
75Ø GOTO 65Ø
85Ø PRINT@48Ø,"  INITIALIZING SI
MULATION  ";:GOSUB 52ØØ:GOTO 1ØØ
9ØØ PMODE 3,1:PCLS(2):SCREEN 1,Ø
:COLOR3,2
91Ø DRAW"BM42,6Ø;D28E12F12U28;BR
12;D28U16R16D16;BR16;H4U8E4R8F4D
8G4L8R8E4F4;BR16;U16L6R12L6U8D24
R1Ø;BD12;L4R8L4D28L4R8;BR16;U16L
4R8L4U8E4F4;BR2Ø;D4U4E4R4F4D4G6D
6;BD6;F2L4E2"
92Ø COLOR 4,2:DRAW"BM16,16;R224D
16ØL224U16Ø;BF16;R192D128L192U12
8":PAINT(Ø,Ø),3,4:PAINT(2Ø,2Ø),4
,4
93Ø FOR K=1 TO 6:GOSUB 991:NEXT:
RETURN
95Ø IF FLAG<>Ø THEN 951 ELSE 1ØØ
951 GOSUB 5ØØØ:GOTO 1ØØ
99Ø AD=B+Y*(IB+1)+X*(IB+1)*(IY+1
):RETURN
991 FOR I=1 TO 17ØØ:NEXT:RETURN
```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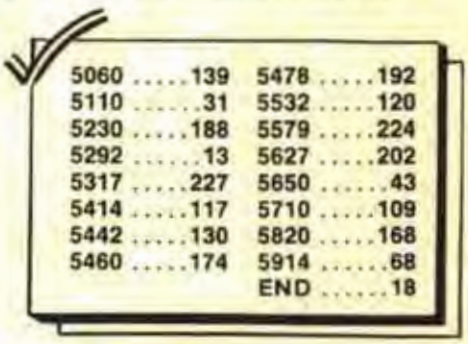

Listing 2: WORLDWAR

```
5ØØØ PMODE 3,1:PCLS(3):SCREEN 1,
Ø:COLOR1,3
5Ø1Ø DRAW"BMØ,155;E1ØR5E5U8R3F2R
```

```
9F6R4ØF5R1Ø;D3F4G7D5F7R1ØF2ØD5R5
R7U3L2U1ØE5R1ØD5R4D3R1ØD5R4ØE1ØU
1ØR3U1ØL3U1ØL8G8L6U3L6D4L6U3L1ØH
6U1ØL3U3"
5Ø2Ø DRAW"E2R1ØU5;L3U2R12U5R1ØF1
ØR1ØE5R1ØU5F5R2ØL2ØH1ØL5H5L5H1ØU
2R5E1ØL1ØD3L5D3L5D5F5D3L1ØU1ØL1Ø
"
5Ø21 DRAW"H1ØL36G16E16U27D27R15E
15U2ØH16F16D2ØG15R21F1Ø;G5D15L5D
1Ø;L15D5R3D12R2D3L8U5H1ØU3H5U1ØH
7L5"
5Ø3Ø DRAW"H15L1ØD5F15R5D3F12L4H5
L3D5R3D6G8L5U2E4U8H1ØL3H5L5H8U4;
L5E1ØU28D28R12D5U5L12G1Ø;G5L5U3L
5D4L1ØG1ØD5R3D2L6D3;G4L4U2L8G3L5
"
5Ø4Ø DRAW"U8H5L8E8H8U5E1ØU5R1ØD3
R8F22H7U5R2U5R2U1ØH8L4U6R5F1ØU1Ø
;R2D4R4D5R1ØE8R1ØU8R16E5G5U1ØL4U
5E5R9D5G4D8R7D5R2Ø;U1ØE5U3R3D7R5
U1ØL2U8"
5Ø5Ø DRAW"R15E7U2;L1ØE1ØU12D12G1
ØL1Ø;H8U7L2D1ØF5D5G1ØD1ØG5L2U2H8
U2ØL3G1ØL5U1ØH3E4H5E6H2E5H4E7H8E
3"
5Ø6Ø DRAW"BM4Ø,57;R7D4E4R3F4E4R3
F4R7U2L3U2E8U3L5U3R3U1ØL3U8L2U3R
4E8L4U2E4L1ØH3G3D3G5R5G5R5D5G3D7
L5D2G7L5D2F4D2L3D2L9D2"
5Ø7Ø DRAW"BM31,4Ø;R4E2F2R4E3U6E4
U6H3L4G4L8G6D2F3G3D3R3D2;BM1Ø8,1
4Ø;L1ØF7U4R3U3"
5Ø8Ø PAINT(56,45),B(2)+1,1:PAINT
(36,35),B(2)+1,1:PAINT(7Ø,85),B(
3)+1,1
5Ø81 PAINT(1ØØ,7Ø),B(4)+1,1:PAIN
T(1ØØ,11Ø),B(5)+1,1:PAINT(25Ø,Ø)
,B(6)+1,1
5Ø82 PAINT(14Ø,11Ø),B(7)+1,1:PAI
NT(12Ø,1Ø),B(8)+1,1:PAINT(1Ø4,4Ø
),B(8)+1,1
5Ø83 PAINT(14Ø,6Ø),B(9)+1,1:PAIN
T(2Ø,1ØØ),B(1Ø)+1,1:PAINT(Ø,18Ø)
,B(11)+1,1
5Ø84 PAINT(25Ø,18Ø),B(12)+1,1:PA
INT(1Ø5,142),B(5)+1,1
5Ø99 K$=INKEY$:IF K$="" THEN 5Ø9
9 ELSE RETURN
51ØØ REM SET UP SCENARIO RULES
51Ø1 IX=12:IY=6:IB=4
51Ø2 Y$(Ø)="AMERICAN":Y$(1)="BRI
TISH":Y$(2)="SOVIET":Y$(3)="FREN
CH":Y$(4)="GERMAN":Y$(5)="ITALIA
N":Y$(6)="POLISH"
51Ø5 X$(Ø)="ATLANTIC OCEAN":X$(1
)="MEDITERRANEAN":X$(2)="BRITISH
 ISLES":X$(3)="FRANCE":X$(4)="GE
RMANY":X$(5)="ITALY":X$(6)="U.S.
S.R":X$(7)="SLAVIC COUNTRIES":X$
(8)="SCANDINAVIA":X$(9)="POLAND"
:X$(1Ø)="SPAIN":X$(11)="NORTH AF
RICA":X$(12)="PALESTINE"
511Ø B$(Ø)="GROUND TROOPS":B$(1)
="NAVAL FORCES":B$(2)="AIR FORCE
S":B$(3)="TROOP MORALE":B$(4)="S
UPPLIES"
512Ø A$(1)="GOOD MORALE":A$(2)="
POOR MORALE"
5199 RETURN
52ØØ REM SET UP INITIAL SCENARIO
 CONDITIONS
52Ø1 T=Ø:FLAG=2:FOR I=Ø TO 7:FOR
 J=Ø TO 15:A(I,J)=1ØØ:NEXT J,I
52Ø2 A(Ø,1)=999:A(1,1)=1ØØ:A(2,Ø
)=1:A(2,1)=9:A(3,1)=1ØØ:A(4,Ø)=1
:A(4,1)=9
52Ø3 A(5,Ø)=1:A(5,1)=1ØØ:A(6,1)=
1ØØ:A(Ø,Ø)=Ø:A(1,Ø)=Ø:A(3,Ø)=Ø:A
(6,Ø)=Ø'LOYALTY AND GOALS
521Ø FOR I=Ø TO 15:B(I)=Ø:NEXT:B
(4)=1:B(5)=1:B(6)=1:B(11)=1 'REG
ION CONTROL
522Ø FOR I=Ø TO 6:FOR J=11 TO 15
:READ Q:A(I,J)=Q:NEXT J,I
5225 FOR X=Ø TO IX:FOR Y=Ø TO IY
:FOR B=Ø TO IB:GOSUB 99Ø:POKE AQ
+AD,Ø:NEXT B,Y,X
523Ø X=Ø:Y=Ø:GOSUB 525Ø
5231 X=Ø:Y=1:GOSUB 525Ø
5232 X=Ø:Y=4:GOSUB 525Ø
5233 X=1:Y=1:GOSUB 525Ø
5234 X=1:Y=4:GOSUB 525Ø
5235 X=1:Y=5:GOSUB 525Ø
5236 X=2:Y=Ø:GOSUB 525Ø
5237 X=2:Y=1:GOSUB 525Ø
5238 X=3:Y=3:GOSUB 525Ø
5239 X=4:Y=4:GOSUB 525Ø
524Ø X=5:Y=5:GOSUB 525Ø
5241 X=6:Y=2:GOSUB 525Ø
5242 X=9:Y=6:GOSUB 525Ø
5243 X=9:Y=4:GOSUB 525Ø
5244 X=9:Y=2:GOSUB 525Ø
5245 X=11:Y=4:GOSUB 525Ø
5246 X=11:Y=5:GOSUB 525Ø
5247 X=12:Y=1:GOSUB 525Ø
```


SOMETIMES I'D RATHER **Dudul**

DUDUL is an entertaining graphics doodling program with the usual things like line, box, paint, and circle drawing, plus some very unusual things like chained parallelograms. Joystick function selection. On screen menus. 20 drawing functions. Pattern painting. Text. Undo. Condensed Disk/Tape Filing. PMODE3. 64K Extended Basic. Sent on tape. Disk optional. $22 + $2 shipping. MO residents, 6% tax. Check or M.O. payable to Doug Dugan. 4514 Wichita, St. Louis, MO 63110.

EARS

Electronic Audio Recognition System

Now Your Computer Can Listen To You!

EARS™

Electronic Audio Recognition System

$99.95

- SPEECH RECOGNITION
- HANDS OFF PROGRAMMING
- HIGH QUALITY SPEECH REPRODUCTION

EARS Does It All!

INCREDIBLE!

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 truely 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' T.M.

COCO'S MOST ADVANCED SPEECH SYNTHESIZER.

NOW IT TALKS, SINGS AND MORE.

only . . . $79.95

WITH EARS PURCHASE

only . . . $59.95

In 1979, VOTRAX brought us the SC-01 chip which made inexpensive speech synthesis possible. Speech Systems was proud to bring the COCO community the first speech synthesizer using this miracle device.

Now Silicon Systems Inc. brings us the SSI 263 (sometimes called the SC-02). Once again Speech Systems is happy to be the first to bring you this breakthrough in speech synthesis. The SSI 263 is the most advanced speech chip available. Read "Build a Third Generation Phonetic Speech Synthesizer" in the March 84 issue of BYTE magazine for details of this amazing chip.

SUPER VOICE works in any 32K or 64K computer. A disk system requires a Multi-Pak or our Y-Cable.

FREE "REACTION" To Test Your Reflexes

FREE SUPER VOICE SINGS THE STAR SPANGLED BANNER

FREE "SIMON" To Test Your Memory

	SUPER VOICE	REAL TALKER	RS SPEECH CARTRIDGE	VOICE-PAK
Synthesizer Device	SSI-263	SC-01	SP-256	SC-01
Speaking Speeds	16	1	1	1
Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
Basic unit of Speech	64 phonemes 4 durations each	64 phonemes	64 allophones 5 pause lengths	64 phonemes
Pitch Variations	4096 (32 absolute levels with 8 inflection speeds)	4	1	4

SUPER VOICE SONGBOOKS

VOLUME 1 SUPER VOICE sings many of your favorite songs **$24.95**

VOLUME 2 SUPER VOICE sings a collection of nursery rhymes. May be used with Super Talking Heads so they (Paul & Pauline) sing the songs **$24.95**

The SUPER VOICE gives you COCO's most intelligible speech. The free TRANSLATOR text-to-speech program makes writing your own talking BASIC program as easy as SAY HELLO. Highest quality speech may be achieved by specifying inflection, intonation, articulation, and filtration. But that's not all, the SUPER VOICE can actually sing over a 6 octave range, play music and sound effects.

SUPER SYNTHER

SUPER SYNTHER allows you to use the SUPER VOICE as a music synthesizer. You can actually play the SUPER VOICE from your COCO keyboard as you would a piano. Vary the PITCH, FILTRATION, SOUND (Phoneme), and VOLUME to develop many unique sounds. **$24.95**

Radio Shack® SPEECH & SOUND PAK version **24.95**

SUPER TALKING HEADS

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**

Radio Shack® SPEECH & SOUND PAK version **24.95**

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'HOME COMMANDER'

$59.95

VOICE CONTROL APPLIANCES WITH EARS

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

NO WIRES NECESSARY

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.

ON FRIDAY 7:42 PM, OFF SUNDAY 1:26 AM

Included FREE is a program to allow you to control up to 256 devices and specify the time and date they are to be activated. That's right, the software has its own built in accurate clock.

Imagine controlling a light or TV with your voice. When used with our Electronic Audio Recognition System, EARS, you can literally control any appliance.

PLUG'N POWER USERS

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**

PLUG'N POWER is a trademark of Radio Shack®

PRECISION TIME MODULE $59.95

— INCLUDES OS9 DRIVER —

Now your computer will always know the correct time and date. This amazing precision time module is calibrated to the National Bureau of Standards (WWV) atomic clock and you should never have to change it.

Use the PRECISION TIME MODULE to add the time element to your games or use on BBS. If you like, purchase separately our BBS.

COLORAMA BBS (64 K, 1 drive minimum) **$99.95**

THE TIMEPIECE FOR THE COLORAMA BBS

FREE TALKING CLOCK PROGRAM requires VOICE, SUPER VOICE, or SPEECH & SOUND PAK

BATTERY BACKUP

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

MONTHS, LEAP YEARS & DST

The PRECISON 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.

Y-CABLE $28.95

Why pay $100 to $200 for a multi-pak. With the Y-CABLE, you can connect your disk system to your computer along with either our STEREO PAK music synthesizer, our VOICE, SUPER VOICE speech synthesizers, or our PRECISION TIME MODULE. All connectors gold plated.

TRIPLE Y $34.95

We developed the Triple Y-Cable specifically for those interested in both speech synthesis and speech recognition. The Triple Y-Cable lets you connect EARS and SUPER VOICE to your color computer along with your disk system.

NEW! ATTENTION EXPERIMENTERS!

Need an SC-01? **$29.00**

Interested in building your own project? Our oversized board gives plenty of room for construction while the sturdy aluminum case with black satin finish assures protection and a professional appearance.

Prototype Board only **$19.95**
Prototype Enclosure only **$19.95**
Buy both for **$29.95**

Advanced Speech Chip SSI-263 (SC-02) **$34.95**

Disks	(any quantity)	$1.49
Tape C-10, C-20		$0.69
Hard Tape Box		$0.29
6821		$2.95
74LS138		$0.79
7407		$0.79
IC sockets 14, 16, 22 pin		$0.29
IC sockets 24, 28, 40		$0.39

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MUSIC THEORY

Speech Systems is dedicated to bringing you the finest in music products. We are now proud to introduce MUSIC THEORY Courses 1 and 2. Each supports: drill and practice sessions, a scorecard to measure your progress, graphics and sound output for complete illustration of the concepts being introduced, and a reviewing session. Each course is a collection of programs emphasizing a particular subject area.

COURSE 1

This course covers all the basics from music notation & duration, key signatures, tempo, to an introduction of the keyboard. This is an entry level course recommended as a prerequisite for Course 2.

32K Disk only **$29.95**

COURSE 2

A more advanced course that deals with: Major and Harmonic Minor scales, interval spelling, Triad (Chord) theory, Inversions, Dominant 7th chords, and ear training of the intervals.

32K Disk only **$49.95**

NEW!

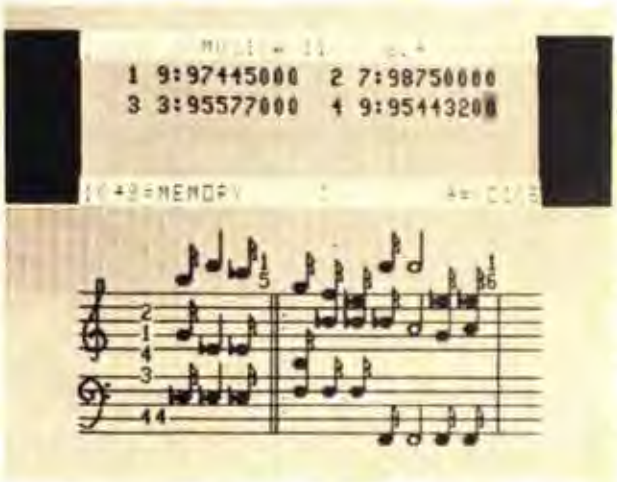
MUSICA 2

$5 OFF With STEREO PAK Purchase

NEW LOW PRICE **$29.95** *Tape or Disk*

Now shipping Version 2.6 Previous users call for update info

- 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!
- Durations include: whole, half, quarter, eighth, sixteenth, thirty second, sixty-fourth, and triplet.
- 30 page manual describes all.
- Requires minimum of 32K.

- Repeat bars allow repeating of music without re-inserting music a second or third time.

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

- 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.
- Measure bars aid in reading and developing music.
- Each voice may be visually highlighted for easy identification.
- 4 Voices produced simultaneously.
- Input notes from keyboard or joystick.
- Play music from your own BASIC program.
- Block copy music for easy music development.
- 100% machine language so it is lightning fast.
- Vibrato effect easily produced.
- With STEREO PAK, voices may be switched between left and right speakers as music plays.

NEW! STEREO PAK™ $39.95

Plug this gem into your computer, connect to your nome 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 THRU THE STEREO PAK Requires 64K

NEW! MUSIC LIBRARY™ — 3 VOLUMES

10 HOURS OF MUSIC
BUY 2 GET 3rd FREE

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 belive 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).

A JUKE BOX selection program is included to allow you to select specific songs or automatically play each. These songs are ready to go, you don't need MUSICA 2 or a knowledge of music.

These songs were developed using the best music program available for the CoCo; MUSICA 2. The tunes may be used as source files for MUSICA 2 and changed by the user. When coupled with the STEREO PAK the songs are reproduced in stereo with unsurpassed realism.

MUSIC LIBRARY 100 categories:

Stage, Screen, and TV	Classical
Music of the 70's	Christmas (popular)
Music of the 60's	Christmas (traditional)
Music of the 50's	Patriotic
Old Time Favorites	Polka Party

MUSIC LIBRARY 200
Our second volume of 100 tunes, 3½ hours of music.

MUSIC LIBRARY 300
Our third volume of 100 tunes, 3 more hours of music.

MUSIC LIBRARY (Each Volume) .. (32K Tape) ... **$34.95**
(Specify 100, 200, or 300) (32K Disk) **$39.95**

SPEECH SYSTEMS DATAPEN $29.95

$5.00 OFF With Any Educational Software Program

Two programs are provided free with each DATAPEN. SKETCH is a superb high resolution color drawing program allowing precise drawing and freehand sketching, painting and much more. SHAPE CREATE is a high resolution library shape drawing program. You can even save your work to tape or disk for later display or editing.

The software is shipped on tape and may easily be moved to disk. Included is complete documentation to allow you to integrate the DATAPEN into your own BASIC program.

Requires 32K.

EASY TO USE!

EDUCATIONAL SOFTWARE

An easy and fun way for kids to enter answers.

Vol. 1 — grades 1, 2, and special education.

Includes these five programs:
- Basic Addition
- Basic Multiplication
- Match the Shapes
- Match the Numbers
- Rhyme the Words

32K disk **$29.95**

Vol. 2 — grades 3 to 6 and special education

Includes these five programs:
- Men of Science
- Mixed Math
- World Capitals
- Computer Terms
- 20th Century Events

32K disk **$29.95**

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```
5248 GOTO 5299
525Ø FOR B=Ø TO IB:READ Q:GOSUB
99Ø:POKE AQ+AD,Q:NEXT:RETURN
529Ø DATA 1Ø,1Ø,6,8,6,7,8,7,9,7,
5,6,8,7,5,5,6,8,4,7,1Ø,1Ø,1Ø,5,8
,4,6,7,3,6,2,3,4,1,3
5291 DATA 1ØØ,25,5,6,5,Ø,2Ø,3,8,
5,Ø,35,3,9,7,Ø,17,2,6,4,Ø,2Ø,4,8
,5,Ø,5,1,5,9,2Ø,8,5,6,8,1ØØ,16,2
5,8,1Ø,6Ø,Ø,6,7,1Ø,21Ø,2Ø,25,1Ø,
1Ø
5292 DATA 14Ø,1Ø,7,8,1Ø,18Ø,Ø,1Ø
,7,1Ø,17,Ø,2,9,1Ø,6Ø,Ø,19,8,8,2Ø
,Ø,11,6,8,11,Ø,7,4,3,3,Ø,Ø,5,6,1
9,Ø,7,7,4
5299 RETURN
53ØØ GOSUB 593Ø 'CALC TIME
53Ø1 GOSUB 58ØØ:IF A(4,1)=6 THEN
 A(2,Ø)=Ø 'CHANGE GOALS
53Ø2 FOR C=Ø TO 6:CLS:K=A(C,1):I
F K=999 THEN 531Ø ELSE IF K=2ØØ
THEN 5312 ELSE IF K=1ØØ THEN 53Ø
6 ELSE IF (K>=Ø AND K<=11) THEN
532Ø ELSE 534Ø
53Ø6 Y=C:PRINT@128,Y$(C)+" TROOP
S DEFENDING            ALL LINES"
:GOSUB 991:FOR X=Ø TO 12
53Ø7 B=Ø:Z=15:GOSUB 5316:B=1:Z=1
1:GOSUB 5316:B=2:Z=14:GOSUB 5316
:B=4:Z=13:GOSUB 5316
53Ø8 NEXT X:GOTO 534Ø
531Ø PRINT@128,Y$(C)+" SIDE":PRI
NT"REMAINS NEUTRAL":GOSUB 991:GO
TO 534Ø
5312 PRINT@128,Y$(C)+" FORCES NE
UTRALIZED":PRINT"BECAUSE IT IS U
NDER FOREIGN     DOMINATION":GOS
UB 991:GOSUB 991:GOTO 534Ø
5316 GOSUB 99Ø:Q=PEEK(AQ+AD):W=I
NT(((A(Y,Z)*.Ø5)+1)*Q)
5317 IF Q<>Ø AND W<(Q+1) THEN W=
Q+1
5318 IF W>255 THEN W=255
5319 POKE AQ+AD,W:RETURN
532Ø PRINT@128, Y$(C)+" FORCES M
OVING TROOPS          AND SUPPLI
ES INTO ":PRINT X$(K):GOSUB 991
5325 Y=C:X=K:IF X<2 THEN 533Ø
5327 B=Ø:GOSUB 5338:B=2:GOSUB 53
38:B=4:GOSUB 5338:GOTO 5335
533Ø B=1:GOSUB 5338:B=4:GOSUB 53
38:GOTO 5335
5335 B=3:GOSUB 99Ø:POKE AQ+AD,1Ø
:GOTO 534Ø
5338 GOSUB 99Ø:Q=PEEK(AQ+AD)+12:
IF Q>255 THEN Q=255
5339 POKE AQ+AD,Q:RETURN
534Ø NEXT C
54ØØ 'LOOP THRU REGIONS AND FIND
 IF INVASION IS TAKING PLACE
54Ø1 FOR X=Ø TO IX:AK=-1 'INVADE
 FLAG
54Ø2 FOR C=Ø TO IY
54Ø4 IF (A(C,1)<>X OR A(C,Ø)=B(X
))THEN 541Ø
54Ø6 AK=A(C,Ø)  'WHO IS INVADING
  Ø=ALLIED 1=AXIS
54Ø8 C=IY
541Ø NEXT C
5412 IF AK<Ø THEN 5599  'NO INVA
SION IN THIS REGION
5414 FØ=Ø:F1=1:FOR Y=Ø TO IY
5415 'DETERMINE FIGHT FACTORS
5416 IF X=Ø OR X=1 THEN 543Ø
5418 IF A(Y,Ø)=Ø THEN 542Ø ELSE
5425  'GROUND BATTLE
542Ø B=Ø:GOSUB 99Ø:F=PEEK(AQ+AD)
:B=2:GOSUB 99Ø:F=F+PEEK(AQ+AD):B
=4:GOSUB 99Ø:F=F+PEEK(AQ+AD):B=3
:GOSUB 99Ø:F=F*PEEK(AQ+AD):FØ=FØ
+F:GOTO 5439
5425 B=Ø:GOSUB 99Ø:F=PEEK(AQ+AD)
:B=2:GOSUB 99Ø:F=F+PEEK(AQ+AD):B
=4:GOSUB 99Ø:F=F+PEEK(AQ+AD):B=3
:GOSUB 99Ø:F=F*PEEK(AQ+AD):F1=F1
+F:GOTO 5439
543Ø IF A(Y,Ø)=Ø THEN 5432 ELSE
```


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```
5435 'SEA BATTLE
5432 B=1:GOSUB 99Ø:F=PEEK(AQ+AD)
:B=4:GOSUB 99Ø:F=F+PEEK(AQ+AD):B
=3:GOSUB 99Ø:F=F*PEEK(AQ+AD):FØ=
FØ+F:GOTO 5439
5435 B=1:GOSUB 99Ø:F=PEEK(AQ+AD)
:B=4:GOSUB 99Ø:F=F+PEEK(AQ+AD):B
=3:GOSUB 99Ø:F=F*PEEK(AQ+AD):F1=
F1+F:GOTO 5439
5439 NEXT Y
544Ø IF AK=Ø THEN F1=F1*1.2 ELSE
 FØ=FØ*1.2  ' MULTIPLIER FOR DEF
ENSIVE TROOPS
5442 IF FØ>3*F1 THEN 545Ø ELSE I
F F1>3*FØ THEN 546Ø ELSE IF FØ>1
.5*F1 THEN 547Ø ELSE IF F1>1.5*F
Ø THEN 548Ø
5443 PRINT"** DIFFICULT FIGHTING
 IN          ";X$(X):PRINT"INVASI
ON FAILED, HEAVY LOSSES   ON BOT
H SIDES":GOSUB 991 'CONTROL DOES
 NOT CHANGE
5444 FOR Y=Ø TO IY:FOR B=Ø TO IB
:GOSUB 99Ø:Q=PEEK(AQ+AD):POKE AQ
+AD,INT(.6*Q):NEXT B
5446 A(Y,15)=A(Y,15)*.9:NEXT Y
5448 CT=-1:GOTO 5499
545Ø PRINT"ALLIES HAVE MAJOR VIC
TORY IN    ";X$(X):GOSUB 991
5452 CT=-1:IF B(X)=1 THEN CT=Ø
5453 FOR Y=Ø TO IY
5454 IF A(Y,Ø)=1 THEN 5456
5455 FOR B=Ø TO 3:GOSUB 99Ø:POKE
 AQ+AD,INT(.9*PEEK(AQ+AD)):NEXT
B:B=4:GOSUB 99Ø:POKE AQ+AD,1+PEE
K(AQ+AD):A(Y,15)=A(Y,15)+2:GOTO
5459
5456 FOR B=Ø TO 4:GOSUB 99Ø:POKE
 AQ+AD,Ø:NEXT B:A(Y,13)=A(Y,13)-
2:IF A(Y,13)<Ø THEN A(Y,13)=Ø
5457 A(Y,15)=A(Y,15)-2:IF A(Y,15
)<Ø THEN A(Y,15)=Ø
5459 NEXT Y:GOTO 5499
546Ø PRINT"AXIS HAS MAJOR VICTOR
Y IN         ";X$(X):GOSUB 991
5462 CT=-1:IF B(X)=Ø THEN CT=1
5463 FOR Y=Ø TO IY
5464 IF A(Y,Ø)=1 THEN 5466
5465 FOR B=Ø TO 3:GOSUB 99Ø:POKE
 AQ+AD,INT(.9*PEEK(AQ+AD)):NEXT
B:B=4:GOSUB 99Ø:POKE AQ+AD,1+PEE
K(AQ+AD):A(Y,15)=A(Y,15)+2:GOTO
5469
5466 FOR B=Ø TO 4:GOSUB 99Ø:POKE
 AQ+AD,Ø:NEXT B:A(Y,13)=A(Y,13)-
2:IF A(Y,13)<Ø THEN A(Y,13)=Ø
```


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```
5467 A(Y,15)=A(Y,15)-2:IF A(Y,15
)<Ø THEN A(Y,15)=Ø
5469 NEXT Y:GOTO 5499
547Ø IF RND(-1)>.8 THEN 5479 ELS
E 549Ø
5471 CT=-1:IF RND(-1)>.8 AND B(X
)=1 THEN CT=Ø
5472 FOR Y=Ø TO IY:FOR B=Ø TO IB
:GOSUB 99Ø
5473 IF A(Y,Ø)=Ø THEN POKE AQ+AD
,INT(.8*PEEK(AQ+AD)) ELSE POKE A
Q+AD,INT(.5*PEEK(AQ+AD))
5474 NEXT B,Y
5475 GOTO 5499
5478 PRINT"ALLIES ARE OUTNUMBERE
D IN          ";X$(X);" BUT STIL
L WINS          MAJOR BATTLE":G
OSUB 991:GOTO 5471
5479 PRINT"AXIS IS OUTNUMBERED I
N          ";X$(X);" BUT STILL W
INS          MAJOR BATTLE":GOSU
B 991:GOTO 5481
548Ø IF RND(-1)>.8 THEN 5478 ELS
E 5491
5481 CT=-1:IF RND(-1)>.8 AND B(X
)=Ø THEN CT=1
5482 FOR Y=Ø TO IY:FOR B=Ø TO IB
:GOSUB 99Ø
5483 IF A(Y,Ø)=1 THEN POKE AQ+AD
,INT(.8*PEEK(AQ+AD)) ELSE POKE A
Q+AD,INT(.5*PEEK(AQ+AD))
5484 NEXT B,Y
5485 GOTO 5499
549Ø PRINT"ALLIES WIN BATTLES IN
          ";X$(X):GOSUB 991:
GOTO 5471
5491 PRINT"AXIS WINS BATTLE IN
          ";X$(X):GOSUB 991:GO
TO 5481
5499 IF CT<Ø THEN 5599
55ØØ 'CONTROL IN X HAS CHANGED T
O CT  RESET GOALS
551Ø B(X)=CT:PRINT X$(X);" FALLS
 UNDER ":IF CT=Ø THEN PRINT"ALLI
ED CONTROL" ELSE IF CT=1 THEN PR
INT"AXIS CONTROL"
552Ø ON X+1 GOTO 557Ø,557Ø,5532,
5533,5534,5535,5536,557Ø,557Ø,55
39,557Ø,557Ø,5542
5532 IF CT=1 THEN Y=1:GOSUB 559Ø
:GOTO 557Ø
5533 IF CT=1 THEN Y=3:GOSUB 559Ø
:GOTO 557Ø
5534 IF CT=Ø THEN Y=4:GOSUB 559Ø
:GOTO 557Ø
5535 IF CT=Ø THEN Y=5:GOSUB 559Ø
```


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```
:GOTO 557Ø
5536 IF CT=1 THEN Y=2:GOSUB 559Ø
:GOTO 557Ø
5539 IF CT=1 THEN Y=6:GOSUB 559Ø
:GOTO 557Ø
5542 IF CT=1 THEN Y=4 ELSE Y=1
5543 A(Y,14)=A(Y,14)+1Ø:IF CT=1
THEN PRINT"AXIS CAPTURES ENERGY
RESERVES   IN MIDDLE EAST" ELSE
PRINT"ALLIES CAPTURE ENERGY RESE
RVES  IN MIDDLE EAST"
557Ø GOTO 5599
5571 IF B(4)=1 THEN A(Ø,1)=4
5572 IF B(5)=1 THEN A(Ø,1)=5
5573 IF B(11)=1 THEN A(Ø,1)=11
5574 IF B(1)=1 THEN A(Ø,1)=1
5575 IF B(2)=1 THEN A(Ø,1)=2
5576 IF B(Ø)=1 THEN A(Ø,1)=Ø
5577 IF B(3)=1 THEN A(Ø,1)=3
5578 IF B(2)=1 THEN A(Ø,1)=2
5579 IF B(4)=1 THEN A(1,1)=4
558Ø IF B(1Ø)=1 THEN A(1,1)=1Ø
5581 IF B(5)=1 THEN A(1,1)=5
5582 IF B(11)=1 THEN A(1,1)=11
5583 IF B(8)=1 THEN A(1,1)=8
5584 IF B(1)=1 THEN A(1,1)=1
5585 IF B(Ø)=1 THEN A(1,1)=Ø
5586 IF B(12)=1 THEN A(1,1)=12
5587 IF B(3)=1 THEN A(1,1)=3
5588 IF B(2)=1 THEN A(1,1)=1ØØ
5589 GOTO 57ØØ
559Ø FOR B=11 TO 15:A(Y,B)=INT(.
2*A(Y,B)):NEXT:A(Y,1)=2ØØ:RETURN
5599 NEXT X
56ØØ FOR Y=Ø TO 6:A(Y,13)=A(Y,13
)+INT(.1*(A(Y,11)+A(Y,12)+A(Y,14
))) 'UPDATE COUNTRY CONDITIONS
561Ø IF FL=1Ø THEN GOSUB 5571 EL
SE GOSUB 562Ø
5615 GOTO 5699
562Ø FOR C=Ø TO 6:ON C+1 GOTO 56
25,5626,5627,5628,5629,563Ø,5631
5625 ON T+1 GOTO 565Ø,565Ø,565Ø,
565Ø,565Ø,565Ø,565Ø,565Ø,565Ø,56
5Ø,565Ø,5671,5671,5671,5671,5671
,5665,5665,5651,5651,5663,5663,5
663,5664,5664 'USA GOALS
5626 ON T+1 GOTO 565Ø,5651,5651,
5651,5651,5651,5651,5651,5651,56
51,5651,5671,5671,5671,5671,5671
,5665,5665,5651,5651,5663,5663,5
663,5664,5664 'GB GOALS
5627 ON T+1 GOTO 565Ø,5669,5667,
5667,5668,5668,5668,5651,5651,56
51,5651,5651,5651,5651,5651,5651
,5651,5666,5666,5666,5669,5669,5
```


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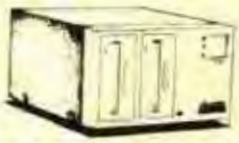

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669,5664,5664 'USSR GOALS
5628 ON T+1 GOTO 565Ø,5651,5651,
5651,5652,5652,5652,5652,5652,56
52,5652,5652,5652,5652,5652,5652
,5652,5652,5652,5652,5652,5652,5
664,5664,5664 'FRA GOALS
5629 ON T+1 GOTO 565Ø,5669,5667,
5667,5663,5662,5662,5662,5662,56
66,5666,5666,5666,5666,5666,5666
,5666,5651,5651,5651,5651,5651,5
651,5663,5652 'GER GOALS
563Ø ON T+1 GOTO 565Ø,5651,5651,
5651,5651,5651,5651,5651,5651,56
72,5651,5651,5651,5651,5651,5651
,5651,5652,5652,5652,5652,5652,5
652,5652,5652 'ITL GOALS
5631 ON T+1 GOTO 565Ø,5652,5652,
5652,5652,5652,5652,5652,5652,56
52,5652,5652,5652,5652,5652,5652
,5652,5652,5652,5652,5652,5652,5
652,5664,5664 'POL GOALS
565Ø A(C,1)=999:GOTO 568Ø
5651 A(C,1)=1ØØ:GOTO 568Ø
5652 A(C,1)=2ØØ:GOTO 568Ø
566Ø A(C,1)=Ø:GOTO 568Ø
5661 A(C,1)=1:GOTO 568Ø
5662 A(C,1)=2:GOTO 568Ø
5663 A(C,1)=3:GOTO 568Ø
5664 A(C,1)=4:GOTO 568Ø
5665 A(C,1)=5:GOTO 568Ø
5666 A(C,1)=6:GOTO 568Ø
5667 A(C,1)=7:GOTO 568Ø
5668 A(C,1)=8:GOTO 568Ø
5669 A(C,1)=9:GOTO 568Ø
567Ø A(C,1)=1Ø:GOTO 568Ø
5671 A(C,1)=11:GOTO 568Ø
5672 A(C,1)=12:GOTO 568Ø
568Ø NEXT C
5681 RETURN
5699 RETURN
57ØØ IF A(2,Ø)=1 AND B(12)=Ø THE
N A(2,1)=12
57Ø1 IF A(2,Ø)=1 AND B(9)=Ø THEN
 A(2,1)=9
57Ø2 IF A(2,Ø)=Ø AND B(4)=1 THEN
 A(2,1)=4
57Ø3 IF A(2,Ø)=Ø AND B(9)=1 THEN
 A(2,1)=9
57Ø4 IF A(2,Ø)<>B(6) THEN A(2,1)
=1ØØ
57Ø5 IF B(4)=1 THEN A(3,1)=4
57Ø6 IF B(2)=1 THEN A(3,1)=2
57Ø7 IF B(3)=1 THEN A(3,1)=1ØØ
57Ø8 IF B(2)=Ø THEN A(4,1)=2
57Ø9 IF B(3)=Ø THEN A(4,1)=3
571Ø IF B(6)=Ø THEN A(4,1)=6
5711 IF B(Ø)=Ø THEN A(4,1)=Ø
5712 IF B(8)=Ø THEN A(4,1)=8
5713 IF B(7)=Ø THEN A(4,1)=7
5714 IF B(11)=Ø THEN A(4,1)=11
5715 IF B(5)=Ø THEN A(4,1)=5
5716 IF B(4)=Ø THEN 578Ø
5717 IF B(1Ø)=Ø THEN A(5,1)=1Ø
5718 IF B(12)=Ø THEN A(5,1)=12
5719 IF B(3)=Ø THEN A(5,1)=3
572Ø IF B(11)=Ø THEN A(5,1)=11
5721 IF B(4)=Ø THEN A(5,1)=4
5722 IF B(5)=Ø THEN A(5,1)=1ØØ
5723 IF B(9)=1 THEN A(6,1)=1ØØ
573Ø RETURN
578Ø CLS:PRINT@128,"    GERMANY
SURRENDERS !                    T
HE WAR IS OVER !!":GOTO 578Ø
58ØØ CLS:PRINT@128,"IT IS ";K$;"
, ";YR:PRINT:PRINT:PRINT"THE MIL
ITARY GOALS ARE:":GOSUB 991
581Ø FOR C=Ø TO 6:IF A(C,1)=999
THEN K$=" REMAIN NEUTRAL" ELSE I
F A(C,1)=1ØØ THEN K$=" DEFEND PO
SITIONS" ELSE IF A(C,1)=2ØØ THEN
 K$="OCCUPIED" ELSE IF A(C,1)>-1
 AND A(C,1)<13 THEN K$=" INVADE
"+X$(A(C,1))
582Ø PRINT C;" ";Y$(C):PRINTK$:G
OSUB 991:NEXT C
583Ø PRINT"  DO YOU WANT TO CHAN
GE GOALS?   (Y/N)"
5832 K$=INKEY$:IF K$="" THEN 583
2 ELSE IF K$="Y" THEN 584Ø ELSE
589Ø
584Ø PRINT" ENTER THE COUNTRY'S
NUMBER Ø-6":INPUT C:IF C<Ø OR C>
6 THEN 584Ø
5842 PRINT"INPUT NEW GOAL FOR TH
E          ";Y$(C);" TROOPS":PR
INT" -1 = REMAIN NEUTRAL
     -2 = DEFEND CURRENT POSITIO
N    Ø TO 12 = INVADE THAT REGIO
N"
5844 INPUT W:IF W<-2 OR W>12 THE
N 5842 ELSE IF W=-2 THEN A(C,1)=
999 ELSE IF W=-1 THEN A(C,1)=1ØØ
 ELSE A(C,1)=W
585Ø FL=1Ø:GOSUB 593Ø:GOTO 58ØØ
589Ø RETURN
59ØØ TF=Ø
59Ø5 ON B+1 GOTO 591Ø,5911,5912,
5913,5915,5917
591Ø TF=1Ø:A$(1Ø)=STR$(Q)+" DIVI
SIONS":RETURN
5911 TF=1Ø:A$(1Ø)=STR$(Q)+" NAVA
L TASK FORCES":RETURN
5912 TF=1Ø:A$(1Ø)=STR$(Q)+" AIRC
RAFT SQUADRONS":RETURN
5913 IF Q=Ø THEN TF=Ø ELSE IF Q>
=5 THEN TF=1 ELSE TF=2
```

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```
5914 RETURN
5915 TF=1Ø:A$(1Ø)=STR$(Q)+" UNIT
S OF SUPPLIES":RETURN
5917 TF=1Ø:IF Q=999 THEN 5918 EL
SE IF Q=1ØØ THEN 5919 ELSE IF Q=
2ØØ THEN 5921 ELSE 592Ø
5918 A$(1Ø)=" REMAIN NEUTRAL":RE
TURN
5919 A$(1Ø)=" TAKE DEFENSIVE POS
ITION":RETURN
592Ø A$(1Ø)=X$(Q):RETURN
5921 A$(1Ø)="  ARE UNDER
         FOREIGN DOMINATION":RE
TURN
593Ø IF T=Ø THEN T=2
5931 Y=INT(T/4+.1):B=T-4*Y:IF B=
Ø THEN K$="WINTER" ELSE IF B=1 T
HEN K$="SPRING" ELSE IF B=2 THEN
 K$="SUMMER" ELSE IF B=3 THEN K$
="AUTUMN" ELSE K$=""
5932 YR=1939+Y:IF(T=3 AND FL<>1Ø
) THEN 5935 ELSE RETURNRETURN
5935 X=3:Y=3:B=3:GOSUB 99Ø:POKE
AQ+AD,Ø:RETURN
9ØØØ FOR X=Ø TO 12:FOR Y=Ø TO  6
:FOR B=Ø TO  4:GOSUB 99Ø:PRINT#-
2,X;" ";Y;" ";B;" ";PEEK(29ØØØ+A
D):NEXT B,Y,X
```

5066	254	5512	145
5108	11	5551	58
5310	175	5635	228
5330	243	5700	240
5455	42	5877	34
		END	37

Listing 3: STOCKCAR

```
5ØØØ 'SCOREBOARD
5ØØ1 CLS:PRINT STRING$(32,CHR$(1
98)):PRINT" TRANSOUTH 5ØØ - DARL
INGTON, SC"
5ØØ2 PRINT USING"###";LS;:PRINT"
 LAPS..TIME  ";:GOSUB 5Ø6Ø:PRINT
 K$
5ØØ3 PRINT"POSIT     DRIVER
       LAP"
5ØØ5 FOR P=1 TO 1Ø:GOSUB 5Ø5Ø:PR
INT USING"##%%%
   %%%###";P," ",Y$(D)," ",A(D,2
)
5ØØ6 NEXT
5ØØ7 PRINT STRING$(31,CHR$(198))
;
5ØØ8 K$=INKEY$:IF K$="" THEN 5ØØ
8 ELSE RETURN
5Ø5Ø X=Ø:B=6:FOR Y=Ø TO IY
5Ø51 GOSUB 99Ø:Q=PEEK(AQ+AD):IF
Q=P THEN D=Y ELSE 5Ø53
```


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```
5Ø52 Y=15
5Ø53 NEXT Y
5Ø54 RETURN
5Ø6Ø TT=T*4Ø:TØ=INT(TT/36ØØ):T1=
INT((TT-36ØØ*TØ)/6Ø):T2=INT(TT-3
6ØØ*TØ-6Ø*T1)
5Ø66 K$=MID$(STR$(TØ),2,2)+":"+M
ID$(STR$(T1),2,2)+":"+MID$(STR$(
T2),2,2):RETURN
51ØØ Q=RND(-TIMER):X$(Ø)="":LP=1
.36:LS=367:TS=157.7
51Ø2 Y$(Ø)="BILL ELLIOTT - FORD"
:Y$(1)="DAVID PEARSON - CHEVY":Y
$(2)="TERRY LABONTE - CHEVY":Y$(
3)="BENNY PARSONS - CHEVY":Y$(4)
="LAKE SPEED - PONTIAC":Y$(5)="R
ON BOUCHARD - BUICK":Y$(6)="NEIL
 BONNETT - BUICK":Y$(7)="DALE EA
RNHARDT - CHEVY"
51Ø4 Y$(8)="RICKY RUDD - FORD":Y
$(9)="BUDDY BAKER - OLDS":Y$(1Ø)
="GEOFF BODINE - CHEVY":Y$(11)="
HARRY GANT - CHEVY":Y$(12)="DARR
ELL WALTRIP - CHEVY":Y$(13)="DAV
E MARCIS - CHEVY":Y$(14)="TIM RI
CHMOND - PONTIAC"
51Ø6 B$(Ø)="TRACK POSITION":B$(1
)="TIRE CONDITION":B$(2)="BRAKE
CONDITION":B$(3)="GEARBOX CONDIT
ION":B$(4)="ENGINE CONDITION":B$
(5)="FUEL LEVEL":B$(6)="CURRENT
POSITION":B$(7)="PIT ON NEXT LAP
?"
51Ø7 A$(1)="FRONT STRAIGHT":A$(2
)="TURN ONE":A$(3)="TURN TWO":A$
(4)="BACK STRETCH":A$(5)="TURN T
HREE":A$(6)="TURN FOUR":A$(7)="I
N PITS"
51Ø8 IX=Ø:IY=14:IB=7
5199 RETURN
52ØØ FG=1Ø
52Ø4 B=Ø:FOR Y=Ø TO IY:GOSUB 99Ø
:POKE AQ+AD,(15-Y):NEXT Y
52Ø6 FOR B=1 TO 4:FOR Y=Ø TO IY:
GOSUB 99Ø:POKE AQ+AD,25Ø:NEXT Y,
B
52Ø8 B=5:FOR Y=Ø TO IY:GOSUB 99Ø
:POKE AQ+AD,25Ø:NEXT Y
521Ø B=6:FOR Y=Ø TO IY:GOSUB 99Ø
:POKE AQ+AD,Y+1:NEXT Y
5211 B=7:FOR Y=Ø TO IY:GOSUB 99Ø
:POKE AQ+AD,Ø:NEXT Y
5212 FOR Y=Ø TO IY:A(Y,Ø)=((15-Y
)/255)*LP:A(Y,1)=TS-.3*Y:A(Y,2)=
1:A(Y,3)=TS-.2*Y:A(Y,5)=Ø:NEXT Y
522Ø A(1,4)=7:A(3,4)=11Ø:A(8,4)=
25Ø
5299 FL=2:RETURN
53ØØ CLS(3):FOR Y=Ø TO IY:TL=3Ø:
```


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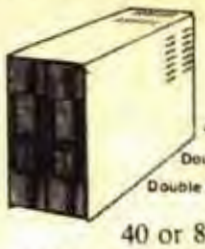

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```
PRINT:GOSUB 569Ø
53Ø1 IF A(Y,5)=1ØØØ THEN 559Ø EL
SE IF FG=15 THEN 5315 ELSE IF FG
=1Ø THEN 531Ø ELSE IF FG=2Ø THEN
 532Ø ELSE IF FG=3Ø THEN 533Ø
531Ø IF A(Y,5)=999 THEN 55ØØ ELS
E IF A(Y,5)=Ø THEN 54ØØ 'GREEN F
LAG
5311 TL=TL-A(Y,5):IF TL<Ø THEN 5
312 ELSE 5314  'ALREADY IN PITS
5312 A(Y,5)=A(Y,5)-4Ø:PRINTY$(Y)
:PRINT" IN PITS":GOTO 5599 'STAY
 IN  PITS
5314 A(Y,5)=Ø:PRINTY$(Y):PRINT"
OUT OF PITS":GOTO 54ØØ RUN WITH
TL TIME LEFT
5315 IF A(Y,5)<>Ø THEN 5316 ELSE
 5599
5316 A(Y,Ø)=A(Y,Ø)+A(Y,3)*TL/36Ø
Ø:A(Y,2)=A(Y,2)+1:GOTO 5599
532Ø IF A(Y,5)=999 THEN 55ØØ ELS
E IF A(Y,5)=Ø THEN 5323 ELSE 531
1
5323 PRINTY$(Y):PRINT"RUNNING UN
DER YELLOW":A(Y,1)=124:SQ=A(Y,1)
*TL/36ØØ:A(Y,Ø)=A(Y,Ø)+SQ:B=1:GO
SUB 99Ø:Q=PEEK(AQ+AD):IF Q<1ØØ T
HEN A(Y,5)=999 'RUN UNDER YELLOW
 & CHCK TIRES
5324 B=5:GOSUB 99Ø:Q=INT(PEEK(AQ
+AD)-(SQ*1Ø/(3.5+RND(1ØØ)*.Ø1)))
:IF Q<Ø THEN Q=Ø ELSE IF Q>25Ø T
HEN Q=25Ø
5325 POKE AQ+AD,Q:IF Q<14Ø THEN
A(Y,5)=999
5326 GOTO 549Ø
533Ø X=Ø:FOR B=1 TO 5:GOSUB 99Ø:
POKE AQ+AD,25Ø:NEXT 'RED FLAG
5331 B=Ø:GOSUB 99Ø:POKE AQ+AD,Ø:
A(Y,Ø)=A(Y,2)*LP:GOTO 5599
54ØØ IF A(Y,2)=A(Y,4) AND RND(1Ø
)>3 THEN 5435 ELSE 5431
5431 X=Ø:B=1:GOSUB 99Ø:Q=PEEK(AQ
+AD):B=2:GOSUB 99Ø:Q1=PEEK(AQ+AD
):IF Q<2Ø OR Q1<2Ø OR RND(15ØØØ)
>14998 THEN 5435 ELSE 544Ø
5435 CLS:PRINT@128,Y$(Y):PRINT"
SPINS ON TURN AND HITS WALL ....
.. HE IS OUT OF RACE":GOSUB 991:
FG=2Ø:A(Y,5)=1ØØØ:GOTO 549Ø
544Ø X=Ø:B=3:GOSUB 99Ø:Q=PEEK(AQ
+AD):B=4:GOSUB 99Ø:Q1=PEEK(AQ+AD
):IF Q<6Ø OR Q1<6Ø THEN 545Ø ELS
E 546Ø
545Ø CLS:PRINT@128,Y$(Y)
5452 ON RND(5) GOTO 5453,5454,54
55,5456,5457
5453 PRINT"..BLOWN ENGINE .. OUT
 OF RACE":GOSUB 991:A(Y,5)=1ØØØ:
GOTO 549Ø
5454 PRINT".GEARBOX FAILURE, OUT
 OF RACE":GOSUB 991:A(Y,5)=1ØØØ:
GOTO 549Ø
5455 PRINT".FUEL PUMP FAILURE,
          .. OUT OF RACE":GOSUB
 991:A(Y,5)=1ØØØ:GOTO 549Ø
5456 PRINT".BROKEN CAMSHAFT,
          .. OUT OF RACE":GOSUB
 991:A(Y,5)=1ØØØ:GOTO 549Ø
5457 PRINT".BROKEN PISTON,
          .. OUT OF RACE":GOSUB
 991:A(Y,5)=1ØØØ:GOTO 549Ø
546Ø B=4:GOSUB 99Ø:Q=PEEK(AQ+AD)
*.2/25Ø+.8:SP=A(Y,3)*Q:A(Y,1)=SP
:SQ=SP*TL/36ØØ:A(Y,Ø)=A(Y,Ø)+SQ:
B=1:X=Ø:GOSUB 99Ø:Q=PEEK(AQ+AD):
IF Q<1ØØ THEN A(Y,5)=999 'ADD MI
LES & CHECK TIRES
5461 PRINTY$(Y):PRINT"  RUNNING
AT ";SP;" MPH"
5462 B=5:GOSUB 99Ø:Q=INT(PEEK(AQ
+AD)-(SQ*1Ø/(3.Ø+RND(1ØØ)*.Ø1)))
```


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```
:IF Q<Ø THEN Q=Ø ELSE IF Q>25Ø T
HEN  Q=25Ø  'USE FUEL
5464 POKE AQ+AD,Q:Q=PEEK(AQ+AD):
IF Q<6Ø THEN A(Y,5)=999 'GO INTO
 PITS?
5465 FOR B=1 TO 4:GOSUB 99Ø:Q=PE
EK(AQ+AD)-RND(3):IF Q<Ø THEN Q=Ø
5466 POKE AQ+AD,Q:NEXT B:GOTO 54
9Ø
549Ø GOSUB 5875:GOTO 5599
55ØØ 'IN PITS
551Ø Q=A(Y,2)*LP:SQ=Q-A(Y,Ø):IF
FG=2Ø THEN TP=SQ*36ØØ/124 ELSE T
P=SQ*36ØØ/A(Y,1)
5512 IF TP<TL THEN 553Ø ELSE 54Ø
Ø
553Ø B=Ø:X=Ø:GOSUB 99Ø:POKE AQ+A
D,Ø:T1=TL-TP  'TIME LEFT FOR PIT
S ON THIS LAP
5531 B=1:GOSUB 99Ø:Q1=PEEK(AQ+AD
):B=2:GOSUB 99Ø:Q2=PEEK(AQ+AD):B
=3:GOSUB 99Ø:Q3=PEEK(AQ+AD):B=4:
GOSUB 99Ø:Q4=PEEK(AQ+AD)
5532 A(Y,Ø)=LP*A(Y,2):PRINT Y$(Y
):PRINT" IS IN PITS AT LAP ";A(Y
,2)+1:GOSUB 991
5534 Q1=25Ø:IF Q2<1ØØ OR Q3<1ØØ
OR Q4<1ØØ THEN 555Ø  'LONG STOP
5535 B=5:GOSUB 99Ø:POKE AQ+AD,25
Ø:B=1:GOSUB 99Ø:POKE(AQ+AD),Q1:B
=2:GOSUB 99Ø:POKE(AQ+AD),Q2:B=3:
GOSUB 99Ø:POKE(AQ+AD),Q3:B=4:GOS
UB 99Ø:POKE(AQ+AD),Q4
5536 Q=RND(1ØØ)*.Ø1:TX=1Ø+2*Q:GO
TO 556Ø
555Ø B=5:GOSUB 99Ø:POKE AQ+AD,25
Ø:B=1:GOSUB 99Ø:POKE(AQ+AD),22Ø:
B=2:GOSUB 99Ø:POKE(AQ+AD),22Ø:B=
3:GOSUB 99Ø:POKE(AQ+AD),22Ø:B=4:
GOSUB 99Ø:POKE(AQ+AD),22Ø
5551 Q=RND(1ØØ)*.Ø1:TX=32+4*Q:GO
TO 556Ø
556Ø PRINT USING"%          %###.
###%       %";"STOP TAKES ";TX;
" SECONDS":GOSUB 991:IF TX>T1 TH
EN 5565 ELSE 557Ø
5565 A(Y,5)=TX-T1:GOTO 549Ø
557Ø A(Y,5)=Ø:TL=T1-TX:GOTO 54ØØ
559Ø PRINT Y$(Y):PRINT" IS OUT O
F RACE ON":PRINT"LAP ";A(Y,2):IF
 FG=15 THEN 5315 ELSE 5599
5599 NEXT Y
56ØØ PRINT:PRINT:IF FG=15 THEN 5
7ØØ
56Ø1 FOR Y=Ø TO IY:GOSUB 568Ø:NE
XT
```


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```
56Ø5 FOR Y=Ø TO IY:IF A(Y,Ø)>LP*
(LS-1) THEN FG=15
56Ø6 NEXT
561Ø FOR P=1 TO IY+1
5611 MN=Ø:IF P=1 THEN MX=1ØØØØ
5612 Q=Ø:FOR Y=Ø TO IY
5613 IF A(Y,Ø)>MN AND A(Y,Ø)<MX
THEN 5615 ELSE 5619
5615 Q=Y:MN=A(Y,Ø)
5619 NEXT Y
562Ø MX=A(Q,Ø):X=Ø:Y=Q:B=6:GOSUB
 99Ø:POKE AQ+AD,P
5621 IF P=1 THEN PRINT Y$(Y):PRI
NT"LEADING THE RACE AFTER":PRINT
A(Y,2)-1;" LAPS"
5622 NEXT P
563Ø Q=RND(1ØØ):IF FG=2Ø THEN 56
35 ELSE IF FG=3Ø THEN 564Ø ELSE
IF FG=1Ø THEN 5645 ELSE IF FG=15
 THEN 565Ø
5635 IF Q>6Ø THEN FG=1Ø:PRINT" G
REEN FLAG !!":GOSUB 991:GOTO 565
Ø ELSE PRINT"YELLOW FLAG IS OUT"
:GOSUB 991:GOTO 565Ø
564Ø IF Q>2Ø THEN FG=1Ø:PRINT" G
REEN FLAG !!":GOSUB 991:GOTO 565
Ø ELSE "RED FLAG IS OUT, THE RAC
E IS    STOPPED.":GOSUB 991:GOTO
 565Ø
5645 IF Q>95 THEN FG=2Ø:PRINT" Y
ELLOW FLAG .. OIL ON TRACK":GOSU
B 991:GOTO 565Ø ELSE 565Ø
565Ø RETURN
568Ø IF A(Y,5)<>Ø THEN 5681 ELSE
 5683
5681 B=7:GOSUB 99Ø:POKE AQ+AD,1:
RETURN
5683 B=7:GOSUB 99Ø:POKE AQ+AD,Ø:
RETURN
569Ø B=7:GOSUB 99Ø:Q=PEEK(AQ+AD)
:IF Q=Ø THEN RETURN
5691 IF A(Y,5)=999 THEN 5692 ELS
E IF A(Y,5)=Ø THEN A(Y,5)=999 EL
SE IF A(Y,5)=1ØØØ THEN 5692
5692 RETURN
57ØØ CLS(7):FOR I=1 TO 48Ø:PRINT
 CHR$(198);:NEXT:PRINT"THE RACE
IS OVER !!":GOSUB 991:GOSUB 991
571Ø FOR P=1 TO IY+1
5711 MN=Ø:IF P=1 THEN MX=1ØØØØ
5712 Q=Ø:FOR Y=Ø TO IY
5713 IF A(Y,Ø)>MN AND A(Y,Ø)<MX
THEN 5715 ELSE 5719
5715 Q=Y:MN=A(Y,Ø)
5719 NEXT Y
572Ø MX=A(Q,Ø):X=Ø:Y=Q:B=6:GOSUB
 99Ø:POKE AQ+AD,P
5722 NEXT P
573Ø FOR P=1 TO 15
5731 FOR Y=Ø TO IY
5732 B=6:GOSUB 99Ø:Q=PEEK(AQ+AD)
:IF P=Q THEN 5733 ELSE 5735
5733 PRINT "#";P;"IS ";Y$(Y):PRI
NT A(Y,2);" LAPS COMPLETE":PRINT
"------------":GOSUB 991
5735 NEXT Y
574Ø NEXT P
575Ø PRINT"SEE RESULTS AGAIN? (Y
/N)"
5752 K$=INKEY$:IF K$="" THEN 575
2 ELSE IF K$="Y" THEN 573Ø ELSE
END
585Ø 'GIVEN Y CONV TO MILES
5852 X=Ø:B=Ø:GOSUB 99Ø:Q=PEEK(AQ
+AD):A(Y,Ø)=(Q/255)*LP+(A(Y,2)-1
)*LP:RETURN
5875 'GIVEN Y CONVERT TO LAPS AN
D POSIT
5877 A(Y,2)=INT(A(Y,Ø)/LP)+1
5879 Q=A(Y,Ø)-(A(Y,2)-1)*LP:X=Ø:
B=Ø:GOSUB 99Ø:POKE AQ+AD,INT(255
*Q/LP):RETURN
59ØØ TF=Ø  'Q INPUT , RETURN TF
59Ø5 ON B+1 GOTO 591Ø,5931,5931,
5931,5931,592Ø,5931,593Ø
591Ø IF Q<=4Ø OR Q>215 THEN TF=1
5911 IF Q<=64 AND Q>4Ø THEN TF=2
5912 IF Q<=88 AND Q>64 THEN TF=3
5913 IF Q<=168 AND Q>88 THEN TF=
4
5914 IF Q<=192 AND Q>168 THEN TF
=5
5915 IF Q<=216 AND Q>192 THEN TF
=6
5917 IF Q=Ø THEN TF=7
5919 RETURN
592Ø TF=1Ø:A$(1Ø)=STR$(Q/1Ø)+" G
ALLONS":RETURN
593Ø TF=1Ø:IF Q=Ø THEN A$(1Ø)="N
O" ELSE A$(1Ø)="YES"
5931 RETURN
```

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Help Wandering Star In The Right Direction

By Bob Albrecht and Ramon Zamora
Rainbow Contributing Editors

"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 his 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.

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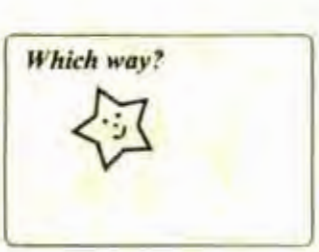
(Well-known author Bob Albrecht co-authors the "GameMaster's Apprentice" feature for THE RAINBOW each month. Ramon Zamora is author and co-author of several books, co-founder of Computer Town USA!, and currently designing computer games for kids at Child Ware Corp. in Menlo Park, Calif.)

Would you like to help Wandering Star move towards cosmic dust? Well, you can. Use the arrow keys.

— Press → to tell her to move right.
— Press ← to tell her to move left.
— Press ↑ to tell her to move up.
— Press ↓ to tell her to move down.
— Press any other key and she will move randomly.



Wandering Star waits for you to press a key. Press any key and she will move. Press an arrow key to tell her which way to go.

Sometimes she will understand you, sometimes she won't. You see, there is cosmic noise in the galaxy, so sometimes she can't hear you because of the noise. (Parent, you can adjust the amount of cosmic noise from zero percent to 100 percent.)

Listing 1: OASIS

```
1ØØ REM**WANDERING STAR SCH 15-1
11Ø CLS
199 '
2ØØ REM**GOURMET OASIS
21Ø MENU$ = "........,,@"
22Ø FOR K=1 TO 1ØØ
23Ø : GD = RND(1Ø)
24Ø : GD$ = MID$(MENU$,GD,1)
25Ø : PRINT @RND(51Ø), GD$;
26Ø NEXT K
299 '
3ØØ REM**WANDERING STAR APPEARS
31Ø WS$ = "*"
32Ø R = 7: RN = R
33Ø C = 16: CN = C
34Ø SP = 32*RN + CN
35Ø PRINT @SP, WS$;
36Ø FOR ZZ=1 TO 1ØØØ: NEXT ZZ
399 '
4ØØ REM**SHE MIGHT GET YOUR HELP
41Ø PCN = 5Ø  '% COSMIC NOISE
42Ø IF RND(1ØØ)-1<PCN THEN 51Ø
43Ø K$=INKEY$:IF K$="" THEN 43Ø
44Ø KC = ASC(K$)
45Ø IF KC=9  THEN CN=C+1:GOTO61Ø
46Ø IF KC=8  THEN CN=C-1:GOTO61Ø
47Ø IF KC=1Ø THEN RN=R+1:GOTO61Ø
48Ø IF KC=94 THEN RN=R-1:GOTO61Ø
499 '
5ØØ REM**TOO MUCH NOISE--MOVE RA
NDOMLY
51Ø W = RND(4)
52Ø IF W=1 THEN CN = C + 1
53Ø IF W=2 THEN CN = C - 1
54Ø IF W=3 THEN RN = R + 1
55Ø IF W=4 THEN RN = R - 1
599 '
6ØØ REM**KEEP HER IN THE OASIS
61Ø IF CN<Ø  THEN CN = Ø
62Ø IF CN>31 THEN CN = 31
63Ø IF RN<Ø  THEN RN = Ø
64Ø IF RN>15 THEN RN = 15
65Ø IF 32*RN+CN=511 THEN 51Ø
699 '
7ØØ REM**WANDERING STAR WANDERS
71Ø PRINT @SP, " ";
72Ø R=RN: C=CN: SP=32*R+C
73Ø PRINT @SP, WS$;
74Ø SOUND RND(255), 1
75Ø FOR ZZ=1 TO 2Ø: NEXT ZZ
799 '
8ØØ REM**GOTO DIRECTION SELECTOR
81Ø GOTO 41Ø
```

Line 410 determines the amount of cosmic noise. We have set it to 50 percent. Therefore, about 50 percent of the time Line 420 will send CoCo to block 500 and Wandering Star will move randomly.

- For entirely random movement, set PCN=100. She will ignore key presses and move entirely at random.
- For complete keyboard control, set PCN=0. Now Wandering Star will move *only* when someone presses a key. If you press an arrow key, she will go in the direction of the arrow. If you press a key other than an arrow key, she will move randomly.

Try various settings between PCN=0 and PCN=100 until you find the one just right for your child or yourself.

Perhaps your child would like to see Wandering Star in the Alphabet Soup Oasis. Easy! Just change Line 210 as follows:

```
210 MENU$ = "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
```

How would you change block 200 so the oasis has brightly colored gourmet shapes? (Hint: Put colored graphics characters in random places on the screen.)

More Interesting Patterns

We have shown you programs to do arithmetic and geometric sequences. Now we will look at ways to generate patterns such as the following:

1) 11, 111, 1111, 11111 and so on.
2) 99, 999, 9999, 99999 and so on.
3) 32, 332, 3332, 33332 and so on.
4) 34, 334, 3334, 33334 and so on.

Interesting things happen when we compute the square of each number in one of the above patterns.

In the meantime, however, how do we get the CoCo to generate the patterns? In particular, how do we write a program to generate any pattern of this type, using as few "get started" numbers as possible?

For pattern numbers 1 and 2, it's easy.

Pattern 1

First number:	11
Second number:	111 = 10*11 + 1
Third number:	1111 = 10*111 + 1
And so on.	

Aha! Next number = 10*Previous number + 1
Or, in BASIC: S = 10*S + 1

Pattern 2

First number:	99
Second number:	999 = 10*99 + 9
Third number:	9999 = 10*999 + 9
And so on.	

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Next number = 10*Previous number + 9
In BASIC: S = 10*S + 9

So, from the evidence in working with patterns 1 and 2, it looks as if we need two numbers to define a pattern of this type. We will call them 'S' and 'B.'

S = Starting number
B = Number to add on after multiplying the old value of 'S' by 10.

Then, the next value of 'S' is computed like this.

S = 10*S + B

But, alas, it doesn't work for pattern numbers 3 and 4. Oh well, back to the old drawing board.

Here is a way to get Pattern 3:

First number: 32
Second number: 332 = 10*(32 + 1) + 2
Third number: 3332 = 10*(332 + 1) + 2
And so on.

Next number: S = 10*(S + 1) + 2

Will it work for Pattern 4? Almost. We have to make a slight change.

First number: 34
Second number: 334 = 10*(34 - 1) + 4
Third number: 3334 = 10*(334 - 1) + 4
And so on.

Next number: S = 10*(S - 1) + 4

Insight! Hang on while we take the big jump. (Don't be afraid to experiment; it's fun!)

Pattern 1 11, 111, 1111, etc.
S = 10*(S + 0) + 1
Pattern 2 99, 999, 9999, etc.
S = 10*(S + 0) + 9
Pattern 3 32, 332, 3332, etc.
S = 10*(S + 1) + 2
Pattern 4 34, 334, 3334, etc.
S = 10*(S + (-1) + 4

Now we have it. To get the next number, do these things:

1) Add something to the previous number. This something *might* be a negative number.
2) Multiply the result by 10.
3) Add something to that result.

In BASIC: S = 10*(S + A) + B

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

Pattern	S	A	B
1) 11, 111, 1111, ...	11	0	1
2) 99, 999, 9999, ...	99	0	9
3) 32, 332, 3332, ...	32	1	2
4) 34, 334, 3334, ...	34	-1	4

Your turn! Show the values of 'S,' 'A' and 'B' for each of the following patterns.

Pattern	S	A	B
5) 43, 433, 4333, . . .	—	—	—
6) 98, 998, 9998, . . .	—	—	—
7) 37, 337, 3337, . . .	—	—	—

Here is a program to generate patterns defined by 'S,' 'A' and 'B.' The DATA statements contain values of 'S,' 'A' and 'B' for patterns 1 through 4.

Listing 2: PATTERNS

```
100 REM**NMBR PATTERNS SCH 15-2
110 CLS
120 PRINT "TRY SOME NUMBER PATTE
RNS.": PRINT
130 PRINT "PRESS THE spacebar TO
 BEGIN."
140 IF INKEY$="" THEN 140
199 '
200 REM**READ STARTING NUMBERS
210 CLS
220 READ S, A, B
230 IF S = 1E37 THEN PRINT "I'M
OUT OF PATTERNS" : END
299 '
300 REM**SHOW 'LATEST' NUMBER
310 PRINT @448, S
320 PRINT
399 '
400 REM**COMPUTE NEXT NUMBER
410 S = 10*(S+A) + B
499 '
500 REM**WHAT TO DO NEXT
510 PRINT @480, "FOR NEXT NUMBER
, PRESS spacebar"
520 PRINT "FOR NEW PATTERN, PRES
S clear";
530 K$=INKEY$:IF K$="" THEN 530
540 IF K$=" " THEN 310
550 IF K$=CHR$(12) THEN 110
ELSE 530
599 '
900 REM**VALUES OF S, A, B
910 DATA 11, 0, 1
920 DATA 99, 0, 9
930 DATA 32, 1, 2
940 DATA 34, -1, 4
950 DATA 1E37, 1E37, 1E37
```

Try the program using our DATA statements. It begins like this:

```
TRY SOME NUMBER PATTERNS
PRESS THE SPACE BAR TO BEGIN
```

This is in reverse color.

Press the space bar and the first pattern begins.

```
11
FOR NEXT NUMBER, PRESS SPACE BAR
FOR NEW PATTERN, PRESS CLEAR
```

Reverse color

Reverse color

To continue with this pattern, keep pressing the space bar. To get the next pattern, press the CLEAR key. If all the starting numbers have been used, you will see the following message.

```
I'M OUT OF PATTERNS
OK
```

Add your own DATA statements with values of 'S,' 'A' and 'B.' Put the flags (1E37) in the last (and only the last) DATA statement.

DragonSmoke

DragonSmoke is our monthly newsletter about new ways to learn, including computers, role playing games, play-by-mail games, COPY ME stuff, public domain instructional materials, software for beginners and our own play-by-mail game, *DragonFun*

DragonFun is a play-by-mail role playing game for beginners. It is nonviolent and features cooperation, exploration, problem-solving and story-telling. How to play is described in *DragonSmoke*. For a free copy, send a self-addressed, business envelope with 39 cents in postage to *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026.

One-Liner Contest Winner . . .

This one-liner (which requires a printer) helps create Adventure maps.

The listing:

```
0 CLS:PRINT@40,"ADVENTURE HELPER
":INPUT"HOW MANY";A:FORT=1TOA:PR
INT#-2,TAB(37)"MAP FOR:":L=4:FOR
Y=1TO14:FORB=1TOL:PRINT#-2:NEXTB
:FORX=1TO80STEP5:PRINT#-2,TAB(X)
"+";:NEXTX:L=3:NEXTY:PRINT#-2,CH
R$(12):NEXTT
```

Bill Gross
Annapolis, 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.*)

Flashing In 6809

By R. Bartly Betts
Rainbow Contributing Editor
With Programs By Chris Bone

If you use *Bytescreen*, you may have discovered there is a way to crash the program. It isn't of major concern because it can only happen if you try to change the PMODE value when the cursor is located on the bottom half of the screen. It most likely results from *Bytescreen* trying to scroll when you are not in PMODE 4, and there just isn't anything to scroll.

You also may have discovered you can get extra wide and extra high characters in PMODE 2. You do need to be careful regarding cursor position before changing the PMODE, however.

Bytescreen Upgrade

I have had a lot of interesting correspondence and phone calls from readers lately, and I do appreciate hearing from you. I was especially glad to hear from George J.P. Dabbene of Ottawa, Ontario, who submitted some nifty upgrades for *Bytescreen*. I expect good things to come out of Canada: first, that is where I came from, and second, Canadians should have more time for programming. (If you had a choice of writing computer programs or shoveling the walk in 40 below zero weather, which would you do?) I received George's program back in February, so I know what he was doing during the long winter months. Listing 4, at the end of this column, shows George's upgrades and tells what they do.

The Ground Work

Before getting into upgrades, you need to spend some more time on the basics. As promised last month, I am going to provide a little more programming meat on which to sharpen your teeth. Beginning this month, the next few columns will deal with doing things with the text screen, the keyboard and interfacing machine language programs to BASIC.

You've probably noticed I have dropped the machine language arithmetic series I began. It seems I was getting over the head of many readers and so decided to detour for a while.

This month's program lets you flash up to 255 characters on the text screen for a selected number of times. I have also written two sample BASIC programs that show how the process works. To get things started, power-up your computer and your editor/assembler, then enter the following code:

Listing 1: FLASH
(A program to reverse a selected portion of the text screen a selected number of times.)

```
                    0001 **************************
                    0002 *     FLASH SCREEN       *
                    0003 * BY R. BARTLY BETTS     *
                    0004 **************************
                    0005 *
                    0006 *
0E00                0010          ORG     5E00
0E00                0020 STOR1    RMB     2
0E02                0030 STOR2    RMB     2
0E04                0040 STOR3    RMB     1
```

(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.)

(Chris Bone is a college computer science major and has been programming for more than three years. He averages between six and nine hours a day on the CoCo.)

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```
ØE05 4F          ØØØ5Ø START   CLRA
ØE06 F6  ØE0Ø    ØØØ6Ø         LDB     STOR1
ØE09 C3  Ø4ØØ    ØØØ7Ø         ADDD    #1Ø24
ØE0C 1F  Ø1      ØØØ8Ø         TFR     D,X
ØE0E F6  ØE02    ØØØ9Ø         LDB     STOR2
ØE11 A6  84      ØØ1ØØ LOOP    LDA     ,X
ØE13 88  4Ø      ØØ11Ø         EORA    #64
ØE15 A7  8Ø      ØØ12Ø         STA     ,X+
ØE17 5A          ØØ13Ø         DECB
ØE18 26  F7      ØØ14Ø         BNE     LOOP
ØE1A 7A  ØE04    ØØ15Ø         DEC     STOR3
ØE1D 27  ØA      ØØ16Ø         BEQ     DONE
ØE1F 31  31      ØØ17Ø TIME    LEAY    -$F,Y
ØE21 1Ø8C ØØØF   ØØ18Ø         CMPY    #$F
ØE25 25  DE      ØØ19Ø         BLO     START
ØE27 2Ø  F6      ØØ2ØØ         BRA     TIME
ØE29 39          ØØ21Ø DONE    RTS
         ØØØØ    ØØ22Ø         END
ØØØØØ TOTAL ERRORS
```

BASIC Interfacing — Step 1

This program is designed to show one way of interfacing to BASIC programs. It lets you store three values in memory: the beginning screen address of the characters you wish to flash, the number of characters you wish to flash, and the number of times they flash. The values must be provided from BASIC to direct the machine language program.

For instance, if you wish to flash characters beginning at PRINT location 101, POKE 101 into memory location $E00. If you wish 10 characters, or screen positions, to flash, POKE 10 in memory location $E02. If you wish the characters to flash 15 times, POKE 15 into memory location $E04. The three RMB statements in lines 20, 30 and 40 reserve memory for these values. That is the purpose of RMB instructions, to reserve a specified number of bytes for data.

The location of the RMB instructions in a program determines where in memory the storage bytes will be reserved. In this program, the storage bytes are the first bytes. No matter where you place the machine language code, these storage bytes are always at the beginning of the program.

Although the code is relocatable, I have placed it in the graphics screen memory to make it compatible with both 16 and 32K computers. You can select another location if you wish, for example, the top of memory. If you do so, use the CLEAR statement to reserve sufficient memory before using *Screen Flash* with a BASIC program.

The Lowdown on *Screen Flash*

Line 30 loads the first storage byte into Register B (this value must have been poked into $E00 from BASIC). A value of 1024 is then added to Register D, which comprises both registers A and B, and the result is transferred to Register X.

Adding 1024 to the value previously loaded into 'B' creates a pointer to the actual screen memory where you wish the flash process to take place. It is this pointer that is stored in Register X, where it is increased by one byte as each character is inverted.

Next, Register B is loaded with the number of characters, or screen locations, you wish to flash. This value must also be POKEd into the second RMB storage area from BASIC. Lines 100 through 140 load each screen character value into Register A, perform an exclusive OR operation with 64 to reverse the character, and load it back into the screen memory from where it came. After each invert operation, the value in 'B' is decreased by one. If 'B' is not equal to zero, Line 140 causes the process to repeat.

When 'B' does equal zero (all of the designated characters having been inverted) the value in Storage Area 3 is decreased. If that value is now zero, the process ends. If it is not zero, the program runs through a delay loop beginning at Line 170. Without the delay loop the time between character inversions is too short to notice. After the delay, the process branches back to START to begin the whole operation again.

Taking Notes

There are a few points about the instructions used in this program that are noteworthy:

1) The following information tells you how the exclusive OR function in Line 110 works. To demonstrate, I have selected the uppercase character 'B' which has an ASCII code value of 66 (in binary, this is 1000010). An exclusive OR of the character 'B' with 64 compares the bits of 66 and 64. When one, but not the other of the two bits being compared is set (equals one), the result bit is set (equals one). Thus, an exclusive OR of 66 with 64 gives the result:

```
01000010    — 66 decimal
01000000    — 64 decimal
--------
00000010    — exclusive OR result = 2 decimal
```

As you see, the result is '2', which produces a lowercase or inverse 'B' when stored in screen memory. If you wish to test this from BASIC type POKE 1Ø24,2. When the same screen location is again subjected to an exclusive OR, the result is:

```
00000010    —  2 decimal
01000000    — 64 decimal
--------
01000010    — exclusive OR result = 66 decimal
```

The original value is restored. This same process holds true for all text screen characters and provides the way to toggle between upper- and lowercase, or regular and inverse, characters. Doing this in machine language is fast enough to make all of the specified characters appear to flash at the same time, even if you set the maximum 255 characters.

2) Notice that it is not necessary to compare Register B to zero before implementing the BNE (Branch not Equal), BEQ (Branch Equal) or the BLO (Branch on Lower) instructions, lines 140, 160 and 190, respectively. You often see programs that include a CMPB #0 instruction before branches, but the comparison instruction is only necessary if you are comparing to a number other than zero, as in Line 180.

3) The transfer instruction TFR only transfers data between equally sized registers, 8-bit to 8-bit, or 16-bit to 16-bit.

4) You can use the decrement instruction DEC to decrease values in memory locations as well as in registers, as in Line 150. DEC always decreases in steps of one. The instruction to increment, INC, always increases in steps of one.

5) The LEA instruction (Load Effective Address) used in Line 170 acts as a delay loop. By giving an offset of -$F, or decimal -15, the value in the 'Y' register is decreased by 15 each time through the loop. Changing this value changes the length of the delay between flashes.

Connecting with BASIC

The following BASIC listing shows how the assembly language program might be used. It creates a demonstration menu and uses *Flash Screen* to highlight one of the menu selections by flashing the characters 15 times.

Listing 2: DEMO 1

```
10 DEF USR0=&HE005
30 CLS
40 PRINT TAB(10)"THE MENU"
50 PRINT
60 FOR T=1 TO 4
70 READ A$
80 PRINT TAB(5)A$
90 NEXT
100 POKE &HE000,101
110 POKE &HE002,17
120 POKE &HE004,15
150 SOUND 200,2
160 A=USR(0)
170 POKE &HE004,1
200 DATA 1. ADDITION,2. SUBTRACT
ION,3. MULTIPLICATION, 4. DIVISI
ON
```

Notice the execution address for the *Flash Screen* program is &E05. This is because of the RMB instructions at the beginning of the program. If you attempt to execute the program at $E00, it crashes. The entire interfacing between this BASIC program and the *Flash Screen* machine language program is in lines 10, 100-120 and Line 60. Line 10 defines the execution address, lines 100-120 POKE the desired values into the reserved memory bytes and Line 60 calls *Flash Screen*.

The following BASIC listing shows how to go a step further with BASIC interfacing. This program sets the number of flashes to two and uses a BASIC loop to repeatedly flash the desired text. The BASIC loop incorporates a sound routine in the flashing process.

Listing 3: DEMO 2

```
10 DEF USR0=&HE005
20 POKE &HE004,TM
30 CLS
40 PRINT TAB(10)"THE MENU"
50 PRINT
60 FOR T=1 TO 4
70 READ A$
80 PRINT TAB(5)A$
90 NEXT
92 P=69
95 FOR Z=1 TO 4
100 POKE &HE000,P
110 POKE &HE002,17
120 POKE &HE004,1
140 FOR T=1 TO 8
150 SOUND 200,2
160 A=USR(0)
170 POKE &HE004,1
180 NEXT T
190 P=P+32:NEXT Z
200 DATA 1. ADDITION,2. SUBTRACT
ION,3. MULTIPLICATION, 4. DIVISI
ON
```

The additional POKE in Line 170 is to ensure that once a portion of the screen is flashed, it doesn't remain inverted.

Forging Forward

The *Flash Screen* program was purposely left incomplete. For instance, it only flashes characters on the top half of the text screen; you cannot POKE a value greater than 255 into the STOR1 byte.

Note, however, the STOR1 RMB sets aside two bytes for storage. This provides a way of accessing the entire text screen with the program. Do you know how to do it? Give it a try. I would be pleased to see your results.

How about a feature to flash a particular sequence of characters at any location on the screen, such as an arrow (←)? Come up with some ideas of your own and experiment with the *Flash Screen* program.

***Bytescreen* and Underline**

Now for the promised revisions to *Bytescreen* (Listing 4). Mr. Dabbene has supplied some additional code that provides an underline feature and some new characters. Note that revised program lines are included in parentheses. Do not type the parentheses when changing the lines in your source listing of *Bytescreen*.

New lines to the program are numbered to fit between the existing lines. Be careful to type the correct line number. Use the normal 'I' (for INSERT) and 'E' (for EDIT) commands to make the changes. When finished, check them carefully, reassemble the listing and you are ready to use your new, advanced *Bytescreen*.

You can now produce an underline character by pressing the SHIFT and up-arrow keys together. You can use an underline in a screen print routine by using CHR$(31). For instance, to underline the word "never" in "I told you to never touch my computer," type:

```
PRINT "I TOLD YOU TO" CHR$(31) "NEVER" CHR$(31)
"TOUCH MY COMPUTER"
```

CHR$(31) turns the underline on and is then used again to turn the underline off.

The new code also contains a routine which only recognizes valid characters. *Bytescreen* previously printed garbage if you attempted to print codes for which no character existed. Now it ignores the code. Also, several new characters have been added:

ASCII Code	Character
123	left brace
124	right brace
125	pi symbol
126-128	graphics characters

"The location of the RMB instructions in a program determines where in memory the storage bytes will be reserved. In this program, the storage bytes are the first bytes. No matter where you place the machine language code, these storage bytes are always at the beginning of the program."

Adding new characters to *Bytescreen* is easy and you may wish to try some yourself. If I can find the room in the future, I will try to provide information on how to do so. As it is, you can

Listing 4: BYTESCRN
(Changes to the *Bytescreen* source code)

Bytescreen alterations lines which already exist, but need changing, are enclosed in parentheses. Do not type these parentheses.

```
(2Ø              ORG     $7C67   *ADJUSTMENT TO ACCOMMODATE NEW CODE)

(27Ø PRETX       PULS    D,X     *NEW LABEL)

(44Ø             LBSR    LETT2   *LONG BRANCH-LABEL CHANGE)

711              CMPA    #31     *CODE FOR UNDERLINE
712              BNE     NOTUL   *IGNORE
713              LDA     #ØFØ    *(SET) SWITCH ON VALUE
714              CMPA    ULFLAG
715              BNE     ULSET
716              BSR     ULCLR   *(CLR) UNDERLINE SWITCH OFF
717              BRA     PRETX   *CLEAR STACK/RETURN TO PARSE
718  ULSET       BSR     CTRL    *(SET) UNDERLINE SWITCH ON
719              BRA     PRETX   *CLEAR STACK/RETURN TO PARSE
(72Ø NOTUL       CMPA    #8      *NEW LABEL)

(76Ø             LBSR    LETT2   *LONG BRANCH-NEW LABEL)

(78Ø             LBSR    LETT2   *LONG BRANCH-NEW LABEL)

(1Ø5Ø            BSR     LETT2   *LABEL CHANGE)

1Ø71 ULCLR       LDA     #$ØF    *(CLR) SWITCH OFF VALUE
1Ø72 CTRL        STA     ULFLAG
1Ø73             LDB     #94     *LENGTH OF NON-GRAPHIC CHAR SET
1Ø74             LDX     #TABLE  *START OF TABLE
1Ø75 CTRLOP      LEAX    3,X     *SKIP 1ST 3 BYTES
1Ø76             LDA     ULFLAG  *GET SWITCH VALUE
```


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RAINBOW

probably discover how to do so on your own.

I don't know what I can do for those of you who do not have editor/assemblers. I do not have an assembled listing that provides the machine language code. Even if you have the code, you must reenter the entire program with the new code inserted in the proper places. This is just one time when an editor/assembler is needed. .

I can make the same offer as before. If you wish to send $10, I will mail you a tape or disk version of the program. For those of you who have already sent $10 for the program and want updates as they come out, I will supply them at no cost if you send a diskette or tape and the return postage. If you do not want to keep sending repeatedly, wait until all of the upgrades have been made.

Farewell to Chris

Although Chris plans to provide a couple more upgrades to "Byte Master," he will soon be leaving the column. He is getting too busy and is returning to Canada this summer. Chris' schooling and the distance make it impossible for him to continue with us. I will miss him but feel we can still keep battering away at assembly language. He has certainly helped me get started and finds a lot of my errors. I will have to work harder without him.

You can write to me by addressing your letters to:
R. Bartly Betts
2251 Lipscomb
Fort Worth, Texas 76110
Phone (817) 924-3725

(If you wish a reply, please include a self-addressed, stamped envelope. Please do not call collect or expect me to return calls unless I can call collect.)

```
1077            CMPA    #$0F    *7 OFF
1078            BNE     SET     *NO, SET CHAR ON
1079            ORA     ,X      *MAKE LSB=$F (OFF)
1080            BRA     PROCES
1081 SET        ANDA    ,X      *MAKE LSB=0
1082 PROCES     STA     ,X+     *REPLACE BYTE AFTER ADJUST
1083            DECB            *AND POINT TO NEXT BYTE
1084            BNE     CTRLOP *DO ALL CHARS IN SET
1085            RTS
(1086 RETURN    JMP     $1000   *WAS AT LINE 1080)

(1100           BNE     LETT1   *CHARACTER SET LIMITS)
1105            BSR     ULCLR   *CAR. RET. CLS UNDERLINE

(1120           BSR     LETT2)

1171  LETT1     CMPA    #32     *LOWEST VALID CHARACTER
1172            LBLO    PRET    *IGNORE
1173            CMPA    #128    *HIGHEST VALID CHARACTER
1174            LBHI    PRET    *IGNORE

(2390           FDB     $FFED   *CHR$(48) SLASH)
(2400           FDB     $BFFF)

(3290           FDB     $FFFB   *CHR$(92) BACKSLASH)
(3300           FDB     $DEFF)

(3330           FDB     $FD8D   *CHR$(94) CARET)
(3340           FDB     $DDFF)

(3430           FDB     $FFF1   *CHR$(99) c)
(3440           FDB     $771F)

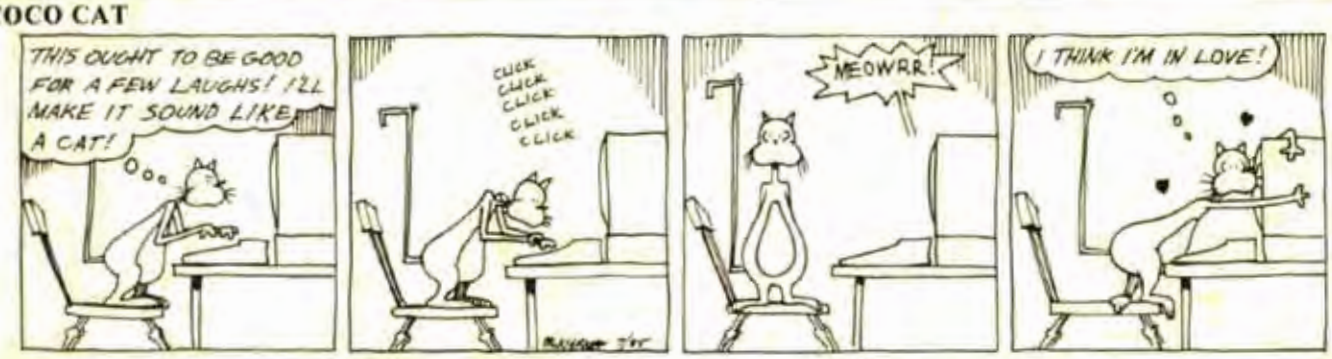
(3510           FDB     $FF06   *CHR$(103) g)
(3520           FDB     $0E8F)

(3690           FDB     $FF06   *CHR$(112) p)
(3700           FDB     $077F)
(3710           FDB     $FF86   *CHR$(113) q)
(3720           FDB     $AEEF)

(3870           FDB     $FF66   *CHR$(121) y)
(3880           FDB     $9D9F)
3901            FDB     $DBB3   *CHR$(123) LEFT BRACE
3902            FDB     $BBDF
3903            FDB     $BDDC   *CHR$(124) RIGHT BRACE
3904            FDB     $DDBF
3905            FDB     $FF0A   *CHR$(125) PI SYMBOL
3906            FDB     $AAAF
3907            FDB     $AAAA   *CHR$(126) GRAPHIC
3908            FDB     $AAAA
3909            FDB     $5555   *CHR$(127) GRAPHIC
3910            FDB     $5555
3911            FDB     $0      *CHR$(128) GRAPHIC
3912            FDB     $0

3915 MASK       RMB     2       *MOVED FROM LINE 3910
```

COCO CAT



A Question And Answer Repertoire

By R. Wayne Day
Rainbow Contributing Editor

It's been a busy spring and it looks like it's getting busier, so let's dive right in with a review of some topics of conversation at the Irvine RAINBOWfest, a look at a way almost everyone can share graphics screens and some random notes.

Irvine Revisited

One of the highlights of speaking at the three seminars I participated in at Irvine was getting a chance to meet some of you, and I really enjoyed putting a face with some of the voices and names on your letters. To those who dropped by *The Color SIG*'s booth, we hope you enjoyed seeing what CompuServe is all about.

Special thanks go out to John Ross and Mike Ward, assistant SYSOPs for the SIG, and to Gerry Nolan, one of the SIG's old-time members, for manning the booth so well.

Questions, Questions

During and after the seminars, we had time to sit down and answer a few questions. Here are some of them that might be of interest to you:

Q: I'm thinking about buying a modem and wonder which one is "best"?

A: This is a question that has no hard and fast answer, but I can give you some general guidelines to follow.

Most modems on the market today work at least at 300 Baud (300 bits of information per second) and are compatible with the CoCo. Then, too, most terminal programs for the CoCo work excellently at 300 Baud, so that means the chances are good that your terminal program and your modem are compatible.

Many bulletin boards and information services offer a higher speed capability than 300 Baud, the most common being 1200 Baud. There are modems that work with both 300 and 1200 Baud, so you don't lose the lower speed capability when you upgrade your modem. Your terminal program, though, must be able to work at 1200 Baud as well for you to be able to use 1200 Baud modems. Again, remember your modem and terminal program must be compatible.

Q: Is a direct-connect modem better than an acoustically coupled modem?

A: Generally, the direct-connects are less prone to interference from noise in the room and usually work as well, if not better, than an acoustic modem.

Q: Are the cheaper modems any good?

A: I've had a chance to play with some of the less expensive modems being sold today and they seem to work very well over local telephone and AT&T long distance lines. I have had some trouble with using some of the supplementary telephone networks like MCI, Sprint, etc., but then again, I occasionally have some problems even with my "industry-standard" modem over those same lines.

Q: My terminal program says it works at 1200 Baud, but I've been having trouble with errors when I use it that fast. What's the problem?

A: The problem here may be two-fold. First, the normal RS-232 port on the CoCo was designed in such a way that the programmer must place each individual bit to be sent over the RS-232 port into a memory address, one bit at a time. That is one reason why the CoCo's RS-232 port is referred to as a "bit-banger."

When using something like the Deluxe RS-232 ROM Pak, though, the programmer merely places the whole byte in a memory address, and the UART (Universal Asynchronous Receiver Transmitter) chip in the ROM Pak takes care of the housekeeping duties. At 300 Baud, there is usually more than enough time available for the program to send and receive data over the bit-banger.

At 1200 Baud, though, the transmission is sped up four times greater than at 300 Baud, and that's just a bit faster than most programs can handle perfectly.

One solution that many programs use

(Wayne Day, a traffic engineering technician for the city of Fort Worth, Texas, is the SYSOP of The Color SIG on CompuServe, the oldest CoCo communications service in the nation. Active in emergency medicine as a paramedic, he is also an amateur radio operator [WA5WDB].)

is to force a "half-duplex" transmission at 1200 Baud, meaning you can only be receiving or sending data at one particular point in time, not both. That's normally OK, except when you want to interrupt what's coming in on the line, or when you need to respond rather quickly to something.

None of the programs I have personally used have been able to keep up with data at 1200 Baud reliably time after time when using the RS-232 port on the computer. The key here is "reliably." If you can afford an occasional error in your data, using 1200 Baud with the normal CoCo RS-232 port may be OK.

As more and more terminal programs that take advantage of the RS-232 ROM Pak become available, that problem will go away.

Q: I'm looking for a program like the guy used in the movie *War Games* to find BBS systems in my town (or county or area code or continent). Have you got one you'll share?

A: Nope. I've got a problem with auto-dialing programs such as that for two reasons.

First off, those programs seem to be used quite a bit at night, and even though your computer might not be bothered by a telephone that's answered by a human, I guarantee it doesn't work the same way around! Imagine what you would feel like if you were awakened at 2 a.m. by someone looking for a BBS system at random?

Secondly, BBSs aren't the only systems in the world that have dial-up terminals. And some of those dial-up numbers are definite no-no's, unless you're specifically authorized for them. Getting in and "hacking" at a dial-up is one of the things that has soiled the nickname of "hacker," and that's something I won't contribute to.

And More Questions

Many of the questions were about CompuServe and *The Color SIG* in particular:

Q: My bills on CompuServe are way too much, and now someone is trying to tell me I can save money by using 1200 Baud. How is that possible when 300 Baud costs $6.25 at night and 1200 Baud costs $12.75?

A: Budgeting your time on CompuServe means budgeting your money, and it's easy to let either one get out of hand. If you are doing a lot of downloading or reading of messages on CompuServe, using 1200 Baud can be a money-saver for you, for with data coming at you four times faster than at 300 Baud, CompuServe charges you just a little bit over twice the normal rate.

If, on the other hand, you're sitting in the Conference mode chatting with other folks, 1200 Baud doesn't make any sense from a cost-effective standpoint.

What I recommend, if you have the capabilities, is to read the messages into a buffer at 1200 Baud, look at them and reply to them offline, then come back on at 1200 Baud to do your downloading, if you know what you want from the data libraries. Then use 300 Baud for exploring new areas on CIS, playing the online games and chatting in CB or Conference on the SIGs.

Q: I live in Canada and access CompuServe through Datapac, a Canadian telecommunications network. The CompuServe 'B' Protocol in *VIDTEX* doesn't work, and neither does *XMODEM*. What gives?

A: Datapac uses some of the same control characters that both CompuServe 'B' and *XMODEM* use, only for different purposes.

Without reconfiguring your Datapac line, it's not possible to successfully use either one, and so far, we've been successful in modifying Datapac for the CIS 'B' protocol only (see *DATAPK.TXT* in the DL4 database on CCSIG). This modification is not an "official" one, meaning that CompuServe's Customer Service office won't be able to help you if it doesn't work right the first time, but many folks have been able to use it successfully.

If any of our Canadian readers are aware of any method to get *XMODEM* working on Datapac, please let me know!

An alternative to consider, especially since Datapac charges are pretty hefty to begin with, would be to call one of the CompuServe nodes on the southern side of the border. Check with your local telephone company to see whether you might come out ahead doing that, and kill two birds with one stone.

Q: Will the RS-232 ROM Pak work on CompuServe?

A: Yes, it will — sort of. You can use the terminal functions on the Deluxe ROM Pak just as you can on any other information service and the print online functions work the same way.

As far as downloading, there's no way to use the RS-232 ROM Pak to download ASCII text files or machine language programs from CompuServe, since the program inside the ROM Pak assumes you're talking with another CoCo using the same software.

You can "fool" the ROM Pak into letting you download an ASCII BASIC program by going into the "Receive BASIC program" mode and letting the remote source dump the program to you. Then, when the "OK" prompt comes back, get back into BASIC where you have to save the program to tape immediately. After that, it's just a matter of re-EXECing the ROM Pak and continuing where you left off.

Q: What about *Color COMPAC*? Can I download with it?

A: The word I get from Tandy Customer Services is that due to a problem with the program itself, there's no way to get *COMPAC* to download anything from CIS. If anyone has been able to either patch *COMPAC*, or figure out how to get it to download something, again, please let me know.

Colorful Questions

One of the bigger hits at the Irvine RAINBOWfest was the introduction of *CoCo Max*, a new *Mac-Paint* clone of a graphics utility, which brought up another question heard frequently: "How can I put up a *CoCo Max* screen on my BBS where other folks can see it?"

The problem is that a full-sized *CoCo Max* screen is exactly twice the size of a "normal" CoCo graphics screen. It's like stacking one screen on top of another screen in one file.

Well, one of the creators of *PIXCMP.BAS* (or *PIXCMP.CC*), Art Flexser, who compressed a CoCo graphics screen into a BASIC program that can be uploaded to any BBS or CompuServe, has struck again; *MAXCMP.BAS* (or *MAXCMP.CC* on CompuServe) is the result.

Consider the problem: A *CoCo Max* screen is composed of binary data, residing (on a disk system) from address $E00 to a possible high address of $3DFF (that's decimal locations 3584 to 15871). For the CoCo user who doesn't have the capability of doing a protocol type transfer (i.e., *XMODEM*, DFT, CompuServe 'B,' etc.), the file must be converted into some form of ASCII data before he can upload or download it. *MAXCMP.BAS* looks at

the data and converts the data into ASCII strings that, along with the on-board re-conversion routine, is written to disk as a stand-alone ASCII carrier for that binary data.

But, how do you look at the complete file, if a screen is twice the size of a normal CoCo screen? *MAXCMP.BAS* is smart! It looks at the file, and if it's too large to be viewed in one sitting, it "beeps" at you, alerting you to the fact that you can now use the up- and down-arrow keys to scroll through the picture to your heart's content.

Here are the detailed instructions.

1) Create the graphics screen (using almost any graphics utility that writes a screen to disk, with a starting address for the screen of $E00 — that includes *Graphicom*, *CoCo Max* and others).
2) `LOAD"MAXCMP.BAS"`
3) `RUN`
4) Give *MAXCMP* the filename of the screen you want to compress. *MAXCMP* assumes a default extension of /MAX, but you can override that easily by specifying another extension.
5) *MAXCMP* then loads the screen into memory and compresses it into ASCII data.
6) Give *MAXCMP* the filename of the new BASIC program you want to save. This is the program you'll actually upload to the BBS.
7) *MAXCMP* then writes the new BASIC program to disk in ASCII using the filename you gave it, and when it's done, you've got a BASIC program ready for uploading to your favorite BBS!

If your BBS needs a little "lift," get the folks started sharing those graphics pictures! It may be just the thing you need!

Of This 'n' That

One of the neater things about calling BBS systems around the country is seeing the specialization that occurs due to local factors. One of the more popular specializations I've seen in quite a while is evident on the BBS operated by Speech Systems in Batavia, Ill.

Their BBS, at (312) 879-6811, is chock full of music files that make the CoCo sound like a full-blown orchestra! Though they sell a music system for the CoCo, you don't have to be one of their customers to call and download music from the BBS, and thus, this BBS rates my "Must Call Award" for this month!

In April, we mentioned that Mike Randazzo of New Orleans has made available a couple of public domain terminal programs for the CoCo running under OS-9. Well, this month, we're quite pleased to relay that Mike, in between changing diapers for a new son, has also made available an *XMODEM* terminal program for the CoCo, and it too runs under OS-9. It's written entirely in BASIC09 and works quite well!

XMODEM.B09 runs at 300 Baud only and requires the use of the RS-232 ROM Pak as the /T1 device on your OS-9 system. You can download *XMODEM.B09* from Mike's Chalmette BBS at (504) 277-6926.

With this series of public domain programs, and the commercial terminal programs for OS-9 that have been appearing lately, it's good to see more and more OS-9 activity on the BBSs!

For those of you who have been looking for a public domain BBS system, Richard Duncan of West

Memphis, Ark., may have the answer for you with his *COBBS* package. *COBBS* has been released into the public domain and the complete set of files can be downloaded from *The Color SIG* in the DL4 data library. See *COBBS.CAT* in DL4 for a list of the needed files and documentation. Richard is also making the package available outside of CompuServe, and you can make arrangements with him through COBBS #1 at (501) 735-5614.

Wrapping it up

Effective immediately, I can no longer be reached through MCI Mail, so please scratch that address from the list.

I may, however, be reached through TBBS Fort Worth at (817) 232-2087, through CompuServe (ID= 76703,376), or: Wayne Day, P.O. Box 79074, Fort Worth, TX 76179-0074. Please enclose a SASE if you desire a direct response.

New Listings

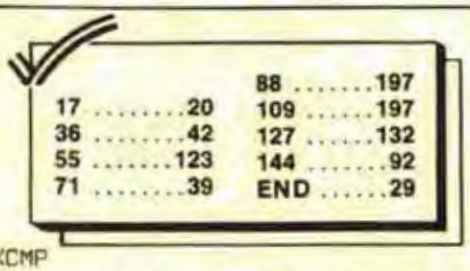
A/C	Phone	BBS Name	Location	Remarks
201	637-6286	Colorama of NW Jersey	<unknown>, NJ	
201	773-8265*	Meadowlands BBS	Meadow Park, NJ	
201	928-0949	Great American Coco	Jackson, NJ	
207	596-0556	Maine-Frame	Rockland, ME	evenings/weekends
305	731-6097	ComTech	Ft. Lauderdale, FL	HQ SYS
504	277-6926	Chalmette BBS	Chalmette, LA	OS9 Interest
602	344-8070*	Cactus Patch	Yuma, AZ	
614	475-0047	CocoNet Colorama	Gahanna, OH	
615	822-3752*	Fast Times	Hendersonville, TN	
619	368-3478	Inner Connection	<unknown>, CA	
619	437-1130	The Monitor	Coronado, CA	
707	538-7100	Archive BBS	Santa Rosa, CA	
714	534-5174*	Orange Co Color America	Huntington Beach, CA	
805	656-3746	Ventura BBS	Ventura, CA	
817	232-2087	TBBS Fort Worth	Fort Worth, TX	
818	996-1977	TRS-80 Country	Inglewood, CA	
919	425-7139	Color 80 #82	Fayettville, NC	

Deletions

408	984-XXXX	Rainbow #5	San Jose, CA	Now Offline
619	474-8981	JARB / Coco Sig	San Diego, CA	Now Offline

Changes

201	827-7815	PeopleLinks	Ogdensburg, NJ	now Sussex County BBS
213	244-XXXX	Fantasy Plaza	Burbank, CA	new number (818) 840-8252



The listing: MAXCMP

```
1 ' * * * M A X C O M P * * * '
2 '
3 'THIS PROGRAM TAKES A FILE SAV
ED FROM A HI-RES GRAPHICS
4 'SCREEN AND CREATES FROM IT A
RUNNABLE BASIC PROGRAM,
5 'SUITABLE FOR BBS UPLOADING, T
HAT RECREATES THE PICTURE FROM
6 'A COMPRESSED ASCII FORMAT AND
 SAVES THE BINARY OUTPUT TO
7 'DISK OR TAPE, ACCORDING TO WH
ETHER OR NOT A DISK CONTROLLER
8 'IS PRESENT.  MAXCOMP REQUIRES
 64K, DISK OR CASSETTE.
9 '
1Ø 'MAXCOMP IS AN ENHANCED VERSI
ON OF PIXCOMP, BY MIKE WARD
11 'AND ART FLEXSER, WHICH HAS H
AD ITS CAPABILITIES EXTENDED TO
12 'ALLOW USE WITH FILES SUCH AS
 THOSE CREATED BY COCO MAX,
13 'WHICH MAY BE EITHER ONE OR T
WO PMODE 4 GRAPHICS SCREENS IN
14 'LENGTH.  WHEN A PROGRAM CREA
TED BY MAXCOMP IS RUN, A BEEP
15 'WILL SOUND AFTER THE PICTURE
 IS CREATED IF THE PICTURE IS
16 'LARGER THAN CAN BE DISPLAYED
 ON THE SCREEN.  THE BEEP
17 'INDICATES THAT THE UP AND DO
WN ARROW KEYS MAY BE USED TO
18 'SCROLL THE PICTURE UP AND DO
```

```
WN TO VIEW IT IN ITS ENTIRETY.
19 'PRESSING THE 'S' KEY WILL CA
USE A PROMPT FOR A FILENAME TO
2Ø 'SAVE THE PICTURE FILE IN BIN
ARY FORMAT, SUITABLE FOR
21 'LOADING INTO A GRAPHICS UTIL
ITY.
22 '
23 'ART FLEXSER, MIAMI, MARCH 19
85
24 FORI=&HEØØ TO&HE16:READ P$:PO
KE I,VAL("&H"+P$):NEXT
25 EXEC&HEØØ:POKE&H9692,19
26 DATA 1A,5Ø,8E,8Ø,Ø,B7,FF,DE,E
C,84,B7,FF,DF,ED,81,8C,DF,FF
27 DATA 25,F1,1C,AF,39
28 GOTO3Ø
29 GOTO31
3Ø PCLEAR11:GOTO29
31 CLEAR8ØØ,&H7AØØ:FORI=&HEØØ TO
&HE16:READ X$:NEXT:GOTO35
32 C$=CHR$(34):GOTO34
33 C$=" "
34 N=N+1:L$=MID$(STR$(N),2)+C$+A
$:PRINT#U,L$:PRINT L$:RETURN
35 CLS:A$=CHR$(232):S$=STRING$(2
3,232):PRINT@67,S$:PRINT@199,S$
36 FORI=ØTO2:PRINT@1ØØ+33*I,A$TA
B(26+I)A$:NEXT
37 PRINT@138,"M A X C O M P";:PR
INT@265,"BINARY TO ASCII"
38 PRINT@296,"PICTURE COMPRESSOR
":PRINT@392,"ARTHUR J. FLEXSER"
39 PRINT@431,"AND":PRINT@457,"MI
CHAEL D. WARD"
4Ø IFPEEK(&HCØØØ)=68THENS=&HEØØ:
D=1:U=1 ELSE S=&H6ØØ:U=-1
41 FOR X=&H7AØØ TO &H7A5D
42 READ H$:POKE X,VAL("&H"+H$):N
EXT
43 DATA BD,B3,ED,C3,Ø,3,ED,8C,58
,1A,5Ø,7F,FF,DF,8E,8Ø,Ø,1Ø,AE
44 DATA 8D,5,E6,86,8,A7,8C,44,86
,6,A7,8C,3E,6F,8C,3D,A6,8Ø,5F
45 DATA 48,59,6A,8C,33,27,16,6A,
8C,2F,26,F4,86,8,A7,8C,28,A6,8Ø
46 DATA AC,8C,25,25,E8,63,8C,1F,
2Ø,E3,CB,3Ø,E7,AØ,C6,6,E7,8C,12
47 DATA 5F,6D,8C,1Ø,27,DB,31,3F,
1F,2Ø,7F,FF,DE,1C,AF,7E,B4,F4
48 FOR X=&H7BØØ TO &H7C5D
49 READ H$:POKE X,VAL("&H"+H$):N
EXT
5Ø DATA EC,8D,4,FA,C3,Ø,1,ED,8D,
1,55,83,Ø,2Ø,ED,8D,1,5Ø
51 DATA 83,Ø,2Ø,ED,8D,1,4B,EC,8D
,4,E1,A3,8D,4,DB,83,Ø,21
52 DATA 43,53,ED,8D,1,Ø,ED,8D,1,
B,CB,2Ø,ED,8D,1,14,1A,5Ø
53 DATA 7F,FF,DF,8E,Ø,Ø,4F,5F,31
,8D,1,24,AF,A1,A7,AØ,4C,5A
54 DATA 26,F8,AE,8D,4,AE,31,8D,1
,14,86,3,E6,8Ø,3D,34,2Ø,31
55 DATA AB,EE,A4,33,41,EF,A4,35,
2Ø,AC,8D,Ø,F9,25,E9,31,8D,Ø
56 DATA F9,C6,FF,AE,A4,A6,22,AC,
23,25,4,AE,23,A6,25,31,23,5A
57 DATA 26,F3,B7,8Ø,Ø,6F,8D,Ø,D8
,AE,8D,4,71,1Ø,8E,8Ø,1,A6
58 DATA 84,17,Ø,8A,17,Ø,B4,27,12
,B1,8Ø,Ø,26,9,F6,8Ø,Ø,E7
59 DATA AØ,C6,1,E7,AØ,A7,A4,2Ø,6
9,A1,84,26,52,34,2,17,Ø,79
6Ø DATA A1,E4,35,2,26,47,34,2,17
,Ø,7D,A1,E4,35,2,26,3C,C6
61 DATA 1,E7,8D,Ø,93,C6,FF,A1,84
,26,12,6C,8D,Ø,89,17,Ø,46
62 DATA 17,Ø,7Ø,26,15,E1,8D,Ø,7D
,22,EA,F6,8Ø,Ø,E7,AØ,E6,8D
63 DATA Ø,72,E7,AØ,A7,AØ,2Ø,9D,F
6,8Ø,Ø,E7,AØ,E6,8D,Ø,63,E7
64 DATA AØ,A7,A4,2Ø,13,B1,8Ø,Ø,2
6,9,F6,8Ø,Ø,E7,AØ,C6,1,E7
65 DATA AØ,A7,AØ,16,FF,7B,7F,FF,
DE,1C,AF,1F,2Ø,7E,B4,F4,AC,8D
66 DATA Ø,4Ø,24,4,3Ø,88,2Ø,39,3Ø
,89,E8,21,39,AC,8D,Ø,31,24
67 DATA 4,A6,88,2Ø,39,A6,89,E8,2
1,39,AC,8D,Ø,24,24,4,A6,88
68 DATA 4Ø,39,A6,89,E8,41,39,6D,
8D,Ø,1Ø,26,C,AC,8D,3,A9,26
69 DATA 4,6C,8D,Ø,4,1A,4,39
7Ø DEFUSRØ=&H7BØØ:DEFUSR1=&H7AØØ
71 CLS:PRINT@64,"FILE NAME OF PI
CTURE":IF D THEN E$="/MAX"
72 '/MAX IN ABOVE LINE CAN BE CH
ANGED TO /BIN IF PREFERRED
73 IF D THENPRINT@128,"(DEFAULT
EXTENSION IS ";E$;")":PRINT@85
74 LINEINPUT"TO COMPRESS: ";F$:I
F D THEN Y$="/BAS":GOSUB159
75 IF D AND F$="" THEN 71
76 PMODE4,5:PCLS1:PMODE4,1:PCLS1
:SCREEN1,1
77 IFD THEN LOADM G$ ELSE CLOADM
 F$:GOTO8Ø
78 OPEN "D",1,G$,3:GET #1,1:CLOS
E 1
79 L=256*PEEK(&H98A)+PEEK(&H98B)
:GOTO81
8Ø L=256*PEEK(&H7E)+PEEK(&H7F)-&
H6ØØ
81 NS=INT((L-1)/6144)+1:L=6144*N
S
82 GS=S/256:GE=GS+&H18*NS-1
83 POKE&H7FFC,GS:POKE&H7FFD,Ø:PO
```

```
KE&H7FFE,GE:POKE&H7FFF,&HFF
84 E=USRØ(Ø):E2=USR1(E):IF E<Ø T
HEN E=E+65536
85 PRINT:PRINTUSING"#####";L;:PR
INT" BYTES ORIGINALLY"
86 PRINTUSING"#####";E-&H8ØØØ+1;
87 PRINT" BYTES AFTER COMPRESSIO
N"
88 PRINTUSING"#####";E2-S;:PRINT
" BYTES CONVERTED TO ASCII"
89 PRINT:PRINT@32Ø,"FILENAME FOR
 ASCII PICTURE"
9Ø IF F$<>""THEN PRINT"OR <ENTER
> TO USE: "TAB(8)F$+Y$+DN$
91 PRINTSTRING$(17,"=");"> ";:LI
NEINPUT G$
92 IFG$=""THENG$=F$+Y$+DN$:IF F$
=""THEN89
93 IF D THEN E$="/BAS":F$=G$:GOS
UB 159
94 PRINT:PRINT"SAVING ";G$:PRINT
95 OPEN "O",#U,G$
96 IF NS<>1 THEN LN$="28" ELSE L
N$="24"
97 AD=S:EC=59:A$="CLS:CLEAR2ØØ,&
H7FØØ:GOTO"+LN$:GOSUB33
98 IF NS=1 THEN 1Ø2
99 A$="PRINT"+CHR$(34)+"USE UP A
ND DOWN ARROW TO SCROLL"
1ØØ A$=A$+CHR$(34)+":PRINT"+CHR$
(34)+"THE SCREEN."+CHR$(34)
1Ø1 GOSUB 33
1Ø2 A$="PRINT:PRINT"+CHR$(34)+"H
IT 'S' TO SAVE PICTURE AS A"
1Ø3 A$=A$+CHR$(34)+":PRINT"+CHR$
(34)+"BINARY FILE"+CHR$(34)
1Ø4 GOSUB33:A$="S=6:E=&H"+HEX$(G
E-8*D)+":IF PEEK"
1Ø5 A$=A$+"(&HCØØØ)=&H44 THEN D=
1:S=S+8:E=E+8":GOSUB33
1Ø6 A$="POKE&H7FFC,S:POKE&H7FFD,
Ø:POKE&H7FFE,E:POKE&H7FFF,&HFF"
1Ø7 IF NS<>1 THEN A$=A$+":V=S"
1Ø8 GOSUB 33:A$="FORI=&H7FØØ TO&
H7FB7:READ H$:POKE I,VAL("
1Ø9 A$=A$+CHR$(34)+"&H"+CHR$(34)
+"+H$):NEXT"
11Ø IF NS<>1 THEN A$=A$+":U=S+24
"
111 GOSUB 33
112 A$="DATA EC,8D,Ø,FA,83,Ø,1F,
ED,8D,Ø,AF,A3,8D,Ø,ED,43,5Ø,5C"
113 GOSUB33:A$="DATA ED,8D,Ø,8E,
1A,5Ø,7F,FF,DF,9E,33,3Ø,6,1Ø,"
114 A$=A$+"8E,8Ø,Ø,86":GOSUB33:A
$="DATA 8,A7,8C,3A,86,6,A7,8C"
```

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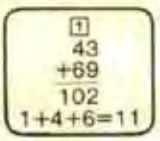

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```
115 A$=A$+",34,A6,8Ø,8Ø,3Ø,48,48
,48,59,6A":GOSUB33:A$="DATA "
116 A$=A$+"8C,29,27,E,6A,8C,25,2
6,F4,E7,AØ,C6,8,E7,8C,1C,2Ø,EB"
117 GOSUB33:A$="DATA 86,6,A7,8C,
14,A6,8Ø,26,A,A6,4,81,22,26,C"
118 A$=A$+",3Ø,5,A6":GOSUB33:A$=
"DATA 8Ø,8Ø,3Ø,48,48,2Ø,D9,Ø,"
119 A$=A$+"Ø,8E,8Ø,Ø,1Ø,AE,8D,Ø,
91,A6":GOSUB33:A$="DATA 8Ø,A7"
12Ø A$=A$+",8C,48,6F,8C,46,A6,8Ø
,A1,8C,4Ø,26,F,E6,8Ø,A6,8Ø,A7"
121 GOSUB33:A$="DATA A4,8D,15,8D
,23,5A,26,F7,2Ø,4,A7,A4,8D,A,"
122 A$=A$+"8D,18,27,E2,7F":GOSUB
33:A$="DATA FF,DE,1C,AF,39,1Ø"
123 A$=A$+",AC,8D,Ø,1E,24,4,31,A
8,2Ø,39,31,A9,E8":GOSUB33
124 A$="DATA 21,39,6D,8C,F,26,B,
1Ø,AC,8C,4E,26,3,6C,8C,4,1A,4,"
125 A$=A$+"39":GOSUB33
126 A$="PMODE4:PCLS1:SCREEN1,1:R
EADZ:EXEC&H7FØØ:CLS"
127 IF NS<>1 THEN A$=A$+":SOUND
2ØØ,1"
128 GOSUB33
129 IF NS=1 THEN X$="<>251 THEN
17" ELSE X$="=251 THEN 22"
13Ø A$="P=PEEK(&H155):IF P"+X$:G
OSUB33
131 IF NS=1 THEN 135
132 A$="IF P=247 THEN V=V+1:IF V
>U THEN V=U":GOSUB33
133 A$="IF PEEK(&H156)=247 THEN
V=V-1:IF V<S THEN V=S":GOSUB 33
134 A$="POKE&HBA,V:SCREEN1:Y$=IN
KEY$:GOTO18":GOSUB 33
135 A$="IFD THEN PRINT@64,"+CHR$
(34)+"(DEFAULT EXTENSION IS "
136 A$=A$+"/MAX)"+CHR$(34)+":PRI
NT@Ø,"+CHR$(34)+CHR$(34)+";"
137 GOSUB33
138 A$="LINEINPUT"+CHR$(34)+"FIL
ENAME FOR PICTURE: "
139 A$=A$+CHR$(34)+";F$:IFF$="+C
HR$(34)+CHR$(34)+"THEN"
14Ø A$=A$+STR$(N):GOSUB33:A$="P=
INSTR(F$,"+CHR$(34)+":"
141 A$=A$+CHR$(34)+"):IFP>2 THEN
 F$=MID$(F$,P+1)+"+CHR$(34)
142 A$=A$+":"+CHR$(34)+"+LEFT$(F
$,P-1)":GOSUB33
143 A$="IFD AND INSTR(F$,"+CHR$(
34)+"/"+CHR$(34)+")=Ø AND "
144 A$=A$+"INSTR(F$,"+CHR$(34)+"
."+CHR$(34)+")=ØTHEN F$=F$+"
145 A$=A$+CHR$(34)+"/MAX"+CHR$(3
4):GOSUB33
146 A$="IFD THEN SAVEM F$,&HEØØ,
256*(E+1)-1,&HAØ27:END"
147 GOSUB33:A$="CSAVEM F$,&H6ØØ,
256*(E+1)-1,&HAØ27:END"
148 GOSUB33:A$="PCLEAR"+STR$(4*N
S)+":GOTO2":GOSUB33
149 A$="DATA1":GOSUB33
15Ø C1=INT((E2-S)/EC)
151 C2=(E2-S)-(C1*EC):N=99
152 V=VARPTR(A$):V1=V+2:V2=V+3:P
OKEV,EC
153 FOR I=1 TO C1
154 GOSUB157:AD=AD+EC:NEXT:IFC2=
ØTHEN156
155 POKEV,C2:GOSUB157
156 CLOSE:PCLEAR4:CLEAR2ØØ,&H7FF
F:END
157 MS=INT(AD/256):LS=AD-256*MS:
POKEV1,MS:POKEV2,LS:GOSUB32
158 RETURN
159 P=INSTR(2,F$,":"):IF P=Ø THE
N 162
16Ø IF P=2 THEN DN$=":"+LEFT$(F$
,1):F$=MID$(F$,3):GOTO162
161 DN$=MID$(F$,P):F$=LEFT$(F$,P
-1)
162 P=INSTR(2,F$,"/"):IFP=Ø THEN
 P=INSTR(2,F$,".")
163 IF P<>Ø THEN E$=MID$(F$,P):F
$=LEFT$(F$,P-1)
164 G$=F$+E$+DN$:RETURN
```

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Volume I, Number 1

As a special Fourth Anniversary bonus, we've reprinted the very first issue of THE RAINBOW which was published in 1981. It consisted of only four pages (two pages front and back) and was printed on a copying machine at a neighborhood drugstore.

The premier issue of THE RAINBOW was written in a spare bedroom of Lonnie Falk's Prospect, Ky. home. It was mailed to a total of 25 persons.

Today THE RAINBOW averages close to 300 pages monthly and three boxcars of paper are required to print just one issue. Our circulation exceeds 83,000 — with subscribers in every state in the union, every country in Central and South America, every province in Canada, all seven continents, and 20 ships at sea.

THE RAINBOW, the Color Computer and the CoCo Community have made great strides since that first newsletter. However, our editorial approach has not changed. We're still providing the kind of information, tutorials and program listings which make it easy and fun for you to realize the enormous potential of your Color Computer. We're still writing THE RAINBOW just for you, as though you were our first subscriber.

We hope you enjoy reading the reprint of our very first issue. It is bound into this month's issue with a special perforated tape which makes it easy to remove from the magazine for safekeeping. It's our way of remembering where we came from and of thanking you for your continued support.

Vol. I
No. 1

the RAINBOW

5803 Timber Ridge Drive • Prospect, KY 40059

First of all, welcome to the RAINBOW!

We'd like to open things up for volume one, number one with a little background on why the RAINBOW exists and what we hope to accomplish with this newsletter. If you are anything like us, we think you'll see that this publication is well worth the small amount we'll be asking you to invest in it.

Most of us are among the first to be the proud owners of a TRS-80 COLOR Computer. And, if you are like we were, you were attracted to TRS-80 in the first place by all those great programs available for the Models I, II and III.

But, where did that leave us? Except for some programs in the manuals -- and the e-x-p-e-n-s-i-v-e ROM Packs offered by the Shack -- there just isn't a great deal out there right now. Oh, it is coming. But the wait seems long and there are a lot of things the COLOR Computer can do that its big brothers can't.

And, frankly, what software is available might be good or might be bad. I'm sure you, like I have, hear all sorts of stories about software that doesn't work, won't load, and so forth. One of the things we expect to be is YOUR representative to the software distributors. We'll be doing reviews and we'll give you the straight scoop. We feel confident that those dealers who have a good product -- and who want to reach an interested and receptive market -- will be happy to let us review their software. And, be sure, you'll get a fair and honest appraisal from the RAINBOW.

We'll also pass along programs on these pages. Those we come across ourselves, and those you may want to contribute. Don't be bashful. And don't think your program has to be a "monster" to get reproduced here. (In fact, as you'll see shortly, the program used to write the RAINBOW takes up just three lines.) So, send in your favorites and we'll share them with the world.

One most important thing. The RAINBOW is devoted to the COLOR Computer and the COLOR Computer only! While future issues will share some of the "secrets" of program conversion, you won't find anything here about any other computer. No Mod III stuff, no Apple stuff, no Atari stuff. The RAINBOW is going to be the one -- and, to our knowledge ONLY -- publication that's just for COLOR Computer owners. In other words, we think you'll find everything you you read in the RAINBOW will have a direct application to YOUR computer.

Ah, the commercial. The RAINBOW costs money to print and mail. In order to pay some of those costs, we're charging $12 a year for a subscription. We hope you'll find that reasonable and that you'll send a check by return mail. Frankly, that's pretty cheap for all the information you'll get. I hope you'll agree. Thanks a lot for listening. We look forward to hearing from you.

MUSIC MADE EASY

For those of you who like music, let us first recommend the fine article on the COLOR Computer in the latest issue of "80-Microcomputing." By far the best program there is one named "Music-Music-Music." And it is wrtten for the COLOR Computer. But one of the things it does not do is allow you to play songs as a part of any other programs you might wish to run. Its an entity (albeit a fine one) to itself.

What we were trying to do was put together a horse race program which we were going to call Derby (remember, the RAINBOW comes from Louisville). We wanted the program to play "My Old Kentucky Home" as the horses moved to the post. But, a couple of trys in decoding notes from a music book into SOUND (and PLAY) statements left a lot to be desired.

Well, the "Music Music Music" program solved that problem for us, we used it to get a really good rendition of "My Old Kentucky Home." The problem was, how to get that code into another program.

Enter "Music Made Easy!" We just wrote the following few lines, added them to their own little space on the "Music Music Music" program, loaded a data tape for the song we wanted and then "broke" the original program. That left all the notes in their array, each with the proper code for SOUND's syntax.

We then instructed the COLOR Computer to GOTO6000 (the line where the codebreaker started). The result was a printout of the proper codes for SOUND. The codebreaker is listed below:

```
6000 FOR X=0 TO 750
6010 PRINT#-2,X, P(X)"  "D(X)
6020 NEXT X
```

Here's the routine to play the music for which you have obtained the codes. As to explaination: Lines 1-5 READ in the conversion of the code obtained in the previous program and the numbers necessary to make SOUND work right. Line 10 is set to the number of notes -- which you will get from your codebreaker. Line 30 is a very important line, which converts musical "rests" into a FOR-NEXT loop. Line 40 actually plays the note. And Line 60 onward is the code from the codebreaker, all in DATA statements.

Here's the program:

```
1  DIM N(48)
2  FOR N=1 TO 48
3  READ N(N):NEXT
4  DATA  5,  19,  32,  45,  58,  69,  78,
      89,  99,  108,  117,  125,  133,  140,
      147,  153,  159,  165,  170,  176,
     180,  185,  189,  193
5  DATA  197,  200,  204,  207,  210,  213,
      216,  218,  221,  223,  225,  227,
      229,  231,  232,  234,  236,  237,
     238,  239,  241,  242,  243,  244
10 FOR X=1 TO 250:'SET TO # NOTES
20 READ P,D
30 IF  P=0  THEN FOR T=1 TO (D*5):NEXT
    GOTO50
40 SOUND N(P),D
50 NEXT X
60 DATA 17, 8, 10, 8, 12, 8, 17, 8
```

NEXT MONTH

We'll be looking at some longer programs next month, and we expect to have a line justifier and a screen printer program to talk about. We also expect to get a start on software reviews. So, take a look at our subscription blank and become an informed COLOR Computer owner! We'll be looking forward to hearing from you.

CPU SPEEDUP

Despite the stuff you may believe or have been told about the speed of the COLOR Computer's 6809E CPU, its really a Pretty swift little device. In fact, if you want to see a Radio Shack store manager's eyes boggle, just Put a COLOR Computer next to a Mod III in his store, write a short for-next loop to count the numbers from 1 to 1,000 on both machines and then run them at the same time. Can you guess which computer finishes first? Yep, old COLOR Computer!

But, there's a way to make your COLOR Computer run even faster. Just POKE 65495,0. You'll be able to see this in action right away, because the cusor will start changing colors more quickly. To get back to the "normal" speed, just POKE 65494,0.

You have to go back to normal for cassette I/O and to transmit to the printer. If you don't, you get all sorts of messy garbage. And in reference to garbage, you probably will get some on the screen (or lose control) if you let your program end while you're still in the fast format. Making your last line read: "POKE 65494,0:END" will handle that Problem just fine. Its a nice feature for all sorts of uses.

LP VII DRIVER

When you bought your LP VII, remember the disaPPointment when you discovered you really couldn't use the graPhics because COLOR Computer owners needed a driver to make a conversion of bit codes?

Well, the wait is over. Even here in Louisville, the driver is available (at Computer Centers). And the best news of all is that it is FREE for those of us who bought the LP VII. We're not going to go into the business of Patting the Shack on the back without cause, but in this case its Justified.

Also in the area of FREE stuff, if you bought VIDEOTEX, Radio Shack has arranged to give you a free hour of the Dow Jones News Service. All you have to do is ask for it!

M & N DECODED

Have you tried that little message board Program in the Extended Color Basic manual that lets you Print what sort of aPPear to be text letters on the graPhics screen?

Since you cannot mix graPhics and text on the same screen, some things can be really confusing without a label. We suggest you create a subroutine with all 26 graPhics letters and then Just execute the letters on the graPhics screen when you want to label something.

Actually, that's not what this is all about, since that seems Pretty easy to figure out. But, we were less than haPPy with the way two of the letters looked. A quick call to Ft. Worth brought the information that the customer service PeoPle at Radio Shack thought one of their Programmers was Just trying to get a bit too fancy with some of the letters.

Those letters in question are the "M" and the "W"...and they do look messy. Here's a suggestion for a way to draw them that's a little more clear:

M...D7U7F3E3D7
W...D7R1E2F2R1U7BD7

We hoPe you'll like these!

OFFICIAL STUFF

the RAINBOW
Published by FALSOFT
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Lawrence C. Falk--Editor

TRS-80, COLOR COMPUTER ARE TRADEMARKS OF TANDY CORP.

WORD PROCESSOR

One of the biggest problems in trying to put the first issue of the RAINBOW together was in finding a way to type these articles out. It seemed a shame to write a computer newsletter on a typewriter.

The RAINBOW comes to you via a Line Printer VII and, yes, there is a short program in "Going Ahead With Extended Color Basic" that will, as Radio Shack says, let you use the keyboard for a typewriter. Only one problem -- you can't make a mistake in typing because the process of disabling the printer to fix them is really time-consuming. And, after all, who doesn't make mistakes?

Enter the following program:

```
10 PRINT@416,;:LINE  INPUT"(16 spaces)
   ;A$
20 PRINT#-2,A$
30 CLS:GOTO10
```

And, you get a mini-text editor!

This program lets you enter your words without committing them to the printer buffer. In other words, if you make a mistake, just backspace and correct it. Not until you have your whole line on the screen do you send it to the printer...so all you have to do is back up and fix your mistakes. For half-columns, like this one, just change the PRINT@ to 456.

What you are doing is positioning the cursor 40 spaces from the end of the screen. When the display "jumps" up, you stop typing and hit ENTER. Or, if you are trying for justified columns like these, you count the number of spaces to the end, back up and insert those spaces, between the words, and then ENTER the line. As you can see, justified lines are a slow process. We're working on a way to justify them automatically and will have a report in the next issue of the RAINBOW.

You DO need Extended Color Basic to make this work. But, if you don't have it, the program will work with a regular INPUT. You just cannot use commas, quote marks and the like.

Try writing a letter with this as we think you'll like it. It is geared for an 80-column printer, but the logic is easy to follow if you need to adapt (for a Quick Printer II, perhaps?) Happy writing!

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THANK YOU!

Have CoCo as a guest at your next birthday party

CoCo Bakes A Cake

By John Plaxton

Birthday is a short program that draws a cake and decorates it to your specifications. You can display a name and an age, and select either red or blue flickering candles. Although designed as a birthday cake, it can be used for other festivities such as anniversaries, etc. And, it is low in calories.

Using this program, like making a cake, will involve a little work. After all, you can't buy a culinary masterpiece in a fast-food restaurant. *Birthday* needs a 16K, or larger, mixing bowl; the decorations are generated by using the ingredients PMODE3, Extended Color BASIC and the DRAW command. To generate any name you will have to be familiar with the subcommands F, R, E, D, L, U, G, H, GM(,), (M+,-,) and perhaps LINE-(,).

DRAW is an extremely powerful command (and I suspect the envy of owners of other computer systems). It is easy to use once you get the idea and try a couple of drawings. The instructions on pages 54-62 in Radio Shack's *Going Ahead With Extended BASIC* are quite clear. However, one point not covered is that sometimes if you use U, D, R, etc., and follow it by a semicolon, you will get a syntax error. I always have a number (including '1') preceding the semicolon.

Another point to consider is the width of the vertical and horizontal lines. Vertical lines tend to be about half the width of horizontal lines, therefore two vertical lines are drawn: one line up, move over one pixel, then another line of the same length down.

The generation of names is interesting because you must try to make them follow the curve of the cake. You will need to use the "M+,+" subcommand because you will have to draw lines at angles other than in 45 increments. (If you were to have a 360 degree navigational protractor, U=000°, E=045°, R=090°, F=135°, D=180°, G=225°, L=270° and H=315°.)

(John Plaxton, owner of Cancoco Software, is a mechanical engineer presently employed with the Aerospace Engineering Test Establishment. He has written several programs, the majority being educational.)

To see what I mean, RUN the program, select 4* LARRY and look at the letter 'L.' On the cake, the bottom of the 'L' is horizontal and does not appear to be resting on the surface of the cake. It should have been drawn tipped slightly downwards. To do this, the last direction in Line 1390 (R8) should be replaced by ;M+8,+3; which DRAWS a line that ends eight pixels to the right of, and three pixels down from, the beginning position. If you know the coordinates where a DRAW command ends you could use the LINE-(,) command to draw the same line. For example, you can get the same result by writing 1390 DRAW "BM84,122;U16R016":LINE-(93,124),PSET'L.

Each letter will have to be drawn individually (even if used twice in a name) because of the need to maintain perspective (or curve) of the cake. Look closely at the coding for the 'M's in MOM (lines 1550 and 1570).

The flickering candle effect is generated by continually redrawing the flame using one of two colors. Once all the candles are drawn (JJ=0), random candles and colors are chosen. Unfortunately, the flickering always occurs in a clockwise direction. To randomly choose a clockwise and counterclockwise direction, change Line 1690 to read 1690 IF RND(2)=1 THEN FOR C=3.3 to 9.58 STEP 6.28/AG ELSE FOR C=9.58 to 3.3 STEP-6.28/AG. However, because of the number of candles and their position change with the selected age, and since there are very small round-off errors in the numerical calculations, extra candles will be drawn.

The rotating plate posed an interesting problem because of the way the PAINT command works. Remove lines 2000-2010 by inserting a REM (or ') at the beginning of each line, then RUN and notice the difference. Drawing a line that allows the paint to "seep through" at the bottom of the plate gives the appearance of continuous motion.

Having described how the DRAW commands are used, I hope you will enjoy DRAWing your own names. Of course, rosettes and other decorations can be easily added. I would appreciate receiving the code for all names generated.

For those of you who have programs that synthesize four-voice music, I strongly encourage replacement of Line 1970 with appropriate code. For the same reasons you bought a CoCo, your masterfully decorated cake deserves the best.

Happy Birthday, RAINBOW!

(For anyone having questions regarding this program, you may contact Mr. Plaxton at P.O. Box 2914, Medley, Alberta, Canada T0A 2M0)

The listing: BIRTHDAY

```
Ø '*** BIRTHDAY CAKE *****
1Ø CLS(RND(9)-1):PRINT@2Ø3," BIR
THDAY ";
2Ø PRINT@46Ø," COPYRIGHT 1985 ";
3Ø PRINT@492,"cancoco software";
4Ø FOR T=Ø TO 15ØØ:NEXT T
5Ø CLS:PRINT:PRINT"WHOSE NAME WI
LL BE ON THE CAKE:  1* RAINBOW"
6Ø PRINT" 2* MOM":PRINT" 3* DAD"
7Ø PRINT" 4* LARRY"
8Ø PRINT" 5* ROBERT"
9Ø PRINT" 6* "
1ØØ PRINT" 7* "
11Ø PRINT" 8* "
12Ø PRINT" 9* "
13Ø NA$=INKEY$:IF NA$=""THEN13Ø
14Ø NA=VAL(NA$):IF NA=ØTHEN13Ø
15Ø PRINT"HOW OLD IS THE BIRTHDA
Y KID";:INPUT AG
16Ø IF AG>99 THEN15Ø
17Ø IF AG<2 THEN RA=Ø ELSE IF AG
<11 THEN RA=.6 ELSE RA=1
18Ø PMODE3,1:PCLSØ:PCLS5:SCREEN1
,1:COLOR6,5
19Ø CIRCLE(128,75),84,6,.4
2ØØ LINE(44,75)-(44,125),PSET
21Ø LINE(212,75)-(212,125),PSET
22Ø CIRCLE(128,125),84,6,.4,Ø,.5
23Ø CIRCLE(128,1ØØ),84,6,.4,Ø,.5
24Ø CIRCLE(128,125),12Ø,7,.4,.89
,.64
25Ø CIRCLE(128,122),94,7,.4,.94,
.57
26Ø COLOR7,5:LINE(43,92)-(43,112
),PSET
27Ø LINE(216,93)-(216,113),PSET
28Ø ON NA GOSUB146Ø,155Ø,161Ø,13
9Ø,131Ø,6ØØ,8ØØ,1ØØØ,12ØØ
29Ø GOSUB165Ø:GOTO18ØØ
5ØØ '***
6ØØ RETURN
7ØØ '***
8ØØ RETURN
9ØØ '***
1ØØØ RETURN
11ØØ '***
12ØØ RETURN
13ØØ '*** ROBERT
131Ø DRAW"BM74,12Ø;U14E2;M+6,+2;
F2D5G2;M-8,-2;R2":DRAW"M+8,+9;"'
R
132Ø DRAW"BM92,123;BU2U1ØE2;M+6,
1;F2D1ØG2;M-6,-1;H2"'O
133Ø DRAW"BM114,126;U14R8F2D2G2L
6R6F2D4G2L6"'B
134Ø DRAW"BM134,126;U14R8L8D7R8L
8D7R8"'E
135Ø DRAW"BM154,125;U14E2;M+6,-1
;F2D5G1;M-8,+1;R3;M+7,+7;"'R
136Ø DRAW"BM179,12Ø;U14;BM-5,2;M
+1Ø,-4;"'T
137Ø RETURN
138Ø '*** LARRY
```

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- 1 or 2 Stop Bits
- All Caps if needed
- Several Printer Formats
- Trapping of incoming characters

BAUD Rates:
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- 600-9600 (printer)

Screen Format:
- 80 x 24 upper/lowercase
- Send all 128 characters from keyboard

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

- 10 Macro keys
- Automatic Capture of incoming files
- X on/X off capabilities
- Send True Line Break
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All Caps if needed
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Trapping of incoming characters

BAUD Rates:
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600-9600 (printer)

Screen Format:
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
Display Bytes Used/Remaining
Editor—Move forward and reverse thru buffer. Insert, type over, delete lines, characters or words. Block delete.

10 Macro keys
Automatic Capture of incoming files
X on / X off capabilities
Send True Line Break
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```
139Ø DRAW"BM84,122;U16RD16R8"'L
14ØØ DRAW"BM1Ø2,126;U12E4R2F4D4L
1ØR1ØD8"'A
141Ø DRAW"BM124,128;U14E2R4F2D5G
L6R":DRAW"M+7,+7;"'R
142Ø DRAW"BM144,126;U14E2R4F2D5G
L6R":DRAW"M+7,+7;"'R
143Ø DRAW"BM169,124;U1ØNH6E8"'Y
144Ø RETURN
145Ø '*** RAINBOW
146Ø DRAW"BM12Ø,128;U14;M+1Ø,+14
;U14;"'N
147Ø DRAW"BM1Ø9,127;U14;"'I
148Ø DRAW"BM141,128;U14;M+8,-1;F
2D2G2;M-8,+2;M+8,-2;F4D2G2;M-8,+
1;"'B
149Ø DRAW"BMØ88,124;U1ØE4R2F4D4;
M-1Ø,-1;M+1Ø,+1;D7;"'A
15ØØ DRAW"BM161,125;BU2U1ØE2;M+6
,-1;F2D1ØG2;M-6,+1;H2"'O
151Ø DRAW"BMØ71,118;U14;M+7,+3;F
2D4G2;M-7,-4;M+5,+4;M+4,+7;"'R
152Ø DRAW"BM178,12Ø;BU12;M+5,+12
;M+3,-1Ø;M+2,+8;M+4,-16;"'W
153Ø RETURN
154Ø '*** I LOVE YOU
155Ø DRAW"C8;BMØ98,126;U14F7E6D1
4"'M
156Ø DRAW"BM122,128;BU2U1ØE2R6F2
D1ØG2L6H2"'O
157Ø DRAW"BM144,127;U14F6E7D14"'
M
158Ø IF AG>29 AND AG<33 THEN AG=
29
159Ø RETURN
16ØØ '*** DAD
161Ø DRAW"C6;BM1ØØ,126;U14R8F2D1
ØG2L8"'D
162Ø DRAW"BM122,127;U1ØE4R2F4D4L
1ØR1ØD6"'A
163Ø DRAW"BM144,126;U14R8F2D1ØG2
L8"'D
164Ø RETURN
165Ø '*** DRAW CANDLES
166Ø IF AG=Ø THEN18ØØ
167Ø IF NA=3THEN C$="C6;U2ØFR4EH
L4GER2;XC1$;UHHUUEUEFDFDDGGL2D1;
C6;R3FD2ØGL4H"'CANDLE
168Ø IF NA<>3THEN C$="C7;U2ØFR4E
HL4GER2;XC1$;UHHUUEUEFDFDDGGL2D1
;C7;R3FD2ØGLUH"
169Ø FOR C=3.3TO9.58STEP6.28/AG
17ØØ IF JJ=3 AND RND(3)=1THEN177
Ø
171Ø X=INT(COS(C)*6Ø*RA)+128
172Ø Y=INT(SIN(C)*25*RA)+75
173Ø IF RND(4)=2THEN C1$="C7" EL
SE C1$="C8"
174Ø DRAW"BM"+STR$(X)+","+STR$(Y
)+";"+C$
175Ø IF NA=3THEN PAINT(X+3,Y-15)
,6,6:PAINT(X+3,Y-4),6,6
176Ø IF NA<>3THEN PAINT(X+5,Y-15
),7,7:PAINT(X+3,Y-4),8,7
177Ø NEXT C
178Ø JJ=3
179Ø RETURN
18ØØ '*** NUMERALS
181Ø AG$(Ø)="BU2U1ØE2R6F2D1ØG2L6
H2"
182Ø AG$(1)="R8L4U14G2"
183Ø AG$(2)="BU12E2R6F2D4G2L6G2D
4R1Ø"
184Ø AG$(3)="BU12E2R6F2D3G2L4R4F
2D3G2L6H2"
185Ø AG$(4)="BU14D7R12L4U7D14"
186Ø AG$(5)="BM+1Ø,-14;L1ØD4F2R6
F2D4G2L6H2"
187Ø AG$(6)="BM+1Ø,-12;H2L6G2D1Ø
F2R6E2U4H2L6G2"
188Ø AG$(7)="BU14R1ØDL1ØR1Ø;M-7,
+14
189Ø AG$(8)="BU2U3E2R6L6H2U3E2R6
F2D3G2F2D3G2L6H2"
19ØØ AG$(9)="BU7U5E2R6F2D4G2L6H2
F2R6E2D6G2L6H2"
191Ø '*** DRAW AGE
192Ø A1=AG:IF AG>9 THEN A1=INT(A
G/1Ø):A2=AG-A1*1Ø
193Ø IF AG<1Ø THEN DRAW"BM"+STR$
(122)+","+STR$(152)+";"+AG$(A1)
194Ø IF AG>9 THEN DRAW"BM"+STR$(
112)+","+STR$(152)+";"+AG$(A1)
195Ø IF AG>9 THEN DRAW"BM"+STR$(
132)+","+STR$(152)+";"+AG$(A2)
196Ø '*** PLAY SONG
197Ø PLAY"O2L8DDL4EDGL2F+L8DDL4E
DAL2GL8DDL4O3DO2BGF+EP8O3L8CCL4O
2BGAL2G"
198Ø 'COLOR7,5:LINE(128,158)-(12
8,17Ø),PSET
199Ø FOR JP=6TO8STEP2
2ØØØ IF RND(AG)>2*AG/3 THEN2Ø5Ø
2Ø1Ø COLOR7,5:LINE(128,158)-(128
,17Ø),PSET
2Ø2Ø PAINT(4Ø,94),JP,7
2Ø3Ø COLORJP,5
2Ø4Ø ON NA GOSUB146Ø,155Ø,161Ø,1
39Ø,131Ø,6ØØ,8ØØ,1ØØØ,12ØØ
2Ø5Ø GOSUB166Ø
2Ø6Ø NEXT JP
2Ø7Ø LP=LP+1:IF LP>2ØTHEN CLS:RU
N
2Ø8Ø IF RND(1ØØ)>85THEN197ØELSE1
99Ø
```

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A-maze-ing Maneuvering with Jetpack Challenge

By Joey Goodson

In *Jetpack Challenge* you are beamed down from your starship to planet Mazon to practice maneuvering skills with your jetpack. You are beamed down to the maze of your choice on the planet and the task is to get out of the maze as quickly as possible without hitting the sides of the maze.

When you run the program, a menu comes up giving you the choice of four mazes and a choice to change the parameters of the program. The mazes are numbered in order from one to four — from easy to hard — and are named accordingly. For example, in the teleporter maze, you fly to the teleporter at the bottom left of the screen and it teleports you to the top part of the maze.

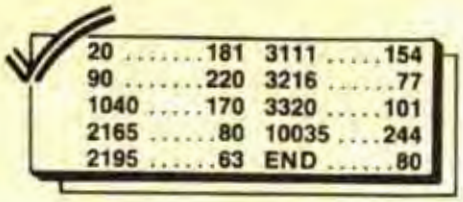
In choosing to change the parameters, you are able to change the rate of acceleration horizontally and vertically. You are also given the option to make the walls lethal (deadly) to touch or not. The program is self-explanatory and will show how to change the parameters.

To control the man, use the right joystick. Push the button to thrust upward and move the joystick right or left to go in any of those directions. If you center the joystick, there is no acceleration taking place to the left or right; therefore, if you are going in a particular direction, move your joystick in the opposite direction to slow down or to stop.

Jetpack Challenge is fun for competing against a friend to see who can get through the mazes the fastest, or just trying to beat your previous time. The program also keeps track of who has the best time on each maze.

(For those having questions about this program, Joey may be reached at 215 Wellington Dr., McDonough, GA 30253.)

(Joey Goodson is working on a degree in computer science at Clayton Junior College in Morrow, Ga. His hobbies are programming the CoCo, lifting weights, fishing, bowling and watching TV.)



20	181	3111	154
90	220	3216	77
1040	170	3320	101
2165	80	10035	244
2195	63	END	80

The listing: JETPACK

```
1 '*****************************
  *                           *
  *     JETPACK CHALLENGE     *
  *           BY              *
  *       JOEY GOODSON        *
  *                           *
  *****************************
5 FORX=1TO4:T(X)=Ø:T$(X)="MR. NO
BODY":NEXTX:M$(1)="BEGINNER'S MA
ZE":M$(2)="REGULAR MAZE":M$(3)="
TELEPORTER MAZE":M$(4)="DEATH MA
ZE"
7 'T(X)   = TIME FOR EACH MAZE***
  T$(X)   = PERSON'S NAME       ***
  M$(X)   = NAME OF EACH MAZE ***
1Ø DIM RS(1,1), LS(1,1), SB(1,1)
'DIDN'T HAVE TO DIM A LARGE
 AMOUNT OF SPACE SO (1,1) WORKS
11 'DEFAULT PARAMETERS**********
12 VX=.2:VY=.3:RG=.1:FF=Ø
15 PMODE4,1:COLOR5,Ø:PCLS:GOSUB1
ØØØ'DRAW SPACEMAN
16 GOSUB21ØØ'CHOOSE MAZE
19 'X,Y = ACTUAL COORDINATES****
    XT,YT = TEMPORARY COOR. ****
    XX,YY = INCR. OR DECR.  ****
    LEFT AND UP DECR.       ****
    XV,YV = ACCELLERATION   ****
    SS = TELLS WHICH SPACEMAN***
    PICT. TO USE (Ø-R,1-L)  ****
2Ø '***FT = FINISHED MAZE AND
GETTING MAN TO DISAPPEAR***FM =
WHETHER MAZE IS LETHAL OR NOT***
TG=TOGGLE FOR SOUND EFFECTS AT
MENU
21 SS=Ø:XT=X:YT=Y:XX=Ø:YY=Ø:XV=V
X:YV=VY:GR=RG:FT=Ø:FM=FF:TT=Ø:TG
=Ø
37 SCREEN1,1:FORP=1TO46Ø:NEXTP:G
OSUB3265
38 'MAIN PROGRAM***************
39 TIMER=Ø
```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```
4Ø IFJOYSTK(Ø)>49THENXX=XX+XV:SS
=Ø
5Ø IFJOYSTK(Ø)<14THENXX=XX-XV:SS
=1
6Ø IFPEEK(6528Ø)=126ORPEEK(6528Ø
)=254THENYY=YY+(GR-YV) ELSEYY=YY
+GR
7Ø X=X+XX:Y=Y+YY
75 IFY<ØTHENTT=TT+TIMER:GOTO1ØØ
76 IFX<9ANDMA=3THENGOSUB325Ø
8Ø PUT (XT,YT)-(XT+8,YT+12),SB,P
SET
81 IFPPOINT(X,Y)=5ORPPOINT(X+8,Y
+12)=5ORPPOINT(X+8,Y)=5ORPPOINT(
X,Y+12)=5THEN1ØØØØ
85 IFSS=ØTHENPUT(X,Y)-(X+8,Y+12)
,RS,PSETELSEPUT(X,Y)-(X+8,Y+12),
LS,PSET
9Ø XT=X:YT=Y:GOTO4Ø
91 'END MAIN PROGRAM**********
1ØØ 'FINISHED MAZE**********
1Ø5 PUT(XT,YT)-(XT+8,YT+12),SB,P
SET:X=XT:Y=Ø
1Ø6 IFSS=ØTHENPUT(X,Y)-(X+8,Y+12
),RS,PSETELSEPUT(X,Y)-(X+8,Y+12)
,LS,PSET
11Ø FT=1:FORP=1TO15Ø:NEXTP:GOSUB
3255:FORP=1TO46Ø:NEXTP:GOTO1Ø1ØØ
1ØØØ 'DRAWING SPACE MAN   ******
      RS = RIGHT SPACEMAN PICT.*
      LS = LEFT  SPACEMAN PICT.*
      SB = ERASE SPACEMAN PICT.*
                          ******
1Ø1Ø LINE(124,84)-(126,9Ø),PSET,
BF:LINE(127,85)-(13Ø,94),PSET,BF
:LINE(127,82)-(127,84),PSET:LINE
(128,82)-(131,85),PSET,B:LINE(13
1,88)-(132,88),PSET:PSET(132,87)
:LINE(131,94)-(132,94),PSET:PSET
(131,86)
1Ø3Ø LINE(118,84)-(12Ø,9Ø),PSET,
BF:LINE(114,85)-(117,94),PSET,BF
:LINE(117,82)-(117,84),PSET:LINE
(113,82)-(116,85),PSET,B:LINE(11
2,88)-(113,88),PSET:PSET(112,87)
:LINE(112,94)-(113,94),PSET:PSET
(113,86)
1Ø4Ø GET(124,82)-(132,94),RS,G
1Ø45 GET(112,82)-(12Ø,94),LS,G
1Ø5Ø GET(124,1Ø2)-(132,114),SB,G
1Ø6Ø PCLS:RETURN
21ØØ CLS:PRINT@7,"JETPACK CHALLE
NGE":PRINT:FORX=1TO4:PRINT"<";X;
"> ";M$(X):NEXTX:PRINT"< 5 > CHA
NGE PARAMETERS"
21Ø4 IFTG=1THENTG=Ø:GOTO211Ø
```


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```
21Ø5 J=RND(5):J$="O"+STR$(J):PLA
Y"T255V1"+J$
21Ø6 FORJ=1TO15:PLAY"V+ABGABG":N
EXTJ
21Ø7 FORJ=1TO15:PLAY"V-ABCDEFGAB
CDEFG":NEXTJ
211Ø PRINT:INPUT"WHICH MAZE (1-4
) OR (5)";MA:MA=INT(MA):IFMA>ØAN
DMA<6THEN2115ELSE21ØØ
2115 PRINT:PRINT"WAIT A MINUTE P
LEASE -          BEAMING DOWN TO
 MAZE."
212Ø ON MA GOSUB 3ØØØ,31ØØ,32ØØ,
33ØØ,215Ø
213Ø GOTO19
215Ø 'CHANGE PARAMETERS********
2155 TG=1:CLS:PRINT@7,"CHANGE PA
RAMETERS"
216Ø PRINT:PRINT"PARAMETERS ARE
SET AS FOLLOWING ON STARTUP OF T
HE PROGRAM******":PRINT"HORIZONT
AL THRUSTS = ";VX:PRINT"UPWARD T
HRUST = ";VY:PRINT"GRAVITY = ";R
G
2165 PRINT"FOR EASIER CONTROL TR
Y*********":PRINT"HORIZONTAL THR
USTS = .1":PRINT"UPWARD THRUST =
 .2":PRINT"GRAVITY = .1"
217Ø PRINT@365,"CHANGE"
2175 INPUT"HORIZONTAL THRUSTS TO
 - ";VX:INPUT"UPWARD THRUST TO -
 ";VY:INPUT"GRAVITY TO - ";RG
218Ø CLS:PRINT@7,"CHANGE PARAMET
ERS"
2185 PRINT:PRINT"NOW, WOULD YOU
LIKE THE WALLS OFTHE MAZE TO BE
LETHAL OR NOT.    IF LETHAL - YOU
 DIE WHEN YOU     TOUCH A WALL, I
F NON-LETHAL -    YOU GET RESET B
ACK TO YOUR       PREVIOUS POSITI
ON BEFORE YOU     TOUCHED THE WAL
L AND HAVE 5"
2186 PRINT"SECONDS ADDED TO YOUR
 TIME."
2187 PRINT"UPON STARTUP OF THE P
ROGRAM,     THE WALLS ARE SET TO
-";FF:PRINT"(Ø=LETHAL, 1=NON-LET
HAL)"
219Ø PRINT:INPUT"WOULD YOU LIKE
THE WALLS LETHAL OR NOT (Ø=YES,
1=NO)";FF:IFFF<>ØANDFF<>1THEN218
Ø
2195 CLS:PRINT@7,"PARAMETERS CHA
NGED":PRINT"PARAMETERS ARE NOW C
HANGED TO**":PRINT"HORIZONTAL TH
RUSTS = ";VX:PRINT"UPWARD THRUST
 = ";VY:PRINT"GRAVITY = ";RG:PRI
NT"WALLS = ";FF
22ØØ PRINT"TO MAKE YOUR CANGES P
ERMANENT,  CHANGE VARIABLES IN <
LINE 12>   TO YOUR CHOICE THEN S
AVE THE    PROGRAM AGAIN. THE VA
RIABLES =  VX = HORIZONTAL THRUS
TS":PRINT"VY = UPWARD THRUST":PR
INT"RG = GRAVITY":PRINT"FF = WAL
LS (LETHAL OR NOT)"
22Ø5 PRINT"PRESS <@> TO GO TO MA
IN MENU"
221Ø IFINKEY$="@"THEN21ØØELSE221
Ø
3ØØØ 'BEGINNER'S MAZE**********
3Ø1Ø DRAW"BM255,8;L4D167L87U1Ø8L
85D13R68D1Ø7L143U47R1Ø4U13L68U1Ø
7R163D1Ø8R9U117L12U4L2ØU3L25U4"
3Ø2Ø POKE178,2:PAINT(Ø,Ø),,5
3Ø3Ø X=28:Y=157
3Ø4Ø RETURN
31ØØ 'REGULAR MAZE**************
311Ø DRAW"BM16Ø,Ø;D12R8U8R36D8R3
9D64L1ØØU5L28U11L12U12L8D63L32U1
6L24U67L11D84R28D51R32U16R48U31R
68D47R23U55L96D7L27U39R27D7R12ØD
1Ø4L75U47L12D31L52D16L8ØU51L28U1
32R59D67"
3111 DRAW"R8U48R53D12R12D12R28D4
R55U15L15D7L36U7L25U4L3U5L4U15L8
U2L9U2L7U3L12U1L8U1L4U2L4U1"
312Ø POKE178,2:PAINT(Ø,Ø),,5
```


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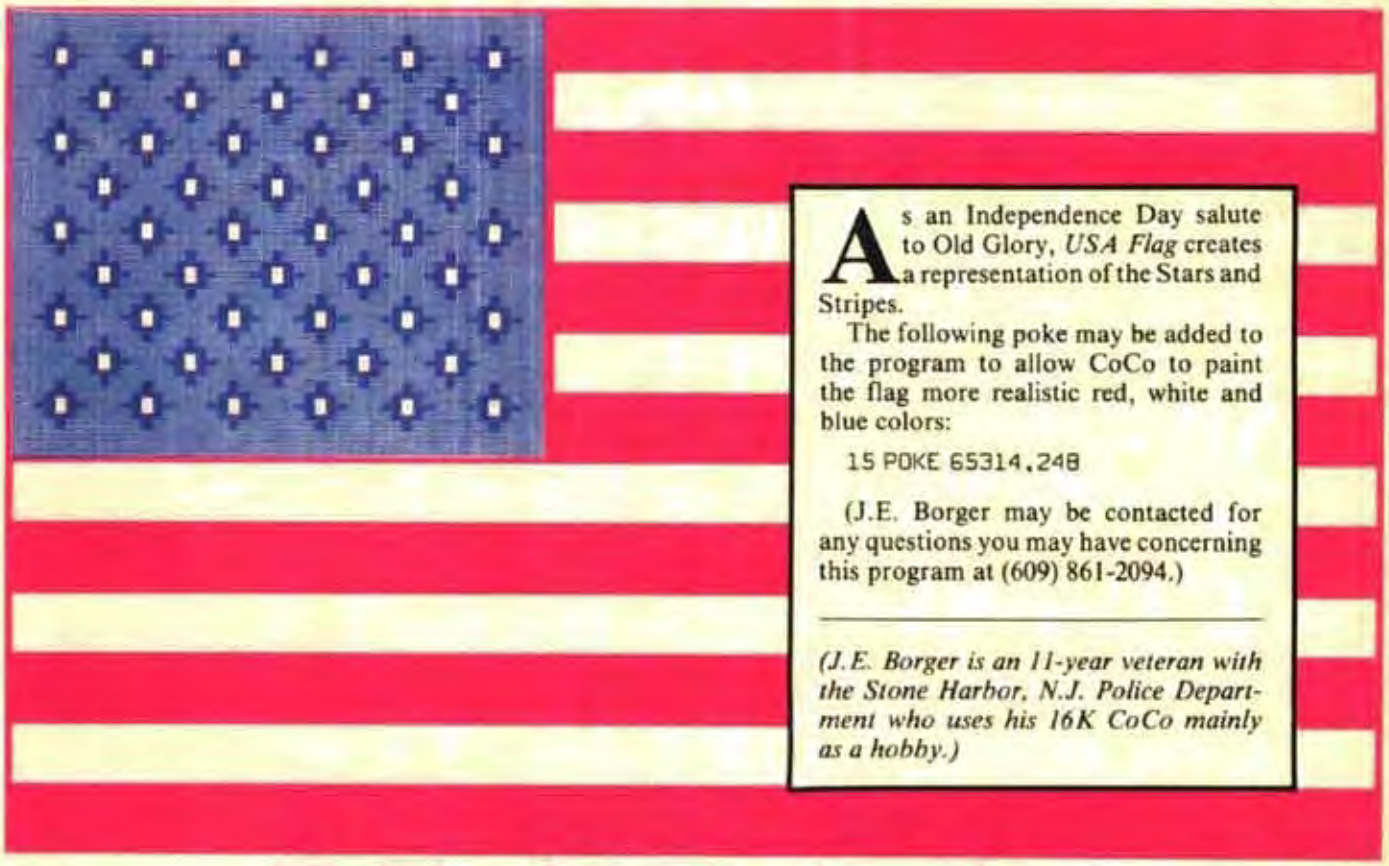
```
313Ø X=116:Y=88
314Ø RETURN
32ØØ 'TELEPORTER MAZE**********
321Ø DRAW"BM35,51;L19U47R19D24R1
9"
3211 LINE(55,28)-(167,92),PSET:L
INE(35,51)-(147,115),PSET
3212 DRAW"BM167,92;R44D27R32D64L
95U23L17D27L64U24":DRAW"BM147,11
5;R44D27R32D17L55U23L81":DRAW"BM
95,152;R8D12L8U12"
3213 LINE(19,139)-(67,163),PSET:
LINE(39,116)-(87,136),PSET
3214 DRAW"BM19,139;D8L15U39R15D8
R2Ø":DRAW"BM167,47;D8L15U39R15D8
R2Ø"
3215 LINE(187,24)-(219,36),PSET:
LINE(167,47)-(199,63),PSET
3216 DRAW"BM219,36;R12U24L15U4L2
ØU4L12U4":DRAW"BM199,63;R52U55R4
"
322Ø POKE178,2:PAINT(Ø,Ø),,5:PAI
NT(1ØØ,156),,5
323Ø X=22:Y=12
324Ø RETURN
325Ø 'TELEPORTING**************
3252 XX=Ø:YY=Ø:PUT(XT,YT)-(XT+8,
YT+12),SB,PSET
3254 PUT(X,Y)-(X+8,Y+12),LS,PSET
3255 'DISAPPEARING*************
3256 FORP=12TO1STEP-1
3258 PUT(X,Y)-(X+8,Y+12),SB,PSET
:IFSS=ØTHENPUT(X,Y)-(X+8,Y+P),RS
,PSETELSEPUT(X,Y)-(X+8,Y+P),LS,P
SET
3259 PLAY"T255O4V"+STR$(P*2)+"AB
CG"
326Ø NEXTP
3262 PUT(X,Y)-(X+8,Y+12),SB,PSET
3263 IFFT=1THENRETURN
3264 FORPP=1TO15Ø:NEXTPP:X=158:Y
=29:XT=X:YT=Y'FOR TELEPORTING
MAZE
3265 'APPEARING****************
3266 FORP=1TO12
3268 PUT(X,Y)-(X+8,Y+P),RS,PSET
3269 PLAY"T255O4V"+STR$(P*2)+"AB
CG"
327Ø NEXTP
3272 SS=Ø
3275 RETURN
33ØØ 'DEATH MAZE***************
331Ø DRAW"BM255,13;L4D35L23D12R2
3D127L52U56L36U36L8D41R24D31R12D
2ØL119U68L38U56R23U27L12D2ØL19D6
8R39D63L59U35R31D15R8U23L39U12ØR
12D12R12U28R51D48R21D24L5D59R32D
28R36U11L27U32L18U13L12U52R8U31R
77D2ØL12D63R4ØD48R8U55L43U44R27U
33"
332Ø DRAW"R21U14L73U2L7U3L5U2L3U
2L3U2L5U2"
333Ø DRAW"BM7Ø,99;R1ØU14L1ØD14;B
M134,95;R8U19R21U28L21D19L8D27"
334Ø POKE178,2:PAINT(1,1),,5:PAI
NT(71,98),,5:PAINT(152,6Ø),,5
335Ø X=14:Y=16Ø'START COOR.S
336Ø RETURN
1ØØØØ 'KILLED
1ØØ1Ø IFFM=1THENX=XT:Y=YT:XX=Ø:Y
Y=Ø:TT=TT+3ØØ:PLAY"T255O3V15AAAA
AAAAAA":GOTO85
1ØØ15 IFSS=ØTHENPUT(X,Y)-(X+8,Y+
12),RS,PSETELSEPUT(X,Y)-(X+8,Y+1
2),LS,PSET
1ØØ2Ø PLAY"T255O1V3Ø":FORP=1TO3Ø
:PLAY"V-AAA":NEXTP
1ØØ25 FT=1:FORP=1TO15Ø:NEXTP:GOS
UB3255
1ØØ3Ø CLS:PRINT"SORRY, YOU DIDN'
T MAKE IT       THROUGH THE ";M$
(MA);".":PRINT"YOUR FUNERAL WILL
 BE HELD       TOMORROW. I HOPE
YOU CAN MAKE   IT."
1ØØ35 FORP=1TO46Ø*8:NEXTP:GOTO1Ø
14Ø
1Ø1ØØ CLS:PRINT"CONGRADULATIONS!
 YOU MADE IT OUTOF THE ";M$(MA);
"!"
1Ø11Ø PRINT"IT TOOK YOU "INT(TT/
36ØØ)"MIN"INT(TT/6Ø)-INT(TT/36ØØ
)*6Ø"SEC"
1Ø13Ø IFT(MA)=ØORTT<T(MA) THENT(
MA)=TT:GOTO1Ø134ELSEFORPP=1TO46Ø
*5:NEXTPP:GOTO1Ø14Ø
1Ø134 PLAY"T255V1"
1Ø135 FORP=1TO15:PLAY"V"+STR$(P*
2)+"O2CDEFGABO3CDEFGABO4DEFGABO5
CDEFGAB":NEXTP
1Ø137 INPUT"YOU COMPLETED THE MA
ZE IN THE   LEAST TIME. WHAT IS
YOUR NAME   CHAMPION";T$(MA)
1Ø14Ø CLS:PRINT@7,"JETPACK CHAMP
IONS":PRINT
1Ø16Ø FORP=1TO4
1Ø17Ø PRINTM$(P);" -"
1Ø18Ø PRINTT$(P),INT(T(P)/36ØØ);
"MIN";INT(T(P)/6Ø)-INT(T(P)/36ØØ
)*6Ø"SEC"
1Ø19Ø IFP=4THEN1Ø2ØØELSEPRINT
1Ø2ØØ NEXTP
1Ø2Ø5 PLAY"T255O1V3Ø":FORP=1TO3Ø
:PLAY"V-CDEFGAB":NEXTP
1Ø21Ø PRINT:PRINT"PRESS <@> TO P
LAY AGAIN."
1Ø22Ø IFINKEY$="@"THENCOLOR5,Ø:P
CLS:GOTO16ELSE1Ø22Ø
```

CoCo Unfurls Old Glory

By J.E. Borger III



As an Independence Day salute to Old Glory, *USA Flag* creates a representation of the Stars and Stripes.

The following poke may be added to the program to allow CoCo to paint the flag more realistic red, white and blue colors:

```
15 POKE 65314,248
```

(J.E. Borger may be contacted for any questions you may have concerning this program at (609) 861-2094.)

(J.E. Borger is an 11-year veteran with the Stone Harbor, N.J. Police Department who uses his 16K CoCo mainly as a hobby.)

Sample Printout

RAINBOWfest℠

Oct. 11-13

Princeton

The location and dates of our next RAINBOWfest have been changed so you'll want to update your calendar. Instead of New Brunswick, we'll be returning to Princeton, N.J., Oct. 11-13, for our fall show. It's going to be the best RAINBOWfest ever, and we hope you will join us.

Where but at **RAINBOWfest** could you meet so many CoCo enthusiasts, see so many new products, and attend seminars that are of immediate assistance? It's the next best thing to receiving the latest issue of THE RAINBOW in your mailbox.

Many of the people who write for THE RAINBOW — and those who are written about — will be there to meet you and answer your questions, technical and otherwise. **RAINBOWfest** is CoCo's very own show, and it's a people-to-people event as well as a valuable learning experience.

To make it easier for you to attend, we schedule **RAINBOWfest** in three parts of the country. If you missed the fun in Irvine, Calif., and Chicago, why don't you make plans now to be with us in Princeton? Each show is unique, offering fun, new acquaintances, and great sharing experiences. For members of the family who don't share your affinity for CoCo, you'll be comfortable knowing that each **RAINBOWfest** is located in an area that will provide fun and enjoyment for all.

The Hyatt Regency offers special rates ($65, single or double room) for **RAINBOWfest**. The show opens Friday evening with a 7 p.m. to 10 p.m. session. It's a daytime-only show Saturday — the CoCo Community Breakfast is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and

runs continuously until 6 p.m. There will be no exhibition hours or seminars Saturday evening. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

A well-known speaker will again keynote the highly popular CoCo Community Breakfast. You can divide your time between viewing exhibits and attending a number of seminar sessions on all aspects of CoCo — from improving your BASIC skills to working with the OS-9 system.

But most of all, there will be exhibitors. Lots of them. All ready to demonstrate products of every kind. It's a time for unveiling brand new products. Many have special buys for **RAINBOWfest**. If you've been eyeing something in THE RAINBOW, you can try it out and take it home that very day.

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

Come to **RAINBOWfest**. Let's all celebrate the CoCo Community!

RAINBOWfest — Princeton, N.J.
Dates: October 11-13, 1985
Hotel: Hyatt Regency, Princeton
Rooms: $65 per night, single or double
Advance Ticket Deadline: October 4, 1985

Show Schedule:
Friday evening — Exhibit hall open from 7 p.m. to 10 p.m.
Saturday — CoCo Community Breakfast at 8 a.m.
Exhibit Hall opens at 10 a.m. and closes at 6 p.m.
Sunday — Exhibit Hall open from 11 a.m. to 4 p.m.

FREE Rainbow poster for first 500 ticket orders received.

FREE T-Shirt to first five ticket orders received from each state.

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Prospect, KY 40059
(502) 228-4492

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Please send me:

_____ Three day tickets at $9 each — total _____
_____ One day tickets at $7 each — total _____
Circle one: Friday / Saturday / Sunday
_____ Saturday breakfast tickets at $12 each — total _____
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TOTAL ENCLOSED (U.S. FUNDS ONLY, PLEASE) $ _____

☐ Also send me a hotel reservation card.

NAME *(please print)* _____
STREET & NUMBER _____
CITY & STATE _____
TELEPHONE _____ ZIP CODE _____
COMPANY _____

Orders received less than two weeks prior to show opening will be held for you at the door.

VISA, MasterCard, American Express accepted.
My Account # _____ Ex. Date: _____

Signature _____

The listing: USA FLAG

```
240 .....74
550 .....201
850 .....109
1150 .....61
END .....113
```

```
1 'FLAG/USA
2 'J.E. BORGER
3 'BOX 52
4 'S. DENNIS, N.J.
5 '08245
10 PMODE 3:PCLS:SCREEN 1,0
20 FOR X=1 TO 255
30 Y=1
40 PSET (X,Y)
50 NEXT X
60 FOR Y=1 TO 156
70 X=255
80 PSET (X,Y)
90 X=1
100 NEXT Y
110 FOR X=255 TO 1STEP-1
120 Y=156
130 PSET (X,Y)
140 NEXT X
150  FOR Y=156TO 1STEP-1
160 X=1
170 PSET (X,Y)
180 NEXT Y
190 FOR X=1 TO 100
200 Y=84
210 PSET (X,Y)
220 NEXT X
230 FOR Y=84TO 1 STEP -1
240 X=100
250 PSET (X,Y)
260 NEXT Y
270 CIRCLE (10,10),5
280 CIRCLE (26,10),5
290 CIRCLE  (42,10),5
300 CIRCLE (58,10),5
310 CIRCLE (74,10),5
320 CIRCLE(90,10),5
330 CIRCLE (18,18),5
340 CIRCLE (34,18),5
350 CIRCLE (50,18),5
360 CIRCLE(66,18),5
370 CIRCLE(82,18),5
380 CIRCLE(10,26),5
390 CIRCLE(26,26),5
400 CIRCLE(42,26),5
410 CIRCLE(58,26),5
420 CIRCLE(74,26),5
430 CIRCLE(90,26),5
440 CIRCLE(18,34),5
450 CIRCLE(34,34),5
460 CIRCLE(50,34),5
```


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COLORBURST™

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```
47Ø CIRCLE(66,34),5
48Ø CIRCLE(82,34),5
49Ø CIRCLE(1Ø,42),5
5ØØ CIRCLE (26,42),5
51Ø CIRCLE(42,42),5
52Ø CIRCLE(58,42),5
53Ø CIRCLE (74,42),5
54Ø CIRCLE(9Ø,42),5
55Ø CIRCLE(18,5Ø),5
56Ø CIRCLE (34,5Ø),5
57Ø CIRCLE(5Ø,5Ø),5
58Ø CIRCLE(66,5Ø),5
59Ø CIRCLE(82,5Ø),5
6ØØ CIRCLE (1Ø,58),5
61Ø CIRCLE(26,58),5
62Ø CIRCLE(42,58),5
63Ø CIRCLE(58,58),5
64Ø CIRCLE(74,58),5
65Ø CIRCLE(9Ø,58),5
66Ø CIRCLE(18,66),5
67Ø CIRCLE(34,66),5
68Ø CIRCLE(5Ø,66),5
69Ø CIRCLE(66,66),5
7ØØ CIRCLE(82,66),5
71Ø CIRCLE(1Ø,74),5
72Ø CIRCLE(26,74),5
73Ø CIRCLE(42,74),5
74Ø CIRCLE(58,74),5
75Ø CIRCLE (74,74),5
76Ø CIRCLE(9Ø,74),5
77Ø FOR X=1ØØ TO 255
78Ø Y=12
79Ø PSET (X,Y)
8ØØ NEXT X
81Ø FOR X=1ØØTO 255
82Ø Y=24
83Ø PSET(X,Y)
84Ø NEXT X
85Ø FOR X=1ØØ TO 255
86Ø Y=36
87Ø PSET (X,Y)
88Ø NEXT X
89Ø FOR X=1ØØTO 255
9ØØ Y=48
91Ø PSET(X,Y)
92Ø NEXT X
93Ø FOR X=1ØØ TO 255
94Ø Y=6Ø
95Ø PSET(X,Y)
96Ø NEXT X
97Ø FOR X=1ØØ TO 255
98Ø Y=72
99Ø PSET(X,Y)
1ØØØ NEXT X
1Ø1Ø FOR X=1ØØ TO 255
1Ø2Ø Y=84
1Ø3Ø PSET(X,Y)
1Ø4Ø NEXT X
1Ø5Ø FOR X=1 TO 255
1Ø6Ø Y=96
1Ø7Ø PSET(X,Y)
1Ø8Ø NEXT X
1Ø9Ø FOR X=1 TO 255
11ØØ Y=1Ø8
111Ø PSET(X,Y)
112Ø NEXT X
113Ø FOR X=1 TO 255
114Ø Y=12Ø
115Ø PSET (X,Y)
116Ø NEXT X
117Ø FOR X= 1 TO 255
118Ø Y=132
119Ø PSET (X,Y)
12ØØ NEXT X
121Ø FOR X=1 TO 255
122Ø Y=144
123Ø PSET(X,Y)
124Ø NEXT X
125Ø FOR X=1 TO 255
126Ø Y=156
127Ø PSET(X,Y)
128Ø NEXT X
129Ø PAINT(5,5),3,4
13ØØ PAINT (25Ø,5),4,4
131Ø PAINT(25Ø,18),2,4
132Ø PAINT (25Ø,32),4,4
133Ø PAINT(25Ø,42),2,4
134Ø PAINT (25Ø,54),4,4
135Ø PAINT(25Ø,66),2,4
136Ø PAINT (25Ø,78),4,4
137Ø PAINT (25Ø,9Ø),2,4
138Ø PAINT (25Ø,1Ø2),4,4
139Ø PAINT(25Ø,114),2,4
14ØØ PAINT(25Ø,126),4,4
141Ø PAINT(25Ø,138),2,4
142Ø PAINT(25Ø,15Ø),4,4
143Ø DRAW"BM 5Ø,16ØD3ØR3ØU3ØL1ØD
2ØL1ØU2ØL1Ø
144Ø DRAW "BM 1ØØ,16ØR3ØD5L15D5R
15D2ØL3ØU5R15U5L15U2Ø
145Ø DRAW"BM 15Ø,16ØR3ØD3ØL1ØU Ø8
L1ØDØ8L1ØU3Ø"
146Ø DRAW"BM16Ø,17ØR1ØDØ8L1ØUØ8"
147Ø PAINT(52,162),4,4
148Ø PAINT (1Ø2,162),2,4
149Ø PAINT (152,162),3,4
15ØØ GOTO 15ØØ
```


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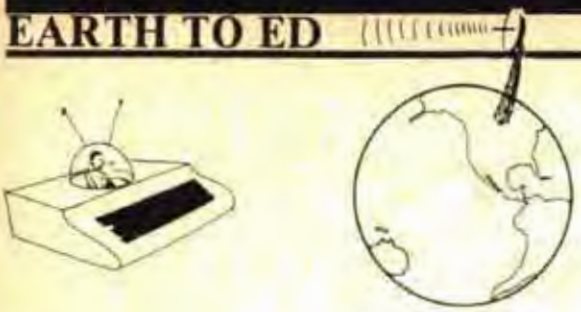

All Choked Up

By Ed Ellers
Rainbow Technical Writer

• *I am having trouble with my Radio Shack Speech/Sound Pak or with my program. The program opens a text data file and "speaks" each line in the file. The problem is that after it speaks for a while (several lines or so) the Speech/Sound Pak stops speaking, but my program keeps running. When it quits I have to break the program; the Pak won't talk again until I reset the system and re-run the program. The program works great on short files, but on the long ones it always quits at the same place. It causes no error messages and does not stop the program. Is there something wrong with my program, or my Speech/Sound Pak?*

Harris Bockhoven
Fort Dodge, IA

I ran across the same problem with the Speech/Sound Pak when I tried it out. What's happening is that the cartridge can take only so much data at a time; when the computer feeds in more before the cartridge has handled what it has, it "chokes." The solution is to put a delay loop in your programs that pauses for a few seconds after each chunk of text. The delay time and the amount of text will have to be determined by trial and error. This won't really slow down the program, because the Speech/Sound Pak (like anything — or anybody) takes time to pronounce the words.

RAM Resistance

• *I upgraded my 'E' board CoCo to 64K by making the wiring changes as published in THE RAINBOW and other CoCo magazines. The only thing that I was unable to do was solder together the two pins next to C44, as there is already a resistor there. I have* Telewriter-64, *and cannot get it to work in its 64K mode. Radio Shack's* Diagnostics *pack indicates that the machine works properly with 32K (whether the jumper is set to HI or LO). The machine has worked flawlessly both before adding the upgrade and as a 32K machine.*

Michael D. Spring
Armada, MI

Since the machine works fine using both banks, your 64K RAM chips should be good. If that resistor you mentioned is soldered across the two pins, just solder across the pins anyway. You might also recheck your wiring on and to the bent-up pins of U11 and U29; this logic lets you switch between 32K and 64K modes. I don't think that the *Diagnostics* cartridge tests the 64K mode, as it was introduced before Radio Shack started supporting the 64K mode.

IC Information and Counterrevolution

• *All has gone well for some years with my 'D' board CoCo, which was upgraded to 32K by Radio Shack in 1981, until recently when I upgraded to 64K based on your tutorial in the May 1984 RAINBOW.*

The chips that Radio Shack used in the modification were Motorola MC8148s, and on examination I found that they were, in fact, 64K RAMs, but I could find no one who had even heard of them. What exactly are they: half-good or all-good? They do work with the 64K addressing modification in your article, but I'm still not sure that I'm getting everything out of my CoCo that I should.

Also, I knew that I wanted MC4164s for my upgrade, but when I got to the store all they had were MC4264s. What are the differences?

Now to change the subject, do you feel that using a double-sided diskette (with a second set of holes punched in it) in a single-sided drive would do any damage to the diskette because of the change of rotation of the disk in the jacket?

James K. Knight
Marysville, WA

The number 8148 is probably the year and week (1981, 48th week of the year) that the chip was made; this is a standard procedure. MCM6665 is a special part number used by Motorola on 64K RAMs made for Tandy, so the chips you have should have this number on them. Electronics manufacturers often refer to industry-standard parts such as transistors and integrated circuits only by their own part numbers; this is so that you'll use only their parts when servicing the equipment rather than going to another source. MC4264, on the other hand, is Micron Technology's own number for what most folks call a 4164; the actual chip may or may not be the same as someone else's, but it is fully compatible.

As for the double-sided "flippy" disks, there's a big difference of opinion on the subject. Some say that the change in rotation can cause dust to come off the jacket's inner liner; others (including Apple, which has released several programs that way, and Tandy, whose new *Trivia Fever* package comes on a "flippy") don't seem to have any objections. If you try it, I'd recommend using double-sided rated diskettes so that the second side is known to be good.

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

ASCII Stop-and-Go

• *Why is it that the recorder is turned off and on every few seconds when saving or loading a program in ASCII format? It seems so inefficient in terms of time, tape switches, motor life, etc.*

Paul Clough
Sulphur Springs, AR

The CoCo stores a BASIC program internally in "tokenized" form, meaning that each command or function name is stored as a one-byte code. When the CoCo converts a program line from ASCII to tokenized form (whether loading a program, keying it in or after editing a line) the process takes a little time. (Notice how long the computer takes to turn the cursor back on when you press ENTER at the end of a really long line.) Because of this and other reasons, an ASCII cassette file consists of short blocks of text, each with its own leader (the short data burst you hear before a file on a tape) and blank space.

Piggyback Revisited

• *I have a 'D' board CoCo which I modified to 32K using the piggyback method. Even though* PRINT MEM *says that over 27K is available, a diagnostic program shows only the regular 16K RAM.* Disk Color SCRIPSIT *shows a garbled screen when in editing mode. I removed the piggybacked chips, and* SCRIPSIT *works fine in 16K. Could I upgrade to 64K, or should this problem be resolved first?*

Ed Gilmore
Moxee, WA

This problem will be resolved when you upgrade to 64K. What's happening with *SCRIPSIT* is that it has located the Hi-Res screen it uses in the high end of the 32K RAM space it sees. Unfortunately, the piggyback mod doesn't provide for video: the 6847 video generator, in place of the graphics image in the upper 16K, is getting whatever happens to be in the same area in the *lower* 16K directly beneath it; hence, the garbage. 64K chips are plentiful and not too expensive these days, and piggyback mods seem to be more trouble than they're worth.

What Does INPUT Have Against Commas, Quotes and Colons?

• *In a program I've written that uses the* INPUT *command to input alphanumeric characters, entering either a comma (,) or a colon (:) causes a message saying "?* EXTRA IGNORED." *When quotes are entered, in some cases the message appears and in others the quotes are ignored completely. I would appreciate any help you can give.*

Jerome W. Scanlon, Jr.
San Antonio, TX

The INPUT command uses the comma and the colon as delimiters. For example, you could have a statement like this:

```
INPUT MAKE$,MODEL$,TYPE$
```

If you entered 'PLYMOUTH, RELIANT, CONVERTIBLE' in response, this would assign values to all three variables in one line on the screen. (If you entered only one or two items at the prompt you would then get a ?? prompt asking for the remaining items.) If an INPUT statement is asking for only one response and you enter something with a comma or colon in it, that is interpreted as meaning that two items have been input; the extra items are ignored, and the message appears.

The quote mark (") is used to mark the start and end points of a string, just as it is in a PRINT or other statement. The advantage is that you can then have colons, commas and leading spaces (which are usually ignored) within the string and the INPUT statement will accept them.

Do Not Pass GOTO

• *A program I saw recently in THE RAINBOW had a line ending with . . .* GOTO 15 ELSE GOTO 15. *I can't see the logic of this.*

Dortha Murray
Grand Rapids, MI

The statement might make more sense described like this:

IF the condition exists, THEN do one thing and the other ELSE just do the other thing.

The programmer is making sure that the program jumps to Line 15 regardless of whether or not the condition exists. (Putting GOTO 15 in the next line would do this as well.)

About Telex

• *I have an interest and use for a program to send and receive telex. What kind of code is used for telex? What equipment is needed, and is there a terminal program for telex?*

Ed Deutsch

The easiest way to send and receive telex [tel(etypewriter) + ex (change)] messages using a personal computer is by means of systems like Western Union's EasyLink; RCA, ITT and at least one other telex carrier have similar systems. You dial into the carrier's computer system, using a normal terminal program and a standard modem, and leave messages to be sent over telex lines and/or pick up messages that came in from telex users and are held in the system for you. MCI Mail and Dow Jones News/Retrieval users can use MCI Mail to send telex messages as well, and telex users can send messages to any MCI Mail ID. Check with the services you want to use for details.

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PIPELINE

ROBOT DOG — All the employees at a company in Clearwater, Fla., howled in unison recently when Skip Webb brought "Spike," his robot dog, in for a tour of the plant.

Equipped with a 64K Color Computer 2 which includes expansion hardware available from Skip's part-time business, Electronic Motion Control, Spike is powered by two motorcycle batteries and rolls on three wheels. The robot dog also is equipped with a sonic ranger that enables it to sense walls, doorways and people.

A phonetic speech synthesizer allows Spike to deliver 100 or more different messages in a completely random way, a characteristic that is a little unnerving to some of the humans it encounters.

When connected to a computer monitor, Spike flashes a "Hello!" on the screen and then displays a menu, making it possible for Webb to enter commands.

With the help of a joystick, Spike can be programmed to roll in specified patterns. Webb plans to retrofit a mechanical arm next on Spike so the robot dog can retrieve beer from the refrigerator — just like the canine in the Stroh's TV commercial.

"I won't have to worry about Spike drinking the beer," says Webb, "because he hates the stuff."

* * *

FLORIDA SUGAR — Sugar Software is moving its operations from Reynoldsburg, Ohio to Hollywood, Fla. The relocation should be complete by early July.

Meanwhile, Susan Davis says, "We will do our best to continue filling all orders within 24 hours of receipt."

During the actual move, customers may call the company's old Reynoldsburg telephone number for a message giving the new number. The new mailing address is 1710 North 50th Avenue, Hollywood, FL 33021.

* * *

WHAT'S IN A NAME? — D. Dean Rector of NEXUS reports that orders sent to the company's old address in Nashville were not forwarded by the postal service to his new Midland, Texas location.

Dean regrets the inconvenience and suggests that customers try again, at his new address: P.O. Box 8303, Midland, TX 79708.

* * *

SCHOOL DAYS — The new Educational Computer Software Catalog from Learning Arts contains a variety of high resolution programs for the Color Computer.

The collection includes reading, grammar, mathematics, geography, history, biology and other programs. Various levels are available for first-graders through eighth-graders. Teachers' guides also are provided. Write to P.O. Box 179, Wichita, KS 67201.

* * *

GO FORTH — Free FORTH Interest Group (FIG) membership is now available to authors of FORTH-related articles. To qualify, just have an article published which is at least one page long in a non-FORTH publication.

Membership in the organization, which is devoted to the FORTH computer language, includes a subscription to *FORTH Dimensions*, a bi-monthly publication. FIG also provides an online database, a job registry, a selection of FORTH literature, group health and life insurance, and other services.

For a copy of the author recognition guidelines, write to P.O. Box 8231, San Jose, CA 95155.

* * *

CHURCH NEWS — Analysis and review of the week's most important religious news is now available every Saturday on NewsNet, a distributor of electronic newsletters.

Summaries of the week's events often focus on important angles and perspectives not clearly revealed by other media.

It's an extension of a daily service offered by ChurchNews International on NewsNet, intended to help religious professionals and others — such as reporters and legislators — involved with religious and social activities. For additional details, call (toll free): 1-800-345-1301.

* * *

THE NUMBER IS . . . — More than 1,000 publicly available bulletin boards from all but two of the 50 states are included in Plumbline, a new directory from *PLUMB*, the newsletter about personal telecommunications.

A special feature of the book is a large number of "hard-to-locate" bulletin boards. Special interests include equipment exchanges, free software, adult information services and tips for solving Adventure games.

Each entry contains a brief description of the bulletin board, the computer it runs on, and its primary area of interest. Write to *PLUMB*, P.O. Box 300, Harrods Creek, KY 40027.

* * *

THE FINE PRINT — A new service makes it possible for employees to access their benefit and savings plan information through interactive computer terminals.

SHOWCASE, which is a service provided by Metropolitan Life Insurance, makes it possible to review general features of benefit plans or to obtain specific information about individual benefits. It also enables employees to create financial scenarios or forecasts to help them select appropriate plan options.

The service is especially helpful with "cafeteria" plans in which employees build their own benefits package from a list of available coverages. An employee can review the options and project the cost of various combinations.

Housed in kiosks that can be placed in a company's lunchroom or other high-use area, the terminal provides easy access to information which can be updated daily to highlight recent changes in laws and tax implications.

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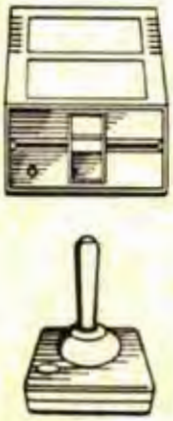

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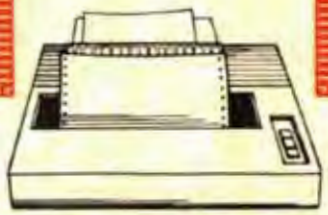

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This program reverses CoCo's background so it's easier to look at

The Eye Saver

By Norman Wong

Do your eyes ache after spending several hours using your CoCo? Well, mine did, and as a result I wrote *Eye Saver*.

Eye Saver alters the way the CoCo shows text. Instead of dark characters on a bright background, the CoCo will use light characters on a dark background.

To use the program, first type it in and save it — do not run the program until you have saved it! Any typing errors may cause the computer to "hang" and require you to turn the computer off and on in order to regain control. In doing so, of course, you will lose the program.

Having saved a copy of the program, you may now run it. To obtain the best results, you may have to adjust the contrast and brightness controls of your television set or monitor. The only time the green background will reappear is if you CLOAD or SKIPF, but this is only temporary and can be remedied by using the CLEAR key on the keyboard.

Eye Saver will allow you to spend more time on your CoCo.

(Norman Wong enjoys computer programming and wrote Eye Saver *during his last year of high school. He is currently studying at the University of Waterloo, Ontario for his bachelor's degree in mathematics.)*

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To help celebrate Spectrum Projects Fourth year in supporting the CoCo, we are offering a truly unbelievable once in a lifetime deal! Buy any software from our 2 page "Colorful Utilities" ad* and get a set of (8) 64K CoCo chips for only $14.95! Offer is limited to one set per customer and expires 08/10/85. Order now as quantities are limited! Sorry, no rainchecks! (*Or CoCo Max)

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- Use w/video digitizer
- 256x192 joystick input
- By COLORWARE

Requires Multi-Pak or Y-Cable

64K DISK $69.95 Y-CABLE $29.95

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⊕⊕⊕ COLORFUL UTILITIES ⊕⊕⊕

COCO CHECKER *

Something possibly wrong with your CoCo??? CoCo CHECKER is the answer!! Will test your ROMs, RAMs, Disk Drives & Controller, Printer, Keyboard, Cassette, Joysticks, Sound, PIAs, VDG, Internal Clock Speed, and more!! 16K TAPE/DISK **$19.95** (See Jan '85 Rainbow Review)

MULTI-PAK CRAK

Save ROMPAKs to your 64K Disk system using the RS Multi-Pak Interface. Eliminate constant plugging in of ROMPAKs now by keeping all your PAK software on disk. Includes POKEs for "PROBLEM" ROMPAKs. (Megabug, Micro Painter, Stellar Lifeline, etc..) DISK **$24.95**

TAPE 'N IMAGE

Easily handles programs with auto loaders, no headers, no EOF markers, unusual size blocks and more! Now is the time to get your tape software collection protected ... against loss!!! TAPE **$24.95**

SPIT 'N IMAGE

A super upgrade from Disk Omni Clone! Back everything up! This amazing program handles "non standard" disks with ease. We haven't found any disk yet that it can't handle. Don't ever be caught without a backup again! Lowest price too! Beats most "copy protection" programs! 32K DISK **$29.95**

COCO SCREEN DUMP

The best screen dump program for the Epson & Gemini printers ever! Have the option of standard or reverse images w/regular or double sized pictures. 600-9600 Baud too! A must for Graphicom and Bjork Block users. 16K TAPE/DISK **$19.95** (see Nov '84 Rainbow Review)

DISK UTILITY 2.1 *

A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename and kill file entries. Lightning fast Disk I/O for format, copy and backup. Examine contents of files, the Granule Table, plus the size, load addresses and entry points of all programs. Single command execution of both Basic and ML programs. 32K/64K Disk **$24.95** (see Oct '84 Rainbow Review)

THE OS-9 SOLUTION

NOW, a program that creates a "USER FRIENDLY" environment within OS-9! The OS-9 SOLUTION replaces 19 of the old "USER HOSTILE" commands with single keystroke, menu driven commands. No more typing in complex, long pathnames or remembering complicated syntaxes! Set all XMODE parameters at the touch of keys! Requires OS-9 Ver. 01.01.00 **$39.95** (see May '85 Rainbow pg. 254)

SPECTRUM DOS

Add 24 NEW Disk commands with 2 Hi-Res screens! Supports 40 track & Double-Sided drives, 6 ms stepping, auto disk search, error trapping & "EPROMABLE". 64K DISK ~~$49.95~~ New LOW price!! **$24.95**

SCHEMATIC DRAFTING PROCESSOR

Save time and design pro looking diagrams using a 480X540 pixel worksheet w/6 viewing windows. Over 30 electronic symbols w/10 definable symbols. Print hard copy and save to disk. 64K DISK ~~$49.95~~ New LOW price!!! **$29.95** (see Jan '84 Rainbow Review)

COLORAMA

A first-class Bulletin Board package... especially geared towards CoCo users... has an ordering section for those who want to run a mail-order business... supports Color Graphics... one nice piece of work. 64K DISK **$99.95** July '84 Rainbow. NEW! COLORAMA BBS Time Module **$59.95**

NEW! COCO CHECKBOOK

Use your CoCo to keep track of your checking and savings accounts! Printout individual personal checks! 32K/64K TAPE **$29.95** DISK **$39.95** (see April '85 Rainbow Review)

* NOW AVAILABLE BY EXPRESS ORDER AT YOUR LOCAL Radio Shack STORE -

#90-0289 COCO CHECKER - #90-0290 DISK UTILITY 2.1

ASK TO SEE THE DEMO DISK !!!

COLORFUL UTILITIES

FAST DUPE II

The fastest Disk copier ever! Will format and backup a diskette in only one pass and can make up to 4 Disk copies at once in 2 minutes! The must utility for every Disk owner. 32K/64K DISK **$19.95** (see May '84 Rainbow Review)

NEW! COCO VIDEO TITLER

Start your VCR tapes with dazzling title frames followed by professional countdown to black fade-outs! Use a title page editor with several sizes of text & background colors! 16K TAPE **$19.95**

NEW! AUT-O-START

Autostart your Basic/ML programs with impressive title screens using a mixture of text and graphics! 16K TAPE **$19.95** "Aut-O-Start is an excellent program" June '85 Rainbow Review

64K DISK UTILITY PACKAGE

Take advantage of an expanded 64K machine. Make an additional 8K of RAM available. Copy ROM cartridges to disk and create a 32K SPOOL buffer for printing. DISK **$21.95** (see July '83 Rainbow Review)

TAPE/DISK UTILITY

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

FAST TAPE

Save and load cassette files at twice the speed! Now you can run tape and printer I/O operations in the high speed mode without a locked up system or I/O ERRORS! "If you are tired of waiting for those long tapes to load, I strongly recommend that you buy this fine utility." TAPE **$21.95** July '83 Rainbow

GRAPHICOM

The ultimate CoCo graphics development tool with sophisticated editing, preview animation, telecommunications and printer support. Hi-Res graphics for only **$24.95.** W/Spectrum's Menu Foot Switch **$34.95** or W/Spectrum's Graphicom Joystick **$49.95.** 64K DISK (see April '84 Rainbow Review)

EZ BASE

A truly user friendly data base program at an affordable price. Maintain inventories, hobby collections, recipes, greeting card lists and much, much more! Hi-Res screen, up to 500 records with 15 fields, record or field search, and a Mailing Labels option. 32K DISK **$24.95** (see July '84 Rainbow Review)

BLACKJACK ROYALE

A Hi-Res graphics casino blackjack simulation and card counting tutor. Fully realistic play includes: double down, splits, surrender, insurance bets, 1-8 decks, burnt cards, shuffle frequency and more! "This fine program is a must for the CoCo Blackjack player." (Aug '83 Rainbow Review) 32K TAPE/DISK **$24.95** (also see Dec '84 Rainbow Review)

All orders plus $3.00 S/H (Foreign $5.00) – COD add $2.00 extra – NYS Residents add Sales Tax

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The Handicapper

Improve your performance at the track! These 16K programs for Thoroughbred, Harness and Greyhound racing let you rank the horses or dogs in each race quickly and easily, even if you've never handicapped before! All the information you need is readily available from the Racing form, thoroughbred or dog track program. We even provide a diagram showing you where to find it!

Thoroughbred factors include speed, distance, past performance, weight, class, jockey's record, beaten favorite and post position. Harness factors include speed, post position, driver's record, breaking tendencies, class, parked-out signs and beaten favorite. Greyhound factors include speed, past performance, maneuvering ability, favorite box, class, kennel record, beaten favorite and breaking ability.

Data entry is quick and easy. Handicap a race in minutes! Complete instructions and wagering guide tell you which races to bet and which to avoid. Thoroughbred, Harness and Greyhound Handicappers sold separately at $34.95 each on tape or disk.

Baseball Statpak!

Your Little Leaguer, manager or coach will love these Big-League stats! This package of 16K Ext. Basic programs will track your hitters, pitchers and teams, with beautiful screen displays and printouts. Batter's Scorecard keeps records of 180 hitters, including AB, hits, batting average, RBI's, home runs, walks, strikeouts and On Base Percentage. Pitcher's scorecard includes games and innings pitched, earned runs, ERA, hits, walks, strikeouts and won-lost record. Team Scorecard keeps team standings for an entire league. Lightning fast sort by any statistic for incredible reports! Whether you're involved in Little League, high school, college or company softball, Baseball Statpak will make you an instant winner! $28.95 on tape, $31.95 on disk.

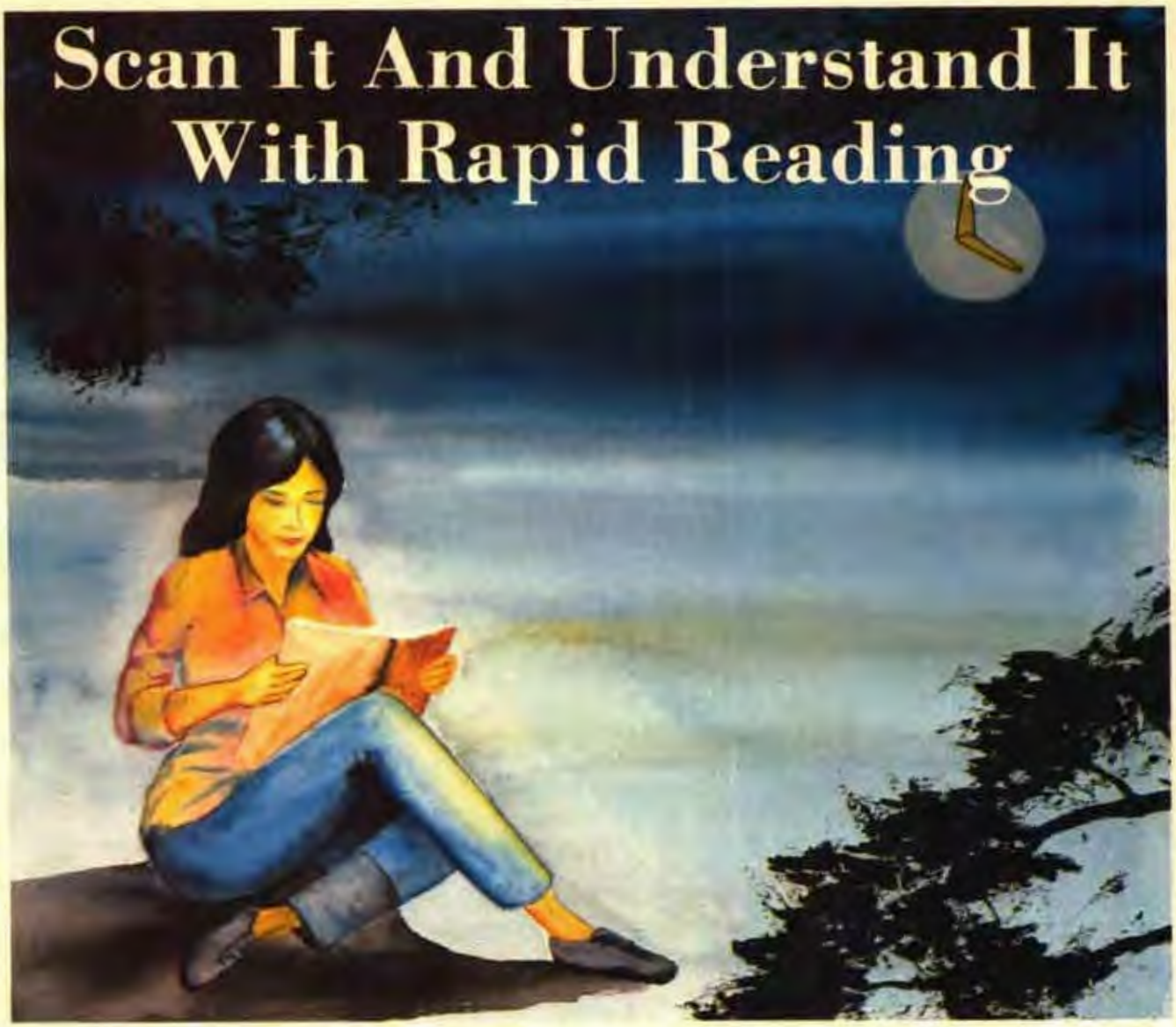
Federal Hill Software
825 William Street
Baltimore, Md. 21230
Toll Free (Orders Only) 800-245-6228
For Information Call 301-547-1447

190 250
END 18

The listing: EYESAVER

```
10 '+--------------------+
20 '!    EYE SAVER 1.0    !
30 '! (C)1984 NORMAN WONG !
40 '+--------------------+
60 CLEAR100:S=&H1DA:PRINT"NOW PO
KING ROUTINE..."
70 POKE116,PEEK(39):POKE117,PEEK
(40)' Protect any user machine
code in high memory such as the
RAINBOW CHECK
80 SM=0:READX$,K:IFX$>""THENFORA
=1TOLEN(X$)STEP2:X=VAL("&H"+MID$
(X$,A,2)):SM=SM+X:POKES,X:S=S+1:
NEXT:IFSM<>K THENPRINT"ERROR IN"
:PRINT"   DATA"X$","K:SOUND150,1
:STOPELSE80
90 EXEC&H1DA
100 DATA8623AD9FA00E88,957
110 DATAA11F260139DC7483,755
120 DATA009C3406318D00C3,599
130 DATA8E01678D40C3006E,756
140 DATA8E016A31A8118D35,677
150 DATAC300118E01A031A8,732
160 DATA118D2A352030F9F,555
170 DATA749F2730889CECE4,1118
180 DATA328434069F21308D,621
190 DATA00C23410308FF64,802
200 DATAA6808A7A0ACE425F8,1306
210 DATA32627EAD2634064A6,709
220 DATA84A7A4867EA784EC,1258
230 DATA01ED2135064ED0139,625
240 DATA0D6F266732623416,487
250 DATA9E88810D271E8108,642
260 DATA27054D2B33202180,420
270 DATA04002340862E684,644
280 DATAC160260A784A782,925
290 DATA9F88203D86208DD6,909
300 DATAD689C41F27332F4,944
310 DATA81202D2D81402508,489
320 DATA804081202502B20,563
330 DATAA7809F888C05FF23,1025
340 DATA188E04A6882A7,671
350 DATA808C05DF23F69F88,1072
360 DATA8620A7808C05FF23,896
370 DATAF935167E0ADB0D6F,803
380 DATA260A810C260634 14,305
390 DATA8D1D35147E0AEC26,653
400 DATA0C34159EA6E61FC1,863
410 DATA9E270535157E0AFD,665
420 DATA8D053515326239C6,623
430 DATA207EA92AE01F8A35,815
440 DATA,
```

Scan It And Understand It With Rapid Reading



By T.C. Taulli

Do you want to read RAINBOW magazine in half the time? Does it take you an arduous effort to finish a book? Do you want to read *War and Peace* but just don't have the time? If you answer "yes" to these questions then *Rapid Reading* is just the program for you.

The average American reads around 225-250 words per minute (WPM). This program can increase your reading rate to 600 words per minute. Just put forth a concentrated effort and you'll be reading *War and Peace* at an incredible pace.

The program uses 16K Extended Color BASIC. After running, the title screen will prompt for

---

(T.C. Taulli is the author of the game Do or Die *and is a member of Color America Users Group.)*

the WPM desired. Each sentence of the story will be printed from left to right. This makes it impossible to go back over what you've already read, which is important for high reading speeds.

While using this program try to do a couple things:

1) Increase your span of recognition by reading in phrases. Reading word for word decreases your reading speed.
2) Eradicate subvocalization by not saying the words in your mind as this is a major factor in being an average reader. Let the words go from the eye to the brain. Don't say them!

The program uses an original story called "One Amazing Program," by Thomas M. Taulli. If you want to use another story or nonfiction piece then follow these directions:

1) Delete the current story by typing DEL 430-.
2) Start at Line 430 and type DATA followed by a sentence with no more than 32 characters.
3) After entering the material, type DATA -1 as your end-of-file marker.

Now it's all up to you.

The listing: RAPDREAD

```
1Ø CLEAR5ØØ:DIMA$(2ØØ)
2Ø CLS3
3Ø FOR X=Ø TO 4:PRINT@X*32,STRIN
G$(32,149);:NEXT
4Ø PRINT@39,"<<RAPID  READING>>"
;
5Ø PRINT@1Ø8,"(C) 1985";
6Ø PRINT@73,"BY T.C. TAULLI";
7Ø PLAY"V25;T5;O2;A;B;G;E;F;E;G;
E;F;G;B"
8Ø PRINT@486,"<<<PRESS ANY KEY>>
>";
9Ø K$=INKEY$:IFK$<>""THEN11Ø
1ØØ GOTO9Ø
11Ø CLS
12Ø CLS:LINEINPUT"HOW MANY WORDS
 PER MINUTE?       (1ØØ-6ØØ WPM)
";W$
13Ø W=VAL(W$):IFW=ØORW>6ØØORW<1Ø
ØTHEN12Ø
14Ø CLS4:PRINT@267,"GET READY";:
GOSUB 32Ø
15Ø J=W:CLS4:GOSUB 35Ø
16Ø IF W=>345 THEN Z=1619Ø2/W-31
.59ELSEZ=164134/W-38.Ø4
17Ø CLS3:FOR X=1 TO 5ØØ:NEXT
18Ø FOR H2=1 TO X
19Ø J=Ø:O=Z:IFLEFT$(W$,1)="6"THE
NI=O/49ØØELSEI=O/32
2ØØ O=INT(I):U=O
21Ø PRINT@224,"":PRINT@288,""
22Ø PRINT@256,A$(H2)
23Ø FOR Y=1 TO Z STEP H
24Ø IFY>U THEN U=U+O:J=J+1:PRINT
@255+J," ";
25Ø NEXT Y
26Ø NEXT H2
27Ø CLS4:PRINT"SESSION OVER WITH
.":PRINT"WOULD YOU LIKE TO RESTA
RT THE   PROGRAM?(Y/N)"
28Ø K$=INKEY$:IFK$="Y"THENRUN
29Ø IFK$="N"THEN31Ø
3ØØ GOTO28Ø
31Ø CLS:PRINT"BYE!!!  BYE!!!":EN
D
32Ø X=1
33Ø READA$(X):IFA$(X)="-1"THEN X
=X-1:RETURN
34Ø X=X+1:GOTO33Ø
35Ø IFLEFT$(W$,1)="1"THENH=3.1
36Ø IFLEFT$(W$,1)="2"THENH=3.15
37Ø IFLEFT$(W$,1)="3"THENH=4
38Ø IFLEFT$(W$,1)="4"THENH=4.85
39Ø IFLEFT$(W$,1)="5"THENH=6.5
4ØØ IFLEFT$(W$,1)="6"THENH=8.6
41Ø RETURN
42Ø DATA"IT WASN'T A VERY BIG AD
VER-"
43Ø DATA"TISEMENT, ONLY A COUPLE
 OF"
44Ø DATA"INCHES IN LENGTH. BUT I
T CAUGHT"
45Ø DATA"MY EYE. IT SAID,'EXPAND
 YOUR"
46Ø DATA"THINKING. AMAZING PROGR
AM FOR"
47Ø DATA"YOUR HOME COMPUTER. ONL
Y $19.95"
48Ø DATA"PPD.'"
49Ø DATA"   NOW, I AM JUST AN AV
ERAGE"
5ØØ DATA"GUY. MADE IT THROUGH HI
GH SCHOOL"
51Ø DATA"WITHOUT TOO MUCH TROUBL
E. I TOOK"
52Ø DATA"A FEW CLASSES AT THE LO
CAL"
53Ø DATA"COMMUNITY COLLEGE BEFOR
E I GOT"
54Ø DATA"TIRED OF NIGHT SCHOOL.
I DO PLAN"
55Ø DATA"TO GO BACK SOMEDAY TO G
ET MY"
```

DISK $44.95

NEW

Introducing The "Super Smart"

DATA PACK II

TERMINAL COMMUNICATIONS SOFTWARE

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

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9 Unlimited Variable Length Macro Key Buffers

BUFFER EDITOR Insert, Delete Change or Add To Buffer

"FEATURES"

- No Lost Information When Using Hi-Resolution Display On Line
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- Full Text Buffering
- Terminal Baud Rates 300 to 9600
- Automatic Word Wrap Eliminates Split Words
- Full/Half Duplex
- Automatic File Capture
- Programmable Word Length, Parity and Stop Bits
- Save and Load Text Buffer and Program Key Buffers to Tape or Disk
- 9 Hi-Resolution Display Formats, 28 to 255 x 24
- True Upper/lower Case Display
- Kill Graphics Option for an Extra 6K
- Supports Line Break
- Freeze Display and Review Information On Line
- Send Files Directly from Buffer or Disk
- Full Disk Support for Disk Version
- Send Control Codes from Keyboard
- Separate Printer Baud Rates 110-9600
- Display on Screen or Output Contents of Buffer to Printer
- Automatic Memory Sense 16-64K
- 9 Programmable Function Key Variable Length Macro Buffer
- Programmable Prompt Character or Delay to Send Next Line
- Programmable Control Character Trapping
- Programmable Open/Close Buffer Characters
- Automatic Key Repeat For Editing
- Program and Memory Status Displays

NEW!!!

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ANNOUNCING

The CBASIC COMPILER

NEW!!!

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

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

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

REQUIRES 32K and Disk, 64K recommended

Introductory Price $119.00

Regularly $149.00

HI — RES II SCREEN UTILITY

NEW IMPROVED VERSION

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

- FULLY BASIC COMPATIBLE
- DISPLAY FORMATS OF 28 to 255 CHARACTERS PER LINE
- FULL 96 UPPER/LOWER CASE CHARACTERS
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Screen Enhancement Program Comparison Chart

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

VISA MasterCard

VISA, MASTERCARD AND C.O.D. ACCEPTED

```
56Ø DATA"DEGREE. REALLY!"
57Ø DATA"   LAST CHRISTMAS, MY P
ARENTS"
58Ø DATA"BOUGHT ME AN INEXPENSIV
E"
59Ø DATA"COMPUTER AT THE LOCAL E
LECTRON-"
6ØØ DATA"ICS STORE. YOU KNOW THE
 ONE."
61Ø DATA"THEY'RE THE ONES THAT S
END OUT"
62Ø DATA"AD MAILERS ALL THE TIME
. WELL,"
63Ø DATA"THE COMPUTER WAS FUN FO
R AWHILE"
64Ø DATA"IN THAT I GOT UP OVER A
 MILLION"
65Ø DATA"IN A PAC GAME. BUT HOW
MANY"
66Ø DATA"POWER PILLS CAN YOU EAT
 BEFORE"
67Ø DATA"YOU GET TERMINAL INDIGE
STION?"
68Ø DATA"THAT'S WHY THE AD FOR T
HE"
69Ø DATA"PROGRAM LOOKED GOOD. I
ALSO MADE"
7ØØ DATA"SURE MY PARENTS KNEW I
WAS SEND-"
71Ø DATA"ING FOR A NEW PROGRAM.
NEVER"
72Ø DATA"HURTS TO LET THEM KNOW
I'M USING"
73Ø DATA"THE THINGS THEY BUY ME.
"
74Ø DATA"   WHEN THE PACKAGE FIN
ALLY CAME"
75Ø DATA"IN THE MAIL, I THREW IT
 INTO MY"
76Ø DATA"DESK AS MY FRIEND, JEFF
, AND I"
77Ø DATA"WERE GOING BOWLING. ABO
UT A WEEK"
78Ø DATA"LATER, I WAS LOOKING FO
R A"
79Ø DATA"PENCIL AND I SAW THE PA
CKAGE."
8ØØ DATA"SINCE NOTHING WAS ON TV
, I TOOK"
81Ø DATA"OUT THE CASSETTE AND PU
T IT INTO"
82Ø DATA"THE CASSETTE RECORDER O
F MY COM-"
83Ø DATA"PUTER. I TURNED IT ON A
ND LOADED"
84Ø DATA"IT IN. THE ONE-PAGE INS
TRUCTIONS"
85Ø DATA"SAID TO USE EARPHONES W
HEN USING"
86Ø DATA"THE PROGRAM. I PLUGGED
MINE INTO"
87Ø DATA"THE TV MONITOR."
88Ø DATA"   THE INSTRUCTIONS SAI
D THAT"
89Ø DATA"SINCE PEOPLE ARE ALWAYS
 THINKING"
9ØØ DATA"AND THAT OUR BRAINS ARE
 LIKE"
91Ø DATA"COMPUTERS, THE BEST WAY
 TO THINK"
92Ø DATA"BETTER IS TO USE YOUR C
OMPUTER"
93Ø DATA"AS A BRAIN HELPER. A BI
NARY"
94Ø DATA"BRAIN. THE COMPUTER COU
LD HELP"
95Ø DATA"YOU THINK ON TWO TO EIG
HT"
96Ø DATA"DIFFERENT TOPICS AT A T
IME. WHEN"
97Ø DATA"I READ THAT, I JUST KNE
W THAT I"
98Ø DATA"HAD THROWN AWAY $19.95"
99Ø DATA"   I REACHED TO TURN OF
F THE"
1ØØØ DATA"COMPUTER, AND I KNEW I
 WAS IN"
1Ø1Ø DATA"TROUBLE."
1Ø2Ø DATA"   MY HAND WOULDN'T MO
VE!
1Ø3Ø DATA"   I TRIED AGAIN. MY H
AND BEGAN"
1Ø4Ø DATA"TO MOVE SLUGGISHLY OFF
 THE KEY-"
1Ø5Ø DATA"BOARD. I WATCHED WITH
A GROWING"
1Ø6Ø DATA"SENSE OF PANIC AS MY H
AND MOVED"
1Ø7Ø DATA"IN SLOW MOTION TO THE
REAR OF"
1Ø8Ø DATA"THE COMPUTER. FINALLY,
 MY INDEX"
1Ø9Ø DATA"FINGER REACHED THE ON/
OFF BUTTON"
11ØØ DATA"AND PRESSED DOWN. I EX
PLODED OFF"
111Ø DATA"MY CHAIR, THREW OFF TH
E HEAD-"
112Ø DATA"PHONES, AND I RACED OU
T THE BACK"
113Ø DATA"DOOR. I WAS OUT OF BRE
ATH WHEN"
114Ø DATA"I SCREECHED TO A HALT
IN FRONT"
115Ø DATA"OF THE BACKFENCE."
116Ø DATA"   I GASPED FOR BREATH
```

```
 FROM MY"
117Ø DATA"RUN. I JUST COULDN'T B
ELIEVE IT!"
118Ø DATA"WHAT HAD HAPPENED? I L
OOKED AT"
119Ø DATA"THE YARD. NOTHING WAS
OUT OF THE"
12ØØ DATA"ORDINARY. I COULD HEAR
 JEFF'S"
121Ø DATA"DOG BARKING DOWN THE B
LOCK. THE"
122Ø DATA"GRASS STILL NEEDED MOW
ING."
123Ø DATA"   I KNEW I HAD TO GO
BACK TO MY"
124Ø DATA"ROOM AND TO THE COMPUT
ER IF I"
125Ø DATA"WANTED ANSWERS. THE ON
LY PROBLEM"
126Ø DATA"WAS THAT I DIDN'T WANT
 TO GO"
127Ø DATA"BACK. I STOOD THERE FO
R TEN"
128Ø DATA"MINUTES DEBATING WITH
MYSELF."
129Ø DATA"I WENT BACK RELUNCTANT
LY."
13ØØ DATA"   MY ROOM HADN'T CHAN
GED. I"
131Ø DATA"PICKED UP THE ONE-PAGE
 INSTRUC-"
132Ø DATA"TION AND THIS TIME REA
D IT CARE-"
133Ø DATA"FULLY. IT SAID THE FIR
ST PART OF"
134Ø DATA"THE PROGRAM CONTAINED
A SELF-"
135Ø DATA"HYPNOSIS SECTION. 'THI
S ALLOWS"
136Ø DATA"THE BODY TO BE VERY RE
LAXED AND"
137Ø DATA"BRINGS TO THE MIND AN
ALTERED"
138Ø DATA"SENSE OF TIME WHICH SP
EEDS UP"
139Ø DATA"THINKING. IT ONLY SEEM
S THAT"
14ØØ DATA"EVERYTHING AROUND YOU
MOVES IN"
141Ø DATA"SLOW MOTION.' I SHUDDE
RED AS I"
142Ø DATA"REMEMBERED MY HAND MOV
ING EVER"
143Ø DATA"SO SLOWLY TO TURN OFF
THE COM-"
144Ø DATA"PUTER."
```


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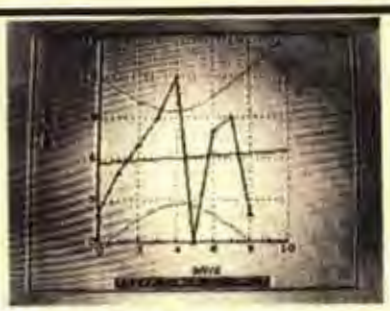

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- Track 14 goalie stats
- Summarize 10 goalie stats
- Track 19 opposing team stats

Baseball will provide:

- Mid-season entry, update and additions
- Correct and review all stats in file
- Correction on all input screens
- Raw dump of data to the printer — for the player, pitcher, and opposing team's files
- Summary of the player, pitcher and opposing team's stats
- Track 21 individual player stats with 18 cum stats per player
- Track 15 individual pitcher stats with 11 cum totals per pitcher
- Compile total team summary of 16 separate stats
- Compile total pitching summary of 11 stats
- Track 15 opposing team stats with 14 cummed stats

Football will provide:

- Mid-season entry, update 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
- Track 90 individual player stats
- Summarizes 63 individual cum stats per player
- Summarize 17 cum team stats
- Summarize 28 cum opposing team stats
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- Comparative summary printouts 62 stats for opposing team
- Over 350 possible stats!

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- Correction on all input screens
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- Summary of the player and opposing team's stats
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- Summarizes 17 individual player team stats
- Compile opposing team summary of 19 separate stats

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```
145Ø DATA"   THE INSTRUCTIONS AL
SO SAID TO"
146Ø DATA"VISUALIZE IN YOUR MIND
 A CHANNEL"
147Ø DATA"SELECTOR. LIKE ONE ON
A TV SET."
148Ø DATA"CHANNELS 1 THROUGH 9.
CHANNEL 1"
149Ø DATA"WAS FOR REGULAR RECEPT
ION. JUST"
15ØØ DATA"TURN THE SELECTOR IN Y
OUR MIND"
151Ø DATA"TO THIS CHANNEL FOR NO
RMAL TIME."
152Ø DATA"THE OTHER CHANNELS WER
E FOR"
153Ø DATA"ANYTHING YOU WANTED TO
 THINK"
154Ø DATA"ABOUT. FOR EXAMPLE, CH
ANNEL 2"
155Ø DATA"COULD BE USED TO THINK
 ABOUT"
156Ø DATA"LAST NIGHT'S BALL GAME
. CHANNEL"
157Ø DATA"3 FOR STUDYING HISTORY
 MATERIAL"
158Ø DATA"FOR YOUR NEXT TEST. CH
ANNEL 4"
159Ø DATA"COULD BE ABOUT MAKING
PLANS FOR"
16ØØ DATA"NEXT WEEKEND. AND SO O
N."
161Ø DATA"   WHEN YOU CHANGED CH
ANNELS,"
162Ø DATA"YOU BECOME IMMEDIATELY
 AWARE OF"
163Ø DATA"WHAT YOU HAD BEEN THIN
KING ABOUT"
164Ø DATA"ON THAT CHANNEL. THE C
OMPUTER"
165Ø DATA"PROGRAM HELPED THE BRA
IN KEEP"
166Ø DATA"TRACK OF THE DIFFERENT
 TOPICS."
167Ø DATA"ONE HOUR UNDER ALTERED
 TIME WAS"
168Ø DATA"EQUAL TO TWO OR THREE
HOURS OF"
169Ø DATA"NORMAL TIME. AND THAT'
S FOR EACH"
17ØØ DATA"CHANNEL!"
171Ø DATA"   NOW, I AM NO GENIUS
, BUT EVEN"
172Ø DATA"I COULD SEE WHAT I COU
LD DO WITH"
173Ø DATA"THIS PROGRAM. THE FIRS
T THING I"
174Ø DATA"DID WAS..."
175Ø DATA"   'MR. WILSON? IT'S 1
ØAM. I"
176Ø DATA"WILL HOLD YOUR CALLS A
S USUAL"
177Ø DATA"FOR THE NEXT TWO HOURS
. IS THERE"
178Ø DATA"ANYTHING YOU WANT ME T
O DO"
179Ø DATA"BESIDES THE WALTER'S A
CCOUNT?'"
18ØØ DATA"WILSON PUT DOWN THE FI
NANCIAL"
181Ø DATA"REPORTS AND PUSHED A K
EY ON THE"
182Ø DATA"COMMANDER. 'YES. PLEAS
E CALL A"
183Ø DATA"2PM MEETING WITH THE S
ECTIONS'"
184Ø DATA"HEADS. IT WILL BE A ST
RATEGY"
185Ø DATA"MEETING ON THE TAKEOVE
R BID."
186Ø DATA"THANKS.'"
187Ø DATA"   WILSON LEANED BACK
INTO THE"
188Ø DATA"PLUSH EXECUTIVE CHAIR.
 HE LOOKED"
189Ø DATA"OUT THROUGH THE FLOOR-
TO-CEILING"
19ØØ DATA"WINDOWS THAT MADE UP T
HE ENTIRE"
191Ø DATA"NORTH WALL OF HIS LARG
E OFFICE."
192Ø DATA"THE SAN GABRIEL MOUNTA
INS HAD"
193Ø DATA"SNOW ON THEM. THEY LOO
KED CLOSE"
194Ø DATA"BY IN THE CRISP JANUAR
Y AIR."
195Ø DATA"   HE REACHED OVER TO
THE"
196Ø DATA"COMMAND MODULE ON HIS
DESK AND"
197Ø DATA"PRESSED A BUTTON. A DR
AWER SLID"
198Ø DATA"OPEN AND HE PICKED OUT
 AN"
199Ø DATA"EXPENSIVE HEADSET. AS
HE PUT IT"
2ØØØ DATA"ON, HE WHISPERED,'ONE
AMAZING"
2Ø1Ø DATA"PROGRAM.'"
2Ø2Ø DATA-1
```

A Fanciful Menu of Flying Buffalo, Flagships and Feudal Lords

Fantasy Fare

By George Firedrake and Karl Albrecht

The play-by-mail game world has become very large and is expanding rapidly, so naturally it needs its own literature. We have just subscribed to *Flagship* and obtained all back issues. We enthusiastically recommend it.

Each issue of *Flagship* contains seven main sections:

— Professional Secrets are the feature articles, analyzing the games and holding forth on novel strategies and insights. Since not every reader will know the game, an introductory piece summarizes the rules in a separate box, so readers who do know it can get on to the main course without delay.

— Explorer's Findings are straightforward reviews, mostly of new and less-known games, as well as comparisons between different games to show the advantages and drawbacks of each.

— Ghost in the Machine is a workshop section, open to actual and would-be game designers to debate the tricks of the trade and tell you how to get started on your own game.

— The Spokesmen Speak is a column available to the PBM GameMasters to tell about their current plans for new games and report on the progress of existing ones.

— The Mighty Pen contains readers' feedback, abuse, compliments and player advertisements in any PBM game.

— Travellers' Tales is reserved for game-based fiction. Expect a wide variety of game locales in coming issues.

— Galactic View surveys the hobby and tells you where to find each game.

We liked these comments by John Nicholson in "Ghost in the Machine," *Flagship* #1, Winter 1983

> "Home computers have a good deal of potential not yet realized, in particular as game aids to make face-to-face play easier and faster. The computer can generate random dice rolls, create characters in role-playing games by interactive consultation with the player, and even be used to enhance book adventures. These adventures (e.g., the *Tunnels & Trolls* series) consist of a series of paragraphs with alternative actions leading to other paragraphs (If you attack the dragon turn to 346): If an uninvolved friend can be persuaded to enter the paragraphs into your cassettes, you can write a very simple program to run the adventure for you without the need to keep flipping through the book and avert your eyes from the 'wrong' paragraphs.
>
> "More familiar home computer games are mostly arcade-type 'action' games or adventure games which usually are essentially puzzles: once you crack the puzzle the game has little further interest. A more interesting possibility is the 'intelligent' program which changes its strategy to meet yours, like the latest chess programs, but this is difficult to achieve on a standard home computer.
>
> "The need which PBM games can fill is for relatively complex games which do not become stale with repeated play — and the best way to guarantee this

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. Roslyn, 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). *Blade, P.O. Box 1467, Scottsdale, AZ 85252.*

is to have a large number of those unpredictable opponents, human beings! The remote GM looks after the boring administration and mundane details, letting the players get on with the fun of planning and plotting.

"Why have computer-moderation, though? Because this enables the postal GM to offer a depth of play which would otherwise be impossible: numerous players, moving simultaneously, choosing from a huge range of options each turn, processed in a matter of minutes, with faultless adjudication every turn."

Flagship is published four times a year. The editor is Dr. Nicholas Palmer, 7 Delahey House, 15 Chelsea Embankment, London SW3 3LA, England; U.S.A. agent is Flying Buffalo, Inc., P.O. Box 1467, Scottsdale, AZ 85252-1467. Subscription: $11/year (four issues).

If you are tired, as we are, of yet another Adventure game, just like all the other Adventure games, and want to move up, try these!

Greetings from the Lord of CairLeon

We signed up for *Feudal Lords*. We play the role of the Lord of CairLeon on the west coast of Britain. There are five other human players in the game, including two from Canada and one from New Zealand. The other 40 fiefs are controlled by the computer.

We begin in the year 801, as follows:

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

We are in a slow game, one turn a month. We must manage our fief, hopefully making it grow and become strong. We will try for alliances with other players, probably the Lords of Denbigh (northwest coast of Britain) and Dorchester (south coast). These are controlled by the New Zealander and a Canadian.

Each turn is one game year. We can send up to 12 orders selected from a list of 31 possible orders. Here are some examples.

- Change tax rate.
- Train knights (to train one knight costs 20 gold and one food unit).
- Lead army on campaign (there are several types).
- Buy food at market.
- Sell food at market.
- Spy on another fief (costs 100 gold per spy).
- Build a ship (400 gold), market place (300 gold), fishing village (300 gold), or lumber mill (100 gold).

This is an excellent multi-player Simulation game, requiring much careful analysis, record keeping, diplomacy, contingency planning, resource management, etc. Here are some excerpts from a review by Nicky Palmer, editor of *Flagship*.

"*Feudal Lords* is a surprising game in two ways. The first is that it provides an impressively precise and apparently well-researched picture of the problems of running a medieval English fiefdom. The second is that its simple and compact exterior conceals considerable strategic and tactical subtlety.

"After two years of reviewing war games which put London south of the Thames and turned Redhill into Red Hill (famous for its Russian moles?), I approached *Feudal Lords* with some skepticism, rather expecting feudalism to be modeled on the movie of *Camelot*. Not a bit of it. True, the scenario postulates an England of 800 A.D. after the death of the possibly mythical King Arthur, and there is in fact a Camelot fief, but both geography and feudal simulation seem to have been drawn up with meticulous care: even Camelot is placed where the real Arthur is said to have had his mini-kingdom, between Wessex and Salisbury. Only one fief (Durham) seems misplaced.

"More important for most game players is that the design neatly slots together military campaigning with the demands of managing the feudal fief, an interesting mixture of a rural barter system with an urban cash economy. The 12-order limit, which I originally felt to be a crude device to help the moderator process more turns per hour and make bigger profit, turns out to enhance the game; it gives you conflicting priorities over which to agonize, and a real sense that you are the feudal lord, with only a certain time available to do your tasks, and no competent administrative staff to do them for you."

For more information on *Feudal Lords*, write to either of the following: Flying Buffalo, Inc., P.O. Box 1467, Scottsdale, AZ 85252-1467, or Graaf Simulations, 27530 Harper, St. Clair Shores, MI 48081.

Further Adventures of Aloysious Anonymous

Last time, you may recall, Aloysious took an unexpected (and unwanted) swim in the fast-flowing creek. Fortunately, he was deposited on the far side, a little watersoaked, bruised and exhausted.

FIRST AID Success percentage: 45%

Aloysious surveys his battered body and applies first aid. He has a 45 percent chance that his self-healing will allow him to immediately continue on his journey.

Success: Roll 45 or less on the percentile dice.
Feeling much better!
Failure: Roll 46 or more on the percentile dice.
Better rest some more.

The roll is nine. Although in some pain, Aloysious can continue. His bruises and abrasions seem minor; they will be completely healed in two game weeks.

CLIMB Success percentage: 55%

Aloysious has a better than even chance of climbing a tree, a wall into a second story window (useful for thieves), or a mountain. We recommend that, at a 55 percent success level, perhaps he should refrain from scaling mountains or even walls leading to third story windows.

Success: Roll 55 or less on the percentile dice.
He surmounts the obstacle.
Failure: Roll 56 or more on the percentile dice.
Let's hope the fall was not from a great height!

Having survived his close encounter with the creek, Aloysious surveys his surroundings. He is on a narrow beach between the creek and a steep embankment.

Well, he *knows* about the creek and wants no more of that, so he tries to climb the embankment. The roll is 51. He made it. He looks down into the rushing waters and kicks a little dirt into the creek. "Take that, you creepy creek!"

THROW Success percentage: 45%

It is not whether Aloysious can throw a rock (or whatever), but whether he can hit something when he throws. He can throw a medium-sized rock a medium distance and hit a medium target almost half the time.

Medium target? How about a wolf trying to get at the sheep? Medium range? About 10 meters. Medium-sized rock? The one that feels comfortable in *his* hand, not in *your* hand. Throw rocks, drive off wolf, save sheep!

Success: Roll 45 or less on the percentile dice.
He hit the wolf!
Failure: Roll 46 or more on the percentile dice.
He missed the wolf — try again.

Before moving on, Aloysious amuses himself by throwing rocks at a tree on the other side of the creek.

First throw:	72 — A miss
Second throw:	46 — A miss
Third throw:	18 — A hit
Fourth throw:	64 — A miss
Fifth throw:	45 — A hit

A little disgruntled with only two out of five, Aloysious moves on. (Continued next time.)

Heroic Fantasy

We know at least one RAINBOW reader is playing *Heroic Fantasy*. Here is an excerpt from a letter from David W. Johnson of Gainesville, Fla.

"I have started playing *Heroic Fantasy*. My party is composed of the following characters:

Albrecht	male elf
Elfonso Ni	male elf
Bit	male hobbit
Cheripop	female human
Hobnobber	female hobbit
Rudim	male orge
Magiuscula	female hobbit
Tui	male goblin
Whisker	male leprechaun

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ETT's video keyboard lets you practice with all the keys labeled, all the keys blank or only the "home" keys labeled. The visual cues guide you while you learn to type without watching your fingers. ETT shows your accuracy, response time, and words per minute. You will quickly see that you are improving with practice.

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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Phone (313) 722-7957

"I'm in a one-turn-a-month game (#HF-157). On my first turn I left the magic-users in the entrance room to prepare spells while the fighters went east."

If you want to play, first get the rules. Send $1 to Flying Buffalo, Inc., P.O. Box 1467, Scottsdale, AZ 85252-1467. Be sure to tell them the name of the game you want. If you are a beginner, we suggest you play a slow game. Make one turn a month.

RAINBOW readers: Would you like a game of *Heroic Fantasy* populated *only* by RAINBOW readers? Rick Loomis, the father of PBM games, would do this for us. Just tell him you want to be in the RAINBOW game. Make one turn a month.

Time Passes, and Things Change

Once upon a time, a courageous person named Lonnie, who wished to give and receive, started a tiny newsletter. Audaciously, he called it THE RAINBOW. His first issue [reprinted elsewhere in this issue] was four pages and went to perhaps as many as 20 people.

One day, a dragon, called sometimes Bob Albrecht and sometimes George Firedrake and sometimes by other names, called Lonnie and said, "May I write for you?"

Lonnie said, "Why not?" Thus was born "GameMaster's Apprentice" in the spirit of THE RAINBOW as it was then, a wondrous periodical by beginners for beginners. The first "GameMaster's Apprentice" appeared in the September 1982 issue.

Sadly and reluctantly, we see the need to move on. We will soon bid you farewell. We thank Lonnie and all the people at THE RAINBOW for this opportunity to share ideas with you, CoCo community. Our next "GameMaster's Apprentice" will be a gala event — our last episode for a wonderful magazine, THE RAINBOW.

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* is growing as did RAINBOW. Our February issue had eight pages; March, 16 pages; April, 20 pages. It grows slowly.

THE RAINBOW grew and grew and became the number one magazine for the CoCo community, with dozens and dozens of 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 and cuddly. 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.

Here are some ways to sample *DragonSmoke*:

— Send $1 and we will send you the first four issues: January 1985 (two pages), February 1985 (eight pages), March 1985 (16 pages) and April 1985 (20 pages).
— Or, send $1 and tell us you want the most recent issue.

Our address is P.O. Box 7627, Menlo Park, CA 94026.

As Laran Stardrake might say, "Use well the tool in your hand, but always try new tools."

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```
1 CLS:PRINT"MINI WASH":INPUT"(C)
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T"NAME/EXT:DR ";N$:LINEINPUT"(R)
 OR (C),TYPE NEW NAME/EXT:DR ELS
E ENTER ";A$:IFD$="C"THENCOPYN$T
OA$:RUNELSEIFD$="R"THENRENAMEN$T
OA$:RUNELSEIFD$="K"THENKILLN$:RU
NELSERUN
```

Shayne Cameron
Salmon Arm, British Columbia

(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 1*.)

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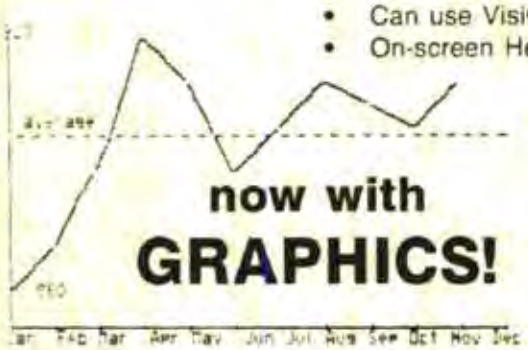

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This program allows you to use machine language without *an editor/assembler*

Machine Code Loder

By Dennis H. Weide

Machine language programs add many features to the 80C that can only be found on more expensive machines. The advantage of these ML programs is that you can have them free. Many magazines print programs in machine language you might want to try.

I have not had the time to sit down and master machine language, assembly language and editor/assemblers, so I wrote a program that allows me to enter an ML listing without an editor/assembler. The program has three sections: one to load the ML listing, one to load a string table and one to print contents of memory.

A Little about ML Listings

First, you will need to understand a little about ML program listings. I am not an expert on machine language and some of my terms may be wrong, but the procedures explained here are valid and have worked for all the listings I have tried. It isn't very hard once you have been through a few lines.

As an example, let's look at Richard Smrcina's *Error Message* program for non-disk users in the January 1984 edition of RAINBOW (Page 169). This is a neat program for printing error messages on the screen.

I won't go into ML programming, but I will tell you a little about how the program listing is laid out. While not all listings follow this format, most of them do and can be loaded using the method described here.

Let's Look at an ML Listing

If you look at the ML listing for error messages, you will notice it contains three major sections. The first section consists of lines 10 to 320; this is the program listing. The four numbers in the left column are the addresses you will be loading. The next two to eight numbers are the opcode and data that will be loaded.

The second section of the program, lines 340 to 850, is the string table. You can tell this is a string table by the

(Dennis Weide has been employed by AT&T Communications for 16 years where he programs microcomputers. He teaches computer programming as a hobby to promote use of home computers.)

heading at Line 330 and the FCC mnemonic for Form Constant Byte or simply a string. The error messages are the strings in the table and they are listed on the right side of the listing. Notice the line following each error message is labeled as FCB or FDB. This marks the end of this string.

The third section of the listing is also a table, however, this is an address table. This section will be loaded the same as the first section. Lines 1130 and 1140 are a string so you must use the string table section of *Codelode* to load these two lines.

The column of numbers just left of center starting with 0010, 0020, etc., is the program line numbers and used for the listing only. Unlike BASIC, ML programs do not need line numbers. They are used only for the programmer's convenience. This column of numbers will be ignored when entering the ML program.

Each address will store a two-character hexadecimal number. Notice that most of the Hex numbers in the data column are longer than two characters. These numbers represent the data in several consecutive addresses. To make things a little clearer, let's look at Line 0060.

Line 0060 7DF8 30 8D 0004

The actual value at address 7DF8 is 30. For a better explanation, look at the following chart.

Address	Data
7DF8	30
7DF9	8D
7DFA	00
7DFB	04

As you can see, the data listed in the data column is actually the data in four consecutive addresses. The rest of the columns contain programmer comments similar in function to BASIC REMs and the ML opcodes which are similar to the tokens for BASIC statements. You only need to know the information contained in columns up to the line numbers. See how easy it's going to be?

How the Code Loder Works

When you enter data, *Codelode* calculates the number of addresses to be loaded and breaks the data down so it can be loaded into the proper address. It's as simple as that. You do not need to do anything but enter the address you wish to load and the data following it; the BASIC program does the rest.

Now Give It a Try

I have included a sample run of *Codelode* using Mr. Smrcina's *Error Message* program mentioned earlier. You can refer to it as I discuss how to use *Codelode*.

First LOAD and RUN the *Codelode* program. When the menu is displayed, enter '1' to start loading the assembly language listing. You will be asked for the offset value. This is the amount of offset from the address listed in the program. Enter this number in decimal.

"When you enter data, Codelode calculates the number of addresses to be loaded and breaks the data down so it can be loaded into the proper address. It's as simple as that."

Normally, you will load the ML program as it is listed, but if you want to relocate it to another address, enter the difference between the address listed in the program listing and the start address where you want to relocate it. In my sample run, I entered zero so the program will be loaded at the address listed.

If the new address is lower than the start address of the program listing, enter the offset as a negative number. If you wish to enter it as a hexadecimal number, precede the number with &H (Color BASIC's symbol for hexadecimal numbers). Color BASIC users can try this:

```
POKE 25,30:POKE26,1:NEW
```

to clear four graphics pages the same as Extended Color BASIC. Many of the ML programs available are written to fit in these four pages.

After entering the offset address, enter the first address you wish to load. In the program we have chosen as an example, you would type 7df8 and ENTER. The program accepts the addresses and data in a hexadecimal format without &H.

After entering the address, you are ready to input the data. In our example, you would type 30BD0004 and ENTER. You will load the first four consecutive addresses with the data entered. The program will respond with the address you entered in decimal format for reference, read each address that was loaded and display it along with its contents. If for any reason you make an error, reenter the bad address and data or the entire line.

At Line 320, you would enter 7E2F for the address and 39 for the data. Since the next section is the start of the table, enter 'M' for the next address. This will return to the main menu.

To enter this table (remember, it is a string table) enter '2' when the menu appears. The first address of this table is 7E30 so enter this when requested, then enter the data (i.e., NEXT WITHOUT FOR) as a string. You must then enter the code following the string. For this string, enter 0D00. The BASIC program will load this value into the proper address and prompt you for the next string address and string to load. Continue this until you have loaded the last address in this table, then enter 'M' for the next address to return to the program menu.

The second table starts at address 7FC5. This table will be entered the same as the first part of the listing except for the last entry. Since this is a string, you must use the string table section of *Codelode*. After loading address 7FF7, enter 'M' for the address to return to the main menu, then enter '2' and load the last string.

Load a Little Faster

You will soon see that you can load much faster if you don't press ENTER at the end of the data to be loaded. You can continue down the data column until you have typed up to 255 characters if you wish. Only enter the address to be loaded when asked to do so — a program like this one can be loaded in 15 minutes or less.

And Finally

If your program doesn't work, you can get a printout of memory contents by using Option 3 of the main menu. Compare your program with the one listed. If you find an error, use *Codelode* to correct it. You can enter a single address and data or you can enter an entire line. Watch the listing for 8 s and B's. These look quite similar in most listings and it is easy to confuse them.

Now you can sit down and load some of those fine machine language programs and give your 80C some real class!

(Should you have any questions about this program, Dennis may be reached at 14201 Marquette N.E., Albuquerque, NM 87123, phone (505) 293-5228.)

The listing: CODELODE

```
1000 '
1100 '     MACHINE CODE LOADER
1200 '     BY DENNIS WEIDE (C)198
2
1300 '
1400 CLS
1500 C$="&H"
1600 PRINTSTRING$(32,"=");
1700 PRINTTAB(10)"PROGRAM MENU"
1800 PRINTSTRING$(32,"=")
1900 PRINTTAB(5)"1. ENTER LISTIN
G"
2000 PRINTTAB(5)"2. ENTER STRING
 TABLE"
2100 PRINTTAB(5)"3. PRINT MEMORY
"
2200 PRINTTAB(5)"4. END PROGRAM"
2300 PRINT
2400 PRINTTAB(3)"ENTER ONE OF TH
E ABOVE";
2500 INPUT OA
2600 ON OA GOTO 2700,5600,7700,9
400
2700 CLS
2800 LINE INPUT"ENTER OFFSET VAL
UE (DEC) ";OV$
2900 PRINT
3000 OV=VAL(OV$)
3100 LINE INPUT"ENTER ADDRESS (H
EX) ";A$
3200 IF A$="M" THEN 1400
3300 PRINT
3400 LINE INPUT"ENTER DATA (HEX)
 ";B$
3500 PRINT
3600 A=VAL(C$+A$)
3700 PRINTTAB(4)"DECIMAL ADDRESS
  "A+OV:PRINT
3800 PRINTTAB(11)"WRITE DATA"
3900 FOR X=1 TO LEN(B$) STEP2
4000 D$="0"+(C$+MID$(B$,X,2))
4100 PRINTTAB(5)"ADDR  "HEX$(A+O
V);
4200 PRINTTAB(19)"DATA  "RIGHT$(
D$,2)
4300 POKE A+OV,VAL(C$+MID$(B$,X,
2))
4400 A=A+1
4500 NEXT X
4600 PRINT
4700 PRINTTAB(12)"READ DATA"
4800 A=VAL(C$+A$)
4900 FOR X=1 TO LEN(B$)/2
5000 NV$="0"+HEX$(PEEK(A+OV))
5100 PRINTTAB(5)"ADDR  "HEX$(A+O
V);
5200 PRINTTAB(19)"DATA  "RIGHT$(
NV$,2)
5300 A=A+1
5400 NEXT X:PRINT
5500 GOTO 3100
5600 CLS
5700 LINE INPUT"ENTER ADDRESS (H
EX) ";A$
5800 PRINT
5900 IF A$="M" THEN 1400
6000 PRINT"ENTER TABLE DATA AS S
TRING"
6100 LINE INPUT B$
6200 A=VAL(C$+A$)
6300 Y=0
6400 FOR X=A TO A+LEN(B$)-1
6500 Y=Y+1
6600 POKE X,ASC(MID$(B$,Y,1))
6700 NEXT X
6800 PRINT
6900 LINE INPUT"ENTER RETURN COD
E (HEX) ";B$
7000 Z=1
7100 Z=Z+2
7200 FOR Y=X TO X+LEN(B$)/2-1
7300 POKE Y+OV,VAL(C$+MID$(B$,Z,
2))
7305 Z=Z+2
7400 NEXT Y
7500 PRINT
7600 GOTO 5700
7700 CLS
7800 LINE INPUT"ENTER START ADDR
ESS (HEX) ";A$
7900 PRINT
8000 LINE INPUT"ENTER END ADDRES
S (HEX) ";B$
8100 PRINT
8200 INPUT"DO YOU WANT A HARDCOP
Y (Y/N)";H$
8300 A=VAL(C$+A$)
8400 B=VAL(C$+B$)
8500 FOR X=A TO B
8600 NV$="0"+HEX$(PEEK(X))
8700 IF H$="Y" THEN DV=-2 ELSE D
V=0
8800 PRINT#DV,TAB(5)"ADDR  "HEX$
(X);
8900 PRINT#DV,TAB(19)"DATA  "RIG
HT$(NV$,2)
9000 NEXT X
9100 PRINT
9200 LINE INPUT"   PRESS <ENTER>
 TO CONTINUE";OA$
9300 GOTO 1400
9400 END
```

SAMPLE RUN

```
RUN

==========================
        PROGRAM MENU
==========================

     1. ENTER LISTING
     2. ENTER STRING TABLE
     3. PRINT MEMORY
     4. END PROGRAM

   ENTER ONE OF THE ABOVE? 1

ENTER OFFSET VALUE (DEC) Ø

ENTER ADDRESS (HEX) 7DF8

ENTER DATA (HEX) 3Ø8DØØØ4

    DECIMAL ADDRESS   32248

        WRITE DATA
  ADDR  7DF8     DATA 3Ø
  ADDR  7DF9     DATA 8D
  ADDR  7DFA     DATA ØØ
  ADDR  7DFB     DATA Ø4

        READ DATA
  ADDR  7DF8     DATA 3Ø
  ADDR  7DF9     DATA 8D
  ADDR  7DFA     DATA ØØ
  ADDR  7DFB     DATA Ø4

ENTER ADDRESS (HEX) 7DFC

ENTER DATA (HEX) BFØ192

    DECIMAL ADDRESS   32252

        WRITE DATA
  ADDR  7DFC     DATA  BF
  ADDR  7DFD     DATA  Ø1
  ADDR  7DFE     DATA  92

        READ DATA
  ADDR  7DFC     DATA  BF
  ADDR  7DFD     DATA  Ø1
  ADDR  7DFE     DATA  92

ENTER ADDRESS (HEX) 7DFF

ENTER DATA (HEX) 39

    DECIMAL ADDRESS   32255

        WRITE DATA
  ADDR  7DFF     DATA  39

        READ DATA
  ADDR  7DFF     DATA  39

ENTER ADDRESS (HEX) 7EØØ

ENTER DATA (HEX) BDA7E9

    DECIMAL ADDRESS   32256

        WRITE DATA
  ADDR  7EØØ     DATA  BD
  ADDR  7EØ1     DATA  A7
  ADDR  7EØ2     DATA  E9

        READ DATA
  ADDR  7EØØ     DATA  BD
  ADDR  7EØ1     DATA  A7
  ADDR  7EØ2     DATA  E9

ENTER ADDRESS (HEX) M

==========================
        PROGRAM MENU
==========================

     1. ENTER LISTING
     2. ENTER STRING TABLE
     3. PRINT MEMORY
     4. END PROGRAM

   ENTER ONE OF THE ABOVE? 2

ENTER ADDRESS (HEX) 7E3Ø

ENTER TABLE DATA AS STRING
NEXT WITHOUT FOR

ENTER RETURN CODE (HEX) ØDØØ

ENTER ADDRESS (HEX) 7E42

ENTER TABLE DATA AS STRING
SYNTAX

ENTER RETURN CODE (HEX) ØØ

ENTER ADDRESS (HEX) 7E49

ENTER TABLE DATA AS STRING
RETURN WITHOUT GOSUB

ENTER RETURN CODE (HEX) ØDØØ

ENTER ADDRESS (HEX) 7E5F

ENTER TABLE DATA AS STRING
OUT OF DATA

ENTER RETURN CODE (HEX) ØØ

ENTER ADDRESS (HEX) M

==========================
        PROGRAM MENU
==========================

     1. ENTER LISTING
     2. ENTER STRING TABLE
     3. PRINT MEMORY
     4. END PROGRAM

   ENTER ONE OF THE ABOVE? 4
OK
```


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The Goolian Olympics Of Trig Functions

By Joseph Kolar
Rainbow Contributing Editor

Creating action plots of trigonometrical functions is not particularly difficult. When displayed on the monitor, the Hi-Res graphics plots are nice to watch as they run their course.

A new concept is introduced wherein a story line is built around each graphics program routine to give it a *raison d' etre*. It is envisioned that an adult supervisor is introducing the wonders of the Color Computer to a small child. The adult is interacting with the child. Here is the procedure.

The adult reads the text to the child, introducing the story plot. He CLOADs the first listing and continues with the story. In the meantime, the child is observing how the adult LOADs a program from cassette. At cue marks in the story, he RUNs the program and continues on with the suggested story. When the viewer's attention span wavers, the adult hits the BREAK key, types NEW and CLOADs the next listing.

The adult continues reading until the cue and runs the program at that point. Since the graphics are stylized, the explanations before viewing are quite important. The child must understand the significance of what he/she is viewing.

Now that the supervising adult knows the procedure, type in CLOAD"ANTHEM" and begin the story.

There is a planet named Gool, far, far away. It is not a very big planet. You can't even see it when you look up at the stars in the night sky. The inhabitants of Gool are called Goolians. Goolians are not like us. They do not speak like us. They look odd, but Gool is an odd place. It is very unlike what Earth people consider normal.

One day, a clever Goolian scanned the heavens with his radio-telescope. He happened to beam in on the 1984 Summer Olympic games in Los Angeles. Goolians have such keen eyesight that they could actually look into the coliseum and see the sports events in progress. The clever Goolian was bemused by the sports events.

Of course, since Goolians have no sports, they do not understand about winning or losing. The clever Goolian liked what he saw. Whatever they were doing on Earth, it sure looked like fun. But, Goolians like to play! The clever Goolian wrote in his notebook about all of the strange things he was astonished to observe.

Unfortunately, it stoned on Gool that day and the notes got all stone marked. You see, it doesn't rain or snow on Gool, it rocks and stones instead. Rock is not too bad because it melts to stone. Stone dents notebooks and makes notes impossible to read.

Even though the clever Goolian failed to beam in on Earth again, he was truly impressed with sports. His stone marked notebook was useless. He wanted to have some Olympic fun, so he and all the other Goolians got together and made up their own games — games that nobody ever wins or ever loses.

(Now RUN and ENTER the program.)

Look at the friendly Goolians. They usually, but not always, walk on stilts. Girl Goolians wear blue stilts. Boy Goolians wear red stilts. Stilts are Goolians' shoes.

The entire Goolian Olympic team is standing in a Goolian straight line. They are singing the "Goolian Planetary Anthem."

Next, hit the BREAK key, type NEW and CLOAD"TRACK".

The first competition is track. Their tracks are quite different from ours. Two runners race around their fourth dimension tracks. Sometimes one track

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(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)

is on top, sometimes the other track in on top and sometimes the two tracks are linked together.

(Now RUN and ENTER.)

Watch the happy Goolians for at least five minutes and you can see their fourth dimension track change colors. They wear special track stilts that blink from blue to red and red to blue. Their word for this type of track is "mobius".

Hit the BREAK key, type NEW and CLOAD"LADDER".

Three fun-loving Goolians compete in the 1000 meter ladder event.

(RUN and ENTER.)

The Goolians race up and down the fourth dimension ladder. The ladder steps change shape and disappear. Every once in a while, Goolian runners tire near the top of the ladder. A new set of Goolians race up to rescue them and continue the race.

Hit the BREAK key, type NEW and CLOAD"TUGOFWAR".

In the next event, Goolians have a tug-of-war with a giant Goolian musical instrument, the sqwakboks. It is somewhat like an Earth accordian. They get between parts of the sqwakboks and push this way, then push that way. As usual, there are no winners or losers, just tired Goolians.

(RUN and ENTER.)

The tune you hear is a Goolian rock and roll classic. Watch the sqwakboks slowly change color and shape. The song may sound odd to Earth people, but it is number one on the Goolian hit list.

Hit the BREAK key, type NEW and CLOAD"PARAJUMP".

The big event in the Goolian Olympics is the parachute jump. The Goolian sky has a roof. The ground is very soft, as you shall see.

(RUN and ENTER.)

Three Goolians have their chutes hooked onto the Goolian sky with special skyhooks. They are very careful and follow the safety precautions. The rule is to hook up and drop safely! They believe a good Goolian is a live Goolian.

Now, hit the BREAK key, type NEW and CLOAD"PARALIFT".

Have you ever wondered how the happy Goolians got up to the roof of the sky to clip on their parachute skyhooks? RUN and ENTER to find out.

Now you know! The Goolians have rocketpacks on their backs. They have two different ways to reach the sky roof. The Goolian in the middle goes up in quantum leaps — a very special energy. The other two just blast off and rocket up, leaving a polluting dust trail behind them.

Hit the BREAK key, type NEW and CLOAD"BUCKLEUP".

Sometimes there is no galactic wind. Parachuting can become a very dangerous sport, indeed. The chutists drop straight down.

(RUN and ENTER.)

Watch what happens to the bad Goolian who doesn't follow the safety rules. The Goolian in the middle drops with a thud and vaporizes. This is not a nice way to end the Goolian Olympics. Let this be a lesson to all Goolians: buckle up and live!

Note: If you want to save the middle Goolian and give him one more chance, take the REM marker out of Line 225. Here is how to do it: hit BREAK, EDIT 225, press the 'D' key, ENTER and RUN. To replace the REM marker: hit BREAK, EDIT 225, press the 'I' key, press SHIFT and '7' simultaneously and ENTER.

If you want to make a good Goolian out of the bad one: hit the BREAK key, EDIT 216, press the 'I' key, press SHIFT and '7' simultaneously, ENTER and RUN. To unhook him again: hit BREAK, EDIT 216, press the 'D' key and ENTER.

There is no reason why you can't personalize the story line and include the child. You may have your own interpretation of the story; use it, by all means. You may also speak extemporaneously and weave a plot of your own.

A final note: A few of the routines take about 10 minutes to recycle. There is no need to watch the entire routine. Just press BREAK when the child begins to get bored. Also, encourage the child to participate in the operation of the computer. Allow the child to type RUN and hit ENTER. He/she will be thrilled to become manually involved.

Listing 1: ANTHEM

```
Ø 'GOOLIAN OLYMPICS---PLANETARY
ANTHEM
1Ø 'CREATED BY J.KOLAR, 1984
3Ø PMODE3:PCLS:PMODE4
4Ø A=126:B=9Ø:R=72:PI=1.7Ø
5Ø DIM S(13)
6Ø DRAW"BMØ,ØD24R2U3BU2U11F3R3D5
L3G3BD2E3R1ØF3D3R2U24L2D6BD2D11H
3L3U5R3E3BU2G3L3U3L4D3L3H3U5L2"
61 PAINT(1Ø,7),1,1
7Ø GET(Ø,Ø)-(2Ø,24),S,G
8Ø PCLS
17Ø SCREEN1,1
175 FOR SS=15 TO 3 STEP-3
18Ø FORZ=1TO288Ø STEPSS:C=Z
19Ø C=9Ø+C*PI/18Ø
191 K=C*PI*18Ø
2ØØ X=INT(A-6+R*COS(K)):Y=INT(B-
8+R*SIN(C))
2Ø9 Q=RND(15Ø)+1ØØ:L=RND(3):SOUN
DQ,L
21Ø PUT(X-4Ø,Y)-(X-2Ø,Y+25),S,PS
ET
211 PUT(X+3Ø,Y)-(X+5Ø,Y+25),S,PS
ET
215 IF Z=241 THEN FOR F=1 TO 4ØØ
Ø:NEXT:PCLS:GOTO17Ø
22Ø NEXT Z,SS:PCLS:GOTO17Ø
31Ø '***CHANGE LINE 2Ø9 TO Q=RND
(15Ø)+1ØØ:L=RND(3):SOUNDQ,L FOR
THE CRISP NOTES OF THE ANTHEM,
'SQUEAKSQUAWK'.
```

Listing 2: TRACK

```
Ø 'GOOLIAN OLYMPICS---TRACK
1Ø 'CREATED BY J.KOLAR, 1984
3Ø PMODE3:PCLS:PMODE4
4Ø A=126:B=9Ø:R=72:PI=1.7Ø
5Ø DIM S(13)
6Ø DRAW"BMØ,ØD24R2U3BU2U11F3R3D5
L3G3BD2E3R1ØF3D3R2U24L2D6BD2D11H
3L3U5R3E3BU2G3L3U3L4D3L3H3U5L2"
61 PAINT(1Ø,7),1,1
```

```
7Ø GET(Ø,Ø)-(2Ø,24),S,G
8Ø PCLS
17Ø SCREEN1,1
175 FOR SS=15 TO 3 STEP-3
18Ø FORZ=1TO288Ø STEPSS:C=Z
19Ø C=9Ø+C*PI/18Ø
2ØØ X=INT(A-6+R*COS(C)):Y=INT(B-
8+R*SIN(C))
21Ø PUT(X-4Ø,Y)-(X-2Ø,Y+25),S,PS
ET
211 PUT(X+3Ø,Y)-(X+5Ø,Y+25),S,PS
ET
22Ø NEXT Z,SS:PCLS:GOTO17Ø
```

Listing 3: LADDER

```
Ø 'GOOLIAN OLYMPICS---LADDER
1Ø 'CREATED BY J.KOLAR, 1984
3Ø PMODE3:PCLS:PMODE4
4Ø A=126:B=9Ø:R=72:PI=1.7Ø
5Ø DIM S(13)
6Ø DRAW"BMØ,ØD24R2U3BU2U11F3R3D5
L3G3BD2E3R1ØF3D3R2U24L2D6BD2D11H
3L3U5R3E3BU2G3L3U3L4D3L3H3U5L2"
61 PAINT(1Ø,7),1,1
7Ø GET(Ø,Ø)-(2Ø,24),S,G
8Ø PCLS
17Ø SCREEN1,1
175 FOR SS=15 TO 3 STEP-3
18Ø FORZ=1TO288Ø STEPSS:C=Z
19Ø C=9Ø+C*PI/18Ø
2ØØ X=INT(A-6+R*COS(2)):Y=INT(B-
8+R*SIN(C))
21Ø PUT(X-4Ø,Y)-(X-2Ø,Y+25),S,PS
ET
211 PUT(X+3Ø,Y)-(X+5Ø,Y+25),S,PS
ET
212 PUT(X+1ØØ,Y)-(X+12Ø,Y+25),S,
PSET
22Ø NEXT Z,SS:PCLS:GOTO17Ø
```

Listing 4: TUGOFWAR

```
Ø 'GOOLIAN OLYMPICS---TUGOFWAR
1Ø 'CREATED BY J.KOLAR, 1984
3Ø PMODE3:PCLS:PMODE4
4Ø A=126:B=25:R=72:PI=1.7Ø
5Ø DIM S(13)
6Ø DRAW"BMØ,ØD24R2U3BU2U11F3R3D5
L3G3BD2E3R1ØF3D3R2U24L2D6BD2D11H
3L3U5R3E3BU2G3L3U3L4D3L3H3U5L2"
61 PAINT(1Ø,7),1,1
7Ø GET(Ø,Ø)-(2Ø,24),S,G
8Ø PCLS
17Ø SCREEN1,1
175 FOR SS=15 TO 3 STEP-3
18Ø FORZ=1TO288Ø STEPSS:C=Z
19Ø C=9Ø+C*PI/18Ø
2ØØ X=INT(A-6+R*COS(C)):Y=INT(B-
8+R*SIN(2))
2Ø9 Q=RND(15Ø):L=RND(2):SOUNDQ,L
21Ø PUT(X-4Ø,Y)-(X-2Ø,Y+25),S,PS
ET
211 PUT(X+3Ø,Y)-(X+5Ø,Y+25),S,PS
ET
22Ø NEXT Z,SS:PCLS:GOTO17Ø
```

Listing 5: PARAJUMP

```
Ø 'GOOLIAN OLYMPICS---PARACHUTE
JUMP
1Ø ' CREATED BY J. KOLAR, 1984
2Ø '
3Ø PMODE3:PCLS:PMODE4
4Ø A=128:B=42:R=8Ø:PI=3.14
41 Q=33
5Ø DIM S(13)
6Ø DRAW"BMØ,8M+2,-3M+6,-4M+2,-2M
+2,2M+6,4M+2,3L2ØF1ØNE1ØNM-4,-1Ø
NM+4,-1Ø LDL2DR2D3LDR4ULU3R2UL2U
L"
61 PAINT(9,5),1,1
62 PAINT(1Ø,2Ø),1,1
7Ø GET(Ø,Ø)-(2Ø,24),S,G
8Ø PCLS
17Ø SCREEN1,1
171 LINE(Ø,32)-(255,32),PSET
172 LINE(Ø,134)-(255,191),PSET,B
F
175 FOR SS=3Ø TO 3Ø STEP3Ø
18Ø FORZ=1TO288Ø STEPSS:C=Z
19Ø C=9Ø+C*PI/18Ø
195 K=C*PI/-9Ø
2ØØ X=INT(A-6+R*COS(K)):Y=INT(B-
8+R*SIN(K))
21Ø PUT(X-4Ø,Y)-(X-2Ø,Y+24),S,PS
ET
211 PUT(X+3Ø,Y)-(X+5Ø,Y+24),S,PS
ET
212 PUT(X+1ØØ,Y)-(X+12Ø,Y+24),S,
PSET
22Ø NEXT Z,SS:FOR H=1 TO5ØØØ:NEX
T:PCLS:GOTO17Ø
```

Listing 6: PARALIFT

```
Ø 'GOOLIAN OLYMPICS---PARACHUTE
LIFT
1Ø ' CREATED BY J. KOLAR, 1984
2Ø '
3Ø PMODE3:PCLS:PMODE4
4Ø A=128:B=122:R=8Ø:PI=3.14
41 Q=33
5Ø DIM S(13),T(13)
6Ø DRAW"BMØ,8M+2,-3M+6,-4M+2,-2M
+2,2M+6,4M+2,3L2ØF1ØNE1ØNM-4,-1Ø
```

```
NM+4,-1Ø LDL2DR2D3LDR4ULU3R2UL2U
L"
61 PAINT(9,5),1,1
62 PAINT(1Ø,2Ø),1,1
7Ø GET(Ø,Ø)-(2Ø,24),S,G
71 LINE(2ØØ,Ø)-(22Ø,24),PSET
8Ø PCLS
17Ø SCREEN1,1
171 LINE(Ø,32)-(255,32),PSET
172 LINE(Ø,136)-(255,191),PSET,B
F
175 FOR SS=3Ø TO 3Ø STEP3Ø
18Ø FORZ=1TO288Ø STEPSS:C=Z
19Ø C=9Ø-C*PI/18Ø
195 K=C*PI/-9Ø
2ØØ X=INT(A-6+R*COS(K)):Y=INT(B-
8+R*SIN(K))
21Ø PUT(X-4Ø,Y)-(X-2Ø,Y+24),S,PS
ET
211 PUT(X+3Ø,Y)-(X+5Ø,Y+24),S,PS
ET
212 PUT(X+1ØØ,Y)-(X+12Ø,Y+24),S,
PSET
216 PUT(X+3Ø,Y)-(X+5Ø,Y+24),T,PS
ET
22Ø NEXT Z,SS:FOR H=1TO2ØØØ:NEXT
:PCLS:GOTO17Ø
```

Listing 7: BUCKLEUP

```
Ø 'GOOLIAN OLYMPICS---BUCKLE UP
THE SKY HOOK!
1Ø ' CREATED BY J. KOLAR, 1984
2Ø '
3Ø PMODE3:PCLS:PMODE4
4Ø A=128:B=122:R=8Ø:PI=3.14
41 Q=33
5Ø DIM S(13),T(13)
6Ø DRAW"BMØ,8M+2,-3M+6,-4M+2,-2M
+2,2M+6,4M+2,3L2ØF1ØNE1ØNM-4,-1Ø
NM+4,-1Ø LDL2DR2D3LDR4ULU3R2UL2U
L"
61 PAINT(9,5),1,1
62 PAINT(1Ø,2Ø),1,1
7Ø GET(Ø,Ø)-(2Ø,24),S,G
71 LINE(2ØØ,Ø)-(22Ø,24),PSET
8Ø PCLS
17Ø SCREEN1,1
171 LINE(Ø,41)-(255,41),PSET
172 LINE(Ø,18Ø)-(11Ø,165),PSET:L
INE-(126,18Ø),PSET:LINE-(255,18Ø
),PSET:PAINT(Ø,181),1,1
175 FOR SS=3Ø TO 3Ø STEP3Ø
18Ø FORZ=1TO288Ø STEPSS:C=Z
19Ø C=9Ø+C*PI/18Ø
195 K=9Ø-C*PI/-9Ø
2ØØ X=INT(A-6+R*COS(2)):Y=INT(B-
8+R*SIN(K))
21Ø PUT(X-4Ø,Y)-(X-2Ø,Y+24),S,PS
ET
211 PUT(X+3Ø,Y)-(X+5Ø,Y+24),S,PS
ET
212 PUT(X+1ØØ,Y)-(X+12Ø,Y+24),S,
PSET
216 PUT(X+3Ø,Y)-(X+5Ø,Y+24),T,PS
ET
22Ø NEXT Z,SS
225 'PUT(X+3Ø,Y)-(X+5Ø,Y+24),S,P
SET
23Ø GOTO 23Ø
```


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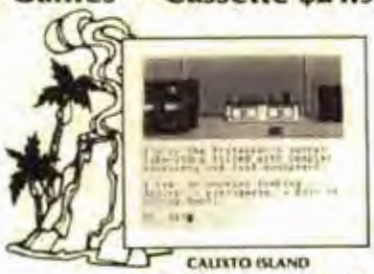

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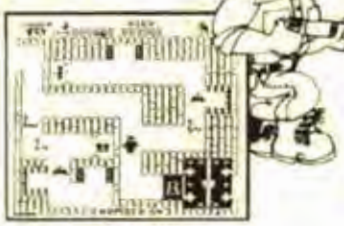

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Direct Comparison — Exhibiting The Power Of Spreadsheets

By Richard A. White
Rainbow Contributing Editor

It occurred to me that some of the utility programs in RAINBOW which are programmed in BASIC might be done just as well or better in a spreadsheet. It is a good opportunity to demonstrate the power of a spreadsheet in a direct comparison. I had to look no further than Joseph Kohn's *Purchase Order* BASIC program in the May 1985 issue (Page 172). I would guess that 20 to 40 hours of programming were involved.

Making forms is where spreadsheets shine, so I brought out *DynaCalc* and within two hours my purchase order form was done, complete with ASCII saves of the results to feed *Telewriter* when it came time to write this column. (Well, not quite done, since I did find a few bugs as I put the column together and had a few ideas for improvements.) The illustrations accompanying this column are the third or fourth try, but still no major amount of time was involved.

For good measure, I did the form over the next evening in the new *Elite*Calc Version 3.0* using the 51-by-21 screen. Having already done the spreadsheet once, the biggest problem with *Elite*Calc* was waiting for the screen to update.

There is a lot to like about *Elite*Calc Version 3.0*. What it gives up to screen memory is gained back in a 30 percent more efficient file structure. A windowing feature, VIEW mode, has been added along with the ability to print the spreadsheet with column and row identification (borders). If you start to enter something new in a cell and decide to keep the previous contents, hit the BREAK key and the entry is aborted without damage. ZAP will delete all numbers in the program, but preserve text and equations — use this with care.

The program is copy-protected, but is supplied with two program disks and a damaged disk can be sent back to Elite with $15 for replacement. I have bombed my share of disks, but never one that was write-protected. Further, once the program is loaded, you can remove and safely store your program disk. *DynaCalc*, on the other hand, overlays a number of functions from disk so your program disk must stay in Drive 0 throughout your session.

Unfortunately, the screen rewrite is slow and is done much more frequently than necessary. Again and again, I sat waiting for the screen to rewrite with exactly the same material that was there before with but one change. I would certainly give up 500 bytes of memory for some screen update smarts; let's have a Version 3.1. We know it can be done since *DynaCalc* does it.

The *Word-Pak* version does not need to deal with graphics so it is much faster. The 80-character-by-24-line display is very attractive. Besides, you get back the graphics memory plus a little. Couple that with the improved file structure and this is a very competitive program.

Coming back to the purchase order, my version is shown as Figure 1. I started with Joseph Kohn's design and modified it to my own tastes. Having some of the basic design already done helped.

To construct the form we start with column widths. These are determined by the central part of the form where the items being ordered are listed. Column A was set to four characters to form a left margin. Column B was also set to four since I do not expect the quantity to be a very large number.

The beauty of a spreadsheet program is that something like a column width is easily set while the form is being

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

constructed. If you are a large volume buyer of, say, disk hub reinforcement rings, and your order quantity is "each," you may want to leave the column a bit wider.

There is a fair amount of text on the form. If you change column widths after the text is entered, some text and formatting may be messed up. Make your column width decisions early and try to stick with them.

Also, don't forget your printer. How many characters wide can you print? The purchase order is best fit onto a standard 8½ by 11-inch sheet using normal type so an 80-character per line limit, including margins, is dictated.

The lot size, which might be a number or each, dozen, ream and the like, is in Column C. This was set at six characters. Column D, reference number, was set at 12 which may be on the short side. In the *DynaCalc*, I was able to set the description, Column E, to 30 characters.

*Elite*Calc* limits column widths to 28 characters for compatibility with the 28-character CoCo display. Remember that an *Elite*Calc* file must work in any version of the program, even when written in a wide line mode. Columns F and G were left in the default: nine columns wide.

In the heading, the name and address are positioned in Column E to be about centered on the whole form. Below that, the words "DATE" and "TO:" are in Column D and are right justified. The

Figure 1 — Purchase Order Spreadsheet Example

```
 [A ][B ][ C  ][    D     ][              E                ][   F   ][   G   ]
 1-
 2-                          RICHARD A. WHITE
 3-                             44 DOW CT.
 4-                        FAIRFIELD, OH  45Ø14
 5-                            513-829-851Ø
 6-
 7-                    DATE APRIL 22, 1985
 8-
 9-                     TO: CINSOFT
1Ø-                         2235 LOSANTIVILLE AVE.
11-                         CINCINNATI, OH  45237
12-
13-
14-                              PURCHASE ORDER
15-   ***********************************************************************
16-       LOT   REFERENCE                                      UNIT    TOTAL
17-   QTY SIZE  NUMBER                 DESCRIPTPTION           PRICE    PRICE
18-   --- ----- ----------- ------------------------------ -------- --------
19-    1  EA    TEAC 54A    2-DRIVE COCO DISK SYSTEM         399.ØØ   399.ØØ
2Ø-
21-    1   1Ø                ULTRA SS/SD DISKS                 15.ØØ    15.ØØ
22-
23-    1  EA                 SPEECH SYSTEMS EARS               99.95    99.95
24-
25-
26-
27-
28-
29-
3Ø-   --- ----- ----------- ------------------------------ ------------------
31-                                                      SUB TOTAL   513.95
32-                                              PERCENT  DISCOUNT
33-                                                       DISCOUNT     Ø.ØØ
34-                                                      SUB TOTAL   513.95
35-                                   PERCENT TAX/TAX        5.5Ø    28.27
36-                                                       SHIPPING
37-                                                                ---------
38-                                                          TOTAL   542.22
39-   ***********************************************************************
4Ø-
41-   PRICES SOURCED FROM-
42-
43-   CHECK ENCLOSED.
44-
45-   CHARGE TO VISA CARD # XXXX XXX XXX XXX
46-
47-       EXPIRATION DATE-  1Ø/86
48-
49-             SIGNATURE-  ----------------------------
5Ø-                         RICHARD A. WHITE
51-
52-   SHIPPING INSTRUCTIONS PICKUP ON/ABOUT APRIL 26
```


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user can then enter the data following these words in Column E. A trick here is to type a space after both DATE and TO: so they don't lay exactly at the right side of the column.

In the order section we are going to do considerable cell formatting. The right-justification format mentioned in the previous paragraph is but one of a large number available. The first four column headings are routine without special format. "UNIT PRICE" and "TOTAL PRICE" are right justified to align nicely over the columns of figures.

Items being ordered are entered in rows 19 through 29. Some of the columns in this area carry a number of format controls. The quantity (QTY) is to be an integer justified to the left. This lets the "LOT SIZE" entries be left justified with one or more spaces between these entries and the quantity. The format command must be invoked for each format control imposed on the cell.

A left-justification format is applied to both columns C and D so any numbers entered will be left justified as text is. With *Elite*Calc* there is no problem with applying a format to a blank cell. However, *DynaCalc* won't let you do this; it gives no objection, it just doesn't comply. You can beat this by putting a space into the cell and then formatting it. Since the space is a nonprinting character the cell looks empty. Whatever you may later enter will wipe out the space.

Cells C and D also want to carry integer format. This is no problem since a cell may have a number of formats at any time.

DynaCalc will not let you format over a range using the format command. In our example, put spaces in cells B19, C19 and D19, then apply all the required formats to these cells. Finally, replicate the range B19 . . . D19 over the range B20 . . . B29. The range B19 . . . D19 is then replicated 10 times, each time starting in another 'B' column cell.

The total price for a line entry is the quantity in Column B times the unit price from Column F. The formulae to calculate total price in *DynaCalc* are shown in Figure 2. An IF statement is used to test if there is a value in Column B before making a calculation. If there is none, the contents of cell A1 are written.

A1 contains a space so it looks and prints like there is nothing in the cells in Column G corresponding to empty purchase order entries. Prior versions of *Elite*Calc* cannot do this. However, Version 3.0 has been improved so if the test in an IF statement is false, the cell is left empty rather than being filled with 0.0. The *Elite*Calc* formula for cell G19 is =IF B19>0 THEN B19*F19.

Figure 2 — *DynaCalc* Formulae for the Purchase Order

```
   [   F   ][          G          ]
15-**********************
16-      UNIT                    TOTAL
17-     PRICE                    PRICE
18- -------- --------
19- 399       @IF(B19>0,B19*F19,A1
20-           @IF(B20>0,B20*F20,A1
21- 15        @IF(B21>0,B21*F21,A1
22-           @IF(B22>0,B22*F22,A1
23- 99.95     @IF(B23>0,B23*F23,A1
24-           @IF(B24>0,B24*F24,A1
25-           @IF(B25>0,B25*F25,A1
26-           @IF(B26>0,B26*F26,A1
27-           @IF(B27>0,B27*F27,A1
28-           @IF(B28>0,B28*F28,A1
29-           @IF(B29>0,B29*F29,A1
30----------------------
31-SUB TOTAL @SUM(G18...G30)
32- DISCOUNT
33- DISCOUNT G31*(G32/100)
34-SUB TOTAL G31-G33
35- 5.5       G34*(F35/100)
36- SHIPPING
37-          ---------
38-     TOTAL G34+G35+G36
39-**********************
```

The @SUM(G18 . . . G30) function's range deserves mention. It spans from the upper to the lower dashed lines. This way, any way you are likely to insert rows to enlarge the order entry area will fall within the range and be included.

If you add rows you are likely to remember to replicate the 'G' column formula into those rows, but probably would forget to check the summation. A likely action is to put the cursor onto Row 30 and do an Insert which will move Row 30 to Row 31. The *DynaCalc* program will adjust the sum to @SUM(G18 . . . G31) and your new row will be included. The remaining formulae are completely straightforward.

The remainder of the purchase order is also fairly straightforward. Note that a line saying "CHECK ENCLOSED" is included as well as charge card information. You can use one or the other and delete the row or rows that do not apply.

Once you have gotten your purchase order shell working, blank out the data only and save it. Thereafter, when you prepare an order, load the empty shell and go to work.

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1009:259 ★Matt Hazard, Columbia Station, OH

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41,975 ★Michael Hebb, Victoria, Australia
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79,100 David Close, Springfield, VA
44,000 Joseph Dehn, Tucson, AZ
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26,000 Eric Foss, Cochrane, Alberta
25,500 Michele Gaboriault, Foxboro, MA
25,000 Andrew Bartels, Sulphur, OK
24,500 Tom Harrison, Pittsfield, MA
20,000 Jean-Pierre Boisclair, Asbestos, Quebec
13,000 Eugene Little, Pierceland, Saskatchewan
10,000 Terry Smith, Grand Centre, Alberta

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668,690,000 ★Jeff Lawrence, Cambridge, Ontario
459,051,041 Denise Morin, Hudson, MA
4,560,144 Jon Hobson, Plainfield, WI
4,134,900 Brandon Duncan, Benton, KS
29,452 Scott Bellman, Davenport, IA

JUNIOR'S REVENGE *(Computerware)*
8,020,000 ★Ian Stewart, Lynwood, Perth-Australia
1,384,100 Chris Morris, Colonial Heights, VA
786,300 Richard Wiseman, Marion, OH
205,700 Tony Smith, Gig Harbor, WA
36,200 Stephane Asselin, Baie-Comeau, Quebec

JUNKFOOD (THE RAINBOW)
1,187,520 ★Larry Thomson, Menominee, MI
1,079,000 Jean-Francois Morin, Loretteville, Quebec
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2,875,870 Ann-Marie MacKay, Port Hardy, British Columbia
2,520,950 Thomas Henry, Boca Raton, FL
2,038,250 Mario Asselin, Baie-Comeau, Quebec
571,300 Gabriel Pigeon, Villemontel, Quebec

MUDPIES *(MichTron)*
961,700 ★Jon Blow, San Diego, CA
285,600 Stephen Zamonski, Ewing, NJ
249,800 Brian Wolfgram, Freeland, MI
137,000 David Craft, Roanoke, VA
114,800 Barry Stanton, North East, PA

PAC-TAC *(Computerware)*
14,425 ★Alfredo, New York, NY

PENGUIN (THE RAINBOW)
48,250 ★Paul Wagorn, Carp, Ontario
28,330 Kirby Smith, York, PA
22,670 Gary Bedford, Piqua, OH
14,550 Matt Funk, Hanover, PA
14,540 Michael Nelson, Lancaster, PA
14,320 Benji Ripley, Toronto, Ontario

PHANTOM SLAYER *(Med Systems)*
1,326 ★Susan Ballinger, Uxbridge, Ontario
124 Chris Morris, Colonial Heights, VA

PIPELINE (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 Bironas, Crestwood, KY

PLANET INVASION *(Spectral Associates)*
59,600 ★Terry Steele, Summerfield, NC
52,450 Ian Loeppky, Blumenort, Manitoba
32,350 Susan Ballinger, Uxbridge, Ontario
10,750 Saul Kirsch, Ra'anana, Israel
5,950 Michael Derman, Tel-Aviv, Israel

POLARIS *(Radio Shack)*
171,862 ★Thomas Levasseur, Rockland, ME
133,726 Ed Meyer, Vancouver, British Columbia
112,535 Brett Ankrom, Atlanta, KS
97,450 Jay Beam, Louisville, KY
87,910 Ron Sujkowski, Bay City, MI
16,966 Clint Stapp, Ft. Worth, TX

POLTERGEIST *(Radio Shack)*
6,000 ★Billy Fairfull, Charleston, SC
4,900 Kristine Haines, Nepean, Ontario
4,885 Frank Canepa III, Santurce, Puerto Rico
4,800 Lisa Ballinger, Uxbridge, Ontario

SCOREBOARD

4,830	Joel Pascock, Thousand Oaks, CA
4,200	Bryan Ecker, Lusby, MD
3,755	Pierre-Jean Douillard, Granby, Quebec

POOYAN *(Datasoft)*

3,785,000	★Ben Collins, Clemson, SC
1,546,000	Jeff Connell, Winona, MN
1,250,350	Richard Hawkins, Cleveland, TN
909,250	Daniel Belisle, Montreal, Quebec
194,800	Helene Gilbert, Rouyn-Noranda, Quebec
114,550	Jamey Maumus, New Orleans, LA
103,150	Lisette Kyer, Cornwall, Ontario
84,600	Sean Colsen, East Lyme, CT
81,750	Jean-Francois Lauzier, Asbestos, Quebec

POPCORN *(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 Bost, Temple, TX
29,640	Alfredo, New York, NY

Q-NERD (THE RAINBOW)

1,958,950	★Bruce Baltzer, Hanover, Ontario
61,290	Sean Conner, Summit, NJ

QUIX *(Tom Mix)*

907,320	★Andrew Norris, Mississauga, Ontario
447,953	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, Prairie du Chien, WI
40	Robbie Haines, Nepean, Ontario

RACER (THE RAINBOW)

159.9	★Frank Canepa III, Santurce, Puerto Rico
90.2	Chris Neal, Wabash, IN

RADIO BALL *(Radio Shack)*

4,510,740	★Les Dorn, Eau Claire, WI
3,708,810	Stephen Zamonski, Ewing, NJ
1,736,150	Mickey Emberton, Indianapolis, IN
1,511,640	Kelly Dion, Cap-de-la-Madeleine, Quebec
1,286,500	Diana Knight, Euless, TX
1,117,500	Michel Francoeur, Laval, Quebec

REACTOIDS *(Radio Shack)*

5,257,295	★Gary Bedford, Piqua, OH
73,240	William Blaine III, Gallipolis Ferry, WV

RETURN OF THE JET-I *(ThunderVision)*

538,432	★Matt Griffiths, Stilwell, KS
429,160	Jean-Francois Bruneau, St-Hubert Quebec
203,500	Jamey Maumus, New Orleans, LA

ROAD RACE (THE RAINBOW)

91.7	★Bill Martin, Myrtle Beach, SC
576.6	Eric Clarkson, Missouri City, TX
706.1	Michael Habb, Victoria, Australia
1212.4	Michael Mariens, Wausau, WI
2158.5	Steven Roth, Fannystelle, 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 Dater, Medford, OR
333,400	Shane Woodrum, Decatur, IL
202,800	Nicole Hubler, Swanwick, IL

SANDS OF EGYPT *(Radio Shack)*

80	★John Allocca, Yonkers, NY
82	Jeff McKay, Travis AFB, CA
97	Phill Zarfos, Dallastown, PA
98	Aaron Durkee, Lansing, MI
198	Bob Mazzola, Freehold, NJ

SHAMUS *(Radio Shack)*

62,940	★Jon Blow, San Diego, CA

SHENANIGANS *(Mark Data)*

96	★N. Wakelin, Mt. Lebanon, PA
103	Chris Cope, Central, SC

SKIING *(Radio Shack)*

01:00	★Scott Clevenger, Fairmount, IN
01:00	★Billy Fairfull, Charleston, SC
01.10	Mike Schart, Fremont, OH
01:12	Sean Conner, Summit, NJ
05.85	John Hokpins, Greenville, SC

SNAKER (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	Baiju Shah, Deep River, Ontario

SOLO POKER *(Radio Shack)*

1,100	★Carol Staker, Moscow, ID
690	Robert Peterman Jr., Newton, TX

SPACE RACE *(Spectral Associates)*

83,422	★Mark Donahue, Alexandria, VA
11,800	Mario Asselin, Baie-Comeau, Quebec

SPEED RACER *(MichTron)*

126,750	★Jack Menzullo, Saginaw, MI
121,260	Paul Kenyon, Phoenix, AZ
115,410	Jean-Francois Pigeon, Villemontel, Quebec
111,200	Mike Rebbecchi, Somerdale, NJ
109,440	Dan Bouges, Niantic, CT
97,670	Gabriel Pigeon, Villemontel, Quebec
91,980	Jean-Francois Lauzier, Asbestos, Quebec
86,510	Peter Hezky, Windsor, Ontario

STAR BLAZE *(Radio Shack)*

9,000	★Gary Bedford, Piqua, OH
7,950	Matthew Daley, Binghamton, NY
7,950	Mike Marcol, 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 Silva, Cranston, RI

TEMPLE OF ROM *(Radio Shack)*

646,100	★Sonya Hurst, Richmond, CA
620,800	Rhea Jarrard, Olympia, WA
463,400	Glenn Alfrey, Olympia, WA
288,500	Carol Elliot, O'Leary, Prince Edward Island
235,660	Jim Issel, Cotati, CA
205,400	Bill Elliot, O'Leary, Prince Edward Island
187,000	Gary Sebastian, Hazel Park, MI

TRAILIN' TAIL (THE RAINBOW)

119,705	★Diago Gallina, Summit, NJ
105,300	Jerry Dill, Frankfort, MI
102,930	Philip Parent, Smiths Falls, Ontario
94,810	Jean-Marc Parent, Smiths Falls, Ontario
76,275	Michael Rosenberg, Prestonsburg, KY

TUT'S TOMB *(Mark Data)*

189,760	★Jerry Austin, Baraboo, WI
184,380	Biagio Di Lorenzo, Montreal, Quebec
163,060	Michael McCafferty, Oceanside, CA
158,000	Chris Russo, Miami, FL
148,300	Mike Rebbecchi, Somerdale, NJ

WHIRLEYBIRD RUN *(Spectral Associates)*

43,850	★Glen Bilodeau, 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 Kluger, Miami, FL
48,900	Stephane Asselin, Baie-Comeau, Quebec

ZAXXON *(Datasoft)*

2,068,900	★Dave Levora, 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
666,000	Andy Green, Whitehall, PA
643,000	Ryan Devlin, Louisville, KY
86,500	Brian Kinnaird, Ladson, SC
84,000	Gail Kinnaird, Ladson, SC
82,300	Erik Huffman, Delran, NJ
60,400	Tom Harrison, Pittsfield, MA

— 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.

MODEM CALL

Scoreboard:

I have the *P51 Mustang Attack Flight Simulator* from Tom Mix Software that is capable of being played over the modem, provided the other end has the program also. If there is anyone out there in the 812 area, please call me at 812-422-8565 to "dogfight." If you can afford to call me long distance, that would be great. I do hope someone calls, because I want to get my money's worth out of this. I am getting rather bored shooting at the computer's "drone" plane. I want to "dogfight" someone and make a new "modem" pal. It should be lots of fun, so do call.

Chuck Alvey
Evansville, IN

WILY WIZARD

Scoreboard:

For those who have *Dungeons of Daggorath*, try this tip. If you have noticed, when facing a creature you and it "take turns" in attacking. To get two "turns" you must find something worthless (such as an Abye flask) and drop it when you are about to fight. When the creature enters your cell, attack repeatedly. When your "turn" is up, the creature will pick up whatever is in your cell instead of attacking. That will be his "turn" and you can attack again. Do *not* try this with the wizard's image or the wizard, because they won't pick up anything. If you need more help or the solution, write to me at Rt. 4, Box 316-A, 24426.

Mike French
Covington, VA

YO HO HO

Scoreboard:

I have just solved Mark Data's *Sea Search*! Here are some clues. To get the shark repellant, get the mirror (it's just beyond the stairs), give it to the mermaid and she will give you the key to the trapdoor. The keg of rum is in the cave where you keep your treasures.

Always watch your air gauge, don't go past the sharks without the repellant and always close the cave with the rock! Good luck!

Charles Farris
Lebanon, IL

BAT O' ROM-A

Scoreboard:

In *Temple of ROM* if you wait until the bat is on the screen, any treasure "taken" doubles in value. This is especially useful in the case of the crown which has a value of 5,000.

Bill Elliott
O'Leary, Prince Edward Island

HEARTY ADVICE

Scoreboard:

I have some hints for your readers who are fans of *Dungeons of Daggorath*.

1) Watch your heart rate carefully. When it is fast, hide by going around corners or in places where there are no long hallways. Another ploy is to stand over a pile of objects. If an attacking creature is known to be weak and may be destroyed with one or two blows, let it take the entire pile before engaging in a fight. This will allow your heart rate to slow, which in turn will increase your strength.

2) The flasks are subtle in effect. Once you have obtained 23 or more objects you will be strong enough to survive the drinking from the Abye flask, but only when your heart rate is at a slow pace.

3) Hiding a pile of objects from wandering creatures is an important strategy. You may choose to move to the hidden pile, luring a creature to the cache at the same time, because of the protection offered when creatures stop to pick up objects.

Douglas G. Oxenreider
Montevideo, MN

ANCHORS AWEIGH

Scoreboard:

I have won a "great victory" on the war game *Battle of Midway* from Ark Royal Games, and have learned that you can lose control of your carriers during the game. A few different things can cause an aircraft carrier to stray off:

1) Trying to re-type after a launch command is entered from the choice of course or launch;
2) Homing a plane squadron on a carrier when the squadron cannot make it to the carrier safely.

When you home a squadron on a carrier, do so only when you are sure the squadron has enough fuel to make it.

I am having trouble with the game *Sands of Egypt*. I cannot get any further into the game when I enter the drain. Should I enter the drain or is there somewhere else I should go? If anyone can help me with this problem please write me at 1360 East Capel Road, 44028.

Matt Hazard
Columbia Station, OH

DARN KID

Scoreboard:

In *Outhouse*, sometimes a bug occurs where garbage appears on the screen. This is to your advantage. The squatters/thieves cannot reach the door. Also, the house will sometimes crumble slowly (as if writhing in pain).

In *Shamus*, you can fire faster by holding the button down and moving the joystick.

In *Mudpies*, hold down the button when you die; this makes it faster. During the last two challenge levels I couldn't control "the kid." Does anyone know why? Write to 14925 Satanas St., 92129.

Jon Blow
San Diego, CA

Scoreboard:

I would like to challenge David Oelhaupl of Calgary on his statement in the March RAINBOW [concerning *Pyramid*]. He says

(continued from Page 14)

". . . don't worry about the scepter, you'll find you don't need it . . ." You need the scepter to get the bird and you need the bird to drive away the serpent in order to get to a large portion of the game. However, there could be another exit to it, and if there is, I'd like David to write to me and tell me where it is. My address is Box 224, R0A 0C0.

Ian Loeppky
Blumenort, Manitoba

POKE PATTER

Scoreboard:

I beat *Dungeons of Daggorath* about a year ago. Since then I have found pokes controlling strength, rings and many other things. If anyone is interested in the pokes or if you need help in *Dungeons of Daggorath, Bedlam, Calixto Island, Shenanigans, Pyramid, Sea Quest* or *Black Sanctum*, just send a SASE to me at 7809 Hermosa, 79108.

Mike Ruggles
Amarillo, TX

DALLAS QUEST

Scoreboard:

I have solved *Dallas Quest*. For anyone interested, to kill the giant rat you need the "night owl." To get the night owl give him the sunglasses.

For more information about *Dallas Quest*, send a SASE to me at 108 Magnolia, 75570.

Joe H. Dike
New Boston, TX

Scoreboard:

In *Dallas Quest*, does anyone know what's so special about the ring and how to use it? If anyone does, then please let me know.

Also, I have solved *Calixto Island* and would be glad to help out anyone who needs it. I can tell you right now you will need everything you come across, except for the following: the message, the chest, the keys (in Trader Jack's shop) and the pottery. To use the teleport you must "activate energizer" and then "press button." If you want help, write to me at 7504 Pimlico Dr., 40214.

One other thing: can someone please help me with *Shenanigans*? I can't get out of jail for "indecent exposure" and I can't get into the subway.

Kevin Dorsey
Louisville, KY

Scoreboard:

Help! I am working on the *Dallas Quest* Adventure game and I am stuck. I don't know how to use the ring. When I type USE RING the computer asks "How?" I've tried everything from eating the ring to showing it. I've gotten as far as the Cannibal Natives and can't get past them to get into the cave. I tried a "clue" and it says "Try using the same thing that you used on the elephant," but I still don't know how to use it there. Please help! Anyone who can help or even give me some hints, write me at #8 Morris Lane, 75503.

Chris Foster
Texarkana, TX

MINE FIELD MENACE

Scoreboard:

In *Crystal Castles*, by ThunderVision, when you are on the first level, go into the door and jump. You should get a 70,000 bonus, a free bear and advance to a high level.

In the Adventure game *Saigon: The Final Days*, I can't get past the mine field after I have blown up the Viet Cong machine gun nest. Any help would be greatly appreciated. You can write to me at 4009 32nd Ave Ct., NW, 98335.

Rodney Mullineaux
Gig Harbor, WA

KEY EXPLANATION

Scoreboard:

Can anyone explain how to get the key in Screen 10 of *Tut's Tomb*. You cannot get out of Screen 12 without it. Write to 231 W. Wagler, 61550.

Ruth Horner
Morton, IL

QUARTERS QUERY

Scoreboard:

I need hints on the *Alcatraz* Adventure. How do you get the bullet? How do you get into the guard's quarters a second time, after you have entered and left? What are the chisel and pliers used for? Hints only please, *not* the whole solution. Write me at 1213 W. McClure, 61604.

Wade Fehr
Peoria, IL

Johnson, Murray Jobe, Donnie Hamilton, Andre Needham, Bruce and Joanne Dugger, E.A. "Ed" Pruitt, Felix and Cheryl Edwards, Melinda Ballist, Eric Elmquist, Thomas Young, Larry Texeira, Carl Milligan, Chris Hawkes, Vitold Gornicz, Terry Jensen and Jerry Yowl, Larry Seymour, Michael Parry, Bob Lentz, Walt Anderson, Frank Callison, Curtis Wood, Paul Schallowitz, Philip Zwart, Bill McCabe, Thomas Bennett, Peter Pollack, Dan Uytiepo, Roger Musser, Herb Hart, Andy Ervin, Richard Sailors, Tom Sancher, Alex and Carolyn Webster, Tom Rosenbaum, Ravo Lainevool, Dave German, Stan Osterbauer, Howard English, Jerry and Karen McKee, Mark McGary, David Prey, Kevin Johnson, Norm Cooke, Z. Szili, Mike Herbert and Glenda MacLeod.

I have saved the best thank you for last, though. That thanks goes to you — the *most important* member of the CoCo Community. Without your support and enthusiasm for the Color Computer and THE RAINBOW, there would be no RAINBOW and no CoCo Community at all.

I know that thousands of you out there not only tell us you like this magazine, but you tell your friends, people who are thinking about buying a computer and, significantly important, our advertisers. I am as candid as I can be in telling you that *your* mentioning THE RAINBOW when you order products from advertisers has had a significant effect on our success. And, too, it has had a significant impact on the success of the CoCo market in general. Thank you for doing it. Please keep it up; it helps us a whole lot.

But just as important, thank you for taking us into your homes and your hearts. I honestly believe "CoCo Community" is more than just an expression to identify those of us who are interested in the Color Computer. I know I feel honored that you care about us as much as you do. And I want you to know we care about you, too.

It is an honor to be part of your lives and part of the CoCo Community. Thank you for letting us be just that.

— Lonnie Falk

Rock'n'Rollin' Back To The CoCo Rockfest

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, but don't forget that this is BASIC. Sorry, no personal replies are possible. All programs resulting from your ideas are for your use but remain the property of the author.)

During the past year I have received a great deal of mail asking when readers could expect the next installment of two of my more popular graphics programs, *CoCo Rockfest* and *Baseball Fever*. After over a year of waiting, *Rockfest II* is now a reality, and what better time for its release than as part of THE RAINBOW's anniversary issue?

In this version, I have included some of the symbols and designs for the most requested groups and have also included some of the graphics breakthroughs I have introduced to you in these pages over the last few months.

Before we get into the details of how *Rockfest II* works, let me deal with the issue of *Baseball Fever II*. I have received many letters from individuals, some of whom get quite angry that I have not replied to say when they could expect to see *Fever II*. Let me state once again: I simply do not have the time to answer all this mail, create the programs and write the column. If you want to know what is coming in following issues, just read the column. (I know I still owe a few people the 32 bracket wrestling programs they requested with a SASE. I will forward those after I add a few more refinements, so please be patient.)

The Wish

For those who may not have seen our first *Rockfest*, let me explain what the program is all about. As I have stated many times before, the Extended Color BASIC Manual which comes with your CoCo is one of the most powerful and flexible graphics languages available. In fact, recently, a friend who is a strong supporter of the Commodore 64 came to me to show me the specifications on the new Commodore 128K computer. This new C128 includes graphics commands such as DRAW, PAINT, LINE and COLOR. Naturally, my response was, "Big deal! CoCo users have had those commands for over four years now!" I guess our little Color Computer has been way ahead of its time!

When I released the first *Rockfest*, I stated that young programmers would find it very interesting to be able to type in graphics commands from the magazine listing and see the symbols and logos from their favorite rock groups explode in color on their computer screens. This helps encourage youngsters to explore how these commands work while improving their keyboard skills as well.

Needless to say, *Rockfest I* was a big success. I have even been approached by owners of discos and night clubs about using the CoCo to project these images on their video screens. (However, no one has actually done it yet, to my knowledge.) The mail I have received regarding the sequel has been overwhelmingly in favor of drawing the logos for some of the more popular "heavy metal" bands. With that in mind, here are your wishes granted in *Rockfest II*.

(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.)

The Program

The remainder of this article will be much smaller than usual since *Rockfest II* really does not break any new ground as far as graphics techniques are concerned. The one major difference between this version and the original is this version will fit into a 16K machine simply by leaving out the curtain and stage title card, and the remark lines.

This will be a big plus for all 16K owners, since the last version would only allow you to type in portions of the program, one group at a time. *Rockfest II* will run perfectly in 32K/64K without any modifications. I will explain the modifications for 16K at the end of this article.

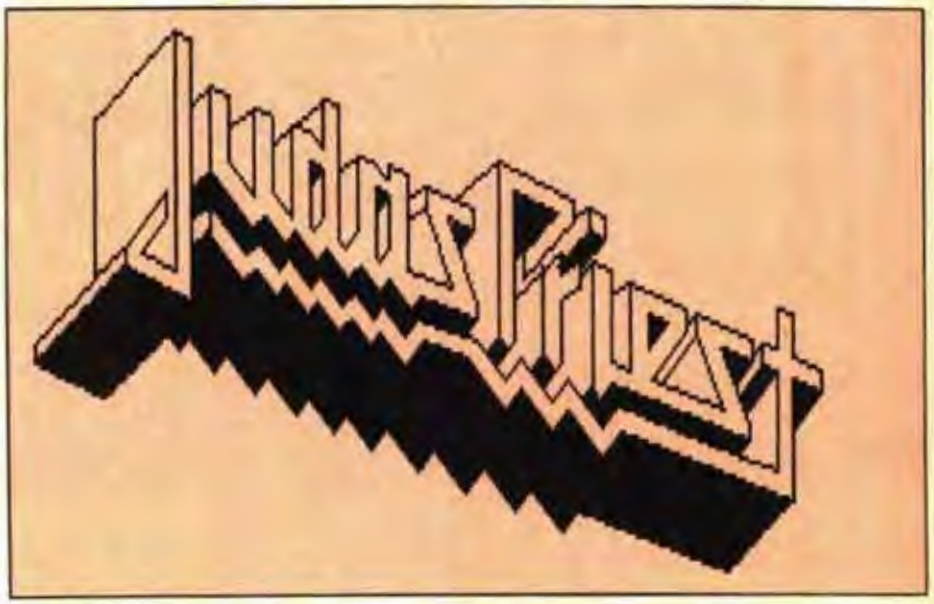
The eight groups included in this version are Judas Priest, Foreigner, Iron Maiden, Ratt, Def Leppard, Big Country, Kiss and The Police. (Not all are heavy metal!) Some of these logos will only take a few lines, such as Ratt, which only takes six lines, or Kiss, which only takes 10 lines. Sure, there is no real work of art, such as the ZZTop logo from *Rockfest I*, and the logo for The Police is a rather simple design from the *Synchronicity* album, but what do you expect? ZZTop did take a great deal of time!

For the first time I have also included a graphics which I did not write the lines for. The Judas Priest logo was written by my cousin, David Casuscelli, who is a freshman at the high school where I teach. Recently, his graphics of the rock group Motley Crue was used in THE RAINBOW as part of the "CoCo Gallery." Since I had planned on designing a Judas Priest logo, and David already had it written for his own use, I let him convince me to put his version in *Rockfest II*. (It didn't take too much convincing. As I've said before, no use reinventing the wheel.) I think you will find David did quite a good job on it.

Another feature which I included in this version is the use of PCOPY to help create the actual graphics. You will notice that after the Ratt logo is drawn at the top of the screen, it is repeated three more times rapidly to fill the screen with four copies of the logo. This technique is also used on the Police logo to repeat the graphics for the paint brush stroke. Not only does this save us some program lines, it helps to draw the graphics on the screen much more rapidly.

Those who are familiar with my graphics in *Football Fever I* and *II* and the extra PMODE4 colors will notice I have used one color from those techniques: yellow. I have put this into one array and use it to paint yellow using the OR command with the PUT statement. For those who wish to know how these colors are created, please refer to those articles (November 1984, Page 177 and December 1984, Page 107).

Some of you will remember that I also used the PCOPY command with the POKE178,n method to rapidly page through different-colored versions of AC-DC and Asia in the last version.



This time I used the same technique for Kiss, only I created the graphics in PMODE1 rather than PMODE3 or 4. This allows us to use the PCOPY command without having to PCLEAR any additional pages.

Running the Program

After you have successfully typed in the listing, RUN the program. The screen will fill with a curtain and stage, draw out the title "CoCo Rockfest II" and then draw a set of A's and B's at the bottom of the screen.

Of the two letters drawn, press the one which is colored red and the program will proceed to the menu. Press the letter next to the graphics you wish to see, and the screen will proceed to draw the group which you selected. If you wish to return to the menu, simply press the ENTER key and the menu will reappear.

If you wish to have a little fun with the program, type AUDIOON:MOTORON and ENTER before running the program. You may now place a music cassette in your computer cassette recorder and play the music over the speaker of your TV.

Also, you may make screen dumps of these graphics if you have a screen dump program. (Please don't write and ask me to send you mine. I don't have one. I'm using someone else's!) Select the graphics you want from the menu, press BREAK and then load your graphics dump.

16K Modifications

If you wish to fit this program into 16K, then delete the following lines from this program listing:

```
DEL 24 - 82
DEL 112 - 128
DEL 248 - 256
DEL 324 - 336
DEL 444 - 454
DEL 514 - 528
DEL 638 - 652
DEL 762 - 776
DEL 826 - 840
```

If you have RAINBOW ON TAPE and only have 16K, you may still load the program, but first you must PCLEAR1. Next, load the program, delete the lines above, then PCLEAR4 and RUN. You may also wish to insert the following lines:

```
24 PMODE4,1:PCLS1:SCREEN1,1:
   PMODE3:PCLS2
26 X$=INKEY$:IF X$<>CHR$(13)
   THEN 26
```

On running the program, the screen should be red. If it is not, press the Reset button and RUN again until it is red. If the screen is red, simply press the ENTER key and the menu will appear. You will not get the title card, but this is better than nothing.

Conclusion

Keep your ideas coming in. If time permits, I just may be able to complete *Baseball Fever II* before the end of the baseball season, but please be patient. That one is a major project to finish!

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Use with your multi-pak or a "Y" cable. ("Y" cable available at $19.95).

Video is input via a BNC connector. External controls for HORIZONTAL POSITION, VERTICAL POSITION, HORIZONTAL WIDTH, BRIGHTNESS, and CONTRAST (FUZZ) settings.

Don't be fooled by imitators - this is the GRAPHICOM **VIDEO DIGITIZER** - the **only** digitizer that DIRECTLY inputs into Graphicom. (The original design by Cheshire Cat, the folks that brought Graphicom to the COCO world).

REQUIRES 64K COCO, 1 DISK DRIVE AND 2 ANALOG JOYSTICKS. FREE GRAPHICOM PROGRAM PICTURE DISK, AND GRAPHICOM UTILITY SUPPLIED WITH PURCHASE OF VIDEO DIGITIZER (A $50 VALUE!)

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5. **DISK TO DISK** (Powerful Sprit-N-Image Program. Copies regardless of protection schemes!!!)

- **MENU DRIVEN**
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Cassette $19.95 **Cat. No. 105CT**
Disk $24.95 **Cat. No. 105CD**

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Cat. No. 135HR

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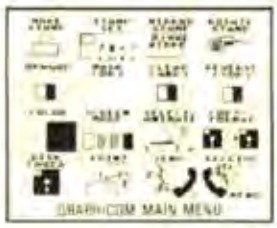

GRAPHICOM MAIN MENU

GRAPHICOM FONT PAGE

12C - ART DEMO FROM WHITESMITH

GCII FONT DISK

GRAPHICOM $24.95

Simply stated - One of the finest graphic programs written for the Color Computer!

FEATURES:

- 9 B.E.S.T. Full Screen Modes!
- 6 Colors modes (including 2 "Hi-Res" modes in 16K!)
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- Color Purge and Auto Color Cycling for use with Hi-Res artifact
- Save Various portions over Computer images in 16K, 32K or 64K RAM
- Supports screen graphics captured by Disto systems from most CRT's or video game consoles and computers.
- Multiple 8-bit character font, user re-definable!
- Supports utility for transferring Graphicom screens to Basic as either M or I programs.
- Screen utility for loading screens from Basic or other sources.
- Built in Hi-Res SCREEN PRINT compatible with EPSON, C-ITOH, GEMINI 10, OKI, Star Micronics, DP-VII, DP-IV, DMP-100, DMP-200 and DCP-111 printers from 110 to 9600 baud!
- Slow scan television SAVE/RECALL options!
- Many additional features, upgrading every month with user's and suggestions, etc.

• EASY TO LEARN GRAPHIC MENU • REQUIRES 64K COCO, 1 DRIVE SYSTEM AND 2 ANALOG JOYSTICKS

PICTURE DISKS $9.95

Available from COMPUTIZE

- 4C - Artifact color palette
- 5C - Large character sets drawn with mouse design (from Derringer Software)
- 6C - Same as 5C, but set up as Starto set
- 7 - Miscellaneous Art Set #1
- 8 - Miscellaneous Art Set #2
- 9 - Miscellaneous Arts and Examples
- 10 - Miscellaneous Fonts
- 11C - Artifact color palette type fonts
- 12C - Art demo from WHITESMITH

Color Hi-res artworks from Whitesmith, the gaspile that brought you Graphicom Part II, introduced by an animated marching band performing a Sousa march in 4-part harmony!

13C - GRAPHICOM PART II function demo

GCII FONT DISKS

Each disk contains 40 or more font files (10 or more GRAPHICOM PART II fonts...4 versions of each, one for each display mode), and three "FONT INDEX" screens to make identification and selection easy.

- 14C - GCII Fonts Disk #1
- 15C - GCII Fonts Disk #2
- 16C - GCII Fonts Disk #3

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GRAPHICOM PART II is a menu-driven graphics utility that does not require the original GRAPHICOM to run. It includes many of the functions that are missing in GRAPHICOM and will load and save both STANDARD (binary) and GRAPHICOM format screens. **GRAPHICOM PART II** requires a 64K Color Computer or Color Computer II, and at least one disk drive. It supports 1 to 4 disk drives, keyboard or joystick input, COLOR or B/W (hi-res) operation, and 4 screen display modes. "OOPS" command provides recovery after mistakes, and allows experimenting. Supplied on disk with a 34 page manual.

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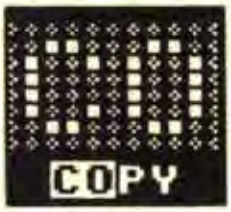
See your screens magnified 2x, 4x, or 8x! Draw or touch up in either color or B/W (hi-res) mode. Excellent for fine detail work.

Reposition graphics with precision and ease. WRAP-AROUND feature prevents graphics from running off the edge of the screen.

Add type in 16 different sizes, over 50 colors of text. Characters may be rotated or mirrored to allow typing in almost any direction!

Enlarge or reduce any part of a screen by any amount, proportional or non-proportional. Rotation can be anything from 0 to 359 deg.



Reproduce and enlarge small areas of the screen with icons or patterns for backgrounds, logos, etc. Over 80 icons supplied on disk (also user-definable).

More than 50 different colored shades and patterns available (over 200 if you count the 4 display modes). (Additional patterns may be user-derived!)

Substitute colors, swap BLUE and RED, remove WHITE (removing all color artifacts, ideal for painting!), create color separations.

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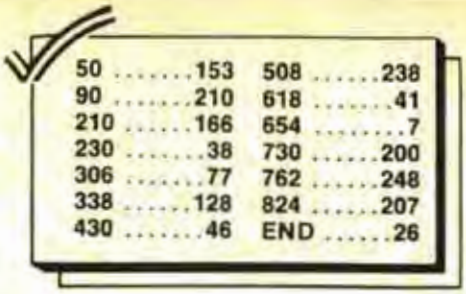

50	153	508	238
90	210	618	41
210	166	654	7
230	38	730	200
306	77	762	248
338	128	824	207
430	46	END	26

The listing: ROKFEST2

```
10 '*****************************
12 '*   THE COCO ROCK-FEST #2   *
14 '*      BY FRED B. SCERBO    *
16 '*      COPYRIGHT (C) 1985   *
18 '*149 BARBOUR ST.N.ADAMS,MA.*
20 '*****************************
22 DIM A(20)
24 PMODE4,1:PCLS0:SCREEN1,1
26 LINE(0,170)-(255,174),PSET,B
28 LINE(0,174)-(255,192),PSET,BF
30 PMODE3,1
32 POKE178,55:PAINT(128,2),,4
34 FORI=1TO40STEP4:IK=RND(3)+1:C
OLOR K,K::LINE(I,0)-(I,170),PSET
:LINE(254-I,0)-(254-I,170),PSET:
NEXT
36 FORI=2TO120STEP2:K=RND(3)+1:C
IRCLE(0,0),I,K,.4,0,.25:CIRCLE(2
55,0),I,K,.4,.25,.5:NEXT
38 LINE(70,48)-(182,120),PSET,BF
40 DRAW"BM108,52C3R4ND6R4BR6D6U3
R6D3U6BR6NR6D3NR6D3NR6"
42 PMODE4,1
44 FORI=96TO140STEP44
46 FOR Y=6TO10
48 CIRCLE(I,70),Y,0,.9,.15,.9
50 CIRCLE(I+11,78),Y,0,.9,.6,.8
52 NEXT Y
54 FOR Y=6TO10
56 IF I=96 THEN 58 ELSE 60
58 CIRCLE(I+33,78),Y,0,.9,.6,.8
60 CIRCLE(I+20,70),Y,0,.9
62 NEXTY
64 NEXTI
66 PMODE3,1
68 DRAW"BM76,94C2U12R4F2D2G2L4R4
F2D4BR8H2U8E2R4F2D8G2L4BR14R4NE2
L4H2U8E2R4NF2BR8D12U6R2E4NU2G4F4
D2BR4BU6R6BD6BR6U6NR4U6R6BR6"
70 DRAW"NR6D6NR4D6R6BR6R8U6L8U6R
8BR4R4ND12R4BD20BL46C3L20R4D12L4
R20L4U12"
72 FORI=6TO120STEP16:I$=STR$(I):
Y$=STR$(256-I)
74 DRAW"BM"+I$+",188C3U4NR4U4R4D
```


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```
8"
76 DRAW"BM"+Y$+",188C2NL6U4NL4U4
L6R2D8"
78 NEXTI
8Ø X$=INKEY$:IFX$="A"THEN82ELSEI
FX$="B"THEN84ELSE8Ø
82 B=2:R=3:R$="C3":GOTO86
84 B=3:R=2:R$="C2"
86 CLSØ:PMODE4,1:PCLS1:SCREENØ,Ø
:PMODE3:DRAW"S4BMØ,1":FORI=1TO64
:DRAWR$+"RBRC4R2":NEXTI:DRAW"BM2
,2":FORI=1TO64:DRAWR$+"RBRC4R2":
NEXTI:GET(Ø,1)-(256,2),A,G
88 CLS5:SCREENØ,Ø:PRINT@132," A)
 JUDAS PRIEST       ";
9Ø PRINT@164," B) FOREIGNER
    ";
92 PRINT@196," C) IRON MAIDEN
    ";
94 PRINT@228," D) RATT
    ";
96 PRINT@26Ø," E) DEF LEPPARD
    ";
98 PRINT@292," F) BIG COUNTRY
    ";
1ØØ PRINT@324," G) KISS
    ";
1Ø2 PRINT@356," H) POLICE
    ";
1Ø4 X$=INKEY$:IFX$=""THEN1Ø4
1Ø6 X=ASC(X$)-64:IF X<1 THEN 1Ø4
 ELSE IF X>8 THEN1Ø4
1Ø8 ON X GOSUB2ØØ,3ØØ,4ØØ,5ØØ,6Ø
Ø,7ØØ,8ØØ,9ØØ
11Ø GOTO88
112 '
114 '
116 '
118 '
12Ø '
122 '
124 '
126 '
128 '
2ØØ 'JUDAS PRIEST
2Ø2 'BY DAVE CASUSCELLI
2Ø4 PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3
2Ø6 DRAW"BMØ,ØCØ"
2Ø8 DRAW"BM21,48S4C1NM+Ø,+37BD1M
+26,-21'M+ØØ,+55'M-11,-4'M+Ø8,-8
U6'M-13,+13D4'M+21,+8'U57U3M-5,-
1D3'BM-17,+46'M-28,+22D4M+28,-22
M-28,+22M+22,+8M+21,-15BU3
21Ø DRAW"BM+8,-5ØM+5,-3D19M-5,+3
NBF4M+5,-3NF2U19M+6,+2D15M+8,+8M
```


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+Ø,-2ØNM-7,+3NM+5,+1BM+6,+2M+Ø,+
17M+6,+6M+Ø,-21NM-6,+4NM+9,-4M+5
,+1M+5,+4M+Ø,-9M+5,+1M+Ø,+29F2E4
U17GLGLGEREREBM+Ø,+48BM-15,-32FE
3U11HLHLD15BU2
212 DRAW"BM+16,-14M+4,+1M+4,+4RU
3M+6,+2D19BL1ØNU16FE3U12HLH"
214 DRAW"BR9BD14D5M+14,+4M-8,-18
NM-5,+2U5NM-5,+2M+15,+5D5NM-4,+4
M-Ø8,-3M+9,+2ØD3NG3BM-13,-4"
216 A$="M+11,+11M+5,-2M+6,+6M+3,
-3M+7,+7M+3,-3M+7,7M+4,-3M+6,+6M
+3,-3M+7,7M+3,-3M+14,+4"
218 DRAW"BM-7Ø,-28"+A$+"M+3,+1
22Ø DRAW"BM15Ø,58NM-14,+9D4ØNG3F
4NG4E2U34M+13,+5M-11,+9D6M+16,-1
3U5M15Ø,58"
222 DRAW"BM+2Ø,+21NM-14,+1ØD5M+6
,-3D6M-6,+3D14G2NG3H4NG3U2ØBM+15
,-13M+5,+2M-Ø,+5NM-7,+6M-5,-2NM-
1Ø,+8U5LGLG"
224 DRAW"BM+5,+1ØNG3ND25M+6,+2D2
1M+6,+2U2ØNM-6,+3M+18,+6D5M-11,+
11BM-1,-8U7M+6,+2M-6,+6BM+1,+7M+
23,+7M-9,-17NM-1Ø,+1ØU5NG2M+18,+
6D5NG5M-Ø9,-3LM+9,+17D4NG3M-44,-
13GGGGHUHUNG3U2"
226 G$="M+11,+11M+5,-2M+6,+6M+3,
-3M+7,+7M+3,-3M+7,7M+4,-3M+6,+6M
+3,-3M+7,7M+4,-4M+19,+5M+9,+9M+5
,-5M+1Ø,+1ØM+5,-5M+11,+11M+5,-5M
+47,+14"
228 DRAW"BM-122,-39NM-5,+3D6NM-5
,+3U6"+G$:DRAW"BM-178,-54M+11,+1
1M+5,-2M+6,+6M+3,-3M+7,+7M+3,-3M
+7,+7M+4,-3M+6,+6M+3,-3M+8,+8M+6
,-6M+14,+4M+12,+12M+5,-5M+1Ø,+1Ø
M+5,-5M+11,+11M+6,-6M+55,+16"
23Ø DRAW"U28M+9,+3NG9U5M-9,-3U1Ø
M-5,-1D9M-5,-1NG2D5NG6M+5,+1NG9D
23M-3,-1"
232 DC$="M+3,+3M+3,-3M+8,+8M+4,-
4M+9,+9M+4,-4M+9,+9M+4,-4M+8,+8M
+4,-4M+8,+8M+5,-5M+1Ø,+1ØM+5,-5M
+1Ø,+1ØM+6,-6M+1Ø,+1ØM+5,-5M+1Ø,
+1ØM+5,-5M+48,+14M+2Ø,-16":DRAW"
BM-191,-3Ø"+DC$
234 PMODE4
236 PAINT(12Ø,112),Ø,Ø:PAINT(74,
74),Ø,Ø:PAINT(186,112),Ø,Ø:PAINT
(15Ø,1Ø1),Ø,Ø:PAINT(165,1Ø5),Ø,Ø
:PAINT(199,97),Ø,Ø:PAINT(227,1Ø5
),Ø,Ø:PAINT(229,111),Ø,Ø:PAINT(2
49,113),Ø,Ø:PAINT(139,75),Ø,Ø
238 PMODE4:SCREEN1,1:PMODE3
24Ø PAINT(49,64),R,1:PAINT(6Ø,44
),R,1:PAINT(152,75),R,1:PAINT(18
1,71),R,1:PAINT(174,86),R,1:PAIN
T(183,88),R,1:PAINT(246,1Ø7),R,1
242 PAINT(Ø,Ø),B,1
244 PAINT(2ØØ,95),1,1:PAINT(16Ø,
74),1,1:PAINT(18Ø,77),1,1:PAINT(
234,1Ø6),1,1
246 X$=INKEY$:IFX$=CHR$(13)THENR
ETURNELSE246
248 '
25Ø '
252 '
254 '
256 '
258 'FOREIGNER
3ØØ PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3
3Ø2 DRAW"C1S4":GOSUB3Ø4:GOTO31Ø
3Ø4 DRAW"BM14Ø,54M-159,46D6ØM+45
,+15M+6Ø,-2ØM-6Ø,+2ØU6ØM-45,-15M
+45,+15M+6Ø,-2ØND6ØM+48,+16D6ØM-
48,-16M+48,+16"
3Ø6 DRAW"M+36,-12U6ØM-36,+12M+36
,-12M-48,-16M+21,-7M+6Ø,+2ØD6ØM-
33,-11M+33,+11M+36,-12U6ØM-36,+1
2M+36,-12M-1ØØ,-34M-12,+4
3Ø8 RETURN
31Ø PAINT(19Ø,1ØØ),1,1:PAINT(24Ø
,1ØØ),1,1
312 FORI=5ØTO18ØSTEP2:PUT(Ø,I)-(
256,I+1),A,OR:NEXT:GOSUB3Ø4
314 PAINT(4,16Ø),B,1:PAINT(8Ø,11
Ø),R,1:PAINT(13Ø,11Ø),R,1:PAINT(
16Ø,11Ø),R,1:PAINT(14Ø,56),1,1
316 PAINT(1,1),1,1:PAINT(126,188
),1,1:DRAW"C4":GOSUB3Ø4
318 DRAW"S4C4BM1Ø,2ØU12BR4NR6BD6
BR2R2":CIRCLE(4Ø,14),8,4:DRAW"BU
8C1R32D16NL28NH28R2NH28BR12BU2C4
U12BR4R6F2D2G2L2M+4,+6BR18U12BR4
NR6BD6BR2R2BD6NL4R2BR18U12"
32Ø CIRCLE(146,14),8,4,1,1,.85:D
RAW"C1BU2R32D16NL28BH8NH6C4R8BR1
8ND6U2BU4F12BU6U6BD12BR18U12BR4N
R6BD6BR2R2BD6NL4R2BR16C4U12BR4R6
F2D2G2L2M+4,+6"
322 X$=INKEY$:IFX$=CHR$(13)THENR
ETURNELSE322
324 '
326 '
328 '
33Ø '
332 '
334 '
336 '
338 'IRON MAIDEN
4ØØ PMODE4,1:PCLSØ:SCREEN1,1:PMO
DE3,1
4Ø2 DRAW"S3C4BM46,7ØU56R16D56NL1
6"
4Ø4 DRAW"BR8U56R14D1ØE12F28G14F2
8G1ØH44BU8E1ØF1ØL2ØBD8D24L14"
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CoCo Max

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

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

UNMATCHED CAPABILITY...

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

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

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

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

THE BIG PICTURE

The large image box in the middle of the CoCo Max screen is actually only a window on an even larger image. Use the Point-and Click "Hand" to effortlessly move your window over any portion of the larger image. You have a working area of up to 3-½ times the area of the window itself.

FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than ¼ page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to ⅛ page size.

THE COCO MAX SYSTEM

FREEDOM TO CREATE...

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

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

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

Plug your same joystick, mouse or touch pad into this new input and you have a whole new kind of control. The difference is remarkable.

A DIGITIZER OPTION...

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

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

COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

AN ABSOLUTE GUARANTEE

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

THE HARDWARE...

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

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***

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```
4Ø6 DRAW"BR72H18E4ØF4ØBD3BL2ØL4Ø
E2ØF2ØBR2ØBU3G18L48"
4Ø8 DRAW"BR72U46H12R2ØF24U24R16D
78H16U16H16D28L16"
41Ø DRAW"BM12,14ØU46H12R26F16E16
F16D64H16U4ØG16H14D32L16"
412 DRAW"BR8ØH12E1ØH8E14F8E22R16
D56L26H1ØG1ØBE22BU2E8D16H8BD2BG2
2"
414 DRAW"BR54U56R16D56NL16"
416 DRAW"BR8U56R16F38G19L36BE15B
R2R18H18D18BL2BG15
418 DRAW"BR72H12U44R34D12L18D1ØR
18D12L18D1ØR18D14L18"
42Ø DRAW"BL36BR72U44H12R2ØF24U24
R16D76H16U16H16D28L16"
422 PAINT(5Ø,3Ø),R,4
424 PAINT(7Ø,3Ø),R,4
426 PAINT(132,3Ø),R,4
428 PAINT(17Ø,3Ø),R,4
43Ø PAINT(1Ø,1ØØ),R,4
432 PAINT(1ØØ,1ØØ),R,4
434 PAINT(12Ø,1ØØ),R,4
436 PAINT(14Ø,1ØØ),R,4
438 PAINT(18Ø,1ØØ),R,4
44Ø PAINT(212,1ØØ),R,4
442 X$=INKEY$:IFX$=CHR$(13)THENR
ETURNELSE442
444 '
446 '
448 '
45Ø '
452 '
454 '
456 'RATT
5ØØ PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3
5Ø2 DRAW R$:DRAW"S4BM2Ø,16R16D3Ø
L16U3ØBU6H12R46"
5Ø4 CIRCLE(56,1Ø),2Ø,R,.7,.77,.2
Ø:DRAW"BD22BR8F14R4F1ØL24H2ØU6H6
R14H6L16F4L14H4BR66BD22M+16,-32R
26M+23,+46L5ØH12R3ØF4R4M-12,-24L
4M-8,+16L16"
5Ø6 DRAW"BR5ØBU32R5ØD46L18U28E2U
2H2L2G2D4L18M-9,-18BR58R5ØM-8,+1
8L2ØU4H2L2G2D2F2D28L18U46"
5Ø8 PAINT(22,18),R,R:PAINT(22,2)
,R,R:PAINT(12Ø,18),R,R:PAINT(18Ø
,18),R,R:PAINT(238,2),R,R
51Ø PCOPY1TO2:PCOPY1TO3:PCOPY1TO
4
512 IFINKEY$<>CHR$(13)THEN512ELS
ERETURN
514 '
516 '
518 '
52Ø '
522 '
524 '
526 '
528 '
6ØØ 'DEF LEPPARD
6Ø2 PMODE4,1:PCLS1:SCREEN1,1
6Ø4 DRAW"CØ":GOSUB6Ø6:GOTO628
6Ø6 DRAW"S5BM9Ø,1ØØU8ØM+2Ø,+4ØM-
2Ø,+4ØM+2Ø,-4ØBL8M-6,-14D26M+6,-
14BR11BD2M+14,-34D16M-6,+15R6M+3
,+5L8M+6,+15D16M-14,-34"
6Ø8 DRAW"BM+1,+1BD3BR19NR4M-3,-5
R7U37M+14,+28L6M-3,-5D13R11M+4,+
6L15D36M-6,-11U26"
61Ø DRAW"BR22BM16,146BD18NR32M+3
Ø,-6ØD17M-19,+38R18M+3,+6BU21"
612 DRAW"BL4M+14,-34D16M-6,+15R6
M+3,+5L8M+6,+15D16M-14,-34BR19BD
23"
614 FOR I=1TO2
616 DRAW"NU6ØR7U2ØBU6U14M+7,+14L
7BD6R18M-24,-4ØBD6ØBR27"
618 NEXT I
62Ø DRAW"BL8M+27,-54D54L6U17BU4U
7M-4,+7R4BD4L6M-8,+17L8BR32"
622 DRAW"NU6ØR7U2ØBU6U14M+7,+14L
7BD6R4M+1Ø,+2ØR7M-1Ø,-2ØR8M-24,-
4ØBR32BD9Ø"
624 DRAW"U8ØM+2Ø,+4ØM-2Ø,+4ØM+2Ø
,-4ØBL8M-6,-14D26M+6,-14"
626 RETURN
628 PAINT(94,1Ø),Ø,Ø:PAINT(134,1
8),Ø,Ø:PAINT(15Ø,12),Ø,Ø
63Ø PAINT(52,1ØØ),Ø,Ø:PAINT(66,1
1Ø),Ø,Ø:PAINT(74,1Ø6),Ø,Ø:PAINT(
11Ø,1Ø6),Ø,Ø:PAINT(16Ø,11Ø),Ø,Ø:
PAINT(17Ø,1ØØ),Ø,Ø:PAINT(21Ø,1ØØ
),Ø,Ø
632 FORI=1TO191STEP2:PUT(Ø,I)-(2
56,I+1),A,OR:NEXT
634 PMODE3:DRAWR$:GOSUB6Ø6
636 IFINKEY$<>CHR$(13)THEN636ELS
ERETURN
638 '
64Ø '
642 '
644 '
646 '
648 '
65Ø '
652 '
654 'BIG COUNTRY
7ØØ PMODE4,1:PCLS1:SCREEN1,1
7Ø2 DRAW"S4CØBM16,11ØR6ØE6U6H6E6
U6H6L6ØD6R8D24L8D6BR3ØBU6U1ØNR1Ø
BU4U1ØR1ØD1ØNL1ØBD4D1ØL1Ø"
7Ø4 DRAW"CØBM128,11ØR3ØU6L12U24R
12U6L6ØD6R12D24L12D6R3Ø"
7Ø6 DRAW"BM238,11ØL12H4G4L22"
7Ø8 CIRCLE(2Ø6,9Ø),36,Ø,.6,.3,.6
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5
710 DRAW"C0BM184,74R30F4U4R14D14
L18H4L8"
712 CIRCLE(212,92),19,0,.5,.25,.
67
714 DRAW"BM213,101E3L6U6R34D6L6D
12"
716 DRAW"BM20,120NR8G4D40F4R12E4
U16L8D16L4U40R4D16R8U20L4G2H2"
718 DRAW"BR16NR8G4D40F4R12E4U40H
4L4BD4D40L4U40R4BU4"
720 DRAW"BR12NR8D4R4D40F4R14E4U4
0R4U4L12D4R4D38G2L8U40R3U4L6"
722 DRAW"BM108,120L10D4R4D40L4D4
R12U4L4U30M116,164F4R6E4U40R4U4L
12D4R4D30M114,120L6"
724 DRAW"BR31NR34D18R9U14R4D40L4
D4R16U4L4U40R4D14R9U18"
726 DRAW"BR5NR20D4R4D40L4D4R18U4
L4U18R6D18F4R10U4L4U16H4E4U14H6L
4BD4L6D16R6U16BU4"
728 DRAW"BR16R12D4L4M229,140M236
,124L4U4R12D4L2M234,146D18R4D4L1
7U4R4U18M216,124L2U4"
730 FORI=46TO0STEP-6:LINE(128,46
)-(0,I),PRESET:NEXT
732 FORI=3TO255STEP10:LINE(128,4
6)-(I,0),PRESET:NEXT
734 FORI=4TO46STEP6:LINE(128,46)
-(255,I),PRESET:NEXT
736 CIRCLE(128,44),26,0,.8
738 PAINT(128,48),0,0
740 PMODE3,1
742 CIRCLE(128,44),23,4,.8
744 PAINT(128,44),4,4
746 PMODE4,1
748 FORI=23TO25:CIRCLE(128,44),I
,0,.8:NEXT
750 PAINT(2,56),0,0
752 PAINT(50,81),0,0:PAINT(50,10
2),0,0
754 PAINT(50,125),0,0:PAINT(195,
125),0,0
756 FORI=B TO255STEP2:LINE(I,0)-
(I,192),PRESET:NEXT
758 FORI=0TO192STEP2:LINE(0,I)-(
255,I),PRESET:NEXT
760 IFINKEY$<>CHR$(13)THEN760ELS
ERETURN
762 '
764 '
766 '
768 '
770 '
772 '
774 '
776 '
778 'KISS
800 CLS0
802 PMODE1,1:PCLS1:SCREEN0,0:PMO
DE1,3:PCLS1:SCREEN1,1
804 FORI=5TO255
806 PMODE1,1:PCLS1
808 DRAW"S4C2BM0,136U76R28ND30":
CIRCLE(26,62),26,2,1.2,.03,.23:D
RAW"BR22ND6NR28":CIRCLE(42,58),4
0,2,1.2,.03,.16
810 DRAW"BD38BR10NE2NF2BD38":CIR
CLE(42,138),40,2,1.2,.83,.99:DRA
W"NR20L10":CIRCLE(26,138),26,2,1
.2,.79,.99:DRAW"BL22NU26L28BR82U
76R26D76NL26"
812 FORG=1TO2:DRAW"BU36E40R36G30
R34G46L34E36L28NL6BD36BR62BU36E4
0R36G30R34G46L34E36L30"
814 POKE178,I
816 PAINT(10,62),,2:PAINT(100,62
),,2:PAINT(160,62),,2:PAINT(240,
62),,2
818 PCOPY1TO3:PCOPY2TO4
820 PMODE1,3:SCREEN1,(RND(2)-1)
822 IFINKEY$<>CHR$(13)THEN824ELS
ERETURN
824 NEXTI
826 '
828 '
830 '
832 '
834 '
836 '
838 '
840 '
842 'POLICE
900 PMODE4,1:PCLS1:SCREEN1,1:PMO
DE3
902 DRAW"BM34,40C1U20NL8R8BR8D20
U10R14NU10D10BR10NR10U10NR8U10R1
0BR20R12D10L12NU10D10BR20U20R12D
20NL12BR12NU20R12BR10NU20BR10NR1
2U20R12BR10NR12D10NR10D10R12"
904 PMODE4
906 DRAW"BM0,52C0D2F4R4D2L4G2D2F
2D2F4L4G2D2F2G2D2F2D2F2R6D2M+40,
+4R30UR20UR16M+40,+2M+86,-5E2U2H
4U2R2E2U2H2L2H2U2E4R4E2U2H2U2E2U
2H2L14DL16M-90,+4M-40,-2M-20,+3M
-50,-3H2L4H2L4G2L4D2"
908 PAINT(40,58),0,0
910 PCOPY2TO3:PCOPY2TO4
912 PMODE3
914 PAINT(40,58),B,4
916 PAINT(40,106),R,4
918 FORI=144TO192STEP2:PUT(0,I)-
(256,I+1),A,OR:NEXTI
920 IFINKEY$<>CHR$(13)THEN920ELS
ERETURN
```

Developing Effective Computer Literacy Methods

By Michael Plog, Ph.D.
Rainbow Contributing Editor

Nine hundred and ninety hours — a little less than 1,000 hours. That is the amount of time the average elementary student spends in school each year for instructional purposes, minus such things as lunch and recess.

The Association for Supervision and Curriculum Development (ASCD) conducted this survey of 1,500 elementary schools across the country. The study will be replicated at regular intervals in future years in order to establish trend data. Also, similar studies are planned for middle and high schools.

The ASCD study found that the average student spends five and one-half hours per day in school, for a school year of 180 days. Sixty percent of each day is spent on instruction in language arts, mathematics, social studies and science.

It breaks down to about 100 minutes a day for language arts, 52 minutes for mathematics, 34 minutes for social studies and 28 minutes for science. Now, five and one-half hours is 330 minutes. If we add the time spent on the basic four subjects, we get 214 minutes per day. What about the other 116 minutes?

Well, other subjects consume part of that time: health gets an average of 22 minutes per day, physical education gets 15 minutes, music, 14 minutes and art, 13 minutes. There are many other subjects schools handle during the course of a year, including drug education, foreign languages, consumer education, environment and the list goes on. Most of these subjects are dealt with (by most schools) by integrating them into the regular curriculum. For example, global education may be studied in social studies; consumer issues studied in mathematics.

". . . The central point of computer literacy is a possession of the skills and abilities to make a computer work for you."

In addition to collecting information from schools for this study, the ASCD also asked experts in subject matter areas to recommend ideal time allocations. As you might predict, the subject matter specialists believe far more time is necessary in their areas of expertise than would be possible to fit in the school day.

Add to this the demand from public segments to include time for topics of great significant social concerns, and it becomes clear that all this takes more time than we can possibly expect elementary students to spend in schools.

These results were reported by principals. The actual time a single student may spend in any particular area, such as language arts, will vary greatly with individual teacher's competence in an area, or even preference for particular subjects.

Above was reported the average times students spend on the different subjects. The *range* of times, however, varied among the schools surveyed. One-fourth of the respondents to the survey said only five hours per week was spent on language arts.

You may have noticed that instruction in computers has not been mentioned so far. The researchers conducting the

(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.)

study did not list computer instruction as one of the topics to be reported by the schools. As a result, we do not have any firm information about the amount of time elementary students spend on computers.

This survey was distributed to elementary schools, where computer instruction may be less popular than with secondary schools. It is possible that much of the computer time is integrated into the rest of the curriculum. That is, students spend time doing a computer lesson about science, or a lesson dealing with history or reading, etc. Of course, many schools do not know what to do with computers, only using them for student games and "toys" for interested instructors. About 20 percent of the principals responding to the ASCD survey indicated their teachers could get help from a computer coordinator or specialists.

The question of what to do with computers is still being hotly debated in schools across the country. Many school administrators appear to be unsure of how to best use computers. As a result, more states are setting guidelines for computer use in school districts. The people at the state level are also unsure of how to best use computers. About two dozen states have set requirements for computer instruction through state legislatures and state boards of education.

Texas and Tennessee both will require schools to teach computer skills to seventh and eighth grade students beginning next school term. Texas mandates a separate computer literacy course in the junior high school; in Tennessee, a three-week unit can be covered in any subject area. However, both states are providing a state curriculum.

Objectives of the computer unit are defined by the state education agency, and all course materials and software are state approved. In Texas, 2,000 teachers must demonstrate that they are qualified to teach computer courses by passing a test by September. The state education agency offers a five-day training program, and also has materials available through regional service centers.

Colorado, New York and Minnesota are doing things differently. Instead of having one uniform system required of all students, these three states are providing examples, but no specific guidance or direction. In Minnesota, all students must be exposed to computer technology by the time they graduate. The state recommends activities for various age groups, but does not set a curriculum — that is left up to individual schools. In New York, the state is providing $17.5 million to buy software and hardware, but will not mandate a particular curriculum.

In the District of Columbia, all teachers must take a course in computer literacy and software evaluation in order to obtain a teaching certificate. Massachusetts requires competency in educational technology for all teachers, and New Hampshire requires all middle school teachers to take one computer science course. In Montana and Vermont, teachers in certain subject areas must be able to use computers in their classes, but are not required to take a course or pass a test.

". . . The computer should be a part of everyday life. Kids should not have to go to special people to learn about it."

Utah is one state in a category by itself. By 1988, computer science instructors will have to show their competency by majoring or minoring in computer science, completing a state approved in-service training program or passing a proficiency test. Those teachers in other areas do not have to do anything. Clearly, Utah does not want to have computers integrated into the entire curriculum, but only wants a computer course in schools.

The idea of requiring teachers to take a test proving competency in computer abilities can be attractive or can be a disaster. An official in Colorado thinks little of computer competency testing: "The state doesn't require an endorsement for someone to use a 16 millimeter projector, and that's a teaching tool. The computer is a teaching tool, too. I don't see any difference between the two."

It is a positive feature to have independent confirmation of a teacher's ability in a subject matter area. For public education, the community has a right to know teachers possess the proper skills related to their work.

The normal certification process provides this to some degree. Teachers of mathematics, for example, have to be graduated from a recognized center of higher learning and must have taken certain mathematics courses while at a college or university. In the field of computers, however, there is no subject matter specialty in many colleges.

Besides, what area of computer knowledge should be tested? I happen to enjoy programming my Color Computer in BASIC. I know other people who never program their own computer. They purchase commercial programs and just love to tear off the cover of the Color Computer to play with the insides. Do these differences of preference make either of us less literate? What about the person who is interested in the history of computing? Should that be part of computer literacy?

The problem is that computer literacy includes all aspects of computers — and none of them! You do not have to program a computer in order to be computer literate. You do not have to recognize a resistor to be computer literate, nor do you have to know when Tandy introduced the Color Computer to be literate.

It seems the central point of computer literacy is possession of the skills and abilities to make a computer work for you. There are many ways teachers can help students become computer literate. Knowing how to program in BASIC may be less helpful for students than how to operate a word processor program and a database program. Knowing how to replace a memory chip may be less important to students than knowledge of a spreadsheet package.

Thus, the state education people in Texas, Tennessee and Utah could be taking the wrong approach. A state curriculum is less helpful for computer literacy than a locally developed curriculum. The best curriculum of all is an understanding of the needs of a student, and then designing a course of study to fit those needs.

Notice that "student" is singular — teachers should work with individual students on individual needs and educational experiences. I agree with a Minnesota state employee: "The computer should be a part of everyday life. Kids should not have to go to special people to learn about it."

We all need to learn; each of us has needs not necessarily shared by others. Write if you wish to take issue with me. My address is 829 Evergreen, Chatham, IL 62629.

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The CoCo Gallery

John Lovell
Fish
John lives in El Portal, Fla., and used *CoCo Max* to create this aquatic first prize winner.

Eric Richards
Sea Elf
Eric submitted his first pictorial effort on the CoCo which he drew with *Micropainter*. Eric lives in Auburn, Ala.

Ralph Strano
Eagle & Banner
Ralph lives in Wexford, Pa., and used *Graphicom*, *Shrinx* and the X-Pad for this patriotic addition to the Gallery.

HONORABLE MENTION

Mark Werdin
Unicorn
Mark lives in St. Ignatius, Mont., and drew this using *Graphicom*.

HONORABLE MENTION

Hal Katschke
Hood
Hal lives in Orland Park, Ill., and sends the Gallery this digitized portrait with color adjusted using *Graphicom*.

Be sure to send a cover letter with your name, address and phone number detailing how you created your picture (what programs you used, etc.), how to display it and a few facts about yourself.

Please don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere.

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.

HONORABLE MENTION

Michael Cox
Damsel
Michael drew this using *Graphicom*.
He lives in Fairfax, Va.

The $100 Challenge

By Richard Ramella

Here is a chance for you to win $100 doing something you enjoy: running a Color Computer program. *The $100 Challenge* is a contest program that will run in 16K Color BASIC and Extended Color BASIC. One entrant will win the $100 and three runners-up will each win software or a book for the Color Computer.

I, Richard Ramella, am the sole judge of the contest and responsible for providing all prizes to winners. First, let me explain how to play the game, then I'll tell how to enter the contest.

When you have typed the program correctly and saved it on tape or disk, type RUN and press ENTER to start the game. You will see an eight-by-eight grid of 64 green squares. At the northwest square is a blinking orange cursor which can be moved around the playing field by tapping the four directional arrow keys. A vertical blue line on the screen is meant only to separate the grid from a list of letters and numbers at the right. This list represents 64 letter-number combinations you will be placing on the playing board. The number '8' at the right of each line means there are eight each of the playing pieces.

An example: Move the orange cursor down three spaces and right three spaces; type A1 and press ENTER. Now look at the "A1" in the list at right and you will see there are only seven left

to play. Now press 'E' for erase, the square goes blank and the number of A1 pieces remaining returns to eight.

It is impossible to set one playing piece over another.

If you tap letter 'A', 'B' or 'C', the orange cursor disappears and the program waits for you to press '1', '2' or '3' to complete the move. If you press a letter and decide it is a bad move, press the asterisk (*) to escape back to cursor mode.

The object of this game contest is to set as many playing pieces on the board as possible. You get one point for each played, and five points for every three consecutive across row boxes containing letters in sequence: ABC. Also, you get five points for every three consecutive down row boxes with numbers in sequence: 123.

The program keeps score. To see your current score, when the orange cursor is flashing, press the 'S' key. In about six seconds the word SCORE followed by the total of your score appears at the center of the grid. It disappears after about three seconds.

Now, here's the catch. No two identical playing pieces may be set in any row, across, down or diagonally. To see how this works, run the program, type A1 in the northwest square, press the right-arrow key and type A1 again. A magenta square appears over the first-typed A1, which is erased and sent back to the A1 total at the right of the screen. The same thing will happen if you type B3 at the northwest and another B3 in any square slanting toward the southeast corner of the playing field.

The program does not end until you press the BREAK key. While it keeps score, it does not record the positions of your playing pieces.

Make a grid of eight-by-eight squares. When you have a good score, stop to record all positions and your score before you end the program. The grid you make will be your entry in the contest.

The Contest Rules

1) Record your score and your grid positions on a sheet of paper. On the same side of this paper, print or type your name, address, city, state and ZIP code. Put your entry in an envelope with

(Richard Ramella has published more than 200 Color Computer programs.)

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your return address written at the upper left. At lower right, address this letter to Richard Ramella, 1493 Mt. View Ave., Chico, CA 95926. Put sufficient postage on the letter and mail it.

2) Note the month on the cover of this issue of RAINBOW (July). Your entry must be postmarked by the final day of the month following this month (August 31, 1985). Entries postmarked after this deadline will be ineligible.

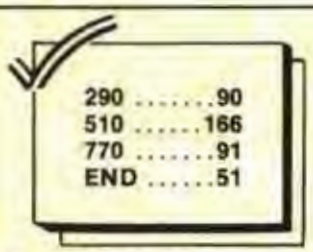
3) First-prize winner will receive $100 and three runners-up will each receive a book or software related to the Color Computer.

4) If there are tying entries, prize recipients will be determined by two tests applied in this order: 1) earliest postmark, and 2) random drawing.

5) Richard Ramella is the sole judge of this contest and his decision is final. The judge will not be responsible for entries based on incorrectly typed program listings or publishing production accidents.

6) Falsoft, Inc. is publishing this program and article solely for the pleasure of its readers. Falsoft, Inc. is not offering any prize in connection with this contest, and it is not responsible for answering any questions pertaining to the contest or its outcome.

7) In fairness to all entrants, the author of the program will not answer any questions about the contest. Winners will be notified.



The listing: CHALENGE

```
1ØØ REM * THE $1ØØ CHALLENGE/COL
OR BASIC & EXTENDED COLOR BASIC
11Ø REM * BY RICHARD RAMELLA/149
3 MT. VIEW AVE/CHICO, CA 95926
12Ø DATA A1 8,B1 8,C1 8,A2 8,B2
8,C2 8,A3 8,B3 8
13Ø CLSØ: CLEAR 75Ø: DIM Q$(8):
D$=CHR$(255)
14Ø FOR X=1 TO 8:READ Q$(X):NEXT
15Ø N$=CHR$(94): S$=CHR$(1Ø): W$
=CHR$(9): E$=CHR$(8): PK=1Ø24
16Ø A$=CHR$(143): A1$=A$: Z$=A$:
 B$=CHR$(128):B1$=B$:A$=A$+A$+B$
17Ø A$=A$+A$+A$+A$+A$+A$+A$+A$
18Ø Z$=Z$+Z$+Z$+Z$+Z$+Z$
19Ø FOR X=25 TO 496 STEP 32: PRI
NT @ X,Z$;: NEXT
2ØØ FOR X=Ø TO 448 STEP 64: PRIN
T @ X,A$;: NEXT
21Ø FOR Y=Ø TO 29: SET(47,Y,3):
NEXT
22Ø GOSUB 35Ø
23Ø A$=INKEY$
```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```
24Ø IF A$="S" THEN GOSUB 88Ø
25Ø IF A$=N$ AND B>Ø THEN B=B-64
26Ø IF A$=S$ AND B<448 THEN B=B+
64
27Ø IF A$=E$ AND A>Ø THEN A=A-3
28Ø IF A$=W$ AND A<21 THEN A=A+3
29Ø DI=PEEK(PK+A+B)
3ØØ POKE PK+A+B,255: FOR T=1 TO
2Ø: NEXT T: POKE PK+A+B,DI
31Ø IF DI<>143 THEN 33Ø
32Ø IF A$="A" OR A$="B" OR A$="C
" THEN GOSUB 37Ø: GOTO 23Ø
33Ø IF A$="E" THEN GOSUB 73Ø
34Ø GOTO 23Ø
35Ø Q=1: FOR X=26 TO 498 STEP 64
: PRINT @ X,Q$(Q);
36Ø Q=Q+1: NEXT: RETURN
37Ø V$=A$
38Ø A$=INKEY$: IF A$="*" OR A$="
:" THEN RETURN
39Ø IF A$<>"1" AND A$<>"2" AND A
$<>"3" THEN 38Ø
4ØØ A$=V$+A$: K=Ø
41Ø FOR T=1 TO 8: IF A$=LEFT$(Q$
(T),2) THEN K=T
42Ø NEXT T
43Ø IF K=Ø THEN RETURN
44Ø N=VAL(RIGHT$(Q$(K),1))
45Ø IF N<1 THEN RETURN
46Ø PRINT @ A+B,A$;
47Ø Q$(K)=LEFT$(Q$(K),2)+STR$(N-
1)
48Ø GOSUB 35Ø
49Ø H=A: FOR V=B TO 448 STEP 64:
 IF H>21 THEN 52Ø
5ØØ IF V<>B THEN GOSUB 82Ø
51Ø H=H+3: NEXT V
52Ø H=A: FOR V=B TO 448 STEP 64:
 IF H<Ø THEN 55Ø
53Ø IF V<>B THEN GOSUB 82Ø
54Ø H=H-3: NEXT V
55Ø H=A: FOR V=B TO Ø STEP -64:
IF H<Ø THEN 58Ø
56Ø IF V<>B THEN GOSUB 82Ø
57Ø H=H-3: NEXT V
58Ø H=A: FOR V=B TO Ø STEP -64:
IF H>21 THEN 61Ø
59Ø IF V<>B THEN GOSUB 82Ø
6ØØ H=H+3: NEXT V
61Ø H=A: FOR V=B TO Ø STEP -64
62Ø IF V<>B THEN GOSUB 82Ø
63Ø NEXT V
64Ø H=A: FOR V=B TO 448 STEP 64
65Ø IF V<>B THEN GOSUB 82Ø
66Ø NEXT V
67Ø V=B: FOR H=A TO Ø STEP -3
68Ø IF H<>A THEN GOSUB 82Ø
69Ø NEXT H
7ØØ V=B: FOR H=A TO 21 STEP 3
71Ø IF H<>A THEN GOSUB 82Ø
72Ø NEXT H: RETURN
73Ø SP$=CHR$(PEEK(PK+A+B))+CHR$(
PEEK(PK+B+A+1)-64)
74Ø FOR T=1 TO 8: Y$=LEFT$(Q$(T)
,2)
75Ø IF SP$=Y$ THEN GOSUB 77Ø
76Ø NEXT T: RETURN
77Ø IF JK=Ø THEN PRINT @ A+B,A1$
+A1$;
78Ø IF JK=1 THEN PRINT @ H+V,A1$
+A1$;
79Ø N=VAL(RIGHT$(Q$(T),1))
8ØØ Q$(T)=Y$+STR$(N+1)
81Ø GOSUB 35Ø: RETURN
82Ø SP$=CHR$(PEEK(PK+H+V))+CHR$(
PEEK(PK+H+V+1)-64)
83Ø IF A$<>SP$ THEN RETURN
84Ø PRINT @ H+V,CHR$(223)+CHR$(2
23);: SOUND 5Ø,5
85Ø PRINT @ H+V,A1$+A1$;
86Ø JK=1: GOSUB 73Ø: JK=Ø
87Ø RETURN
88Ø SC=Ø: FOR V=1 TO 8: S1=S1+VA
L(RIGHT$(Q$(V),1)): NEXT
89Ø HZ$="": FOR V=Ø TO 448 STEP
64: FOR U=Ø TO 21 STEP 3
9ØØ HZ$=HZ$+CHR$(PEEK(PK+V+U)):
NEXT U: HZ$=HZ$+"/": NEXT V
91Ø VT$="": FOR V=1 TO 22 STEP 3
: FOR U=Ø TO 448 STEP 64
92Ø VT$=VT$+CHR$(PEEK(PK+V+U)-64
): NEXT U: VT$=VT$+"/": NEXT V
93Ø FOR V=1 TO 69: IF MID$(HZ$,V
,3)="ABC" THEN S2=S2+5
94Ø IF MID$(VT$,V,3)="123" THEN
S2=S2+5
95Ø NEXT V
96Ø S=64-S1+S2: S1=Ø: S2=Ø
97Ø PRINT @ 231,"SCORE:";S;: FOR
 T=1 TO 1ØØØ: NEXT T
98Ø FOR V=231 TO 241: PRINT @ V,
B1$;: NEXT: RETURN
99Ø END
```

Hint . . .

Saving in ASCII

Saving BASIC programs in ASCII (by adding an ',A' to the end of the command, such as CSAVE"program",A) is sometimes more reliable than saving in the usual "tokenized" format. This is especially true when you're transferring a program from one system to another. Another added advantage is that BASIC programs saved in ASCII can be edited using text editors such as Radio Shack's *T/S EDIT*, Cognitec's *Telewriter-64* and *VIP Writer*.

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The following products recently have been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

PRINT MASTER, a printer utility that will work with any printer capable of dot addressable graphics. Among the features are automatic PMODE recognition, eight color recognition, menu driven or called from BASIC, inverse printing and vertical and horizontal stretching (zoom) and concantenation. All will work on full screen or any portion you specify. Dataman International, 125 South Fifth Street, Lewiston, NY 14092, or 420 Ferguson Ave. N., Hamilton, Ontario, L8L 4Y9, cassette $33.95 U.S., $39.95 CND., disk $37.95 U.S., $33.95 CND. plus $2.50 S/H

Guide to Computer Magazines — 1985 Edition, a 144-page soft-cover book containing annotated listings of computer related publications for beginners, advanced users, business oriented users and professionals. Also listed are publications geared to specific systems or computer applications with details such as description of audience, editorial scope, list of regular features and subscription information. Steve Davis Publishing, P.O. Box 190831, Dallas, TX 75219, $9.95

Model 200 Buss Driver, a hardware expansion accessory to enable users to create automated control systems. Features include TTL, Fanout of 10, two card slots and flexible ribbon buss provided with additional connectors available. Electronic Motion Control, P.O. Box 27271, ARPT Station, Clearwater, FL 33516, $89.95 plus $3 S/H

NUTRIGUIDE Version 1.0, a 64K program requiring a disk drive designed to allow you to monitor nutrition intake (calories, vitamins and minerals) and make informed dietary decisions. Possible are the tailoring to individual needs government Recommended Daily Allowance values and the objective evaluation of any diet to pinpoint the need for protein or any other supplement. Homesoft Company, P.O. Box 607, Baker, LA 70704-0607, disk $24.95

EZ Cassette Encrypt, an ML encryption device to make unreadable all cassette files through the use of a password. Decoding occurs with the same password. LANDWARE, 6 Larchmont Rd., Edison, NJ 08817, cassette $25

EZ Disk Encrypt, an ML encryption device to make unreadable disk files. Encryption and decoding are accomplished through use of a password. LANDWARE, 6 Larchmont Rd., Edison, NJ 08817, disk $29

EZ Cassette PILOT, a preprocessor to run PILOT programs on CoCo by translating PILOT language programs into BASIC language. LANDWARE, 6 Larchmont Rd., Edison, NJ 08817, cassette $15

EZ Disk PILOT, a program to translate PILOT language programs into BASIC for CoCos with disk systems. LANDWARE, 6 Larchmont Rd., Edison, NJ 08817, disk $19

EZ Profiler, a 32K ECB utility requiring a disk drive which counts how many times each line of a BASIC program is EXECuted when it is RUN. LANDWARE, 6 Larchmont Rd., Edison, NJ 08817, disk $20

EZ RAM Disk, a 16-32-64K ML utility to use upper memory as if it were a disk drive by accessing all available memory. LANDWARE, 6 Larchmont Rd., Edison, NJ 08817, cassette $25

Trivia, a 16-32K quiz game based on the popular board game. Included are dozens of questions in five categories, one or two player options and three clock speeds. Moore Computer Services, 1090 East Country Club Circle, Plantation, FL 33317, 16-32K cassette $19.95, 32K disk $21.95

PETSTORE, a 32K ECB text Simulation that pits you against opponents in a race to succeed at selling and buying pets at competitive prices. Each player starts with $200 and one store and as in real life the prices vary according to supply and demand. Once you make a profit you will need to buy more stores to expand. Winning depends upon reaching a predetermined goal. PAL Creations, 10456 Amantha Ave., San Diego, CA 92126, cassette $14.95

The Dallas Quest, a 64K graphics Adventure based on the television show *Dallas*. The plot involves you, the detective Sue Ellen hires to find a multimillion dollar oil field in South America. Among the dangers you face are opposition from the other residents of Southfork including the infamous J.R. Produced by Datasoft and available in Radio Shack stores nationwide, disk $29.95

OS-9 Hi-Res Screen Dump Utilities, a 64K graphics utility requiring a color TV, color disk drive #0 kit, printer cable and a CGP-220 Ink-Jet Printer or any Tandy Dot Matrix Printer with bit image capabilities for monochrome printing. The disk provided with the package contains *CGS DUMP* (Color Dump Program) and *BWSDUMP* (Black and White Dump Program) which allows the printing of Hi-Res graphics displays in four colors or black and white from OS-9. Radio Shack stores nationwide, disk $14.95

OS-9 Pascal Reference Manual Version 2.0, a 10-chapter users manual for OS-9 PASCAL covering PASCAL system, language, standard functions and procedures, run-time options and error handling with appendices for error message descriptions, PASCAL syntax

and quick reference. Radio Shack stores nationwide, manual and two diskettes $99.95

VIEW-II, a 64K program to make your CoCo a slow scan television transceiver. Menu driven by joystick or keystroke, with on-screen help available. *VIEW-II* provides you with the ability to receive, transmit, zoom and pan, print (Epson or Gemini printers only), save/load via diskette, eight-second 128-by-128 slow scan television images. No hardware is required, you simply connect your cassette port to your radio. Other slow scan television formats capable of reception with *VIEW-II* are 12-second ROBOT color (luminance only; you see black and white), single frames of RGB 128-by-128 color and stretched images of 17-second black and white or sequential color. Comes with a nine-page manual. SoftCircuits, 401 S.W. 75th Terrace, North Lauderdale, FL 33068, disk $24.95

VIEW-EDIT, a companion to *VIEW-II* (needed for this program) which allows you to take any image, or section of an image and perform the following functions: stretch, shrink, zoom, pan, modify in FATBITS, insert to another frame, rotate, draw lines, circles, arcs, fill with any gray level, filter with lowpass, highpass, bandpass, notch options, save and load, enhance contrast, enhance brightness, cut, paste, generate text (any size), stamp, scan edit, invert and flip. Fully menu driven by joystick with on-screen help, *VIEW-EDIT* supports multiple drives. Comes with a 15-page manual. SoftCircuits, 401 S.W. 75th Terrace, North Lauderdale, FL 33068, disk $24.95

The CoCoGrey, a hardware accessory that provides a real-time composite video 128-by-192 pixel signal in 32 gray levels. Designed to be used with the *VIEW-II* software, CoCoGrey will not affect the operation of your CoCo. Comes with a 16-page manual containing theory, schematics, installations, etc. SoftCircuits, 401 S.W. 75th Terrace, North Lauderdale, FL 33068, $100

The Magic Box, a special purpose utility designed to load TRS Model I/III 500 Baud BASIC programs into CoCo thus making a different spectrum of software available. Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $24.95 plus $3 S/H

500 Pokes Peeks 'N Execs, a book by Kishore M. Santwani to unravel the uses of POKE, PEEK and EXEC commands to facilitate programming in assembly language. Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $16.95 plus $3 S/H

TAXAN Personal TV Tuner, a hardware accessory to convert a composite monitor into a television set. Spectrum Projects Inc., P.O. Box 21272, Woodhaven, NY 11421, $99.96 plus $3 S/H

PROBALOTO, a 16-32K ECB lottery program which is menu driven and incorporates mathematical formulas for weighing numbers either positively or negatively. Possible are numbers generated to screen or printout with user's options to weigh numbers randomly to favor most chosen, least chosen or to accommodate personal intuition. Gary Olander, 322 Haymarket Place, Gahanna, OH 43230, cassette for 16K ECB $19.95, disk for 32K ECB $19.95

TESTMAKER, a 16K educational utility requiring a disk drive. This menu-driven internally linked series of programs enables a teacher to create multiple choice or true/false tests to be administered either on the computer screen to individuals or printed out and distributed to a class. Possible are an unlimited number of files and unlimited file length. Saguaro Software, 7331 E. Beverly, Tucson, AZ 85710, disk $29.95

BASTXT Version 1.0, a 64K BASIC utility requiring a disk drive to add 21 commands and eight more functions including COM, EOR, ARSL, ARSR among others. Possible are definition of CHR$ codes, normal and smooth scrolling, four-color letters, BREAK key disable and two Hi-Res modes. Valley Micro Systems, 801 W. Roseburg Ave., Suite 200, Modesto, CA 95350, disk $34.95 plus $3 S/H

Disk Disassembler, a 16-32-64K disassembler to allow changing a machine language program on disk without calculating any addresses and help users understand how machine language programs operate. Possible are: examining/changing games, learning autostart procedure, examining/changing programs with segmented files (multiple load addresses). Valley Micro Systems, 801 W. Roseburg Ave., Suite 200, Modesto, CA 95350, disk $24.95 plus $3 S/H

Graphiset, a companion to *GRAPHICOM* featuring different letter sets such as Roman, Italics and Text to allow users to mix 16 different styles of letters with graphics. Also included are three palettes compatible with *GRAPHICOM*. Valley Micro Systems, 801 W. Roseburg Ave., Suite 200, Modesto, CA 95350, disk $20 plus $3 S/H

RAINBOW CERTIFICATION SEAL

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

REVIEWING REVIEWS

COLOR MATH

Editor:

We would like to take this opportunity, if we may, to address just a few of Mr. Cobello's specific comments about *Color Math*.

Mr. Cobello objects to the fact that *Color Math* is a version of our popular Model I/III/4 *K-8 Math Program* which is widely used in the schools and has received numerous positive reviews from professional educators. Mr. Cobello states that *Color Math* gave him "a bad impression from the first page of the program guide," but he does not present any specific or general criticism of our documentation. Instead, the problem seems to be that the user is required to enter one extra word when loading the program. *Color Math* is a machine language program, not a BASIC program, and for this particular program one extra command is necessary.

Mr. Cobello states that the documentation does not explain how placement is accomplished — but that statement is not true. The parent guide included with the program provides ample explanation of placement. This information was purposely omitted from the program guide, which is a booklet for optional use by children who are working independently.

Color Math does not include disk record keeping but can be used quite effectively without any pencil-and-paper record keeping. Recording scores and timings is strictly optional. The user only needs to remember the number of the last lesson completed, and if this information is forgotten, he or she can use the PLACEMENT option again. Score reports remain on the screen until a special code is entered, so the parent need not be directly on hand to retrieve this information. Mr. Cobello is correct in pointing out that *Color Math* does not use graphics or sound to the extent that some other programs do. However we maintain that the program *does* make good use of the computer such as random generation of problems, immediate feedback, placement capabilities, and the ability to evaluate performance automatically and to suggest the next lesson.

In the development of *Color Math*, computer and human resources were focused on providing a very large number of different lessons and providing different modes for flexibility, and we believe that *Color Math* is remarkable in this respect. *Color Math* should be reviewed in the context of what it seeks to be — a basic skills, drill-and-practice program with an extensive amount of instructional material built into it.

Bill Gattis
Radio Shack Education Division

SBASIC

Editor:

Thank you for the opportunity to comment on the review by Mr. Redman of our product, *SBASIC* [June 1985, Page 223]. I would like to point out several factual errors in the review.

It is stated that the examples in the review are "examples of *SBASIC*'s substitute for BASIC's FOR/NEXT statement:". However if you look closely, the example is not a straightforward FOR/NEXT loop. The first example loops until TOTAL is more than 1000. The variable 'I' simply holds the count.

Mr. Redman states that when the first example was "put through" the compiler the only change was to Line 20. Here again, if he would have looked closely, he would have noticed that Line 50 had been changed to: IFNOT (TOTAL>1000) THEN20.

He did however notice one error in our manual. In his example one, the variable TOTAL appears. Of course, this would generate a syntax error because the BASIC keyword TO appears in TOTAL.

The above were the factual errors that I found in the review. I would also like to comment upon some of the conclusions the reviewer arrived at.

The Pack command does exactly what Mr. Redman describes it does. It is not intended to be a complete Packer utility.

Finally, *SBASIC* is intended for experienced programmers, who probably have previous dealings with structured type languages, such as PASCAL. *SBASIC* is for people who enjoy programming in a structured environment. To this end, the manual is intentionally brief. It is not the purpose of the manual to teach structured programming.

R. Lainevool
Tandar Software

MLBASIC

Editor:

In my opinion the review of the Wasatchware compiler in the May 1985 issue of THE RAINBOW [Page 209] was unfair and uninformed. The reviewer compares it to the Microsoft compiler for the IBM PC. What good does this do a CoCo owner? Certainly there are things I could wish for that the Wasatchware compiler does not have, but the typical CoCo hacker is a quality-conscious and price-conscious person who is going to find a lot to like about the Wasatchware compiler.

I don't know what kind of programs gave your reviewer the comparison timings he quoted; all I can imagine is that they must have been loaded with Real variables. I have compiled over 20 programs on this compiler, and none of them run less than 15 times as fast as the non-compiled versions. This program will run circles around many minicomputer systems doing the same job.

Sure, you are going to have to modify most of your present programs to get them to run on the Wasatchware compiler. Some of the modifications will be minor, and some may be quite extensive, but once you know the rules, you can write programs that will run in both compiled and non-compiled modes very easily, and the gains are well worth the bothers in my estimation.

You can call uncompiled BASIC and assembly programs from the compiled BASIC programs and vice versa, and I had great luck running overlays to two and more compiled programs so as to preserve tables in memory from program to program. The manual is far better than most, though a better explanation of the differences in string handling would be very helpful. Just a page of examples would do the trick, which is what I eventually built for myself. When I called Dave Prey at Wasatchware, I got instant and excellent help.

OK, so I'm the kind of person that delights in the challenge of doing something with a computer that it wasn't intended to do. The CoCo makes a great little mainframe terminal, word processor, data collection and networking device. It can do more practical work around an office than most people would ever dream, and the Wasatchware compiler made it even better than it was. I can assure you that the CoCo can

give you more computer for the buck than any fancy micro you can buy today. Keep that CoCo humming.

Tom Carl
Savannah, GA

MLBASIC

Editor:

Based upon the Rainbow Seal of Certification issued to Wasatchware's *MLBASIC* in your January 1985 issue I sent off an order. The program was received shortly thereafter. However, I have since returned the program disk after many hours of unsuccessful use.

I, like your reviewer James G. Kriz, could not compile even the simplest of programs.

```
10 S$=CHR$(10)
20 PRINT #-2,S$
30 END
```

```
10 REAL X
20 X=0.0
30 FOR I=1 TO 10
40 PRINT X
50 X=X+1.0
60 NEXT I
70 END
```

The first program would not compile. It seems the compiler did not recognize CHR$. The second program did compile. However, the values of 'X' that were printed were incorrect.

When	Printed
X=0	0
1	1.00146484
2	2.00292969
.	
.	
.	
10	10.0146484

Colin G. Sanderson
Norwood, NJ

PAINTPOT

Editor:

I was pleased to see the review of *PAINTPOT* in the May issue [Page 225]. The review was accurate and complete, and showed that *PAINTPOT* is easy for kids as young as the reviewer's son (and even much younger) to have fun with right away.

There is one thing that the review did not make clear about the tape and disk versions. The tape version saves screens only on tape, while the disk version saves them only on disk. The documentation explains how to transfer screens from tape to disk, but purchasers should be sure to buy the correct version for their system.

The quoted price also includes first class postage and handling charges to U.S. and Canada.

Tim Skene
Tim Skene Software

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 guage 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.

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NEW LOW PRICES

Flashcard Review Lets You Build Your Own Study Guide

Flashcard Review is a re-working of an old educational idea and an old computer idea. Instead of presenting the learner with preprinted or preprogrammed questions, *Flashcard Review* lets the learner build his or her own questions and answers. This easy-to-use program is completely menu driven so you don't need the manual. The version I tested was for 64K Disk BASIC and had the capacity to handle 100 question and answer pairs, but there is also a tape version.

The purpose of the program is to let one build a study guide and then have the computer present the questions one after the other as you review and try to build up your knowledge of the answers. The advantage is that you can tailor the material to exactly what you wish to study instead of reviewing someone else's prescribed questions, but, of course, the disadvantage is that one must type in all the questions and answers from notes or other sources before the study period can begin. The typing-in is just one more repetition and hence a learning experience, also. (It certainly ought to improve your typing!)

Once the questions and answers are typed into the computer, you can save the entire set on disk and bring them in as often as desired for review. You can also add to the study guide, provided you have room left, and then re-save the question set.

The study guide is used by taking option two of the menu which presents the first question. Then, when you hit the ENTER key, the answer is displayed. Pushing the ENTER key again will clear the screen and display the next question. At any point you can push the 'R' key and return to the menu. An option to have the questions presented in a random order might have been an interesting addition to *Flashcard Review*, but this feature is not included.

If it were the late 1960s when Computer Assisted Instruction (or CAI) was first getting started, *Flashcard Review* would have been judged to have violated two cardinal rules of CAI design. One is never do with a computer what you can adequately do manually. And secondly, a computer application must save more effort than it requires the user to exert.

But, many flash card programs are now available for computers with preselected subject matter, some very straightforward and some with elaborate graphics and organization.

I think one can argue successfully that these programs have a definite place in education, particularly for the younger students whose interest and motivation can be helped along by the computer interactive format. Even for older students, such programs can add interest and depth to what is basically a boring part of education — the rote digestion of facts. And one can defend them equally well as a means of letting students proceed independently and at their own pace.

But one must understand clearly that the *Flashcard Review* has few of the motivational benefits of the flash card systems described in the last paragraph; The effort necessary to build the study guide will never equal the effort it saves once it is built. You will have to decide for yourself how important this factor is when considering purchase of this software.

I think the concept of *Flashcard Review* has a place in education, but I certainly would not urge someone to buy a computer if this application were the prime purpose for the purchase. *Flaschcard Review* is intended mainly for the older student, about seventh grade through college level, but with parental help even an elementary student might get something out of its use.

Flashcard Review is written and presented with good craftsmanship, and its cost is very moderate. If it is the kind of thing you have been looking for, you should be pleased with the quality of this product.

(D & D Software, Route 2, Box 47, West, MS 39192, $14.95 on tape or disk, for 16/32/64K with or without Extended BASIC.)

— Tom Carl

One-Liner Contest Winner . . .

This is a target shoot game using Lo-Res block graphics. Press the space bar to fire. You must hit the target three times to win; if it reaches the bottom of the screen before that, you lose.

The listing:

```
Ø CLSØ:S=S+1:J=R+496:PRINT@S,CHR
$(183);CHR$(187);:PRINT@495,CHR$
(167);CHR$(171);:IFS=491THENENDE
LSEIFINKEY$=" "ORD=3THENR=R-32:D
=3:PRINT@J,CHR$(162);:IFR=-48ØTH
ENR=Ø:D=Ø:GOTOELSEIFS<=J ANDJ<S+
2THENP=P+1:PLAY"C":IFP=3THENCLS:
ENDELSEGOTOELSEGOTOELSEGOTO
```

Daniel Hamilton
Oak Lawn, IL

(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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- Un-DISK will work even if you already own a disk but WHY BUY A DISK AT ALL?
- Un-DISK should be in the library of every serious CoCo user even if you own a disk says Frank J. Esser, independent reviewer for RAINBOW Magazine!

OK sure, disk drives ARE NICE. I own one. But if your finances are limited, the Un-DISK can give you much of the power of the mechanical drive. Even if you already own a disk the Un-DISK can work like a super fast extra disk.

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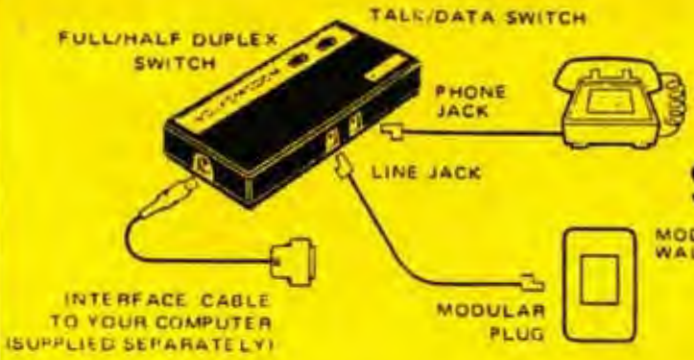

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Try To Checkmate CoCo With *VOX CHESS*

Computerware has again brought us another fine piece of software for the CoCo. There are not very many good chess games available for the Color Computer, but David Crandall has created one that is sure to be classified as one of the best. *VOX CHESS* is a high resolution graphics, machine language, talking chess game with 24 levels of play and several special functions.

VOX CHESS requires 32K RAM, is for one player only and can be used with or without a speech synthesizer. The program works with either the *Real Talker* by Colorware, the old or the new Spectrum Voice Pak (*Cheap Talker*), *The Voice* by Speech Systems, or a compatible SC-01 type voice synthesizer.

VOX CHESS is supplied on disk or cassette, but does not require a disk controller. I received a disk copy of *VOX CHESS* and ran into a few problems. In order to load in the program from disk and use a voice synthesizer, you really need a Multi-Pak or Y-cable. For those of us who aren't blessed with a Multi-Pak or Y-cable (I am not), it is best to forget about using a synthesizer and disk.

In order to properly review *VOX CHESS*, I took a chance at frying a few of CoCo's chips by first loading *VOX CHESS* from disk, secondly pulling out the disk controller, then plugging in the voice pak while the power was on the whole time. (I didn't blow up the CoCo as expected, but could have.) If you don't have at least a Y-cable with your disk controller, order the cassette copy of *VOX CHESS*.

VOX CHESS provides an SA and an LO command, for saving or loading a game in play. However, these are for cassette operation only, not disk. Despite this, *VOX CHESS* has some fine features that won't be found in most chess games.

The setup of *VOX CHESS* is easy. After loading the program, a menu appears and asks which voice synthesizer you have. Those who aren't using a voice pak, or want to play silently, select 'C.' Next, you are asked which difficulty level you wish to play ('A' through 'X').

I am no expert at chess, but according to Crandall, *VOX CHESS* is not considered to be at expert level of play, and can be overcome with several of the classic fools mates. It is, however, able to play a good game of chess for beginning and intermediate players, and does allow setup of the game board along with self-play. Lastly, the player is asked to choose either white or black. Your pieces will appear at the bottom of the screen.

Moves can be entered by either using the keyboard or joystick. Each square has a coordinate which is a letter ('A' through 'H') and a number ('1' through '8'). It is easiest to use a self-centering joystick for the moves. In the joystick mode, a square can be moved around, which outlines the spaces on the board. Once positioned over the correct piece you want to move, a press of the joystick button will cause the square to pick up that piece and allow you to move it around on the board to the desired position.

In the keyboard mode, you type the coordinates of the piece and the square you want to move it to and press ENTER. For example, at the beginning of the game, entering E2E4 will move the white king's pawn forward two squares.

The modify mode is one of the nicest features. It lets you change the contents of any square at any time. It is useful for setting up chess problems. I'm a little ashamed to say, but I used it for cheating. If you type 'W' in the modify mode, the board will be wiped clear, except for the kings. You can add or delete any pieces you wish in this mode by using commands similar to those used for moving pieces in the keyboard mode during game play.

There is nothing spectacular about the speech/talking portion of *VOX CHESS*. The program only speaks when it's moving one if its pieces, or when there is an illegal move made. Terminology used by Ham radio enthusiasts is used. For example, at the beginning of the game, if the CoCo decides to move its knight from B8 to C6, it will say "Knight to Charlie-six." If the knight is taking a pawn it will add, "taking pawn."

Overall, I think this is a well-designed chess Simulation. Moves are calculated very fast by the CoCo, and it wasn't too difficult for me to win at difficulty 'A,' but difficulty 'X' is another story! I don't consider myself a beginner or intermediate chess player, but somewhere in between. If you're looking for a good challenge, and you're not an expert yourself, *VOX CHESS* may be for you.

(Computerware, P.O. Box 668, Encinitas, CA 92024, 32K RAM required, cassette $21.95, disk $24.95)

— Darren Nye

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Advanced And Full-Featured, *CMODEM* Is A Comparable Terminal Program

By Theodore S. Arrington

There are many terminal programs available for the Color Computer. Now there are also several on the market that use the OS-9 disk operating system; *CMODEM* is one of these. It was developed by Edgar M. "Bud" Pass of Computer Systems Consultants, Inc. It is an impressive system with some good features and some drawbacks.

If that sounds like faint praise, let me add that I have found no terminal program that is perfect. I have used seven different communication systems for micros on three different brands of computers. I have also read the documentation for several others, and I follow the ads in RAINBOW closely. All of these programs have some desirable features and all of them have faults. In this review, the emphasis will be on describing which features *CMODEM* has and which features it lacks, though what I consider a bell or whistle others may regard as the most important part of the program and vice versa.

Documentation and Loading

Poor documentation is the bane of the micro industry. The 18 stapled pages of information on *CMODEM* is more complete than I at first thought. It has to be read very carefully and re-read often. I found many of my questions were answered in the documentation, but those answers were hard to find. The program, like virtually all OS-9 software, is not copy protected. But backing up an OS-9 disk which does not itself contain the DOS is not always a simple one-step operation, especially for those with one disk drive. The lack of information on this aspect in the documentation in simple step-by-step terms is a problem.

Similarly, the loading is simple. This is often not the case for OS-9 programs where complicated procedures for "installing" are sometimes necessary. Thus the simple instructions for putting the *CMODEM* programs on a system disk in the current directory should be included. Examples should be given.

The documentation did not tell me whether the program would work with my PBJ 80-column *Word-Pak* or with the *O-Pak* screen modification. I had no trouble at all with the 80-column board, but would have liked the assurance that this was OK in the documentation.

Dumb Terminal Operation

At a minimum, a communication program must be able to simulate the operation of a "dumb terminal." A dumb terminal means that what you type at the keyboard should appear on your screen and be sent out through the modem to the computer with which you want to communicate, and what that computer sends to you should appear on your screen.

CMODEM does have a simple dumb terminal mode, with a few added touches. If the material being received is too long for one screen, some of the material will scroll off the top and be lost. *CMODEM* deals with this by allowing the user to stop what is going to the screen. The computer continues to receive additional characters, which are stored in a small buffer until the user is ready to start the screen motion. Some terminal programs have the capability of allowing you to scroll the screen back to review the last several "pages." *CMODEM* can't do it this way, but both approaches would seem to solve the problem for most users.

Some programs also allow the user to format the screen with a word-wrap feature so words or terms are not spread across two lines — *CMODEM* doesn't have this feature.

Communication Settings

To establish a communication link and to provide for more sophisticated exchange of information, the two computers must be speaking the same electronic language. An adequate terminal program must allow simple alteration in these various elements so contact can be established with many different kinds of computers. *CMODEM* provides for almost all of what are called UART settings. These include Baud rate (110-4800), number of bits for each character (seven to eight), parity (odd, even or none) and a choice of how line feeds and carriage returns are to be handled.

There doesn't seem to be a provision for putting in what is called a "stop bit" and the program only provides for two duplex settings. Full duplex is where the keys you press on the keyboard send a signal to the other computer which "echoes" that signal back to be displayed on your screen. This acts as something of an error checking device. In half duplex, your computer puts the characters you enter on your screen directly. *CMODEM* has both of these settings.

An advantage of *CMODEM* is that the program makes the standard serial I/O port of the Color Computer work more reliably. To this end it has a function to allow the Baud delay factors of the modem port to be set. This is, in effect, a fine tuning — called "tweaking" — of the Baud rate.

With this facility, one should be able to use 1200 Baud or higher without having to purchase an RS-232 Program Pak, although *CMODEM* will work with such an external RS-232 port. I found the program did not work reliably with my 300 Baud acoustic connect modem until I adjusted the delay setting. Once that was done the transmission was flawless.

Intelligent Terminal Functions

What makes programs like *CMODEM* special is that they turn CoCo into an "intelligent terminal." This means that what comes from the other computer (downloaded) can be saved or printed, and what has been saved at a previous time can be sent (uploaded) to the other computer. *CMODEM* has some simple and some sophisticated ways of performing these functions.

Occasionally, the advanced features of *CMODEM* get in the way of simple usage. For example, I frequently have a small amount of data I wish to download and print. When I go into one of the download modes, the program insists I establish a disk file for the downloaded material to be placed in. Even though I may not really want to save the data to disk, the disk file must be established anyway. Simpler programs allow data to flow into the buffer without tying it to a disk file.

A second problem is the lack of a print buffer capability. In order to print what has been downloaded I must first save it to disk, then I must enter the OS-9 shell (that is, get access to the DOS commands) by entering 'U' at the main menu. Then I would enter `list /dl/filename>/p` at the OS-9 prompt. After the file is printed, I can reenter the *CMODEM* program by pressing CLEAR-BREAK. While this will work, it seems cumbersome to me.

There is also another printer function that is either missing or undocumented. If one has an RS-232 Program Pak and a Parallel Printer Pak attached to the Color Computer, some programs will permit printing of material as it is communicated. Thus, one can print part of a terminal session as it is happening, but it is not clear that *CMODEM* can do this.

While the data saved in the buffer cannot be edited (part of it deleted) before or after it is saved to disk, it is possible to view the buffer a little bit at a time and decide whether or not to save the whole thing to disk.

CMODEM has the capability of sending and receiving both ASCII text and binary data. The latter might be, for example, machine language programs. In addition to the nearly universal X-On/X-Off system of sending or receiving data, *CMODEM* features a much more reliable method called by various names — Ward Christiansen protocol, UMODEM, TMODEM, XMODEM and MODEM7.

In the simple X-On/X-Off method, the two computers have an agreed upon signal for starting or stopping the flow of data. Since the CoCo serial I/O port is really only capable of half duplex (data flows into or out of the I/O port, but not both at the same time), some incoming data will be lost as CoCo tries to tell the other computer to stop sending. Moreover, X-On/X-Off has no method to check on the reliability of the communication.

With the Ward Christiansen protocol, a more elaborate procedure assures completely accurate transmission. First the two computers agree on the number of characters in each "block" of data, and a method of assigning a value to each possible character. An example would be to give each character a value equal to its ASCII number. The sending computer asks the receiving computer if it is ready. When both are ready one block of data is sent. The sending computer then stops and gives the receiving computer the checksum or total value for that block. (This is sort of like the Rainbow Check Plus value that we all use when typing in programs printed in RAINBOW.)

If the two computers agree on the checksum value, then they both know the first block was received with 100 percent accuracy. If the checksums don't agree, then the block is sent again. If the checksums agree, then the second block is sent. This continues until all the data is received with total accuracy.

Such reliable transmission takes time, but may be worth it. If one is downloading an E-mail letter from Aunt Tillie in Minneapolis, this kind of accuracy is unnecessary. But one needs total accuracy if important data are downloaded, or if a machine language program is being transmitted. Of course, the computers at both ends of the transmission must be using the same protocol, but this more accurate method is now widely used on both mainframe and microcomputers.

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User Convenience Features

I found *CMODEM* menus to be less user friendly than the industry standard today. When a selection is made from a menu, that selection is not displayed. The whole menu scrolls off the screen leaving a new menu and no assurance that the menu selection was accurate. This is especially distressing for those items where the menu selection "toggles" between two values such as full or half duplex.

The program features an "expert mode" in which menus are dispensed with altogether. This is a good feature. Those who use programs daily soon memorize the commands and find menus time consuming and unnecessary. But for the beginner, there is nothing like a menu that assures the right choice has been made.

Another feature missing from *CMODEM* is "keystroke multipliers" (KSMs), also called "macros." With KSMs the program stores character strings that are used frequently — such as user codes or commands — and makes them available with prearranged codes such as <clear>-A. Once a KSM has been established, the user can cause the entire character string to be sent by simply typing the prearranged code. This saves a lot of time and prevents typing errors when one is trying to get on and off a time-sharing mainframe computer as fast as possible.

On the other hand, *CMODEM* does have the ability to save the communication settings in a "profile" that can be called up when the *CMODEM* program is loaded. If the user typically communicates with several different computers which require different Baud rates, duplex, etc., then one profile would be saved for each of these computers with the ideal settings already saved and ready to load. This also saves time and avoids false starts.

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CMODEM is written in the C language. This is a compiler-based language. This means the author wrote the program using commands that are easily understood by humans (source code), but far from the pure number-based language (machine code) the computer can understand. Then he ran his source code through a compiler (a software program) that translated the commands into machine code.

For $100, you can buy the C language source code. This would allow you to see how the program works and to modify it. In order to use this you must know the C language and have a C compiler, or you can buy just the machine language program without the source code for $50 (a pretty good price). With this you cannot modify the program for your own needs, but the machine code version will load on the CoCo under OS-9 without a C compiler.

If you buy the machine language program and you have a disk-based 64K CoCo, OS-9, a modem and a telephone you are ready to communicate, right? No. *CMODEM* is a good program; it has many fine features and the things it lacks may be unimportant to many consumers. But, it has one unforgivable drawback: Tandy evidently goofed when they set up the serial I/O port. Many terminal programs, especially those that operate under OS-9, cannot use the standard CoCo port without a modification of the cable which goes from that port to the modem.

While this is a simple hardware modification, it is an additional item that must be considered when examining *CMODEM*. It is a low blow to get a new piece of software and be ready to load up and go, only to discover that one has to do a hardware modification before the program will run. I strongly suggest that Computer Systems Consultants, Inc. offer a modified cable — perhaps one of those little six-inch ones — as an option for those who buy their program.

For those of us who have run across this problem before and already have a modified cable, we can skip the optional mod. For others, the cable would probably cost a few extra dollars. At least the company needs to tell consumers in its advertisements that a cable modification is necessary to run the software.

Conclusion

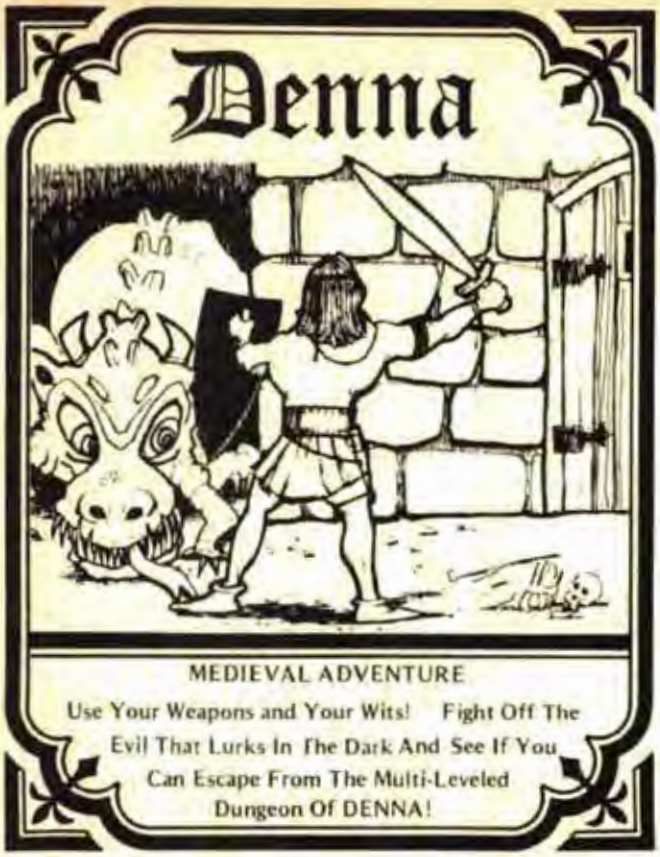
If *CMODEM* included a modified cable, the documentation was a bit more generous and the menus a bit more informative, the program would be greatly improved. As it is, *CMODEM* is a highly advanced and full-featured terminal program that will compete with anything else on the market.

(Computer Systems Consultants, Inc. 1454 Latta Lane, Conyers, GA 30207, OS-9 disk with source code $100, without source $50)

Hint . . .

Verify Tape Saves

To verify that a file (BASIC, machine language or even a data file) has been saved properly on cassette, rewind the tape to the beginning of the file, type SKIPF and ENTER, and press the Play button. If there are any I/O errors the I/O ERROR message will come up and the tape will stop; you can try another save, since this process has no effect on anything that might be in memory.



After capturing the Castle of Denna, you and your trusted followers are given to wine and song and celebration. So much celebration that you deplete the overthrown king's ale and must rummage the castle for more. You soon discover a small strongbox covered with strange, indecipherable writings. You bring it back to your comrades where you discover inside a rusted metal staff on which similar writings are recorded. Convinced it is a powerful magic wand, you become the focus of jokes and chiding. One of your friends playfully touches the staff to your shoulder while scoffing at your belief in magic. Their boisterous laughter is quickly replaced with open-mouthed astonishment as you vanish in a blinding flash of light. You find yourself in a dark, damp and stinking dungeon deep within the bowels of the castle. Armed with nothing more than your good sense and survival skills, you must avoid being killed by the many monsters and pitfalls inhabiting these depths. You must ESCAPE FROM DENNA.

DENNA is a graphic adventure game requiring 32K and Extended Basic. Player picks his character along with strength, agility, physique and alertness. He must maneuver through a multi-tiered dungeon whose play and characteristics are different every game. Player collects items, inventory, checks status and any of 7 other options. Combat with all sorts of monsters. Lots of fun. *Cassette $25.95 and disk $28.95. Versions are different.*

THE POWER OF THE TRS-80 COLOR COMPUTER by John Sharp and David Bolton is a great guide to programming featuring short, powerful programs including Bar Chart Plotter, Secret Code Maker, Racing Driver, City Bomber, Space Invader, Checksum, Bio-rhythms, Lissajous Figures, True Interest Rate, Database, Screen Crawler and much more. Plus sections on debugging, checksums and program merge. Routines are fully documented in clear, concise terms. *This book is loaded with features for experts and beginners alike. $14.95.*

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BACKUP ZERO: Fast Backups For Single Drive Users

If you own a disk drive, you should already know that having a backup of your software is a necessary evil. Making these backups is a very easy and straightforward process, unless you only have one disk drive. With one disk drive, it seems you are swapping disks forever, and should you insert the wrong disk at the wrong time, there's no telling what the final results will be.

BACKUP ZERO is a 64K machine language utility program that will make your life a great deal easier if you only have one disk drive. Instead of the usual six disk swaps normally required, this program cuts that in half to only three disk swaps. This may not seem very significant at first, but you will quickly realize just how much time and frustration you will save once you begin using it.

That's really all there is to this program, and although it does not come with any documentation, if you know how to use the Disk BASIC BACKUP command, you already know how to properly operate it. There is, however, one additional feature of the program, namely the cost.

It is being distributed by the author using what I like to call the "Freeware" system. This means there is no charge for a copy of the program (i.e., it is free!), but the author does request that you make a contribution should you decide you like the program. In other words, it costs only what you feel it is worth.

In these days of high priced, and sometimes overpriced software, it is refreshing to review a product such as this. In order for this type of software distribution scheme to thrive, you must be honest with yourself and send a contribution to the author. Without any contributions, there is very little likelihood that any additional software of this type will become available to us.

For those of you who would like a copy of *BACKUP ZERO*, you can download it from Grand Central Terminal BBS in New York City by dialing 212-682-0681.

(Free CoCo Software, Box 2321, Westover, WV 26502, 64K Disk)

— Gerry Schechter

Que Bit — Quality Game At A Fraction Of Normal Cost

If you guessed from the title this is another "Q-Bert" type game, you guessed right. There have been several Q-Bert games reviewed in THE RAINBOW, including entries from well-known CoCo software vendors. This version of the Q-Bert game comes from Mike Ro Products and deserves your consideration. Not only are the graphics and playability of *Que Bit* excellent compared to the rest of the Q-Bert software on the market, but the price is exceptionally low for this kind of quality.

It had been at least a couple months since any of my kids (ages 6, 8 and 11) had played either of the Q-Bert games we have in our library when we received this version for review. Needless to say, the kids were ecstatic for the chance to play a new one! I have not received any negative comments from them about *Que Bit*. The most frequent remarks around the house are that 1) *Que Bit* seems easier to play with its fast response and good directional control of the lead character, QB, on our standard Radio Shack joysticks, 2) QB "looked" more like Q-Bert than the other two versions we have, and 3) the pyramid shape was more authentic.

Que Bit comes with a one-page explanation of the game, loading instructions and playing instructions. Simply LOADM"QB" and EXEC, then push the Reset button until QB in the upper left corner is reddish-orange. Press the firebutton and the action begins!

Que Bit has a "practice" mode which can be accessed by pushing the 'P' key on the keyboard instead of the firebutton on the joystick to start the game. In the practice mode there is no limit to the number of turns (men) you can have, and you can play indefinitely or until you get tired.

In the normal game mode you have four men and you gain one additional man for each level to which you advance. There are four "rounds" to each level and, unfortunately, I can't tell you how many levels there are in the normal game mode. The documentation makes mention of the third and "later" levels, so I must assume there are a few more after three. My kids and I have only managed to get to the fourth round in the third level. I do know, however, that in the practice mode there are only three levels and you keep repeating the four rounds

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within the third level once you get that high. With each round and each level it gets progressively harder to survive.

Just in case you're not familiar with Q-Bert type games, the object of the game is to jump onto three-dimensional blocks which form a pyramid, and change all 28 blocks to the "target color" of the block shown in the top left screen. That sounds easy, but additional obstacles have to be avoided.

The first and second levels appear to be reasonably attainable by kids and adults with little arcade-game playing ability. However, the third and later levels are quite challenging and difficult. During the first level you need to jump only once onto a block to change it to the correct color. The second level requires two jumps on each block, with the first jump changing the block to an intermediate color. You must jump onto the blocks three times for the third and later levels.

While you are maneuvering to change the blocks' color, each level of play has an increasing number of events happening to undo what you've done or to destroy you altogether. Deadly balls fall onto the pyramid and bounce to the bottom; they should be avoided or you lose your man. One of the balls contains a snake which "hatches" when it reaches the bottom and comes after your man. There are rotating disks along side the pyramid which can be used to escape the snake and other deadly balls. The disk will carry you to the top block of the pyramid after you jump onto it, and if the snake was right on your tail at the time you jumped for the disk, the snake will fall to its death.

In addition to all this activity, there are two bluish characters, Slick and Sam, that mischievously change the color of your blocks as they hop down from the top of the pyramid. Slick and Sam are not deadly, though, and can be destroyed by jumping onto them.

Que Bit is available on cassette or disk. My review copy was on disk and I should mention here that *Que Bit* will run fine on JDOS. Initially, the program appeared to crash or hang up somewhere when first EXECuted from JDOS, but after pushing the Reset button *Que Bit* seemed to run the same as on Disk BASIC.

There are two possible improvements to the program which my kids and I thought would be nice — a pause feature and a scoreboard. Both a pause and scoreboard are usually incorporated into most of the CoCo arcade games. It's hard to tear yourself away from a game that's going good when someone in the family needs your attention elsewhere and there's no pause feature! The scoreboard would preferably be capable of saving top scores to tape or disk and loading those top scores when the game was loaded.

The quality of this program is comparable to the better arcade games on the market. I thought joystick response was excellent in speed and directional control of the QB men, and the graphics are superior. Don't be fooled by the price! If you're looking for quality games or are interested in a Q-Bert type game, I sincerely believe you won't be disappointed with *Que Bit*. It's a quality arcade game at a fraction of the normal cost.

(Mike Ro Products, P.O. Box 1317, Lavergne, TN 37086, tape or disk $7.50)

— Kenneth D. Peters

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Uncle Bert Is An Excellent Teacher In *CoCo Logo for the TRS-80 Color Computer*

"Well, they goofed this time," I thought when I opened the package that had just arrived in the mail. It was a book called *CoCo Logo for the TRS-80 Color Computer* and I don't happen to have LOGO for my CoCo. I was ready to ship the package back for someone else to review when the thought occurred to me — what better way to review a book that is trying to teach something than to use that book to teach myself? I headed up to my local Radio Shack Computer Center and acquired a copy of LOGO for the CoCo (ROM pack version). Let me state that one month is not enough time to become a LOGO expert, but the time spent has been interesting and worthwhile.

First, I was truly surprised to learn all the power the language has — we usually think of LOGO as a kids' language that lets them write "programs" to draw cute pictures using a concept called "Turtle Graphics." In Turtle Graphics, the cursor is referred to as a turtle and shapes can be drawn by giving the turtle instructions such as "forward," "right turn," etc. By stringing together these instructions into procedures, we can program pictures, shapes and designs. Color LOGO does these things and is easy enough to use that my 6-year-old daughter uses some of its basic features on her own.

It also supports some high level programming techniques and instructions such as WHILE, MAKE (allows changing values of variables during program execution) and recursion. LOGO subroutines can be saved on tape and disk (disk version only).

But, this is not a review of Color LOGO so let us proceed to the book. Regular readers of THE RAINBOW should recognize the names of the book's co-authors: Dale Peterson, Don Inman and Ramon Zamora. Further, the concepts of this book should seem familiar — about a year ago RAINBOW readers were treated to a series on LOGO called "Greetings from Uncle Bert." In this book, each chapter is a letter from Uncle Bert (W. Bert Woofensburger) to his niece, Molly. In each "letter," Uncle Bert talks about some of the latest happenings on his farm and then tells Molly of his latest activities with LOGO on his CoCo in a delightful, down-home style.

What makes this book different from most books that try to teach a programming language is that it doesn't seem to be teaching at all. Uncle Bert is just telling Molly about some of the things he tried and encouraging her to try it on her own CoCo. He also tells her about things he tried that didn't work and then, in his own way, ponders and tries things to find out why it wouldn't work and what had to be done to make it achieve the desired result.

One example is when Uncle Bert tries to draw a circle by telling the turtle to move ahead one unit, then turn one degree and repeat this 360 times. Logically, this would seem to make a circle; instead, the result is a hexagon. Uncle Bert then works his way through a series of simple experiments in which he finally determines how to draw an apparent circle (really a multisided figure with so many sides it looks round) and figures out why the 360 repetitions of forward 1, right 1 resulted in a hexagon.

Each "letter" or chapter is liberally sprinkled with interesting examples and the book is best used by sitting down at your CoCo and trying the examples while you read the material. It also includes some challenges for the reader: "Here's the way I did this, Molly, but it seems there should be a better way — can you figure one out?" In 14 interesting chapters, Uncle Bert gives the reader a very thorough understanding of Color LOGO.

Now for some of the technical details. At the end of each chapter there is a brief summary of the features of LOGO that were taught in the chapter. Four appendices cover setting up, saving on tape or disk, using the printer and a summary of Color LOGO.

I keyed a few paragraphs from the book into a text analysis program running on a large mainframe at the college where I teach. The results of the analysis gave a "Fog index" of 8.9, indicating a 13- to 14-year-old reading level. This appears to be about the level Uncle Bert is addressing in his letters, so the text is consistent with the targeted audience.

To summarize, I think the authors have compiled an excellent text for learning LOGO painlessly — better than that, they have made it interesting and fun! Color LOGO is an interesting and surprisingly powerful language, and learning it develops not only programming skills, but general problem solving techniques and some good concepts of geometry. I hope to hear from Uncle Bert again soon.

(Dale Peterson, Don Inman, Ramon Zamora, Wiley Press, New York, NY, $12.95)

— James G. Kriz

One-Liner Contest Winner . . .

Crashing Rocket draws a planet and stars on the Hi-Res screen in PMODE 4; a rocket then moves down the screen, hits the planet and explodes.

The listing:

```
1 E$="C1NM14Ø,14ØNM15Ø,156NM146,
15Ø":PMODE4:PCLS:SCREEN1,1:R$="B
R3D4NL3F3":FORI=1TO1ØØ:CIRCLE(25
5,191),I:NEXT:FORI=1TO15Ø:PSET(R
ND(255),RND(191)):NEXT:FORI=ØTO1
53:L$="BM"+STR$(I)+","+STR$(Y):Y
=Y+1:DRAW"C1"+L$+R$:DRAW"CØ"+L$+
R$:NEXT:DRAWE$:SOUND1Ø,1Ø
```

Chris Babcock
Cary, NC

(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.*)

The 'Beep' Is On With *KLICKER*

Have you ever wished *Telewriter-64* had a "beep" function so you could hear if/when you actually hit a key? Wouldn't it be nice to add this as an auto-executing feature to your own programs, even those you plan to market? With TEPCO's *KLICKER*, you can have both!

KLICKER is a machine language program for the 64K CoCo, CoCo 2 or TDP-100 that generates a beep or click through the TV's speaker whenever a keyboard key is depressed, except for SHIFT and SHIFT-0. The program is a short six-line BASIC listing, included in a well-written, eight-page documentation sheet and must be typed in (which should only take a few minutes). A 64K CoCo is required, since ROM must first be moved to RAM. The documentation states that *KLICKER* will work with all versions of BASIC. Disk BASIC 1.0, Extended BASIC 1.0 and Color BASIC 1.1 are being used on my system; they work fine with the program.

The BASIC *KLICKER* program can be added to other BASIC programs, so when they are run the click function will be activated. Technical details of how the program works and its source code are provided with the documentation. According to the author, with this information *KLICKER* can be incorporated into programs written in other languages such as PASCAL and assembly, or even other operating systems. However, programs which use the upper 32K of RAM for their own purposes or which use a subroutine other than POLCAT to interrogate the keyboard will not work with the BASIC *KLICKER* program.

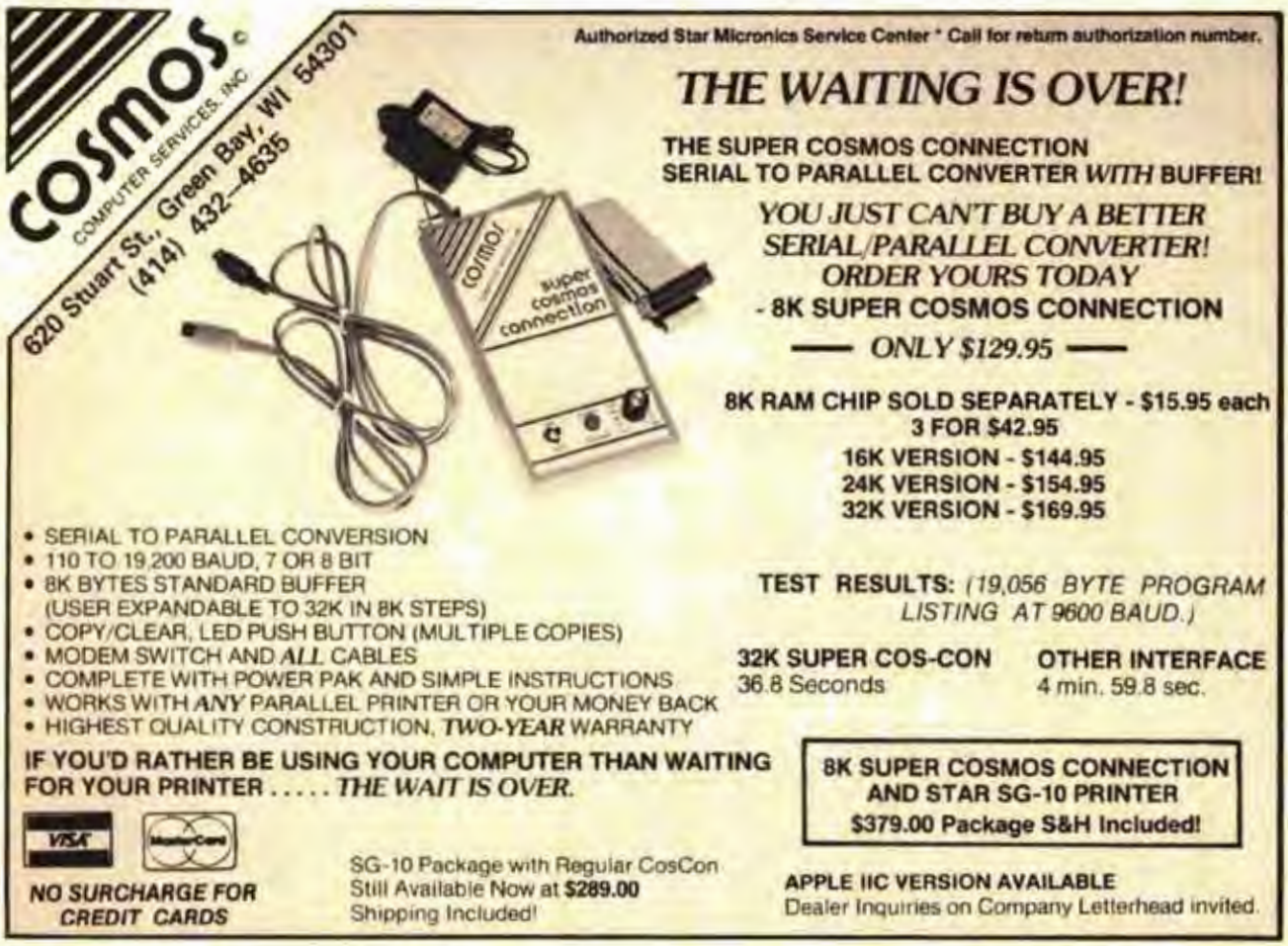
TEPCO gives the buyer of *KLICKER* permission to include it as a minor part of any program he or she has created to be sold, provided the copy of the program contains the credit "*KLICKER* Copyright 1985 by Laurence A. Tepolt." (Under all other conditions, reproduction or use without the express written permission from TEPCO is prohibited.) This is a pretty good deal for those software writers who wish to add a click function to their programs but don't know machine language.

Having a click accompany every keystroke increases the confidence of the person who is typing. I type around 70 words per minute, and will normally lose some characters while using word processors. This usually happens when two keys are hit at the same time. *KLICKER* can be added to the 'U' program of *Telewriter-64* to provide the click function. With this added, I can hear when I miss a key and correct the mistake immediately. Hearing when or if a key is hit will reduce the amount of errors typists make and probably increase their typing speed.

KLICKER is well worth the price if you want *Telewriter-64* or your own programs to beep. There have been programs in the CoCo magazines which provide a keyboard click function, but permission to use these routines in your own marketable software is not given.

(TEPCO, 30 Water Street, Portsmouth, RI 02871, $6)

— Darren Nye



Time Keeps Ticking Away With Suspense In *Bomb Scare*

Bomb Scare is a text Adventure game from Pal Creations that will keep you on guard at all times! The scenario is as follows: You are the poor sucker who risks your life disarming bombs. At the beginning of the game, a terrorist group has just planted eight bombs throughout the city. Your goal is to disarm all eight bombs with only the tools in your bomb van, items you pick up along the way and your wits. Beware, these bombs are very dangerous and very elaborate. They are quite tricky sometimes, and if one blows up in your hands you are doomed to certain death. The bombs range from acid bombs to fire bombs to grenades, and there is one "super bomb" that happens to be a nuclear bomb.

As if the disarmament weren't hard enough, there is also a time limit on the bombs. If you aren't quick enough to disarm all of the bombs, well, it's just kiss-the-ol'-city-hall-goodbye time. Other than the setting and the goal, this game is much like any other Adventure game with nearly the same vocabulary and the standard two-word commands.

If you like Adventure games, I'm sure you will get a kick out of this one unless you are an English teacher. If so, you will certainly be annoyed by the continual use of the word "dearm" used throughout the program. This surprises me because in the documentation the correct word "disarm" is used. Just a minor oversight I suppose. Hmmm, now how do you "dearm" the grenade bomb?

(Pal Creations, 10456 Amantha Ave., San Diego, CA 92126, cassette 14.95)

— Jim Sewell

Feuer and Gasse — Armchair Sport With Historical Challenge

Feuer and Gasse is a war game built around the American Second Division's operations in Belleau Wood and Chateau Thierry during World War I. The game includes many of the tactical problems faced by American troops trying to maneuver and advance in a war that had been marked thus far by stalemate and static trenches.

The concepts needed are set up in a most enjoyable short instruction book which clearly warns the customer that he will get beaten to a pulp if he begins the war without careful study of the problem. It also warns that the game is so absorbing a game-save feature (for bouts lasting over six hours) had to be built in.

At this point, reeling with confidence, I rushed into the fray at only 8 p.m. Since I am a "one-man, military-industrial complex" (that is, a defense industry engineer with a Reserve Commission), I am clearly competent for command! About 4 a.m., proud of having fought von Ludendorff to a draw, I invoked the game-save feature. In the weeks since, I've never beaten my own first try score and I've had to game-save repeatedly. I have extra respect now for the Second Division.

My DOS quit over the same problems and with the same symptoms I had encountered with a previous Picosoft game review. (Some ROM versions — mine in particular — need unpacking of deleted spaces in the game-save I/O area to run properly on disk; tape versions perform correctly the first time. Picosoft supplies both tape and disk versions in each shipment.) As before, the author provided outstanding support by phone, and I was up and running fine that weekend on both tape and disk versions.

The program is shoehorned a bit tight even for a 32K CoCo, but I did get my disk version to run with only a `PCLEAR1` even though the manual claims `PCLEAR0` is mandatory. That was fortunate because my ROM will not

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do a PCLEAR0 using the POKEs normally given for a CoCo.

This game uses seemingly crude semi-graphics for the tactical map on which you play; this crudity masks subtleties, much as the simplicity of a chess board does. (Besides, how good were the maps and intelligence provided to regimental commanders in that region in June 1918?)

Another disparaging comment about the game is that the music can drive the player nuts, although it is almost recognizable as silent movie chase scene music — a very cute touch. One can suppress it, but then the time required by the program for internal housekeeping and garbage collection gets truly boring. I left the music as is.

In *Feuer and Gasse*, the procedure of space occupation has become very sophisticated. On a number of occasions, I was pounding some under-strength German company with three or four oversized U.S. regiments when suddenly from under the bushes of Belleau Wood would spring an entire German regiment which was invisibly hidden. Such a surprise reversal is most disconcerting! I learned to watch carefully when aircraft of either side was passing over; if the plane strafed empty woods, I assumed that is where the German reserve was hidden.

I finally got intrigued enough to examine the logic in the coding for this. As mentioned in Ed Hetzler's instructions, the "stacking" of units and/or rough terrain produces "phantom" units which the machine logic normally ignores. Because the machine logic works from a proper table of units actually present, it can sort out and ignore "phantoms." However, the player sees only the semi-graphics on the screen and can be fooled by "stacked" units.

My belief is that since planes flying over "see" the video screen by PEEKing video screen locations, they likewise can be fooled by some "phantoms." In any event, the combination of "phantoms," planes strafing empty woods, and some German units camouflaged in the woods or beneath other units, combine to provide the uncertainty factor in ground combat tactical intelligence which is actually present.

There is another item in the *Feuer and Gasse* logic that bothers me a bit. It may just be a statistical oddity, but I do not understand why about 90 percent of the time if one of the American units surrenders to a smaller German unit, it's a Marine battalion that does the surrendering. Not being a Leatherneck, I do not take offense, but I do detect some devilish humor (or a "bug") in the program.

In conclusion, you do not have to be a blood-thirsty savage to enjoy war-gaming — even chess is a form of this arm-chair sport. If the intellectual challenge of war-gaming interests you, and if the latent historian in you enjoys irreverent summations of battles like Chateau Thierry, an evening with a Picosoft game like *Feuer and Gasse* will be most rewarding. And, I guarantee it will keep you out of the refrigerator; there are no commercials to squeeze a snack into, and if you leave the board in mid-move, that von Ludendorff will sneak an extra regiment into Belleau Wood!

(Picosoft Games, P.O. Box 35, Eighty Four, PA 15330, 32K tape and disk versions supplied on cassette, $24.95)

— H. Larry Elman

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Junior Typer Is A Good Teacher For Beginning Typists

Junior Typer uses colorful graphics to teach elementary students very basic touch typing skills. The *Junior Typer* package is divided into two programs, *Junior Typer I* and *Junior Typer II*; each program is stored on a separate disk. Students are introduced to the location and correct finger positions for two- and four-letter combinations such as: fj, de, fgju and swjm. *Junior Typer II* teaches the number row and special shifted characters such as: d3, j', f% and s". Capitalization using the shift key is not taught.

The *Junior Typer II* disk also contains student tests and a teacher management system. Student tests are divided into two areas, easy and hard. When the easy section is selected, students type in three to six word phrases. During hard section testing, students type in five to 10 word phrases. All phrases are randomly selected.

During tests students work against the clock. Time is represented by a shrinking line at the bottom of the screen. The amount of time allotted is determined by the length of the phrase. Each test contains 10 phrases which each count for 10 percent of the total score. Scores from the tests are recorded in a management system on the *Junior Typer II* disk. Student names, test scores and difficulty levels are recorded by the management system. Student records can be accessed by the teacher to check student progress and for grading.

During typing drills two graphics hands are displayed on the screen. The keys featured in the drill appear on the proper finger or at the appropriate location near the finger. The lettering on the hands display is in uppercase to match the computer keyboard. In addition, the featured keys are located, in lowercase, between the graphics hands.

A line appears under the lowercase letter to be typed. When a letter is typed correctly the line moves to the next letter. Each two- or four-letter combination is typed 10 times. Each time the student types a letter combination correctly, a portion of the graphics reward is added to the display. When the student finishes typing the drill 10 times, the graphics reward is complete. In most cases, the graphics rewards contain some animation. I found the graphics rewards to be of good quality. I especially liked the graphics display buildup used during the drills.

Junior Typer comes in a plastic storage case and is accompanied by an operator's manual. The manual is well-written and easy to understand. Two visual aids, a universal keyboard layout and a student progress report, are attached to the manual. The visual aids can be copied and used by teachers or parents.

The manual covers the operating instructions for the three computers that can run *Junior Typer*: CoCo, Model III and Apple. I found no confusion with the multiple operating instructions. As a matter of fact, I was online and using *Junior Typer* in a couple of minutes. It is easy to use and menu driven.

Overall, *Junior Typer* is a good program that will do the advertised job. There are several things that I would like to see in a program of this type: sound or music and tests on the drills. Sound or music is a great reward for young people. Since this program can be networked in a classroom, I understand that sound can be distracting. *Junior Typer* can also be used at home where music or sound effect rewards can be very effective. Testing on the drills would allow teachers or parents to locate problem areas.

I would like to restate that adding sound or testing on the drills are personal additions. Someone else would probably like to add something different to the program. *Junior Typer* works fine without any additions.

According to the advertisement I received, Aquarius People Materials, Inc. does not charge extra for networkable versions of their software. This should be good news to schools. Also, the price of the *Junior Typer* package includes a backup copy.

(Aquarius People Materials, Inc., P.O. Box 128, Indian Rocks Beach, FL 33535, disk $45 plus $3 S/H)

— Gabriel Weaver

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ROBOT BASIC Has A Use For Every Member In The Family

Do you like to doodle? Are you a frustrated artist? Do you do mechanical drawings? Would you like something to entertain the kiddies?

ROBOT BASIC will let you doodle to your heart's content! It will draw pretty pictures with the help of your imagination and a little effort. The engineer or architect can prepare, print and CSAVE work. The youngster in your family can entertain himself or herself with this program for hours! It will also teach some of the basic elements of programming.

It was a pleasure to review *ROBOT BASIC* since the program itself operates just as the instructions say it will; the instructions (largely in the form of a tutorial) are detailed and accurate. They can be readily understood by anyone who can read English — step by small step is the way it goes. You may even get a little bored by the details, but you cannot misunderstand them.

If you have a disk system, I suggest you remove the disk controller before you start. The program may be disk compatible, but I had trouble loading the program with the disk controller connected. The BASIC portion of the program is contained in 339 tightly packed lines (32K version). Both the 32K and the 16K version leave plenty of RAM for manipulation of drawings.

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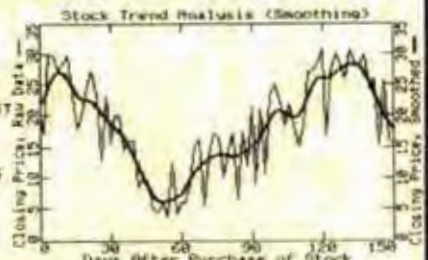

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After entering the program I immediately started doodling. I became so interested in doodling that I had to wait for a second session to try all the other things which you can do with this program. You can get out of the Doodle mode by merely pressing the ENTER key.

One can DOODLE or DRAW in any of CoCo's eight colors and change colors at any place and any time by a simple command. The commands are easily understood and remembered. To set the screen color you merely type SCREEN followed by the number of the color you wish. To designate the color for the drawing lines just type COLOR (followed by the number of the desired color). The CLEAR key will cancel a previous command.

If you wish to draw a line from the position of the robot (its initial position is in the center of the screen) up, down, right or left, just say so! Add the number of spaces you wish to the command. To move up 20 spaces, just type UP20 and ENTER. To move at an angle, specify the degrees (in increments of five degrees) of the angle and the number of spaces you wish the line to cover. If you construct a compass and wish to draw a line north by 10 degrees east, with a length of 20 spaces, type ANGLE10;20 and press ENTER. (Degrees are measured clockwise.)

After you draw your masterpiece, you can color any part of it by placing the robot in the space you want to paint and then specify the color you wish. Example: PAINT4 will fill the space with red. Also, by typing SOUND followed by a number between 1 and 255, the computer will respond.

ROBOT BASIC permits you to program your drawings. To go from the Doodle mode to the programming mode, just press the ENTER key twice and the first line number (10) for your program appears. Each command is followed by a colon (:). Use a program line for each segment of the picture you wish to draw. When you have finished the program, simply RUN it. You can also CSAVE it for future use. If you wish to edit a line of your program you may do so in a simple way — just about the same way you edit any program in your CoCo.

When you wish to move the robot to another location on the screen without making a visible line, just type BLANK followed by the number of spaces and direction the robot is to be moved. A graphics screen chart is supplied with the program for planning purposes when you start to doodle or prepare a program.

ROBOT BASIC is a good program with which you and your family can have fun.

(Triad Pictures Corp., P.O. Box 1299, Sequim, WA 98382, cassette $18 plus $2 S/H)

— Charles L. Redman, Jr.

Hint . . .

Disk or Cassette I/O Errors?

Make sure the disk drive(s) and cassette recorder are not on the left side of the TV set (or if they are, that they're at least six inches or more away). This is because a TV set's flyback transformer, almost always on the left side of the set, puts out a strong magnetic field which can interfere with cassette or disk operation.

MEMODATA — A Valet For The Busy Person

If you have important dates to remember in the coming months, this program will fill your needs. *MEMODATA* from Compugram is a very well-written, electronic appointment calendar. The instruction manual included with the program is written in an easy, comprehensive style.

This program can be used with either a 16K or 32K Extended BASIC computer with cassette or disk drive. *MEMODATA* automatically adjusts itself for the amount of memory available. A 16K computer has a capacity of 90 records if no disk drive is used (it will hold up to 60 records with a disk drive) and each message can be up to 35 characters in length. A 32K computer will hold up to 250 records and the only limit on the number of characters allowed in each message is determined by Color BASIC's limit on string length (255 characters).

After loading the program and running it, the first input is to enter the current date. The date is used for the scanning process by which previously loaded messages from your data file will be displayed. The program will scan for messages that are coming up five days ahead of the current date entered. If you run the program near the end of the month, the program will scan the messages up to eight days into the next month.

After setting the current date, you will see the main menu. Following is a list of the five options and their functions:

1) DISPLAY allows you to scan all messages in memory.
2) LOAD allows you to load the data file from cassette or disk.
3) MODIFY sends you to the modify submode section of the program.
4) STORE allows you to store your data file on cassette or disk.
5) END allows you to end the program.

The display portion of the program offers you three prompts (options). If you use the default values (by pressing ENTER after all three prompts) *MEMODATA* scans the messages, then it prints the ones that are due up to five days from the current date or eight days into the next month, provided the current date is near the end of the month.

If you want to search for a specific appointment, you can type a category name (up to eight characters) and *MEMODATA* will scan all records and print only those that match the category. The alternate date option allows the user to enter a date and *MEMODATA* will scan and print all messages that are due up to that date.

When you press #3 on the main menu, you will enter into the modify submode. The five categories of this mode are as follows:

1) ADD allows the user to enter new messages into memory.
2) DELETE allows the user to set a delete flag.
3) UPDATE allows the user to change a message.
4) DUMP allows the user to see a listing of all the messages in memory.
5) SORT allows the user to sort the messages by date and also to delete all the messages that have a delete flag set.
6) END SUBMODE allows the user to return to the main menu portion of the program.

The ADD option is the most important part of this section. This allows you to add new messages to memory. After pressing #1 from the menu, the program will ask you to enter the due date of the message, then you will be asked to enter the category, up to eight characters. This will help you to identify your records. Suggested categories might be: birthdays, holidays, work, etc. You will then be asked to enter your reminder message.

If you have an I/O problem while loading a data file or accidently hit the BREAK key during the program, *MEMODATA* has a unique function you can use. All you need to do is type GOTO44 and ENTER, and the program will start again at the main menu screen. There is no loss of any messages you have in memory at the time. (Remember that RUN will restart the program and lose all data.)

Also included with this program is another program called *MFG*. This is a *MEMODATA* form generator and can be used to print reminder forms on your printer. This is a good idea, as you can keep these forms in places where you spend a lot of time, such as your home or office. If you have an important date to remember, just write it down on the *MEMODATA* form and, when you get home, enter it into your data file. I would strongly recommend at least a monthly entry and/or perusal.

I was very impressed with the smooth operation of this program and its ease of use. This program and the accompanying instruction booklet are very user friendly. For those of you with a lot of appointments or important dates to remember, *MEMODATA* could be the most exciting and important piece of software in your collection. Don't forget it — *MEMODATA* it!

(Compugram, Box 26663, Richmond, VA 23261, cassette $15)

— John H. Appel

One-Liner Contest Winner . . .

This one-liner asks for your name and then displays it in an unusual way.

The listing:

```
1Ø CLSRND(8):INPUT"NAME";N$:CLSØ
:FORW=15TO3Ø:FORT=ØTO62:SET(T,W,
2):NEXT:NEXT:FORA=ØTO55Ø:FORB=1T
O247:PRINT@A," ":PRINTTAB(B);CHR
$(153);N$;CHR$(153):NEXT:NEXT
```

Paula Vaske
Beloit, WI

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

SIMON Makes Program Input As Simple As One Keystroke

When the teacher let our third grade class play "Simon Says," I was always the one who forgot to listen for the "Simon says" part. I lost the game a lot then, but Dennis Derringer has fixed it so that does not have to happen. One of the latest offerings from the Dennis Derringer Software emporium is *SIMON*. This particular *SIMON* is the strong, silent type. There is very little talk and a lot of doing.

SIMON is not a game at all. It is a very serious program which can be of great use in most CoCo libraries. Simply described, *SIMON* is a program which permits you to make inputs in BASIC programs without laying a hand on the keyboard. The documentation says you can do all of this with just one keystroke; the documentation tells the truth!

SIMON came to me with six pages of documentation which were fairly easy to follow. I'll admit to a bit of puzzlement as to why such a program would be written, but then I considered all of the routine inputs I must use in my *Pro-Color-File* database, and I had an idea why Dennis Derringer wrote *SIMON*.

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I spoke briefly with Dennis before I put *SIMON* to the test, and he alerted me to the aversion *SIMON* has to machine language in certain programs. I proved all of that to myself when I experimented with my mail merge program. The results were some spectacular color shows on the screen, but little help to run the programs. When I dealt with the strictly BASIC programs within the mail merge, it worked like a charm, however, the computer locked up when the mail merge called up its own bulletin board. According to documentation, that may be a function of my 1.0 disk ROM and could be worked around.

You load *SIMON* in the usual manner and get a colorful billboard which flashes colors and asks you to press a key. When I pressed the key, I got the *SIMON* menu which has a test program at position 'A' and a program to teach *SIMON* at letter 'L'; letter 'M' is to exit *SIMON*. When you push 'A,' *SIMON* whips through the input phases of a name-address program and waits for you to input a telephone number. It is done in a flash!

After walking through the short tutorial and observing what happened, I decided to use *SIMON* on one of my own programs. I have been working on a routine which will figure the sunrise or sunset for a given area. It requires input of some basic information which is the same for your home town every time you use the program. I realize you could have that data as a permanent part of the program, but what if, for example, a friend should call from Santa Ana needing to know the time of the next sunrise? *SIMON* is the answer.

Running under BASIC, my program requires the inputs to determine latitude-longitude variables. When I ran the program under *SIMON*, those inputs were converted into a machine language program which will run my routine until the point where I must input the time variables. It worked like a charm, and made my sunrise-sunset program much more useful.

The documentation tells you how to modify the *SIMON* menu and to install the commands you need to run from the menu. Besides letting *SIMON* watch you run your program, you can choose to use direct input and predefine a series of keystrokes. You have to really know what move you are going to make, because like the old game, *SIMON* does not forgive.

You may also edit the command file you have prepared to change it at any time. Take a little time here and get familiar with what you are to do. The line oriented editor works just fine, but you have to remember "GIGO": Garbage In, Garbage Out.

I have had *SIMON* up and running for about two weeks on a couple of *Pro-Color-File* databases. It saves a lot of time. One of the great advantages besides the fact that it works is that Dennis Derringer runs a fine software house, and you can depend upon first class advice and help to tailor *SIMON* to your needs.

To give you an idea of the worth of this program — I had no idea when I first saw it what I would do with it; now, it is so comfortable, I don't know what I did before I had it!

(Derringer Software, Inc., P.O. Box 5300, Florence, SC 29502-2300, disk $24.95 plus $2 S/H)

— Howard Lee Ball

BUT...CHECKERBOARDS ARE FOR TABLECLOTHS!

THE LOWERKIT III FROM GREEN MOUNTAIN MICRO

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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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ADDLINE Gives Advantages Of Word Processing With *EDTASM+*

If you are the proud owner of the *EDTASM+* ROM Pak from Tandy but are somewhat dissatisfied with the editor provided, then Software Tools may have a new product of interest for you. The tool is a machine language program called *ADDLINE* that allows you to use a full-screen text editor such as *Telewriter-64* or other ASCII cassette format editor to create 6809 source code. Once the code is generated, you can use *ADDLINE* to add line numbers to it for access by *EDTASM+*.

The program comes on cassette with two pages of very complete instructions. *ADDLINE* is written in position-independent code and will run on 4K, 16K, 32K and 64K systems. The program requires a total of 1,760 bytes and Extended BASIC is not required.

To use *ADDLINE* you must first own a copy of an editor/word processor such as *Telewriter-64*. In fact, although *ADDLINE* is designed for ASCII-oriented editors, it will handle *Telewriter-64*'s nonstandard binary format, also.

Once you load your editor from cassette, you may then proceed to code your assembly language program using the more powerful editor contained in your word processor. When finished, you would save your program text to cassette, `LOADM"ADDLINE"` and `EXEC`. *ADDLINE* will read in your source code, append a line number to each line and write it back out to cassette. You may now get into *EDTASM+* and reload the file for assembling.

Having done this with no problems, I can honestly say *ADDLINE* performs exactly as indicated. However, there are a few points to consider. One of the advantages to owning *EDTASM+* is that the Editor, Assembler and Debugger are all present in the same package and flipping from one to another is quick and effortless. As you can see in the previous paragraph, using an alternate editor will involve much more cassette I/O and could become tedious.

For instance, if while assembling you find minor errors, it would be silly to go back to your word processor to make a minor change when *EDTASM+*'s editor would be much simpler. However, if you don't go back, you will now be committed to using *EDTASM+*'s editor for the rest of testing and debugging. Although a full-screen editor such as *Telewriter-64* is definitely an advantage, on a tape-based system, the additional loading and saving of programs could be a major nuisance. I will admit, however, that I found keying in a long listing from a magazine was definitely easier on my text editor with a 51-by-24 display and full-screen edit capabilities. But, when it came to corrections later, I resorted to my more convenient, but less powerful *EDTASM+* editor.

As usual, the decision to buy should be based on your own preferences and if you don't mind the extra I/O, then I definitely recommend *ADDLINE* as a very complete program at a very reasonable price.

One final note to Software Tools. Many of us with the *EDTASM+* ROM Pak have upgraded to disk. Since using disk removes my objections to saving and loading repeatedly, I would humbly suggest that you consider bringing out a version of *ADDLINE* that would be disk oriented.

(Software Tools, P.O. Box 39532, Cleveland, OH 44139, cassette $7.35)

— Ken Boyle

Hint . . .

Get the Most Memory

If you have an Extended BASIC CoCo, four graphics pages are reserved when you switch on your computer. Unfortunately, you can't just do a `PCLEAR 0` to free up that space. To accomplish a virtual PCLEAR 0 and thus free up more RAM on a cassette-only system, try this command:

```
POKE 25,6:NEW  ENTER
```

On a disk system, to increase the amount of free memory, try this:

```
FILES 1:POKE &HD00,0:POKE
25,13:NEW  ENTER
```


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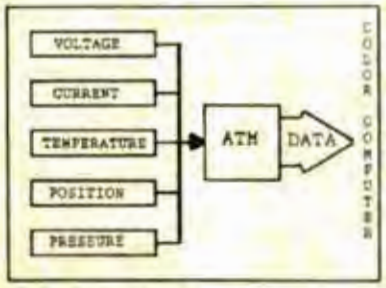

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Ease Of Use Makes *Bob's Magic Graphics Machine* A Good Graphics Tool

Bob's Magic Graphics Machine (I'll just call it *Magic*) is a menu-driven graphics building program. You can use *Magic* to produce pictures that can be used with machine language programs and edited with other graphics editors. *Magic* can also produce pictures that can be used in BASIC programs.

Magic requires 64K of memory, one joystick and Extended Color BASIC. It is available on disk or tape. It comes with an extensive 32-page manual, which is supplied in a 5½ by 8½-inch format. The print is small but readable. The only time I had to use the manual was to familiarize myself with the features of the program. *Magic* is entirely menu driven. This makes it so easy to use that after a few days, you may have trouble remembering where you put the manual.

The first menu you see gives a choice of one of three modes to operate in, doodle, BASIC picture compile or subroutine picture compile. All modes have the same graphics building capability; they only differ in the type of output produced.

The doodle mode produces a binary file which can be used with other graphics editors or with machine language programs. The BASIC picture compile mode will produce a BASIC program of the picture that can be loaded and run like any other BASIC program. The subroutine picture compile mode is used to produce BASIC subroutines of the picture screens. That's right, screens. In this mode you can draw several screens of graphics. The output is a single file with all the subroutines. With this output, the user will have to write the main controlling BASIC program. This gives the user an easy method to develop graphics intensive programs without the hassle of laying out each graphics element and then translating these elements to BASIC statements.

After the mode has been selected, *Magic* will prompt for a filename and several other parameters if you select one of the compile modes. After these parameters are entered, or if you selected the doodle mode, a blank screen with a set of cross hairs will be displayed. You are now ready to start drawing some pretty pictures.

But, what are the commands? Press the 'H' key to take a look at the first help screen. This screen will display a list of single-key commands and their functions. The commands include Circle, Ellipse, Line, Box, Draw, Get, Put, Set and Fill. They will perform the function the name implies. When using Line or Draw, *Magic* uses a rubber band technique for drawing the lines. You position the cursor at a point on the screen and press the joystick button to pin down this end of the line.

Further movement of the joystick will produce a line that can be stretched from and rotated around the pinned point until you are satisfied with its position. You then press the joystick button again to fix the line's position.

The Box, Circle and Ellipse commands work in a similar manner. They allow you to enlarge or shrink the object by movement of the cursor. These three commands will also let you move the object to another position on the screen with the joystick. This makes it very easy to position objects exactly where you want them.

Two other commands are Get and Put. These commands enable you to pick up a 64 by 64 pixel area of the screen and replicate it at any other position on the screen. The object can be reproduced as is or you can apply several logic conditions (AND, OR, NOT) to the object.

Magic also has the capability to put text on the graphics screen. The text is displayed in upper- and lowercase letters and normal or inversed video. After the text is typed in, you can use the joystick to move it where you want it on the screen.

Each of the commands has its own submenu which lists the options for the command. *Magic* also has options for the cursor. You can have solid cross hairs, flashing cross hairs or no cross hairs. The cursor can be changed at any time by pressing the CLEAR key which toggles between the three choices. Pressing the space bar will toggle a magnification window around the cursor. This is very useful when you are trying to precisely line up graphics elements.

Magic also uses the arrow keys of the CoCo keyboard for fine positioning of an object. They will move the cursor or object one pixel in any direction. These are active while the joystick is active. You do not need to switch between keys and joystick.

Magic is a very good graphics production tool and a must if you plan to do a lot of graphics programming with BASIC. It is both easy and fun to use.

(The Other Guy's Software, 875 South Main, Logan, UT 84321, 64K disk ECB, one joystick required. Disk or tape $14.95 plus $2.50 S/H)

— Mike Piotrowski

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, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

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

Be a Space Age Trucker With *Star Trader*

Star Trader is a space-based game that is a cross between a stock market game, a shipping line and a shoot-'em-up game. You are the commander of a space freighter who must find cargo, transport it to its destination and, if you wish, destroy pirates.

The goal of the game is to get 1,000 credits. A credit is a monetary unit which can be acquired by shipping cargo. If the cargo arrives in time, you get the agreed upon number of credits, but if you get it to its destination early you will also receive a bonus. The game is also easy to play and has no complicated controls as some do.

The top section of the screen is a pilot's eye view of the universe through which you can see pirate ships, hyperspace jumps and planets. The middle of the screen is the status section displaying relevant information such as fuel and laser levels, credits gained and ship's damage. The bottom of the screen is for your commands, input with the joystick.

All commands are issued by positioning a box with the joystick and pressing the firebutton. These commands include jump, which initiates the hyperspace jump necessary to go from planet to planet; thrust, which moves the ship from orbiting a planet to its starport or surface (if it's a gas giant); battle, which is used to fight off pirate ships; and starport activities.

The last one is only available if you are at a starport and allows such options as buying fuel, laser power, repairing damage or clean the fuel cells. The fuel cells will need to be cleaned only if you get fuel from a gas giant because although the fuel is free on a giant, it is unrefined and may ruin the cells. Other options are SAVE, LOAD or END to save, load or end the game.

Finally, there is a Cargo option available to you when you are in a starport. There are five subcommands to be given from Cargo: Request cargo, Steal cargo (which can be costly if caught), Dump cargo into space (to save your reputation), Sell cargo on the street (which is also illegal and quite costly if caught), or Deliver cargo.

Star Trader is shipped on a protected disk with an enlightening explanation of why it is protected in the documentation. An interesting feature of the game is that on each planet you are given a reputation depending on early/late deliveries, whether you shoot pirates without provocation first, and other reasons.

The documentation states that some of the details are left unmentioned to keep the game interesting since "Part of the fun is figuring out a strategy to make 1,000 credits." It also warns that the same strategy may not work the next time through the game. The documentation is on a single sheet of paper folded into a four-page pamphlet. This may sound cheap, but I assure you the game is so well-written documentation is not even needed. Besides, which is more important, fancy documentation or a quality game?

(Computerware, P.O. Box 668, Encinitas, CA 92024, 32K cassette $24.95, 64K disk $27.95)

— Jim Sewell

Canadians

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One-Liner Contest Winner . . .

Multiline draws horizontal lines that seem to flow up and down the screen.

The listing:

```
Ø LINE(X+A,Y+B)-(X-A,Y+B),PSET:L
INE(X+Q,Y+U)-(X-Q,Y+U),PRESET:Q=
W:W=E:E=R:R=A:U=I:I=O:O=P:P=B:B=
B+(C*7):A=A+(D*7):IFB>95ORB<-9ØT
HENC=-C:GOTOØELSE IFA>12ØORA<-1T
HEN D=-D:GOTOØELSE IFA<>ØORB<>ØT
HENØELSEPMODE4,1:SCREEN1,1:PCLS:
C=1:D=1:X=128:Y=92:GOTOØ
```

Chris Klick
Laurel, MS

(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 Paint Is Versatile And Easy To Use

CoCo Paint is a group of programs designed to help you create Hi-Res graphics. As an art educator, I am always excited to see a new graphics program on the market. I have used a variety of programs ranging from the extremely simple to the overwhelmingly complex, and most of them have been disappointing for one reason or another — they don't do what you need or they are complex and cumbersome or they are slow. Often, I end up just programming graphics without the use of a "graphics generator." After all, the point of a graphics program is to make the creation of graphics easier, not more confusing or frustrating.

I'm happy to say *CoCo Paint* has managed to obtain a good balance between being versatile and easy to use. It has all the functions I want and more, but most important, it remains easy to use.

Although *CoCo Paint* supports additional equipment, all it requires is any 64K Color Computer and a single disk drive! The optional equipment you can use is a single joystick or mouse, a graphics tablet, additional disk drives, a printer with graphics capabilities and a modem.

The main mode for working with *CoCo Paint* is the Graphics mode. In this mode you have three separate workspace screens on which to work. You use the keyboard to select the various functions: lines, circles, boxes, cursor type (dot or cross hair), zoom, PMODE 3 or 4, colors, color set, paint (colors or textures), copy screen to another workspace, insert characters, create stamps, print graphics, communications and more. You may use the arrow keys or a joystick for cursor movement.

I am very pleased with the keyboard cursor control. It is nice for detail work, but still fast when used with the SHIFT key. The zoom is also particularly nice, enlarging a section of the screen so you can do detail work with ease. Stamps can be made from any portion of the screen and then modified by inverting, rotating by 90 degrees, stretching or shrinking and mirror image. Stamps can also be displayed in four styles: opaque, OR, AND and XOR.

The graphics screens can be saved to disk in either a compressed form that can only be used by the *CoCo Paint* program, or they can be saved in the usual binary form. The ordinary binary screen dump allows you to access your graphics creations from your own programs or to share them with friends who may not have *CoCo Paint*.

CoCo Paint supplies a variety of character sets for you to choose from, but you can also make your own. Using a separate utility program, you can create your own set of characters or symbols (or whatever) to use with your graphics. The same is true for the textures available in the paint command. You have a variety to choose from or you can create your own.

The printers supported by *CoCo Paint* are the Epson MX-80, and Radio Shack's DMP series, LPVII, LPVIII and CGP-220. The printout I got with a Radio Shack DMP printer was small but fast. If you have a different printer you are out of luck. You'll have to use your own print program or write a driver in machine language.

The communication mode allows you to transmit or receive graphics screens over a modem. Both computers must be running *CoCo Paint* and, of course, follow the usual modem procedures.

One more utility included in *CoCo Paint* is the ASCII *Pack A Picture*. This will take any binary screen dump that has been saved to disk and create a BASIC program with the graphics screen stored in it as data statements. This program is in standard ASCII and can be downloaded over a BBS system.

The main *CoCo Paint* program is written in machine language and is on its own copy-protected disk. It's unfortunate that software piracy forces companies to copy protect their disks, but *CoCo Paint* does come with a backup system disk. There is also a utility disk that is not copy protected. This disk contains files used by the main *CoCo Paint* program, utility programs and some sample graphics screens. This disk can be totally or partially copied to suit your own needs.

Of course, nothing is perfect. As with most programs of this sort, it is hard to remember which key selects which command (there are 36 keyed commands in the graphics mode) and how to use some functions. There is a reference card included, but I found it to be poorly organized. The manual is adequate but skimpy. I often had to experiment with the program in order to understand what the manual was talking about.

After all is said, I like *CoCo Paint* a lot. It's fast, easy and doesn't require special equipment or three hands to use.

(Four Star Software, P.O. Box 730, Streetsville, Ontario L5M 2C2, disk $39.95)

— James Ventling

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Tape $21.95 (16K required) See July '83 review.

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Color Tape Manager Helps Coordinate Tape Activities

There is a proliferation of utilities that staggers the mind. There are disk utilities, graphics utilities, tape utilities and so on. It's getting very hard to keep up with the latest ones. By the time one gets reviewed, it seems there is another new one available that's even better and has more features. Well, here's one more that just possibly could make life with CoCo a little easier.

Color Tape Manager (*CTM*) by Roger Smith is billed as a "valuable learning tool and useful utility" for a 16K tape or 32K disk CoCo. The version I received was on tape with an *Auto Run* loader (Sugar Software almost invented this concept for the CoCo). It ran without a hitch.

The program is menu driven which means no commands to remember; this is especially useful with this program because it has 18 different selections. To give you a "feel" for the program, I'll list the commands and then give a detailed account of their uses. The commands are: Normal load and save; Data load and save; Skip file; Motor on and off; Examine memory; Go to address; Change format; Change machine language (ML) to BASIC; Move memory block; Return to BASIC; Merge BASIC programs; Append ML to BASIC; Append ML to ML; Decimal to Hex and Hex to decimal.

Some of these commands should sound familiar (e.g., Motor on and off, Skip file, etc.) and I won't spend any time discussing them, but I will concentrate on the unfamiliar ones. Normal load will read in a tape created by a CSAVE or CSAVEM command to a buffer which starts at the end of *CTM*. If it's an ML program, the start, end and execute addresses will be displayed. Regardless of the type of program loaded, the display will also show the buffer start address, end address and end of program address.

Once a program has been loaded, you can use several of the other commands to manipulate the information in the buffer. The first 15 bytes are the name header. You can look at it or any of the program with the primitive monitor command (Examine memory). This feature displays the address and contents of the memory location you choose. This information can be shown in Hex or decimal and ASCII (or block graphics), and the memory contents can be changed. A total of 16 addresses with their contents are displayed on the screen at once and the arrow keys allow you to scroll rapidly up and down memory.

You can execute a program by choosing the Go to address command. Or, if you like, you can "Move a block of memory," but be careful, as it is possible to move on top of *CTM*. Once you have things rearranged to your liking, you can save it all with a normal save to tape. Changing format allows all the input/output (I/O) to be either Hex or decimal, whichever you are most comfortable using.

The more powerful commands allow you to turn an ML program into standard BASIC data statements (so that's how they do it!), append an ML program to the end of a BASIC program and save the whole thing as one file. The manual explains in detail how to do it and what the BASIC program needs to do to use it. You can even append an ML program to another ML program.

The manual is 12 pages long and packed with information on how to use all the commands. It even gives examples for the more difficult to understand concepts and two sample programs with listings to study (the programs are on the tape, too).

BASIC returns you to BASIC. You can restart *CTM* by EXECuting at $1000 (cold) or $1003 (warm). This wasn't explained at all in the manual but this is what it means: Cold restart is like loading the program from the tape and any information that was in the program is lost; warm restart reruns the program but does not reinitialize the program, so all the information is still there (except it destroys a small and insignificant piece of the menu screen).

BASIC programs can also be merged without saving them first in ASCII format. They have to be renumbered before merging so there are no duplicate line numbers, then it's a simple matter of loading the first program and merging the rest, one at a time. The newly merged program can then be saved to tape as one larger file. A warning that was not in the manual about merging BASIC programs concerning the duplication of variable names: If two merged programs use the same variable name(s), the program can produce incorrect values or other subtle problems.

The Data load command loads a tape that doesn't have a filename header block. "This provides a possible means of copying files saved by some programs in nonstandard format, such as Radio Shack's *Color File* and *Art Gallery*." The Data save command dumps the buffer to tape without the filename header.

The last two commands convert numbers from base 10 (decimal) to base 16 (hexadecimal) or in the other direction, hexadecimal to decimal. This feature is especially useful when reading articles in magazines where one author speaks in 10s and another speaks in 16s. (I'm a Hex person myself and all those huge decimal numbers [65535=$FFFF] make me extremely uncomfortable!)

The menu for *CTM* is quite long and is split into two pieces. Hitting the BREAK key toggles between them. I was unable to crash this program no matter how many silly mistakes I made before I had thoroughly read the manual. If you select a command that needs more information, you are prompted for it as you go along (very user friendly). If errors are detected while loading a program, it doesn't crash but flags you that there is an error and keeps on reading (if possible).

The ML program is well-done and brings together a lot of miscellaneous, tape-oriented utilities into one easy-to-use package. If you do a lot of cassette-based programming, give *Color Tape Manager* your serious consideration.

(Sugar Software, 2153 Leah Lane, Reynolds, OH 43068, tape or disk $24.95)

— C.L. Pilipauskas

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October 11-13

Erase Two EPROMs In One Operation With Datarase

No, not database . . . Datarase. Now you can erase any 24- or 28-pin EPROM two at a time with this inexpensive little gadget. And little it is. It measures 3¾" x 2¼" x 1¾" and plugs into a standard 120-volt wall outlet.

One switch turns it on and off. Two slots are provided opposite each other with a high intensity, mercury vapor lamp inside between the two slots. A little filtered green light shows that the unit is operating.

Sufficient operating instructions are provided and give examples of typical erasure times for different brands of EPROMs. I tried it on both 24- and 28-pin devices and got total erasure in less than five minutes. Short erasure time is a direct relationship of the UV light intensity and proximity of the EPROM "window" to the light source.

This unit provides a high intensity lamp with a life expectancy of 6,000 hours or more. Unless you plan on erasing EPROMs for a living, the lamp will probably outlive you!

For most CoCo hobbyists who appreciate the versatility that EPROMs offer, Datarase is a helpful addition to go along with your EPROM programmer.

(Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $49.95 plus $3 S/H)

— Jerry Semones

One-Liner Contest Winner . . .

Rollover is a little gem that really shows off the graphics powers of the CoCo.

The listing:

```
1 PMODE4,1:PCLS3:SCREEN1,1:FORX=
ØTO3:DRAW"BM128,96;S9CØA"+STR$(X
)+"BG2BF3G7NG2H8NG4E18NE4F8NE2G1
1H5NG2E2NH2E2NE2F5R3NF1NH1BG7NF1
NH1U4":PCLS3:DRAW"BL3L1ØNL3U12NL
6R26NR6D12NR3L16U7NL3R3NU3R3NR3D
7F4ND2NU2BL14ND2NU2E4":PCLS3:NEX
T:GOTO1:'ROLLOVER- R.MURRAY
```

Ray H. Murray
Florissant, CO

(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*.)

High Score Bookkeeping Made Easy With *Master Scoreboard*

If you are among the many people who send in your high game scores to THE RAINBOW "Scoreboard," you probably have hundreds of pieces of paper scattered all over the place with your high scores on them. This type of filing system, although adequate at times, is clumsy and messy. What would you say to a program designed with you in mind?

Master Scoreboard is a machine language utility program designed to keep track of your high scores for the various games you play. The program will keep track of the five highest scores for up to 32 games on a 16K system, and up to 100 games on a 32K system.

Once the program has been loaded, the menu (in Hi-Res) is displayed which shows you all of the possible program options. First, you enter the name of the game, then you enter the initials of the person with the highest score and the score itself. The program automatically rearranges these scores so only the five highest ones are displayed. You can then enter any comments you like, such as the level at which the game was played, the number of men used, etc. This process is repeated for each of the games you are keeping track of. Finally, you can save all of this information out to tape or disk.

Master Scoreboard works well and is extremely easy to use. The documentation, what there is of it, explains everything you need to know about operating the program, and is really unnecessary because of menu prompts and the simplicity of the program itself. It also features a variable auto-key repeat function (for what purpose I don't know) as well as the ability to save additional "blocks" or groups of scores if you need to save high scores for more than 100 games on a 32K system.

(Genesis Software, P.O. Box 936, Manchester, MO 63011, 16K tape or disk $11.95)

— Gerry Schechter

One-Liner Contest Winner . . .

Timer is a simple timing program. Simply enter the number of minutes and seconds desired. The program plays random music when the time runs out.

The listing:

```
Ø INPUT"INPUT THE NUMBER OF MINU
TES";A:INPUT"INPUT THE NUMBER OF
 SECONDS";B:FORC=1TO(46Ø*B)+(46Ø
*6Ø*A):NEXTC:C=X:IF X=Ø THEN FOR
Z=1TO1ØØ:SOUNDRND(255),2:NEXTZ
```

Jon Furlong
Springfield, VA

(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*.)

Color Math: A Series Of Lessons In Math Applications

Color Math is a series of lessons in addition, subtraction, multiplication and division. It is produced by Tandy and their Home Education Systems. Color Computer products produced by Tandy are usually of superior quality; this program is lacking in many areas, especially in utilizing the features of the Color Computer.

My disappointment stems from the fact that this appears to be a reconstruction of the math program that was originally marketed for the Model I computer. Let's take a look at what the program offers.

Color Math gave me a bad impression right from the first page of the program guide. This is not due to the program manual itself, but stems from an apparent turn in the quality of loading Tandy Education Products. I expected operating instructions that would tell me to run a program and I would see a nice title screen and a menu of all my selections for the program. This is not the case. Instructions state typing in `LOADM "COLMATH1"` for addition and subtraction or `"COLMATH2"` for multiplication or division. Each of these programs is run by the `EXEC` command. This seems like a small matter, but I would expect Tandy to make the program as "user friendly" as possible based on their targeted market. These qualities were found in previous products such as the Children's Television Workshop series.

After execution of one of the options, the student is prompted to select the correct number of problems for the current session. The screen now shows four additional options and appears like this:

A) PLACEMENT
B) LESSONS
C) TEST
D) CHANGE MAXIMUM PROBLEMS

The placement option decides at which level the student should start. It is not adequately explained how this is accomplished. The program guide states:

> "The computer then presents a few problems from the lesson you chose. If your child does well, the computer presents some problems from the next higher lesson. If your child does not do well, the computer goes to the next lower lesson. The computer continues to present problems, moving forward or backward through the lessons, until it has found the right lesson for your child. If the lesson you chose to begin with is the right one, the computer places your child in that lesson."

This does not define what "well" means quantitatively. When it has decided, initial lesson placement level is shown on the screen. The student can now proceed to complete the number of problems that is selected at the start of the program.

If a correct response is made the computer beeps, or in the early lessons, displays a smiling face. If an answer is incorrect, the computer blocks out the wrong answer and allows another chance to answer correctly. After two incorrect responses, the computer flashes the answer on the screen and proceeds to the next problem. At the completion of the lesson, a small scoreboard is shown reflecting the number right after one try, two tries, etc. The average response time is also shown as part of the scoreboard.

When the lesson is complete, the computer shows whether the student should proceed to the next lesson or remain at the same level. This information is not stored in the computer. The adult with the student must write the result down on a page that is supplied in the program manual. The other menu choices (lessons and test) operate along the same guidelines.

My major objection with this program is that it does very little in using the computer as a method of computer-based instruction. All of the record keeping is done by pencil and paper. Two of the nicest motivating features of the computer are not used at all. The advanced graphics features of the Color Computer are not used; graphics are definitely needed for an additional motivation factor. A smiling face that changes colors does not represent the real potential of the Color Computer. Sound is not used either, other than the beep, as was mentioned earlier.

In summarizing this program, the concept is an admirable one, but the presentation has much to be desired. Program documentation is adequate, with a program guide and a parent's guide. Included in the documentation are: two quick reference cards, summaries and examples showing the content and mastery levels of each lesson. The documentation is presented in a format that is easy to read for parents. The program guide can also be used by older children.

Tandy needs to rethink this product to make it more effective and instructional. Sorry, this one definitely does not make the grade.

(Tandy Home Education Products, Radio Shack stores nationwide, requires 64K, disk $19.95)

— Rick Cobello

One-Liner Contest Winner . . .

Calligraphy simulates the use of a calligraphy pen. After you input the pen size needed, you can move the right joystick to control the pen's location. To place an "ink" mark on the screen, hold down the firebutton.

The listing:

```
1 IFF=ØTHENDEF FNP(Q)=(Q+4)/32-1
:CLS:INPUT"SIZE (1-1Ø)";S:PMODE4
,1:PCLS1:SCREEN1,Ø:F=1:GOTO1ELSE
PSET(X,Y):X=ABS(X+FNP(JOYSTK(Ø))
):Y=ABS(Y+FNP(JOYSTK(1))):PRESET
(X,Y):IFPEEK(6528Ø)=126ORPEEK(65
28Ø)=254THENLINE(X,Y)-(X+S,Y-S),
PRESET:GOTO1ELSE1
```

Patrick S. Davis
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*.)

Library 2 Has Graphics Macros To Simplify ML Programming

In reviewing *Library 1* by Sadare Software recently, I expressed concern that the package might have appeared too late in CoCo's lifespan to have a chance on the market. I think I was wrong, for three reasons. First, paging through any issue of THE RAINBOW should persuade anyone that all those third-party suppliers will not simply dry up and blow away tomorrow; second, there is Tandy's demonstrated record for upware compatibility and all the rumors we hear of the fabled Super CoCo, Model 9, the machine using Motorola's new RMS chip set, stress that it will include a CoCo emulation mode; and third, Sadare is whisking out the follow-ups in their series of macro libraries with remarkable speed.

This disk, *Library 2*, contains a set of graphics macros to simplify the lot of the ML programmer who wants to include graphics in his programs without all the tedium of coding in, which would ordinarily be required.

As before, the macros come on the disk in two forms, as a complete library (*GRAPHICS/LIB*) and as a set of separate modules (e.g., *CIRCLE/MAC, GET/MAC*). They include routines to draw lines, boxes and circles, to set and reset individual pixels, to set up PMODE values, to move graphics blocks about in memory, to clear the screen or paint areas of it — many of the facilities, in short, available in Extended BASIC, and all to be achieved with single-line commands.

There is also a file of graphics EQUates, supposedly not needed for the macros to function, but enabling the programmer to define the address of the current page, his initial mode and color values, etc.

All this is entirely praiseworthy. In addition, *Library 2* is now available in a version which will work with the ROM pack version of *EDTASM+*, and with any other assembler which accepts ASCII source files. The price is the same.

If we have a complaint, it is that the graphics macros function by way of ROM calls, using the algorithms they find. In the case of *CIRCLE/MAC*, this is a pity because Jake Commander developed a much better circle algorithm in his *Spirograph* program; something of the kind ought not to have been too difficult to incorporate here. In the former review, I described the manual as excellent. I should do so here, too, except that my elder son suggested a great deal of information was left out. Upon investigation, it appears that what was left out is all contained in the *EDTASM+* manual, or in any number of books devoted to the 6809 instruction set. I think Sadare is perfectly within its rights in supposing that no one will want to use this package, or its predecessor, who has not some prior knowledge of such things.

The summary judgment is the same as before: If you need graphics macros, you will save yourself a great deal of work by acquiring this package.

(Sadare Software, P.O. Box 3891, Gaithersburg, MD 20878, disk $24.95, requires disk *EDTASM*)

— R.W. Odlin

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One-Liner Contest Winner . . .

This one-liner displays the 256 possible bit combinations in Hi-Res graphics; it's useful in creating video games and displays. The program will display the colors in approximately the top fourth of the screen; you can change the number 3519 to 7679 to display over the entire screen. (The program does not run with the disk controller plugged in.)

The listing:

```
1Ø PMODE4,1:SCREEN1,1:PCLS:FORX=
1TO255:PCLS:FORY=1536TO3519:POKE
Y,X:NEXTY,X
```

Jeremy Jurek
Grafton, WI

(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*.)

Crash Takes You On A Creative Journey

Most everyone enjoys a challenging video game with a variety of obstacles which must be conquered to progress. *Crash* is one that provides the stimulation necessary to create excitement. With four different screens to complete, this game soon captivates the attention of its players.

Crash requires 32K ECB and can be played by one or two players (adequate loading instructions are included). The graphics are high resolution, arcade-type and my favorite character, Mario (from the "Donkey Kong" clone, *The King*), is featured.

The challenge is to direct Mario through the four screens and, with a little stretching of the imagination, a tantalizing adventure is created that sends him through the jungle in quest of his airplane. Each player begins the game with five men, which I used frequently when I first started playing, and one additional man is awarded after completing all four screens. Fortunately, for those having difficulty making their way through any of the screens, the program features screen selection.

To begin the journey, in Screen one Mario must climb the cliffs from one side of the screen to the other while hanging from a line. Holding in the joystick button may seem to be a nuisance, but it reminded me of the tight grip needed to prevent Mario from falling to his death. It is also necessary to stop and pick up rope from a cliff at the midway point. Not only are points awarded for the pickup, but the rope is needed to get back to the other side after Mario climbs the ladder to the next layer of cliffs. The rope climb must be completed on five layers to reach the top, while it is necessary to avoid the deadly suspending spiders and venomous snails. I thought this screen was the most exciting of the four.

Once Mario reaches the top, the journey continues into Screen two. This time you must help him to the bottom of five layers using the ladders in between. You will find this very similar to the ladder screen in *The King* because Mario must jump the gaps and either jump or avoid the fatal frogs which are a constant threat. The timing of the jumps must be perfect which makes this the most difficult of the four screens.

If you get Mario down the difficult maze of ladders, he will begin the third screen high on top a rocky cliff. With a big bird coming at him from the other side, the only means of escape is to parachute to the row boat in the water below. Using the joystick button to both jump and pull the rip cord, the accurate timing needed will take a little practice. But after a few tries you should easily have him landing safely into the boat and rowing his way into the next screen.

In the last screen, Mario finally discovers his airplane on top of a temple. The only way to get to the top is to again climb the layers of ladders which are heavily guarded by angry monkeys and suspended spiders. But, with no gaps to jump, this climb is not nearly as difficult as in Screen two, and with a little patience, you should have the hero in his plane fairly easily.

As Mario flies away in his airplane, the adventure seems to be over. But, apparently he forgot to refuel and the plane suddenly makes a diving crash, forcing him to parachute back into the jungle. Although you keep your accumulated point total, you must guide Mario through the same obstacles again. However, this time you will find the difficulty has been increased.

I found Mario's creative journey to be a fun manipulation through varying degrees of obstacles. I was mildly disappointed, however, to find that none of the journey actually involves the player in flying the plane. After reading the instruction sheet, which speaks of flying Mario's plane through and over obstacles, I expected to at least guide the plane through one screen. But, if you get through all of the obstacles and return him to his plane, Mario will fly away with absolutely no assistance. Nevertheless, *Crash* is still the kind of game that can be enjoyed by anyone.

(Tom Mix Software, 3424 College N.E., Grand Rapids, MI 49505, cassette $24.95, disk $27.95)

— Philip S. Helm

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WARNING – YOU MAY BECOME ADDICTED

Taxan's Personal T.V. Tuner Gives Your Monitor Double Function

If it's true that necessity is the mother of invention, then that adage certainly befits Taxan's new Personal T.V. Tuner. This neat little gadget, which is about the size of a small desk calculator, allows you to get twice as much from your computer monitor. Not only can you enjoy your favorite computer programs, but your favorite TV programs as well!

The tuner comes well-packaged with a simple, easy-to-understand installation booklet. Two small cables are provided to attach the tuner to your composite monitor. One cable has standard RCA-type phono plugs at both ends for the video connections while the other cable has standard miniature phone plugs for the audio connections.

Installation is quick; it took only five minutes to hook up the unit for this review. No soldering or modifications are required to your computer, monitor or the tuner provided your monitor uses these standard cables, and most do. Other plug arrangements could easily be fabricated: Plug in the two cables provided between the tuner and your monitor; plug in the two cables from your computer that used to go to the monitor into the tuner instead; attach a TV antenna, plug in the AC power cord and you're in business — instant TV!

I hooked up the tuner to my Amdek Color 1+ and was delighted with the quality of the picture. Since most monitors are high resolution, you can expect a super TV picture. A switch provided on the tuner allows you to switch between the computer and the tuner.

One criticism I have of this tuner is that the antenna connection only accepts a standard 75-ohm-type 'F' connector. This is not a major problem, but screw terminals capable of attaching "rabbit ears" or other twin-lead-type antennas would have been helpful. If you have such a system it would be a simple matter to purchase a 300 to 75 ohm matching transformer at Radio Shack (Cat. No. 15-1253, $2.99). I hooked the tuner antenna connection to my TV cable service and got outstanding reception on several of the local cable channels.

I found one problem with the tuner supplied for this review. When I first turned the unit on, I got a great picture but no sound! After a few minutes of watching a "silent movie," the sound suddenly came on. After checking the connections, I finally discovered that by tapping on the computer/tuner selection switch the sound was intermittent. Apparently, a loose connection or poor switch contact exits inside the tuner. I spoke to Bob Rosen at Spectrum about this and he agrees with my diagnosis. I believe this to be an isolated case and no real cause for alarm; besides, each Taxan tuner is covered by a one-year manufacturer's warranty.

One last word of caution: This tuner will only work on a monitor with a composite video input. That's about the only kind you see advertised in RAINBOW. Also, the monitor must have built-in sound capability. An add-on audio board in the CoCo will not provide TV broadcast sound.

In summary, Taxan's Personal T.V. Tuner is well-built, sturdy and attractive in its off-white plastic case. It will work with any computer and composite monitor including black-and-white, amber or green screen, although a TV picture on the latter two really looks unusual! If you like the idea of getting more out of a computer monitor, this accessory is for you. With this addition to your computer setup, you'll have one more reason to stay tuned to your CoCo.

(Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $99.95 plus $3 S/H)

— Jerry Semones

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Hint . . .

Single Disk COPY

Here's a feature which can be invaluable for users with a single disk drive. A single drive COPY can be performed by doing the following:

1) Insert the disk with the file to be copied into the drive.
2) Type `COPY"filename.ext"` and press ENTER.
3) After a few seconds you will hear a beep and the computer will tell you to insert the destination disk. Insert it, press ENTER and the file will be copied onto the other disk.

To Preserve Quandic Is An Impressive Adventure

The graphics ability of the Color Computer is being utilized further all the time. This is evident in the outstanding graphics of Prickly-Pear's newest Adventure. *To Preserve Quandic* is a two-disk graphics Adventure requiring 32K.

The disks come in a nice vinyl library case. I do not normally say much about packaging, but in this case Prickly-Pear has devised what I consider the right combination. The package is not so elaborate that you feel you are paying a lot just for the package, but it is enough to make you feel the company cared enough about the product to not just wrap it in cellophane.

When you start the game, you are given a demonstration of the sound capability of the Color Computer and then, if you desire, given the background scenario of the Adventure. This is also the time you may elect to load a saved game (more on that later). The musical interlude at the beginning was very impressive the first time I heard it, but the seventh or eighth time I restarted the Adventure, I wished there was some way to skip the music along with the background scenario.

A synopsis of the scenario is as follows: The year is 481 A.D. and a race known as Quandic lives a parallel but secret existence to that of earth's emerging civilizations. Quandic is already an advanced civilization dedicated to pure science. Their aims include elimination of disease, space discovery, time travel and the creation of a wise government. Their scientists have done well, and the great discovery of the year is the Time Machine. But, unfortunately for Quandic and the world, one of Quandic's foremost scientists, Cerdric, while working on a breakthrough of human disease, succumbed to the disease himself. He has gone berserk, and his deviousness and sickness made him a fugitive. No one can help him. He has stolen the time machine, dismantled it and sent the pieces into the future. Most were discovered, but the key piece is somewhere in the present time. The future of the Quandic depends upon locating this critical part.

As I started playing the Adventure I ran into a few problems that seemed to be in the game and not a result of my own mistakes. I called Prickly-Pear's 800 number for assistance and I would like to commend Joann Chintis for the help received. The support you get after a sale is usually the most important feature of a product and the support I got was outstanding.

The first thing I noticed upon playing was that after a command was entered, it was slow to give a response — being programmed in BASIC was the reason behind the slow response. It appeared to be approximately 61K of BASIC programming. The remainder of the two disks are full of very well-done graphics. The Adventure consists of about seven levels with a number of rooms on each level. It appears a lot of time was taken in developing the Adventure.

I will try not to give away the secrets of the Adventure with some of my concerns. In the disk I received there were some grammar mistakes in the computer responses. In some places there seemed to be a problem with updates. One example: you type LOOK DESK and see a key. After getting the key and looking at the desk again, the key is still there. The same thing happened with some cheese. At another point, if you have the correct item, you can feed a dog anything and it will accept it, even if you feed the dog to itself. These are minor, but they should be corrected.

My most critical point is that at different points in the Adventure, you must fight or kill something and the winning or losing of these fights is random. I feel that random happenings in an Adventure should be kept at a minimum or eliminated.

The Adventure has the ability of loading saved games but a game can only be saved at certain locations. This isn't too bad, but a saved game can only be loaded at the very beginning. This means if you try something that is bad and you want to load the game again, then you have to go through the musical introduction again. I would really like to be able to load a saved game any time.

I would consider *To Preserve Quandic* a very good intermediate level Adventure. I believe the Adventure could be made better with a few minor changes and refinements. The graphics are excellent, and the music is impressive the first few times through. Even with the few concerns I stated, I believe Prickly-Pear has a winner with this new addition. If you like graphics Adventures, you will be impressed with the graphics, but be ready to use up some paper on making maps.

(Prickly-Pear Software, 2640 N. Conestoga Ave., Tucson, AZ 85749, disks $39.95)

— Dale Shell

One-Liner Contest Winner . . .

This one-liner serves a huge purpose for today's person who is always charging items and would like to know what his payments are per month, per year and in total.

The listing:

```
1Ø INPUT "LOAN AMOUNT";L:INPUT "
RATE OF INTEREST";R:INPUT"YEARS
OF LOAN";Y:M=Y*12:R=R/12ØØ:A=L*R
:B=(1+R)^-M:C=1-B:D=INT(A/C):PRI
NT"LOAN AMOUNT - $";L:PRINT"PAY
MONTHLY - $";D:PRINT"ANNUAL COST
 - $"D*12:PRINT"TOTAL COST - $";
D*12*Y:END
```

David Helfrich
New Port Richey, 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.*)

LaserJet Printer: 'Simply Dazzles' By Current Technology Standards

You may have noticed a big change in our program listings this month. After switching from a trusty old Epson MX-80 to a faster FX-80 a few months ago, and then trying a Radio Shack DWP-210 daisy wheel printer for some listings, we've finally settled on a Hewlett-Packard LaserJet printer for the listings in THE RAINBOW. After looking at the copy this machine produces, we decided to get this $3,500 marvel for our production operations.

Hewlett-Packard, in case your list of "Who's Who" in the computer business doesn't stretch much farther than Epson, is an old favorite among engineers and scientists for electronic instruments. About 10 years ago they made a big splash with scientific pocket calculators (the ones that use "Reverse Polish Notation," like the very fancy HP-41CV). HP is now making its presence felt in the personal computer business with the LaserJet, among other things.

The LaserJet, as the name implies, prints with a laser beam. The actual printing on paper is done in the same way that a copier works. The laser beam, turned on and off by the printer's own computer, scans across a light-sensitive drum. The drum picks up toner powder and transfers it to the paper; the paper passes through hot rollers that fuse the toner to its surface, and you end up with what amounts to a copy of a laser image.

The toner, drum and some other goodies are in a disposable cartridge (the same system as in the Canon PC copiers; the LaserJet mechanism is made for HP by Canon), and after about 3,000 pages you just replace the cartridge. You can even get cartridges in other colors. The LaserJet prints on single-sheet paper, either in a 100-sheet tray or fed by hand, or even on envelopes. The standard tray takes 8½ by 11-inch sheets.

Because of the laser/copier combination, this printer is both very fast (eight pages per minute when it gets underway) and prints with an extremely high resolution (300 dots to the inch). The LaserJet uses this high resolution to print text in actual typewriter-quality fonts, not just the close approximations you get with the best dot matrix printers, and even typesetting fonts. The built-in character set, called Courier 10, is the style you get on many office typewriters; optional cartridges add other styles, such as Times Roman, Helvetica and Prestige Elite.

With advanced dot matrix printers many people have become accustomed to all sorts of fancy tricks like italics, double-width characters, emphasized printing and the like. The only such tricks built into the LaserJet are underlining and super/subscripting (which uses regular-size characters). Some of the cartridges have boldface, italic and other variations on the fonts they contain, but the printer itself doesn't do that.

One thing you can choose to do (with the built-in Courier 10 font or some optional ones) is print sideways on the paper to get more columns on a page. That small type I mentioned puts 166 columns by 60 lines on an 8½ by 11-inch sheet and still looks much better than the typical compressed print mode.

The most unusual thing about the LaserJet, besides its printing system, is that it's a serial printer only. For the CoCo that's OK (except you'll have to make a special cable), but then you have the same problem that Tandy computer owners have dealt with for years: the LaserJet expects to see a line feed after a carriage return at the end of a line, while the CoCo sends a carriage return by itself. There's no DIP switch setting to change this. To set up the printer, you could send a `PRINT #-2, CHR$(27); "&k1G";` command to change modes in the printer.

We wanted to do some more things with the printer, like add slashes to the zeroes (which the LaserJet doesn't do), so we got something called the Printer Optimizer from Applied Creative Technology. For our listings, it adds a slash to each zero and it neatly takes care of the line feed situation.

It also has a 64K print buffer, which means the computer actually finishes a long `LLIST` in a few seconds at 9600 Baud and is ready to do something else while whatever printer you're using does its thing. With the LaserJet this doesn't take long at all. Monster listings that used to take a half hour now come out in one or two minutes. This printer's speed doesn't really depend on how much text is on a page; it's eight pages a minute even if everything is blank, but with a lot of text that is equivalent to as much as 660 characters per second!

The graphics freaks among you are probably thinking of what works of art you could create at 300 dots per inch. They would be very detailed indeed — but very small. The LaserJet has to have all the data to go on a page in its buffer before it can print it, and the bit-image graphics buffer is only 59K, so at 300 dots/inch you can print in only a 5.4 square inch area.

There are also 75, 100 and 150 dots/inch modes, and the 75 dots/inch mode covers essentially a full 8½ by 11-inch sheet. (The only LaserJet screen-print driver I know of for the CoCo is the one that comes with The Micro Works' DS-69 Digisector video digitizer; it prints either normal `PMODE 4` screens or 16-level digitized images, using a Radio Shack Deluxe RS-232 Pak to drive the LaserJet at 9600 Baud reliably.)

Let me quote from Lonnie Falk's review, which appears in the June issues of RAINBOW's sister publications, PCM and SOFT SECTOR: "All in all, the LaserJet, though a bit high priced at $3,495 retail, is a marvelous device. It provides the best copy I have ever seen at a speed that, by current technology, simply dazzles." What more can I say? Perhaps the things you do with a $200 computer don't justify spending so much on a printer. But if they do (or if you do things on some other computers that do), Hewlett-Packard's LaserJet is certainly worth considering.

(Hewlett-Packard Co., Boise Division, 11311 Chinden Blvd., Boise, ID 83707, $3,495 list)

— Ed Ellers

CORRECTIONS

"Purchase Order" (May 1985, Page 172): Joe Kohn tells us that a definition was left out of both listings. To correct this problem, change Line 30 in each listing to read:

```
3Ø CLEAR5ØØØ:DIMQ(5Ø),D$(5Ø),P(5
Ø),T(5Ø),R$(5Ø)
```

"Home Financial Management Made Easier" (November 1984, Page 132): Ed Carson has informed us that some late editing caused some unneeded code to be left in the program, which has caused some problems. He suggests simply deleting lines 1190 through 1220 from the program.

"Get The Picture With Gemini Screen Print" (May 1985, Page 45): Richard Lack has passed along a fix for the reverse printing method given in the article. Change lines 1000 through 1030 to read:

```
1ØØØ T=Ø:P=PPOINT(X,Y):IF P=1 TH
EN T=T+2
1Ø1Ø P=PPOINT(X,Y+1):IF P=1 THEN
 T=T+3
1Ø2Ø P=PPOINT(X+1,Y):IF P=1 THEN
 T=T+4
1Ø3Ø P=PPOINT(X+1,Y+1):IF P=1 TH
EN T=T+8
```

"Personalize Your Printouts With Script" (May 1985, Page 68): Users of this program may have noticed that an IE Error (input past end of file) occurs after the program has finished printing. While this does no real harm, Ben Brunotte has provided a fix for the problem. Change Line 200 to read:

```
2ØØ IF EOF(1)=-1 THEN 1ØØØ ELSE
LINEINPUT #1,LL$
```

"Home Financial Statement" (March 1985, Page 87): Roland Portillo has sent us a set of patches to make this program work on cassette-based 16K Extended BASIC systems. Change these lines to read as follows:

```
11Ø DIMA$(75),M(75),MM(75),Y(75)
,YY(75)
16Ø GOSUB122Ø:OPEN"I",#-1,"BUDGE
T"
18Ø INPUT#-1,Y(N):NEXT:CLOSE#-1
```

```
3ØØ CLS:PRINT@164,"Will there be
 any additions before printing s
tatement? ";:LINEINPUTR$:IFR$="Y
ORR$="YES"THEN GOSUB122Ø:GOTO113
Ø

98Ø GOSUB 122Ø:OPEN"O",#-1,"BUDG
ET"

1ØØØ PRINT#-1,Y(N):NEXT:CLOSE#1

1Ø1Ø CLS:PRINT@135,"ENTER 'C' FO
R COPY":PRINT:PRINTTAB(6)"OR <<E
NTER>> TO END":EXEC44539:IF INKE
Y$="C" THEN 98Ø ELSE END

113Ø GOSUB 122Ø:OPEN"O",#-1,"MID
MONTH":FORN=1 TO 75:PRINT#-1,M(N
):NEXT:CLOSE#1

114Ø CLS:PRINT@135,"ENTER 'C' FO
R COPY":PRINT:PRINTTAB(6)"OR <<E
NTER>> TO END"

115Ø EXEC44539:IF INKEY$="C" THE
N GOSUB122Ø:GOTO113Ø ELSE END

121Ø GOSUB122Ø:OPEN"I",#-1,"MIDM
ONTH":FOR N=1 TO 75:INPUT#-1,M(N
):NEXT:CLOSE#-1:M(7)=Ø:M(15)=Ø:M
(28)=Ø:M(36)=Ø:M(43)=Ø:M(44)=Ø:M
(72)=Ø:M(73)=Ø:M(74)=Ø:M(75)=Ø:R
ETURN
```

Delete lines 1020 and 1030, and add this line:

```
122Ø CLS:PRINT@73,"POSITION TAPE
":MOTORON:AUDIOON:PRINT@13Ø,"PRE
SS ANY KEY TO STOP MOTOR":EXEC 4
4539:MOTOROFF:AUDIOON:PRINT"   P
RESS ANY KEY TO CONTINUE":EXEC4
539:RETURN
```

In "Letters To Rainbow" (May 1985, Page 8), we ran a letter from Gary McConville stating that Motorola has a new video generator chip that gives true lowercase letters on the CoCo and is pin-for-pin compatible with the existing 6847 chip. Information we've received from Motorola and other sources indicates the new 6847-T1 chip will not work in existing CoCos without modifications. We apologize for any inconvenience this error may have caused.

"MAIL09" (June 1985, Page 249): Please refer to Page 266 of *this* issue for additional listings to last month's OS-9 feature.

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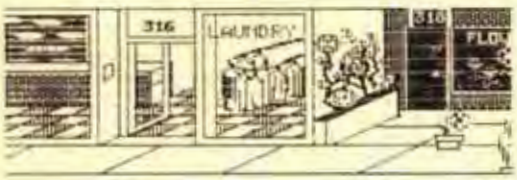

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THE FOURTH YEAR OF RAINBOW

An Index to the Articles, Reviews and Authors Appearing in THE RAINBOW from July 1984 through June 1985, including a complete index to RAINBOW ON TAPE since its inception, April 1982 through June 1985.

Compiled and Edited by Leslie A. Foster

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AN INDEX TO THE RAINBOW JULY 1984 - JUNE 1985

This is the third index to the *Rainbow*. —there have been changes made in response to requests from readers.

-the subject headings have been increased in order to make finding articles easier.
-short descriptions of the articles have been added if the title is not clear.
-any corrections noted in later issues are indicated.
-a program that is on "Rainbow on Tape" is indicated by •

The subject breakdown, and number of items per heading are shown below.

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AUTHOR INDEX - 340

TOTAL NUMBER OF ARTICLES - 692

This index only covers the last year of publication—that is from July 1984 to June 1965. For the index to previous issues, either see the July 1984 issue (page 259) or buy it separately (see "Back issue information" in the table of contents). For those of you who do not yet have the last index, here is a breakdown of the first 3 years of the *Rainbow*:

ASSEMBLY LANGUAGE - 24
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UTILITY - SOFTWARE - 98
WORD PROCESSING - 28

TOTAL NUMBER OF ARTICLES - 1528

GRAND TOTAL FOR FOUR YEARS OF RAINBOW — 2220

A complete index to "Rainbow on Tape" is included—it is arranged alphabetically by the name of the program, with a short description. It includes all issues from April 1982 to June 1985—a total of about 800 programs.

ASSEMBLY LANGUAGE

Betts, R. Bartly. "Introducing screen 51." *(1984, December)* 249• —51 column text generator.
Betts, R. Bartly. "It's time to assemble 'round the ol' CoCo." *(1984, October)* 243• —Tutorial on assembly language.
Betts, R. Bartly. "The one great secret to assembly language." *(1985, June)* 138• —Hints on writing ML programs.
Betts, R. Bartly. "School days, school days." *(1984, September)* 121• —Tutorial on Assembly language.
Betts, R. Bartly. "Staging the final scene of the 51-column screen." *(1985, February)* 110•
Betts, R. Bartly. "6809 arithmetic—the way it all adds up." *(1985, March)* 237 —Instructions in assembly language programming.
Betts, R. Bartly. "The 6809 instruction set: zeroing in on 'the real thing.'" *(1985, January)* 242• —More on the 51 column display.
Betts, R. Bartly , and Bone, Chris. "Covering the bases with assembly language." *(1984, August)* 236• —Start of a beginner's assembly language tutorial.
Clements, W. C., Jr. "More patches for EDTASM." *(1985, June)* 124
Roberts, Steve. "CoCoMon junior." *(1985, February)* 164• —A monitor for machine language programs.

BUSINESS

Bonnell, William S. "Watching your cash flow rate of return." *(1985, March)* 131• —Determine the cash flow rate of return and present worth of a project.
Davis, Susan P. "So you want to sell your software part 1." *(1985, March)* 167 —Helpful hints on how to set up a software business.
Davis, Susan P. "So you want to sell your software part 2." *(1985, April)* 154
Kohn, Joseph. "Purchase order—the order recorder." *(1985, May)* 172• —Mail order aid.
Mir, Jorge. "PERT: Project evaluation and review technique." *(1985, March)* 140• —A simple program to do the "PERT" technique. (Corrections, June 1985, page 226)
Myers, Paul. "Finding the ultimate bargain." *(1985, March)* 18• —An example of operational research technique.
Ray, J. D. "Landlord's helper part 1." *(1985, March)* 106• —System to help manage rental property.
Ray, J. D. "Landlord's helper part 2." *(1985, April)* 170•
Searby, Paul. "Design and development of application software part 4." *(1984, September)* 258 — Accounts payable system, continued from June 1984.
Searby, Paul. "Design and development of application software part 5." *(1985, January)* 280 — Program for small business.
Weide, Dennis H. "CoCo becomes the paymaster part 1." *(1985, March)* 58• —A small business payroll package. (Corrections, May 1985, page 146, and June 1985 page 226)
Weide, Dennis H. "CoCo becomes the paymaster part 2." *(1985, April)* 82•

CASSETTE

Curtis, H. Allen. "Link." *(1985, January)* 58• — Concatenates RAM records and writes them to tape.
DiStefano, Tony. "Dualing cassettes." *(1984, July)* 176 —Make your CoCo drive two or more cassettes.
Hetzler, Ed. "Direct to the rescue." *(1985, May)* 36• —Index to cassette tapes.
Latner, Norman. "Getting the most from your cassette recorder." *(1985, January)* 76 —Comments on making best use of the cassette recorder.

CLUBS

"CoCo community." *(1984, September)* 238 —List of Color Computer clubs.
"CoCo community." *(1985, January)* 252
"CoCo community." *(1985, April)* 234

COMMUNICATIONS

Day, R. Wayne. "BBS wrap-up." *(1984, November)* 66 —A list of BBS's.
Day, R. Wayne. "Farewell to a 'pioneer,' a look at some updates and a review of a new arrival." *(1985, April)* 70 —News from the BBS world and review of Mikeyterm.
Day, R. Wayne. "Modeming across America." *(1984, November)* 72 —Lesson on terminal programs and hints.
Day, R. Wayne. "Welcome to the world of telecommunications." *(1984, October)* 126—Getting started with modems and BBS's etc.
Day, Wayne. "A guide to the do's and don'ts of modeming." *(1985, February)* 39
DiStefano, Tony. "The modem to printer connection." *(1984, October)* 66 —Print while using your modem.
Downard, Dan. "Ham radios and CoCos: a great combination." *(1984, November)* 250
Goodman, Martin H. "Weather...or not." *(1985, February)* 42• —Make your own satellite weather maps. (Correction, Apr., page 226)
Gossette, Frank. "CC Talk: smart terminal package." *(1984, November)* 50• —A terminal program for the CoCo. (Correction, Jan., 1965, page 232)
LaBonville, Helene M. "RS-232 interface cable for data communication equipment." *(1984, November)* 89 —Shows how to make your own cable.
Lester, Lane. "Rainboard 1984." *(1984, November)* 44• —Update to the Rainboard BBS.
Sharp, Tony. "Adding an auto answer." *(1984, November)* 18 —Add an auto-answer to the Modem I.

DATABASE MANAGEMENT

Nolan, Bill. "Developing a database manager part 1." *(1984, July)* 64 —Creating a disk mailing list program.
Nolan, Bill. "Developing a database manager part 2." *(1984, August)* 22
Nolan, Bill. "Developing a database manager part 3." *(1984, September)* 111• —Developing a disk mailing list program.
Nolan, Bill. "Developing a database manager part 4." *(1984, October)* 32• —Use of direct access disk files.
Nolan, Bill. "Developing a database manager part 5." *(1984, November)* 245•
Nolan, Bill. "Developing a database manager part 6." *(1984, December)* 256• —Disk mailing list program. (Correction, Feb., 1985, page 281)
Scerbo, Fred B. "The world's easiest database." *(1985, June)* 152•
Weir, Robert. "JINFILE: a jumbo information handler with some very special features." *(1984, November)* 162• —Special purpose filing program.

DISK

Bironas, Dennis. "Super-disk charger puts the 'turbo' in your drives." *(1985, June)* 113•
DiStefano, Tony. "Constructing 16K of EPROM for your disk controller." *(1985, March)* 54
Duncan, Wayne H. "The disk to tape transfer...track by track." *(1984, August)* 229• —Backup your disks to tape.
Gani, Paul. "Get it together with disk merge." *(1985, February)* 175•
Schrag, Roger. "Disk drive speed check." *(1984, August)* 164•

Leslie A. Foster is a Librarian with Dalhousie Ocean Studies Programme in Halifax, Nova Scotia, Canada. He is the co-editor of "Marine Affairs Bibliography"—an index to law of the sea literature, and has owned a Color Computer since April, 1981.

Schrag, Roger. "A special use for the DOS command." *(1984, November)* 140•

Stearman, Colin J. "Cooking with CoCo part 1." *(1984, July)* 18• —Exploring CoCo's disk operating system. (Correction, Aug., page 130)

Stearman, Colin J. "Cooking with CoCo part 3." *(1984, September)* 74• —Enhance the Disk operating system. (Corrections, Oct., page 237; Nov., page 244)

Swan, Marvin E. "The diskette directories handler system part 1." *(1984, November)* 100• —How to organize your diskette files.

Swan, Marvin E. "The diskette directories handler system part 2." *(1984, December)* 37• —(Correction, Apr., 1985, page 226)

Swan, Marvin E. "The diskette directories handler system part 3." *(1985, January)* 120•

Zimmer, Charles C. "Block out those troublesome granules with Disktest utl." *(1985, January)* 89• —(Program listing, Feb. 85, p.250)

EDUCATION - ELEMENTARY

Albrecht, Bob ; and Zamora, Ramon. "Binary birthday cakes, letters and more wordsworths." *(1985, January)* 48 —Comments for parents of small children.

Albrecht, Bob ; and Zamora, Ramon. "Determining the fate of wandering star." *(1985, April)* 140 —Short programs for 3-8 year old children.

Albrecht, Bob ; and Zamora, Ramon. "The gateway to adventure." *(1984, November)* 81• —Easy to play adventure game.

Albrecht, Bob ; and Zamora, Ramon. "Having fun with number patterns." *(1985, February)* 253 —Exercises for children.

Albrecht, Bob ; and Zamora, Ramon. "Letters, books and dreams of the future." *(1984, August)* 53 —General information useful to parents.

Albrecht, Bob ; and Zamora, Ramon. "Play together, learn together." *(1984, September)* 44 —Examples from the game 'Reverse.'

Albrecht, Bob ; and Zamora, Ramon. "Wandering star finds a gourmet oasis." *(1985, May)* 181•

Albrecht, Bob ; and Zamora, Ramon. "Wandering star learns to PEEK." *(1985, June)* 229• —Hints on the PEEK command.

Blyn, Steve. "Gathering information from the CoCo encyclopedia." *(1984, December)* 174•

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MOIRE (1984, October) 19 —Graphics demo
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CoCo Community

We have compiled a list of Color Computer Clubs because of the many requests we have received. CoCo Clubs may wish to exchange newsletters, share ideas for topics of discussion at monthly meetings, etc.

Please let us know if we have omitted any clubs and send us complete up-to-date addresses. Only those clubs which have signed our "agreement form" will appear in this listing of CoCo Clubs. Also, please notify us if you wish to add or delete any names on this list. Send your information to:

CoCo Clubs
THE RAINBOW
9529 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059

ALABAMA

Birmingham Alabama Color Computer Club, Robert Matthews, 3529 Laurel View Lane, Birmingham, 35216, (205) 933-0887

Huntsville Color-80 Users Group, Randy Niemann, 1011 Versailles Dr., S.E., Huntsville, 35803, (205) 882-2485

ALASKA

Alaska Color Computer Users' Group, Rick McDannel, 430C Beluga Ave., Ft. Richardson, 99505, (907) 428-0392

ARIZONA

Huachuca Hot Pokers, James Standley, 235-A Jeffords Street (NBU-96H), Ft. Huachuca, 85613, (602) 458-8338

Tucson Color Computer Club, William H. Nunn, 6857 A Lighting Circle #22, Tucson, 85708

ARKANSAS

Central Arkansas CoCo Club, Melinda Braslovsky, 1203 Erving Rdg., LP Cabot, 72023, (501) 982-8854

CALIFORNIA

Color America Users Group, Mark Randall, 2227 Canyon Rd., Arcadia, 91006, (213) 355-6111

The Davis CoCoNuts, Adam Sherman, 1818 Haussler Dr., Davis, 95616, (916) 758-3195

Sacramento Color Computer Club, Wayne Chrisope, P.O. Box 9, Elverta, 95626

North American CoCo - Orange County, Eric Wilson, 8405 Sweetwater Circle, Huntington Beach, 92646, BBS (714) 847-2268

Joe Bennett, 1169 Florida Street, Imperial Beach, 92023, (474-6213)

Los Angeles-Wilshire Color Computer Users' Group, Norm Wolfe, P.O. Box 11151, Beverly Hills, 90213

Ventura County Color Computer Club (VC4), John Bascue, Oxnard Public Library, 214 "C" Street, Oxnard, 93030, (805) 987-4752 or DATA (805) 484-5491

Sacramento CoCo Club, Charles Doughty, Box 60511, Sacramento, 95860

Salinas Color Computer Club, Larry Livingston, 501 Monterey Highway, Salinas, 93906, (408) 484-9697

Citrus Color Computer Club, Joseph Kohn, P.O. Box 6991, San Bernadino, 92412, (714) 792-8721

The MC-10 Newsletter Club, Jose J. Bray, 4730 Cass Street, San Diego, 92109, (619) 483-8744

Local Color—A CoCo Club of San Francisco, Andrew G. Kleval, P.O. Box 421242, San Francisco, 94142

San Joaquin CoCo Club, Steven Paul Moreno, P.O. Box 99024, Stockton, 95209, (209) 951-3938

Silicon Valley Color Computer Club, Shawn Jipp, P.O. Box 61593, Sunnyvale, 94088, (408) 749-1947

CoCo Nutz Computer Club, Walter V. Seay, 68-461 Highway 86, Thermal, 92274, (619) 397-4252

Conejo Color Computer Users Group, Robert S. Rimmer, 472 Sundance Street, Thousand Oaks, 91360, (805) 492-4972

South Bay Color Computer Club, Karen Schlotzhauer, 23113 Dana Ave., Torrance, 90501, (213) 539-2539

COLORADO

Lowry Microcomputer Club/CoCo Users' Group, Jerry D. Surritte, 2249 Moline St., Aurora, 80010, (303) 343-3273

Colorado Color Computer Club, Joe Applegate, P.O. Box 33492, Northglenn, 80233, (303) 650-9768

FLORIDA

Northwest Florida CoCo Nuts, William N. Lamb, P.O. Box 1032, Fort Walton Beach, 32549, (904) 244-5281

Alachua County CoCo Special Interest Group, Chris Meyers, P.O. Box 14927, Gainesville, 32604, (904) 378-9598

Jacksonville Color Computer Club, William H. Brown III, 2411 Hirsch Ave., Jacksonville, 32216, (904) 721-0282

CoCo Chips Color Computer Club, 6 Belle Mead Circle, Largo, 33540, (813) 581-7779

Broward County Color Computer Club, Timothy D. Neary, 510 S.W. 64th Ave., Margate, 33068, (305) 972-4074

South Brevard Color Computer Club, Benjamin S. Jerome, 496 Hillside Court, Melbourne, 32935, (305) 259-4609

The Naples CoCo Club, Matt Tari, 3320 7th Avenue S.W., Naples, 33964, (813) 455-4830

C.C. Club of Sarasota, Ernie Bontrager, 4047 Bee Ridge Rd., Sarasota, 33582, (813)921-7510

Broward CoCo Club, Sue Spahn, 11950 N.W. 29th Manor, Sunrise, 33582, (305) 741-4737

IDAHO

CoCo-AG Farm Computer Users Group, Kelly Klass, Rt.1, Box 4133, Twin Falls, 83301, (208) 733-4251

ILLINOIS

Glenside Color Computer Club, Ed Hathaway, 8 W. Stevenson Drive, Glendale Heights, 60139, (312) 462-0694

Town & Country CoCo, 5461 S. Kenwood, Chicago, (312) 493-3748

Cook County Color Computer Club, Tim Powers, 1633 Fifth Ave., Chicago Heights, 60411, (312) 747-7062

Illinois Color Computer Club of Elgin, Steven Stroud, 1098 Florimond Dr., Elgin, 60120, (312) 695-3186

Northern Illinois Color Computer Club, 580 Milton Lane, Hoffman Estates, 60194, (312) 885-2573

Peoria Color Computer Club, Lawrence Parker, 418 Lakemper Dr., Metamora, 61548, (309) 383-4312

Motorola Microcomputer Club, Steve Adler, 1301 Algonquin Rd., Schaumburg, 60196, (312) 576-3044

Chicago OS-9 Users Group, 480 Gilbert Drive, Wood Dale, 60191, (312) 860-2580

INDIANA

Evansville Color Computer Users Group, Dave Jenkins, 1418 E. Illinois Street, Evansville, 47711, (812) 424-0099

Three Rivers Users Group, George Barber, 2410 New Haven Ave., Fort Wayne, 46815

Indy Color Computer Club, Mike Davis, P.O. Box 68702, Indianapolis, 46268, (317) 257-3300

Southern Indiana Computer Club, Route 1, Box 459, Mitchell, 47446

CoCo Program, Erik Merz, 310 Appletree Dr., Noblesville, 46060, (317) 842-1340

IOWA

Metro Area Color Computer Club, K.L. Knudtzon, 3324 11th Ave., Council Bluffs, 51501

Mid Iowa CoCo, Terry Simons, 1328 48th Street, Des Moines, 50311, (515) 279-2576

Dubuque Tandy Users Group, Wesley Kullhem, 1995 Lombard, Dubuque, 52001, (319) 556-4137

Iowa City TRS-80 Users Group, Susan Chapler, R.R. 6, The Woods, Iowa City, 52240, (319) 351-5959

KANSAS

Kansas City CoCo Club, Mike Allinder, P.O. Box 11192, Kansas City, 66111, (913) 287-1904

Topeka Color Computer Club, Kevin Cronister, 2224 Hope, Topeka, 66614, (913) 272-1353

Color Computer Club of Wichita, Rex Rivers, 1205 N. Mosley, Wichita, 67214, (316) 264-9193

Walnut Valley C.C. Users Club, David Anderson, 1212 E. 4th St., Winfield, 67156, (316) 221-0040

KENTUCKY

LOCO-COCO, Mike Standefer, 3141 Doreen Way, Louisville, 40220, (502) 458-6690

LOUISIANA

Red Stick Color Computer Club, Gary Cash, 8929 Metairie Drive, Baton Rouge, 70810, (504) 293-7799

Cajun CoCo Club, Bob Hoevel, 104 Karen St., New Iberia, 70560, (318) 365-7706

MASSACHUSETTS

Greater Boston Super Color Users Group, Robert Biamonte, 5 Boulder Drive, Burlington, 01803

New England C.C. Users Group, Christopher E. Sweet, R.D. 2, Box 261, Harvard, 01451, (617) 456-8291

Massachusetts CoCo Club, Jason Rahaim, Spring St., Lunenberg, 01462, (617) 582-6514

6809'ers, Jean Salvas, 204 East Street, Springfield, 01104, (413) 734-5163

MICHIGAN

Petoskey Area CoCo Club (PAC²), Dennis Hoshield, 670 Liegl Drive, Alanson, 49706, (616) 347-0607

Color C.H.I.P.S., Jack Pieron, 3175 Oakhill Place, Clarkston, 48016, (313) 627-4358

Greg Miller, P.O. Box 365, Haslett

Midland C.C. Club, Neil Drake, 709 Coolidge, Midland, 48640, (517) 631-2939

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MISSOURI

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Mid-America Color Computer User's Group, Jerry Morgon, 807 Ponca Drive, Independence, 64056, (816) 796-5813

Coconuts, 1610 N. Marian, Springfield, 65803

MONTANA

Billings C.C. Club, Jayne Kenyon, 4306 Phillip, Billings, 59101

NEBRASKA

TRS-80 Color Computer Users Group of Lincoln, Jonathan Skean, 2629 South 15th St., Lincoln, 68502, (402) 475-9815

NEW JERSEY

Intrasoft, Ravi Sakaria, 139 Candace Lane, Chatham Twp., 07928, (201) 635-8025

The Kid CoCo Club, Derrick Kardos, 11 Regal Drive, Colonia, NJ 07067, (201) 382-6662

Bug 80 Users' Group, George R. Miller, Jr., Box 52, Glen Gardner, 08826

Garden State Color Computer Users Group, Darren Nye, 5 North 20th Ave., Manville, 08835; Voice (201) 725-8385, Data (C.C.I.E. BBS) (201) 725-5028

Loco CoCo Club, Bud Lavin, 73B Wavercrest Ave., Winfield Park, 07036

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Adirondack CoCo Club, (Athens Chapter), Pete Chast, P.O. Box 61, Athens, 12015

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Local CoCo, Charles Martin, P.O. Box 901, Bellmore, 11710

Broome CoCo Club, Bucky Helmer, 57 Front St., Binghampton, 13905

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C.C. Club of Central N.Y., Joseph Short, 248 S. Fourth Ave., Ilion, 11357, (315) 895-7730

Olean Area CoCo Users Group, Herman L. Smith, P.O. Box 216, Olean, 14760, (716) 372-1170 or 372-3121

NORTH CAROLINA

TRS-80 Users' Group of Charlotte, Jason Foodman, 240 Medearis Dr., Charlotte, 28211

Bull City CoCo Users Group, Todd Wall, 5319 Durand Drive, Durham, 27703, (919) 598-1348

Raleigh Color Computer Club, David Roper, P.O. Box 681, Garner, 27529

OHIO

CoCo Club of Youngstown, Timothy McFadden, P.O. Box 478, Canfield, 44406, (216) 788-4218

Columbus & Central Ohio Color Computer Club, D.E. Sparrow, 19 E.N. Broadway, Columbus, 43214, (614) 268-5366

Dayton CoCo Users' Group, Joseph P.Evans, 609 Applehill Dr.,W. Carrollton, 45449

Cincinnati TRS-80 Users Group, R.A. White, 44 Dow Court, Fairfield, 45014

Dayton Are Color Computer Users Group, David R. Barr, 2278 Yorkshire Pl., Kettering, 45419, (513) 293-2228

M.U.G. of CoCo—Middletown Users Group, James Carr, Middletown, 45042, (513) 424-6905

Northeastern Ohio (N.E.O.) CoCo Club, Tony Rugue, 527 Malvern Drive., Painsville, 44077, (216) 354-2736

Miami Valley CoCo Club, R. Douglas Wales, 2065 LeFeure Rd., Troy, 45373

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Willamette Valley CoCo Users, Brian James, P.O. Box 11468, Eugene, 97440, (503) 687-9286

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HUG-A-CoCo, George Lurie, 2012 Mill Plain Court, Harrisburg, 17110, (717) 657-2789

Penn-Jersey Color Computer Club, P.O. Box 2742, Lehigh Valley, 18001

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RHODE ISLAND

New England CoCo Nuts, P.O. Box 6604, Providence, 02940

SOUTH CAROLINA

Invitation Software Group, Tom Reed, 3562 Linbrook Dr., Columbia, 29204, (803) 786-0541

Midlands 80 Computer Club, Tommy Sanders, P.O. Box 7594, Columbia, 29202, BBS (803) 755-3414

Metropolitan Greenville CoCo Club, Ed Lowe, P.O. Box 6, Gray Court, 29645, (803) 676-3928

Hilton Head Island CoCo Club, Kevin Clark, P.O. Box 6187, Hilton Head Island, 29926, (803) 785-9630

Spartanburg County CoCo Club, Dennis Shattuck, 473 Royal Oak Drive, Spartanburg, 29302, (803) 583-3017

TENNESSEE

Chattanooga CoCo Club, Jim Perkins/Jim Cox, P.O. Box 9825, Chattanooga, 37412, (615) 870-2439

Foothills Micro-Computer Club, Aaron Sentell, Route 14, Box 289, Maryville, 37801, (615) 982-4629

Memphis Color Computer Users Group, Ben Barton, 4903 Warrington Rd., Memphis, 38116, (901) 795-7075 or 362-5945

TEXAS

CoCo User Group, David Karam, 1809 Dexter, Austin, 78704, (512) 442-6317

B/CS Color Computer Users Group, Dale Cuthbertson, 1812 Michael Lane, Bryan, 77801, (409) 822-0731

Deer Park Color Computer Club, Donald Burr, 4314 W. Grant, Deer Park, 77536, (713) 479-5313

International Color Computer Club, Inc., Robert L. Garrett, 2101 East Main Street, Henderson, 75652, (214) 657-7834

TRS-80 Users Group of New Braunfels, John Mendez, 408 Acorn, New Braunfels, 78130, (512) 629-3207

UTAH

Ogden CoCo, Kathy Rush, 4535 S. 2600 W. Roy, Ogden, 84067

Salt City CoCo Club, Dennis Mott, 720 E. Browning Ave., Salt Lake City, 84105, (801) 487-6032

VIRGINIA

Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Road, Dale City, 22193, (703) 670-4962

Central Virginia Color Computer Club, Lane Lester, 413 Woodland Circle, Lynchburg, 24502, (804) 237-4188

WASHINGTON

Northwest Computer Club, Judy Gehman, E. 14012 Cataldo, Spokane, 99216, (509) 928-2169

WEST VIRGINIA

Kanawha Valley Personal Computer Club, P.O. Box 5354, Charleston, 25311, BBS (304) 925-3338 or 345-6502

Mln. State CoCo Users Group, Donald G. Barber, Jr., P.O. Box 1084, Morgantown, 26507, (304) 599-4493

Mil-O-Bar Computer Club, Jim LeMaster, P.O. Box 130, Ona, 25545, (304) 743-4752 after 4 p.m.

Blennerhassett CoCo Club, David Greathouse, Rt. 9, Box 119, Parkersburg, 26101

West Virginia Color Computer Club, William Mucklow, 949 Baier Street, St. Albans, 25177, (304) 727-6764

WISCONSIN

CoCo-MUG, Tom Fandre, P.O. Box 10152, Milwaukee, 53210, (414) 542-0600

Southern Wisconsin CoCo Club, David C. Buehn, P.O. Box 411, Twin Lakes, 53181

CANADA

ALBERTA

Calgary Color Computer Club, Don Towson, 832 Cannell Rd. S.W., Calgary, T2W 1T4, (403) 281-2855

Edmonton CoCo Users Group, Dexter Dombro, P.O. Box 4507 Stn. South, Edmonton, T6E 4T7, (403) 461-4750

Medley Computer and Electronics Club, P.O. Box 1267, Medley, T4A 2M0

NEW BRUNSWICK

Color Computer Moncton Users Group (CoCoMUG), Leo Allain, 91 Woodland Dr., Moncton, E1E 3C4, (506) 382-2190

BRITISH COLUMBIA

North Island CoCo Club, Ann Marie MacKay, P.O. Box 1740, Port Hardy, B.C., V0N 2P0

Salmon Arm CoCo, David Coldwell, 2981 N. Broadview, Salmon Arm, B.C., V0E 2T0, (604) 832-8247

NEWFOUNDLAND

Avalon CoCo Club, A.R. Thompson, 10 Foran St., St. John's, A1E 4G1

NOVA SCOTIA

Halifax Dartmouth CoCo Users Group, P.O. Box 572, Dartmough, B2Y 3Y9, (902) 469-3656

ONTARIO

International Adventurer's Club, Maurice Dow, 84 Camberley Cres., Brampton, L6V 3L4

K-W C.C. Club, Peter Karwowski, 23 Hudson Crescent, Kitchener, N2B 2V7

London CoCo Nuts Computer Club, Harry K. Boyce, 180 Concord Road, London, N6G 3H8, (519) 472-7706

Meadowvale Color Computer Club, Howard Porter, P.O. Box 186, Streetsville, Mississauga, L5M 2B8

Niagara Regional CoCo Club, Harry VanDyke, 7707 Jubilee Drive, Niagra Falls, L2G 7J3

QUEBEC

Club d'Ordinateur Couleur du Quebec, Inc., Jean-Marie Beaujean, Centre de Loisirs St-Mathieu, 7110- 8e Ave., St-Michel, Montreal, H2A 3C4, (514) 270-7507

South Shore CoCo Club, Jacques Bedard, 33 Lisilre, St-Constant, P.Q., J0L 1X0

SASKATCHEWAN

Regina Color Computer Club, Georges Glass, 26 Tweedsmuir Bay, Regina, S4X 2B1, (306) 949-3942

Saskatoon Color Computer Club, L. Curtis Boyle, 35 Bence Crescent, Saskatoon, S7L 4H9

AUSTRALIA

Blacktown City TRS-80 Colour Computer Users Group, Keith Gallagher, P.O. Box 264, Riverstone, New South Wales, 2765

CoCo Colyteens of Colyton, Dwayne Manson, P.O. Box 506, St. Marys, New South Wales, 2760

Color Computer Penrith User Group, Alexander Schofield, 15 Tasman Avenue, Lethbridge Park, New South Wales, 2770

CoCoHUG (Color Computer Hobart Users Group), Robert Delbourgo, 15 Willowdene Avenue, Sandy Bay, Hobart, Tasmania, 7005

MEXICO

Mexico City Color Computer Club, Marcelo Luft, Laja #232, 01900 Mexico D.F., Mexico City, 5-68-78-75

WEST GERMANY

First CoCo Club Hamburg, Theis Klauberg, 2000 Hamburg 65, Op de Solt 53 a, West Germany

new clubs

Editor:

I would like to thank you for publishing the notice about my MC-10 club. The dues for our newsletter have risen from $4 to $6 due to the outgrowth of our newsletter and the recent postage increase. For information write to MC-10 Newsletter, 4730 Cass Street, 92109.

Jose J. Bray
San Diego, CA

Editor:

I would like to inform Color Computer users of an organization forming in California. We are interested in exchanging ideas and information and informing others of the true power of the Color Computer. We are also interested in bettering ourselves; so if you have any tips or information, send it to us. Write to 2432 Cordelia Road, 94585.

David Jenkins
Suisun, CA

Editor:

Membership is free in the Color Computer Adventurers Club. The purpose of the club is to exchange tips on solving Adventures and experiencing interactive fiction. Please enclose a SASE and send us your tips and questions. Write to me at P.O. Box 15564, 20003. We will also be serving as a clearinghouse for public domain software and advice on how to generate your own Adventures.

Jack Darling
Washington, D.C.

Editor:

I am proud to announce the opening of a new club called the Naples CoCo Club located in the heart of southwest Florida. Feel free to write for the Naples CoCo Club newsletter which is published every month. Write to The Naples CoCo Club, 3320 7th Avenue S.W., 33964. Phone (813) 455-4830.

Matt Tari
Naples, FL

Editor:

The Big Bend Color Computer Users Group is looking for people in the Big Bend area to help us get off to a good start at our new location in Tallahassee. Anyone interested should write to 2506 Colleen Drive, 32303.

Ronald Majiros
Tallahassee, FL

Editor:

Our Color CHIPS club meets every fourth Wednesday at the I.M.S. Building on Cresent Lake Road off M-59 in Waterford at 7 p.m. For information call (313) 627-2235 or write to 586 Eastridge, 48462.

Julie Hallock
Ortonville, MI

Editor:

I think you are all doing a great job and I've only gotten two of your issues!

I would like to know if there is anybody in southeastern Minnesota with a Color Computer or if there are any CoCo clubs in the area? Write me at Route 1, Box 21, 55991.

Steve Kriesel
Zumbro Falls, MN

Editor:

I would like to announce the start of the Bull City Color Computer Users Group which is located in Durham. We meet twice a week, usually at the Riverview Library. If you would like more information, you can call (919) 598-1348. Or write 5319 Durand Drive, 27703. We would like to hear from other CoCo clubs. Any companies wishing to send catalogs are welcome to do so.

Todd Wall
Durham, NC

Editor:

I would like to announce the existence of the National Musica 2 Users Group (MUG).

If there is interest in this group, send your name and address to 711 Third Street SE, 58072 and let us know what benefits you would like to see from this users group.

Solveig Pederson
Valley City, ND

Editor:

The Greater Toledo Color Computer Club is happy to announce that it just celebrated its second anniversary. The club meets the first Thursday of each month at The Wernert Civic Association Building, 5068 Douglas Road, Toledo, just north of Wernert School. Dues are $2 a meeting or $20 a year. The club has its own bulletin board for members only. You can call Bob Butler at (419) 537-1432.

Ronald Hall
Monclova, OH

Editor:

Tri-County Computer Users Group (Cleveland area), Jack Smith, 35748 Detroit Road, Avon, OH 44011, (216) 937-5516. We all love THE RAINBOW. Keep up the good work!

Marge Robitaille
North Olmsted, OH

Editor:

The Central Oklahoma Computer Organization, Inc. is a 278-member Radio Shack Color Computer users group which meets the second Saturday of each month at 9 a.m. at 10th Street and Hudson in Oklahoma City.

Robert Helms
Midwest City, OK

Editor:

This is to announce the existence of a small but growing group of CoCo enthusiasts, The CoCo Philadelphia Users Group (COCO PUG). We have a newsletter of sorts, helpful hints and nifty promotional items for other CoCo clubs. Now, all we need are some new members! Contact me at P.O. Box 28326, 19149 for details.

Phil Costello
Philadelphia, PA

Editor:

I am proud to announce the formation of the Foothills Micro-Computer Club. To be a member you must own a TRS-80 model computer of any kind. It can be anything from a Model 100 to a Tandy 1000. We meet every other Tuesday night at 6:30 p.m. at the Blount County Public Library.

Aaron Sentell
Maryville, TN

Editor:

I consider your magazine the best friend an avid CoCo user can have. I am looking for other CoCo users in the El Paso area. I am unable to find a CoCo club or any BBSs. Surely someone is here! Please write to me at 2140 Woodside, 79925; phone (915) 592-2719.

Michael Teegarden
El Paso, TX

Editor:

The Fort Worth Color Computer User Group meets on the Fourth Tuesday of each month from 6:30-8:45 p.m., Downtown Public Library, Classroom B, 300 Taylor Street. For more information call Lloyd Rogers at (817) 294-9904, Barry Pottinger at (817) 297-2732 or Harley Ainsworth at (817) 834-9030.

Fort Worth, TX

Editor:

It is with extreme pleasure that I announce the TRS-80 Users Group of New Braunfels. Anyone in the area of San Marcos, Seguin, San Antonio and New Braunfels is cordially invited to join us in promoting the use and enjoyment of our truly superior machine.

Thank you, RAINBOW, for giving us a fantastic magazine to look forward to each month!

John Mendez
New Braunfels, TX

Editor:

Our club meets twice a month. We also have a monthly newsletter called *The Cursor*. Anyone wanting more information can call John Pettengill at (804) 320-3833 or Bill Mays at (804) 282-7778.

Bill Mays
Richmond, VA

Editor:

I just bought my first issue of THE RAINBOW and think it is just great. Your magazine seems to have it all. Good articles, programs and reviews. All in all, I am very pleased.

I am very interested in starting a CoCo club in the Sisterville area. If anyone is interested in joining please contact me at 512 Riverside Drive, 26175 or call (304) 652-1437.

John Martin, Jr.
Sisterville, WV

Editor:

It is with pleasure that I announce that Edmonton has finally come out of the wilderness. The new group features regular club meetings which start at 7 p.m. on the third Monday of every month at the Northwestern Utilities Building, 10540 - 112 Street, Edmonton, Alberta. We have numerous talented people involved who will be offering workshops for beginners and interested parties alike, general interest programs at our regular meetings and a dynamite newsletter to help CoCo users who want to know what's going on in and around Edmonton. We already sport a considerable membership, including several BBS operators.

For more information write to ECUG, P.O. Box 4507 Stn. South, Canada T6E 4T7.

Dexter B. Dombro
Edmonton, Alberta

Editor:

I am proud to announce the formation of the Kingston CoCo Club. We meet the first Monday of every month at Kingston City Hall. For more information call me at (613) 389-0467 or call Ken, our president, at (613) 544-2806.

Kanti Dinda
Kingston, Ontario

Editor:

I am starting a CoCo club for Adventure freaks in the Mississauga area. This club will be just something for people having trouble with some Adventures and for us Adventure fanatics that have nothing else to do but sit around playing Adventures. So if anyone is having trouble with an Adventure, write to 2571 Pollard Drive, Canada L5C 3G9.

Vince Lok
Mississauga, Ontario

Editor:

I would like to announce in your magazine, *le club couleur du nord*, Gabriel Pigeon, RR # 2 Villemontel, Abitibi-ouest, Canada J0Y 2S0. Anyone interested please write.

Gabriel Pigeon
Abitibi-ouest, Quebec

Editor:

The Halifax Dartmouth Colour Computer Users Group meets the second Monday of the month at 7:30 p.m. in the Findlay Community Centre, Dartmout, Nova Scotia. New members welcome.

The Halifax Dartmouth Colour Computer Users Group BBS operates Monday-Friday, 9:30 p.m. until 9 a.m., from 5:30 p.m. on Saturdays until 9 a.m. Mondays. Telephone (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

Editor:

I am writing to let you know of a group of dedicated people in the North Shore area of Sydney who call themselves the North Shore CoCo User Group. This group has now been going for almost two years. Among our members are a number of avid OS-9 users. For more information write me at 9 Milham Crescent, Forestville 2087, Sydney.

Graeme Nichols
Sydney, Australia

Editor:

I recently bought a TRS-80 Color Computer 2 with Extended BASIC (64K) but I soon noticed there's a lack of (good) programs in Belgium. Books or information are almost unfindable. I can't find THE RAINBOW here; I have to go to The Netherlands to buy it.

Is there a CoCo club in Europe? Write to me at Tijl Uilenspiegallaan 108, 2050 Antwerpen, Belgium.

Tony Meulenbergs
Antwerp, Belgium

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Addendum to last month's article

Poking For Printer Baud Rates

By Dan Downard
Rainbow Technical Editor

• *I have yet to find the pokes for the different Baud rates for the printer. I have looked into RAINBOW's latest issues and have found nothing at all. Could you please tell me where I could get the pokes for the different Baud rates for the printer? The only way I could access 2400 Baud for my DMP-105 was from* Telewriter-64 *and I could only use the word processor, but I want to use it for something else like graphics, etc.*

Michael Sileo Jr.
Ridgewood, NY

We'll do better than give you a table, Michael. Any Baud rate constant you are looking for is derived from the following formula:

Baud Constant=(55930/baud rate)-5

Round off the answer to the nearest integer. The location that you POKE is 150. An example follows for 2400 Baud:

(55930/2400)-5=18, so POKE 150,18

There is one little catch to this formula. If your answer is 256, or greater, the decimal answer must be converted to Hex and back to two decimal values since a number greater than 255 indicates a 16-bit hexadecimal value. The first, or higher order, byte must be POKEd into address 149. Another example for 110 Baud:

(55930/110)-5=503
503(decimal)=01F7(Hex)
01(higher order byte-Hex)=1(decimal)
F7(lower order byte-Hex)=247(decimal)
so POKE149,1:POKE150,247

One thing about it, Michael, you don't need a pocket calculator; you can do it on your CoCo.

Editor's Note: For those who'd rather not do it themselves, Dan, these POKE values for the CoCo will create the 16 most commonly used Baud rates. They are as follows:

Baud Rate	POKE 149	POKE 150
50	4	88
75	2	227
110	1	246
134.5	1	153
150	1	153
300		110
600		87
1200		40
1800		25
2000		23
2400		18
3600		10
4800		7
7200		3
9600		1

To achieve 19200 Baud, one must use the pokes for 9600 Baud and then use the bold poke (65497,0) to double the CoCo's speed. (Use POKE65496,0 to restore normal speed.)

(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.)

'TRACKING' DOWN THE ANSWER

• *In response to your answer to Mike Lotti about disk drives for the CoCo 2, I have a question about a specific combination of drive, controller and DOS.*

I am thinking of using 80-track, double-sided drives, J&M controller, piggybacked JDOS and Disk BASIC with hard select switch. Would this combination work? Would this combination read and write regular 35- or 40-track, single-sided Radio Shack software? Could all the different types of drive formats be accessed from Disk BASIC without XEX or OS-9? In another word, could I use this as an all-purpose system?

I have talked to people and they say it should work, but nobody I know has tried it. Could you or any of your readers offer any affirmative results before I start buying the system?

N.S. Pui
Waterloo, Ontario

Unless special software is used, an 80-track disk drive cannot be used to read, or

write, a 40-track formatted disk. It's not impossible, but you have to understand the difference between 40- and 80-track drives. An 80-track drive records information on the disk at a track density of 96 TPI, or 96 tracks per inch. The track density for 35/40-track drives is 48 TPI.

You can record 40-track data on an 80-track drive by skipping every other track, but the software you mentioned will not do that. It will record the data on the first 40 tracks, making it unreadable on a standard 40-track drive.

As I have said several times in the past, you have to have at least one 40-track drive in the system to read standard Radio Shack formatted disks. After you read them, you can transfer the data to any format you desire.

TV vs. MONITOR

• *I read Keith Currier's letter in the April 1985 issue concerning wavy lines and poor definition on the TV set he uses as a monitor.*

I use a Radio Shack Model 3010 TV receiver as a monitor and have no trouble like Mr. Currier's. My problem is something different. The TV set my wife watches while I use my computer is close to the computer and is subject to a great deal of interference, especially on VHF channels; it is not so bad on the UHF channels. The size of the room makes it impractical to separate the two enough to eliminate the interference.

I could buy a monitor and interface if that would eliminate the problem. Do you think it would? I don't want to spend the money unless I can be reasonably sure it will work.

John N. Parker
Columbia, SC

A monitor will not solve your problem, John. The interference to your wife's TV is coming from your CoCo. Installing a monitor will clean up the picture from the CoCo, but RF (Radio Frequency) will still radiate from the microprocessor. The only suggestion I have is to install a high pass filter, available at your local Radio Shack store, on your wife's TV. High pass filters will attenuate the low frequency RF emitting from your CoCo.

CHIPS A-BLOWN!

• *I have an upgraded 64K CoCo with Extended BASIC, Mark Data "Superpro Keyboard" and a monitor interface. Just after I installed the monitor driver the computer started doing strange things. When I would turn it on, the screen would show garbage and the computer seemed to do nothing; it would just lock up.*

I think one of my chips is blown — SAM chip, PIA or the 6809. What does it sound like to you?

Chris Foster
Texarkana, TX

It is hard to troubleshoot computers from letters, Chris, but from your symptoms I would check the PIA. It sounds like your problem is coincidental to installing the monitor interface and keyboard.

One of the easiest ways to troubleshoot a computer is by swapping chips. If you have a friend with a CoCo, put your chips in his computer, one at a time, until you find the bad chip. For the majority of problems, I would first check the SAM, 6809E and the memory chips, in that order.

If you don't feel comfortable swapping chips, take your CoCo to your local Computer Center. One of Radio Shack's strong points is their service force.

AUTOMATIC BAUD SETTING

• *I would like to know if there is any way to hard wire my CoCo so it is set for printing at 1200 Baud when I turn it on. I have a DMP-100 and I don't like poking it in every time I want to print something.*

Also, is there any way to run two or more printers at the same time on one CoCo? It would save a lot of time in copying programs for my friends.

Charles Farris
Lebanon, IL

It depends on what you consider hard wiring, Charles. If you don't mind replacing your BASIC ROM, then you can do it. Address $A113 in your BASIC ROM contains the Baud rate constant that is copied to RAM each time you cold start your CoCo.

You will need a 68766 EPROM. Change byte $113 (relative) to $29. Other than doing this, you're stuck at 600 Baud unless you're using OS-9.

MYSTERIOUS MISHAP?

• *I would like to inquire of your readers about some unusual things that happen when running the disk version of* Spectaculator *with a write-protect sticker installed.*

When I use a WP on my version, the disk chatters away and I expect to get an I/O Error. When the disk finally stops I am looking at an unusual menu that resembles nothing in the instructions. Prior to putting this WP on the diskette I had been able to LO: filename:1 and SA: filename:1. Now trying to do this results in an I/O Error being returned. However, I can remove the data disk from D1 and insert it in D0 and the LO and SA commands work. Anybody have any ideas of what may be going on?

Also, I would appreciate it if you could supply a drawing of how to set up the plugs for the four-drive system. I hope to purchase one of the Amdek mini drives soon and tie them onto my existing floppies. Also, on my present two-drive system if I use one disk the other motor runs while the disk that is in use runs; is this correct? My D0 is the CoCo drive, but D1 is a Shugart 400.

James Johnson
Hampton, VA

James, what you are doing is accessing the DOS that was written for Tandy for the operation of *Spectaculator*. I have had no need to use it, so I'm not familiar with any of the commands. If any of our readers can help, please write.

As far as how to set the plugs for a four-drive system, I assume you are not using Radio Shack drives. There are no plugs on Radio Shack drives. Each drive is recognized by a signal on a respective pin of the cable from the controller to the drive. The pin assignments are as follows:

Pin 10 - Drive Select 1
Pin 12 - Drive Select 2
Pin 14 - Drive Select 3
Pin 32 - Drive Select 4

Therefore, Pin 32 of the standard Radio Shack connector must sometimes be moved to the enable pin of the drive you are using if you wish to use it for Drive 3, or the fourth drive in your system.

GETTING HOOKED ON OS-9

• *Will someone please tell me how to hook up a terminal to my Color OS-9 system? I would like to know how to hook up another CoCo to my system. What do I need as a program in the terminal? What kind of cable? What editor/assembler do you use to enter the terminal program in "KISSable OS-9," May 1984?*

Kenny Brunell
Ruidoso, NM

First, you have to connect the two computers either by modems or by hard wiring them through the RS-232 ports. Make the following connections for hard wiring:

CoCo #1		CoCo #2
Pin 2	to	Pin 3
Pin 3	to	Pin 2
Pin 7	to	Pin 7

Next, you must have terminal software in the remote, or terminal, CoCo. A smart terminal program was in a recent issue of THE RAINBOW. Look on Page 50 of the November 1984 issue for "CC Talk: A Smart Terminal Package," by Frank Gossette.

The rest is fairly simple. After booting OS-9 enter the following commands:

```
XMODE /T1 BAUD=1
TSMON /T1&
```

A carriage return on the RS-232 port will greet the remote user with a sign-on message

KISSable OS-9

A Short Tutorial On C Compilation

By Dale L. Puckett
Rainbow Contributing Editor

We've noticed a growing interest in C programming recently. And with that interest, we've noticed an increase in the number of questions concerning the Microware C Compiler licensed by Tandy for Color Computer OS-9. We don't have room for a complete tutorial about the C programming language in this column — the subject could fill several books. But we'll try to answer a few of the questions you've asked and possibly give you a fresh perspective.

We'll wrap up this month's column with an impressive BASIC09 program contributed by Tom Ring. Random hints will be sandwiched in the middle. Here goes!

The inspiration to say a few words about C came in a letter from Frank Dupont in Detroit, Michigan. Frank purchased a C compiler from Radio Shack more than a year ago and hasn't had a lot of luck bringing it to life. He notes that the two disks that come with the package are very full and asked for help in setting up his system. He also wanted to know what steps he needs to go through to compile a program and questioned whether he needed the DEFS directory on his system directory.

We'll start with setting up the system. Frank's observation is correct. The disks shipped with Microware C for the Color Computer are very full. In fact, if you use the "free" command you will notice there are only 109 free sectors remaining on the C system disk and 199 on the C library disk.

Let's start with the system disk. Programming in C on the Color Computer is a perfect example to illustrate a suggestion we made several columns ago. Remember when we said it is sometimes easier to create several "system" disks — one to use when you are writing and testing assembly language programs, another for BASIC09 programs and now another one for your C language programming sessions.

When you apply this philosophy you will find there are two ways to implement it. You can use *Cobbler* or *OS9Gen* to put the OS9Boot file on each one of your system disks. If you do this you will be able to boot up OS-9 with that disk and start programming immediately.

However, if you get tired of using *Cobbler* or *OS9Gen* and then Dsave to build a new boot disk every time you create a new system disk, you can simply maintain one system disk along with a group of "system programming disks." If you take this route you can boot OS-9 with your single system disk and then insert the "system programming disk" for the language you plan to use that day.

After you insert the system programming disk you must then use the Chx command to make the CMDS directory on that disk your current execution directory. In other words, after you remove your "boot" disk and insert your C programming disk you must type:

```
OS9: chx /d0/cmds  ENTER
```

This command line tells OS-9 where to look for the utilities and programs you will be running. We're assuming you have used the OS-9 MakDir

(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.)*

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command to create the CMDS directory on your C programming disk. It is a good idea to create a CMDS directory on all your system programming disks. After you create a new CMDS directory, store all of your executable object code files — the utilities and programs you need to program in this language — in this new directory.

Since the CMDS directory on the C compiler disk from Radio Shack uses all but 109 sectors on the disk, you will most likely want to use it as a system programming disk without an OS9Boot file. You can use those 109 sectors to store a few additional utilities to make your programming life easier. For example, you'll need to move your favorite editor into the CMDS directory on this disk. You may also find a few compare and word search utilities useful, such as Comm, Diff and Grep.

You can use the OS-9 Copy command utility to move your programs and utilities into your new CMDS directory. If you are moving a number of utilities into this directory from another, you can use the OS-9 Dsave utility command.

However, don't forget this important point: Do not make these changes on your original C Compiler disk, but put a write-protect tab on it immediately. Then make a copy of it using the OS-9 Backup utility command. Put your original C Compiler disk away so you can use it to make a new copy if something happens to your working system disk.

So far, we have taken care of the C programming system disk you will be using in drive /d0. Now we'll look at the disk you'll be using in drive /d1. It's a bitter fact of life — if you are going to program in C using Color Computer OS-9 you are going to need two disk drives. If you plan to write huge programs and you are using the single-sided, 35-track drives from Radio Shack, three disk drives would be better. However, if you have purchased the improved *CCDisk* from Computerware or *SDisk* from D.P. Johnson and are using them with 40- or 80-track double-sided disk drives, you'll have it made with two drives.

When you buy Microware's C Compiler from Radio Shack you receive two disks. The second disk is called the "C Library." It contains three directories — DEFS, LIBS and SOURCES. Let's examine them in detail.

First, the C Compiler expects to find the DEFS and LIBS directories on a disk mounted in drive /d1. If it does not find them there, it will not work. The DEFS directory contains files similar in nature to the files found in the DEFS directory on your original OS-9 System disk. In fact, if you look closely, you'll find the answer to one of Frank Dupont's questions.

Specifically, Frank wanted to know if he needed to have the DEFS directory installed on his system disk in drive /d0. The answer is no. Why? The DEFS directory on the C Library disk contains a file called *OS9defs.a* that contains the definitions needed by *c.asm*, the relocatable macro assembler that comes with the C Compiler.

How do we know this? Take a look at any of the assembly language source files — they are the ones with the '.a' extension — in the SOURCES directory. You'll find that most of them contain the line:

```
USE . . . /defs/os9defs.a
```

Essentially, this tells the assembler to insert the source code stored in a file named *os9defs.a*, located in a directory named DEFS on the disk that contains the parent of the parent of the current data directory. When the assembler reads this file it learns the symbolic names of the many OS-9 function calls and variables.

Looking deeper into the DEFS directory on the C Library disk we find a number of files with an '.h' extension. These are C "header" files. Header files usually contain collections of "#define" statements and declarations. They are read in by the compiler when you use an "include" statement in your program. By using include statements in your large programs, you can guarantee that all the source files you are compiling will be using the same definitions and variable declarations. Remember however, if you change a header file you must recompile all of the files that use it.

Let's look at an example. If you need the definitions that deal with OS-9 signals, you will want to include this line in your program source code.

```
#include <signal.h>
```

The left and right angle brackets tell the C compiler to look for a file named *signal.h* in the DEFS directory. If you have stored header files in other directories you can tell OS-9 where they are located by including a complete pathlist to the file enclosed in double quotes. For example:

```
#include "/d0/junk/signal.h"
```

The bottom line? Since you will use the *stdio.h* file with every C program you write, you'll need the DEFS directory on the disk in drive /d1. When you begin your C programming career, you probably will not use the other files in this directory very often, but leave them intact. You'll need them when your skills advance or when you compile programs from other sources such as the OS-9 Users Group Software Library or listings in RAINBOW.

The LIB directory contains a file named *clib.l* which stores the standard library functions, math functions and other object code needed by the system. Another file in that directory named *cstart.r* contains code that is used to set up compiled programs. It must be in the LIB directory and the directory must be in a disk mounted in drive /d1 when you run the C Compiler.

That leaves us with the SOURCES directory. It holds the source code for three useful sample programs and a directory named SYS which holds the assembly language source code that was used to generate the object code in *clib.l* in the LIB directory. Studying these files will help you understand how the C Compiler works.

If you are working with the Radio Shack 35-track, single-sided drives, you should be able to delete the SYS directory from the SOURCES directory to make more space for your own source code. The same goes for the files holding the sample C source code. But please, remember to do this deleting on a copy disk, not on your original C Library disk from Radio Shack.

You'll already have 199 free sectors available on the C Library disk before you delete the sample source code. That should be plenty of room for your early efforts. Deleting the sample source code will give you even more.

Here's an additional reminder. Don't forget how OS-9 works. Remember, the system always looks for the source code and data files in your current data directory. This means you will probably want to use the SOURCES directory already on the disk to store your own programs. To do this, make sure you use the OS-9 Chd command when you

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begin your C programming session. Do this by typing:

```
OS9: chd /d1/sources   ENTER
```

Now that you have set up your two disks — the C Compiler for drive /d0 and the C Library for drive /d1 — you are ready to begin programming. Use your favorite editor to create a file containing a short program. For example, you could use this example from Page 6 of Kernighan and Ritchie's *The C Programming Language*:

```
main ( )
{
   printf("hello, world\n");
}
```

After you type this short program, save it in a file named *hello.c*. You're almost ready to compile your first C program, but first make sure the C Compiler disk is in drive /d0 and your current execution directory is /d0/CMDS. Also, make sure the C Library disk is in drive /d1 and your current data directory is /d1/SOURCES. Then, type this command line:

```
OS9: ccl hello.c   ENTER
```

When you strike the ENTER key your disk drives will begin to spin and, after several minutes, you'll see something like this on your screen.

```
'hello.c'
c.prep:
c.pass1:
c.pass2:
c.opt:
c.asm:
c.link:
```

Hello.c is the name of the source file you are compiling. The other lines tell which part of the C Compiler is running at the time. You'll notice disk drive /d0 starts each time you see a new line on your screen. It is loading in the program named.

If you look in the current data directory after you compile the program above, you will see a file named *c.com*. If you list it you will learn why the previous messages appeared on your screen. You'll also see what OS-9 was doing throughout the compiling process. Let's look.

Let's study this listing. *C.com* is an OS-9 procedure file that is generated by ccl. It puts the C compiler through its paces.

The first line in this procedure file tells OS-9 to echo the name of the file it is compiling. Then it sends the "-x" command that is built into the OS-9 Shell. It tells the Shell not to abort the entire process if an error occurs.

After this signal it echos the word "c.prep:" on your screen, giving you the name of the program it plans to run next. It then sends out the command line that runs the program *C.PREP*. That same line tells *C.PREP* to get its input from the file named *hello.c* in your current data directory and to put its output into an intermediate file named *ctmp.4.m*.

When *C.PREP* finishes its job, the procedure file sends an 'x' command to the Shell. This tells the Shell to abort if there is an error. It then echos the word "c.pass1" and proceeds to run that program.

Notice that *C.PASS1* gets its input from the file named *ctmp.4.m* that was just created by *C.PREP*. *C.PASS1* sends its output to a file named *ctmp.4.i*. I'm sure the 'i' stands for intermediate.

As you study the rest of the procedure file, *c.com*, you'll notice a pattern. OS-9 is using a series of temporary files to store intermediate results. The output of one part of the compiler is put into a temporary file that is used as the input for the next part of the compiler. After a temporary file has been used, the procedure file deletes it.

These temporary files are used much like pipes. The difference lies in the fact that the compiler is so large it won't all fit in memory at one time. The temporary files are needed to hold the results of one part of the compiler while the other is loaded into memory.

```
echo 'hello.c'
-x
echo c.prep:
C.PREP hello.c >ctmp.4.m
x
echo c.pass1:
C.PASS1 ctmp.4.m -o=ctmp.4.i
del ctmp.4.m
echo c.pass2:
C.PASS2 ctmp.4.i -o=ctmp.4.a
del ctmp.4.i
echo c.opt:
C.OPT ctmp.4.a ctmp.4.o
del ctmp.4.a
echo c.asm:
C.ASM ctmp.4.o. -0=ctmp.4.r
  del ctmp.4.o
echo c.link:
C.LINK /d1/lib/cstart.r ctmp.4.r  -o=hello -l=/d1/lib/clib.1
del ctmp.r.4
```

Work your way through the procedure file one line at a time until you understand what happens during each part of the compilation. Notice that several of the compiler parts can be used as stand-alone programs. For example, you can use the relocatable macro assembler, *c.asm*, to assemble an assembly language source file you have

```
PROCEDURE primes
 0000      DIM trial,number,factor:REAL
 000F      PRINT
 0011      INPUT "Number? ",number
 0021      IF number<1 OR number<>INT(number) THEN
 0037        PRINT "Must be a POSITIVE INTEGER!";
 0057        RUN primes
 005B      ENDIF
 005D
 005E      trial:=2
 0066      factor:=number
 006E 10   IF factor/trial=INT(factor/trial) AND trial<>number THEN
 008F        PRINT trial;
 0095        factor:=factor/trial
 00A1        GOTO 10
 00A5      ENDIF
 00A7      IF trial<factor AND trial<number/2 THEN
 00C0        IF trial<3 THEN
 00CD          trial:=trial+1
 00D9          GOTO 10
```

written. It just happens that when you are writing in the C language, the compiler writes an assembly language source code file for you.

When you get to the command line for *C.LINK*, the linker program, you'll see why you must have a directory named LIB on a disk mounted in drive /d1. The linker reads two files from this directory, *cstart.r* and *clib.l*. Further, it explicitly states the directory is located on drive /d1.

We haven't jumped into the mystery of C programming in this short tutorial, but hopefully we have helped you understand how to set up your Color Computer OS-9 system so you can use the Microware C Compiler effectively. I hope to take a closer look at C in future columns if the interest continues.

Frank Dupont also asked if he should buy the manual for Microware's RMA; this is the same assembler that comes with your C Compiler. Only the name has been changed — it's called *C.ASM* in the C Compiler package.

If you plan on doing a lot of assembly language programming, the $25 price tag is a steal. The manual tells you all you need to know to tame this powerful assembler. Plus, the fact that you can assemble one module at a time and put the object code in a library makes a lot of sense. Once your code is debugged and in a library, you can use it over and over again by including it in your new programs with the linker program, *C.LINK*.

And, don't forget the powerful macro handling capability built into this assembler. If you are an assembly language programmer you'll love this assembler and want the manual so you can use it effectively. Order it direct from Microware.

One more note about C. Many people complain they don't like C because the code it generates is too long. But, before you jump to any conclusions, consider this. You can't really compare the size of a finished C program to a BASIC09 program unless you play fair and count the size of BASIC09's *RunB* module.

Remember, *RunB* must be in memory if you are going to run your packed BASIC09 programs direct from your execution directory. When you throw in this factor, you realize that C programs are really shorter than BASIC09 programs because the standard C library stored in *clib.l* is shorter than *RunB*.

```
00DD          ELSE
00E1            trial:=trial+2
00ED            GOTO 10
00F1          ELSE
00F5          ENDIF
00F7        ELSE
00FB          IF number=factor THEN
0108            PRINT number; " is a PRIME number!";
0124            RUN primes
0128          ENDIF
012A        ELSE
012E          IF trial>factor/2 THEN
013F            RUN primes
0143          ENDIF
0145        ENDIF
0147        RUN primes
014B        END
PROCEDURE cls
0000        PRINT CHR$(12)
0005        PRINT
0007        PRINT "**** Finding PRIME factors ****"
002A        RUN primes
002E        END


PROCEDURE fib
0000        REM This is a sample calling routine that makes use of MATH.
0038        REM Note the params that are passed to and returned from it.
0076        REM These must match what MATH expects exactly, or fatal errors
00B4        REM could result.  If this should occur I would recommend
00EC        REM reloading the procedures as it is possible to overwrite
0126        REM them if too many bytes are passed.  I cannot vouch for
015F        REM what occurs if too few bytes are passed.
018A        REM
018D        REM All procedures should be base 0.
0189        BASE 0
01B2        REM The next 3 dim statements will set up all variables needed
01EF        REM by MATH.  Printop turns screen print on or off, while
0228        REM still returning the results in zs (4xs as remainder in
0261        REM div).  printop="Y" OR "N".
027E        DIM x(300),y(300),z(300):INTEGER
029C        DIM xs,ys,zs:STRING[300]
02B9        DIM op,printop:STRING[1]
02C9        DIM i,printer:INTEGER
02CB        printop="N"
02D3        op="+"
02D8        REM Setup initial values for Fibonacci series.
0308        xs="2"
0319        ys="1"
0318        OPEN #printer,"/p":WRITE
0325        REM Init. counter value
0338        i=1
0342 1      xs=ys
034D        ys=zs
0355        RUN math(x,y,z,xs,ys,zs,op,printop)
0382        i=i+1
038D        PRINT i;
0393        WRITE #printer,i,"   ",zs
03A7        GOTO 1
03AB        END
PROCEDURE math
0000        REM This procedure and the ones it calls were adapted from a program in
0046        REM March 1985 BYTE magazine. The article was titled "Arithmetic on your PC",
0092        REM and was written by Peter Rice.
00B3        REM
00B6        REM Adaptation by Thomas Ring
00D2        REM
00D5        BASE 0
00D7        PARAM x(300),y(300),z(300):INTEGER; xs,ys,zs:STRING[300]; op
             ,printop:STRING[1]
0117        DIM xl,yl,i:INTEGER
0126        RUN initialize(x,y,z)
013A        REM Remove leading zeroes from xs
015A        WHILE LEFT$(xs,1)="0" DO
016A          xs=RIGHT$(xs,LEN(xs)-1)
017A        ENDWHILE
017E        REM Remove leading zeroes from ys
019E        WHILE LEFT$(ys,1)="0" DO
01AE          ys=RIGHT$(ys,LEN(ys)-1)
01BE        ENDWHILE
01C2        REM Convert ascii chars in xs to digits in x array
01F3        xl=LEN(xs)
01FC        FOR i=1 TO xl
020D          x(xl-i)=VAL(MID$(xs,i,1))
0225        NEXT i
0239        x(300)=xl-1
```

Code for Time

Since we had something for C language beginners, we'll give equal time to those who are more experienced. Often you want to print the time somewhere in your programs. This code should help you do it.

```
#include <time.h>
struct sgtbuf buf;

/* Your "main ()" program goes here */

getime(&buf);
printf("%02d/%02d/%02d %02d:%02d:%02d\n",
buf.t_month, buf.t_day, buf.t_year,
buf.t_hour, buf.t_minute, buf.t_second);
```

When your program runs this code it should print the time in the standard mm/dd/yy hh:mm:ss format. The %02d's in the code above tell printf that the byte is Hex, but you want it printed in decimal. Also, you always want it to be printed as two digits with a leading zero as a pad if necessary. In other words, April Fool's Day will come on 04/01/86 not 4/1/86. Have fun.

BASIC09 Notes

Everyone seems to like to write programs that generate prime numbers. The latest comes from Joel Sherman of Watertown, Conn. He translated it from a standard BASIC program. The

```
0237      REM Convert ascii chars in ys to digits in y array
0279      y1=LEN(ys)
0279      FOR i=1 TO y1
028A        y(y1-i)=VAL(MID$(ys,i,1))
02A2      NEXT i
02AD      y(300)=y1-1
02BC      REM Run appropriate operation procedure, then print procedure
02F8      IF op="+" THEN
0305        RUN add(x,y,z)
0319        RUN printadd(x,y,z,zs,printop)
0337        END
0339      ENDIF
0338      IF op="-" THEN
0348        RUN sub(x,y,z)
035C        RUN printsub(x,y,z,zs,printop)
037A        END
037C      ENDIF
037E      IF op="*" THEN
0388        RUN mult(x,y,z)
039F        RUN printmult(x,y,z,zs,printop)
03BD        END
03BF      ENDIF
03C1      IF op="/" THEN
03CE        RUN div(x,y,z)
03E2        RUN printdiv(x,y,z,zs,zs,printop)
0405        END
0407      ELSE
0428        PRINT "Don't understand operation"
0429        END
042B      ENDIF
042D      END
PROCEDURE initialize
0000      REM This proc  initializes x,y, & z arrays to zero.
0032      BASE 0
0034      DIM i:INTEGER
003B      PARAM x(300),y(300),z(300):INTEGER
0059      FOR i=0 TO 300
006A        x(i)=0
0075      NEXT i
0089      REM After x array is set, direct array transfers are used for speed
00C2      REM and savings in code.
00D0      z=x
00E1      y=z
00E9      END
PROCEDURE add
```


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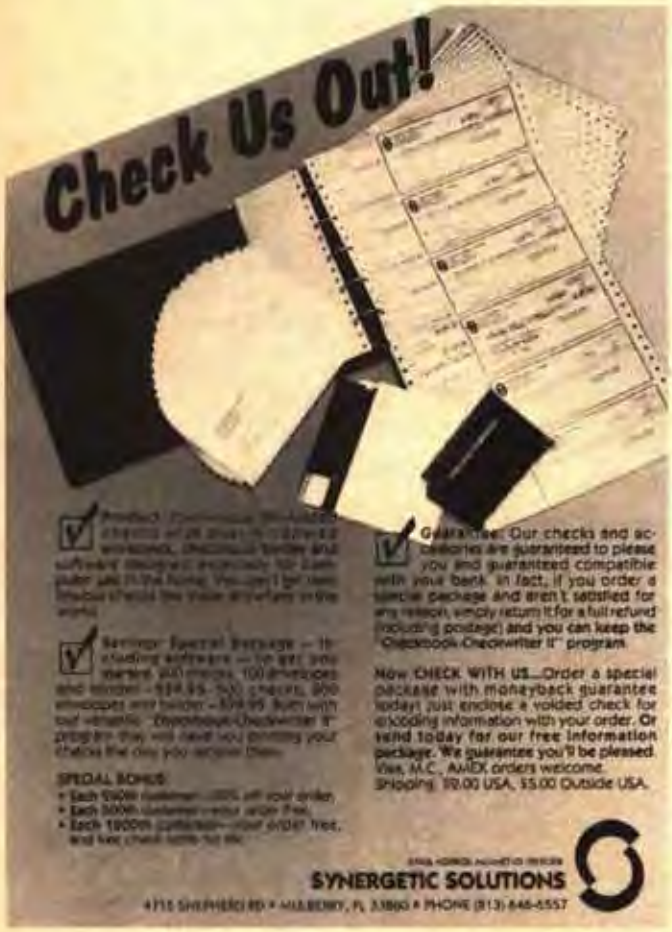
original version took 30 minutes to discover that 44449 is a prime number. The BASIC09 accomplishes the same goal in 2.5 minutes. Joel asked how he could write the code at Line 10 without using the GoTos. If you're game, submit your solution and we'll list it here.

Our feature BASIC09 listing this month was contributed by Tom Ring of Potsdam, N.Y. It was adapted from an IBM PC listing in a *Byte* magazine article named "Arithmetic on your PC." It was written by Peter Rice and published in the March 1985 edition. Rice gave Ring permission to translate it to BASIC09 and publish the results.

Here's another time to use in your debate with your IBM PC friends. The PC version of *Mathmaster* requires four minutes and 55 seconds to divide a 160-digit number by a 40-digit number — that's 295 seconds. The BASIC09 version does the job in 79 seconds. Try it yourself by running the procedure named *smalltest*.

Mathmaster contains a group of BASIC09 procedures. If you plan on loading them all at the same time, you will need to request more memory from BASIC09 by typing `MEM 15000` before you load the file. The program will work

```
0000      BASE 0
0002      PARAM x(30),y(30),z(30):INTEGER
0020      DIM i:INTEGER
0027      IF x(000)>y(000) THEN
003A        z(000)=x(000)
0049      ELSE
004D        z(000)=y(000)
005C      ENDIF
005E      FOR i=0 TO z(000)
0072        z(i)=z(i)+x(i)+y(i)
0087        IF z(i)>=10 THEN
009E          z(i+1)=z(i+1)+1
00B6          z(i)=z(i)-10
00C8        ENDIF
00CA      NEXT i
00D5      IF z(z(000)+1)>0 THEN z(000)=z(000)+1
00F8      ENDIF
00FD      END
PROCEDURE sub
0000      BASE 0
0002      PARAM x(30),y(30),z(30):INTEGER
0020      DIM i,n:INTEGER
0025      IF x(000)>y(000) THEN
003E        n=x(000)
0049      ELSE
004D        n=y(000)
0058      ENDIF
005A      FOR i=0 TO n
006B        z(i)=z(i)+x(i)-y(i)
0088        IF z(i)<0 THEN
0097          z(i)=z(i)+10
00A9          z(i+1)=-1
00B8        ENDIF
00BA      NEXT i
00C5      IF z(n+1)<0 THEN
00D7        n=n+1
00E2      ENDIF
00E4      WHILE z(n)=0 DO
00F3        n=n-1
00FE      ENDWHILE
0102      z(000)=n
010E      END
PROCEDURE mult
0000      BASE 0
0002      PARAM x(30),y(30),z(30):INTEGER
```

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 6809 microprocessor. That is why the BASIC compiler, called MI BASIC 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 either program storage or for large numbers of variables and arrays like A(20000)
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BASIC source and MI. output I/O to disk, tape or memory

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1. I/O -Commands

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DSKO$	FIELD	FILES	GET	INPUT	KILL
LSET	OPEN	PRINT	PUT	RSET	

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	PPOINT	RND
SGN	SIN	SQR	TAN	TIMER	VAL

4. String Functions

CHR$	INKEY$	LEFT$	MID$	MKN$	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
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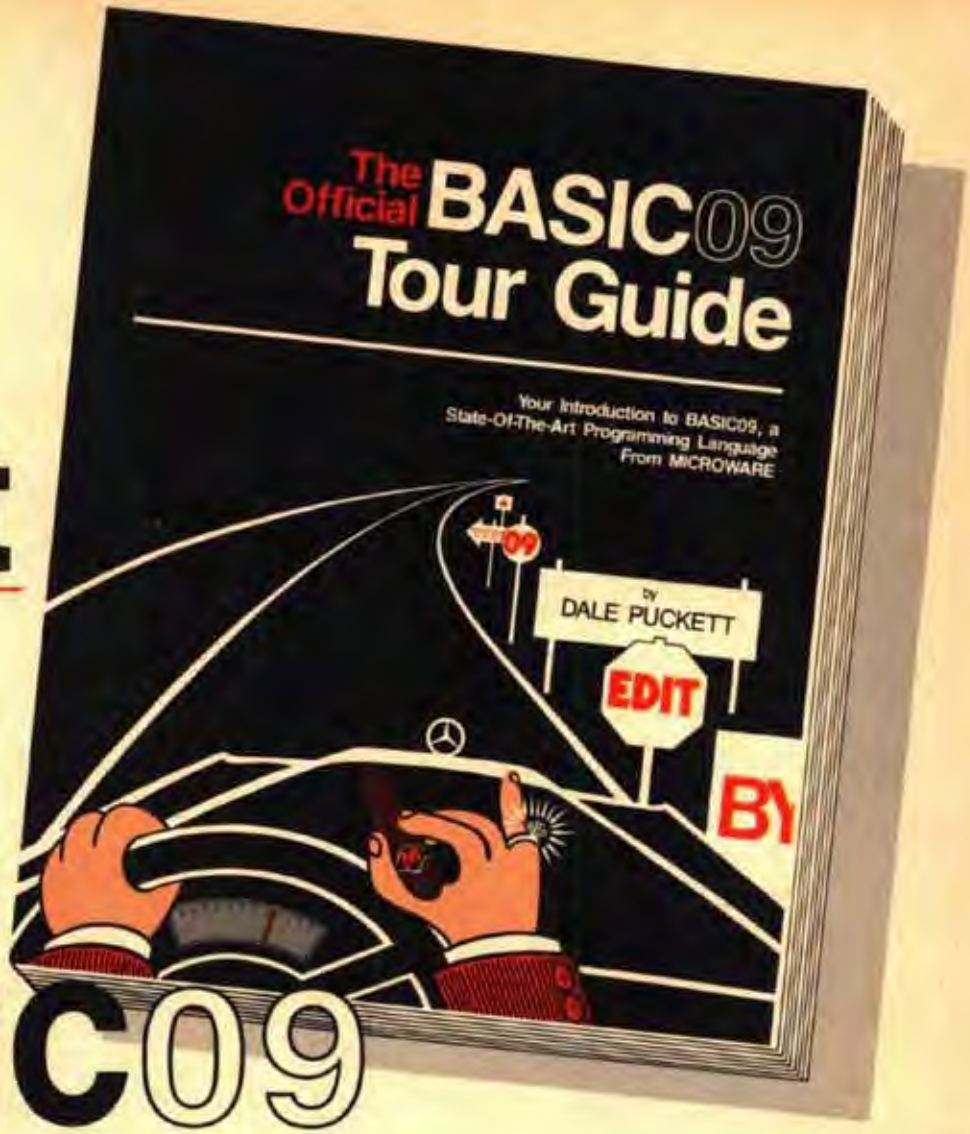

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with numbers as long as 300 digits. However, it does not check to see if the answers are larger. Ring said he would be glad to send you a copy if you send him a disk with return postage (his address is 75 Market St., Apt. 4, 13676).

Random Notes

Tim Grovac, the editor of the OS-9 Users Group newsletter *MOTD*, published a special edition in April. It lists the address of the group's members in alphabetical order by state. If you're looking for someone to share OS-9 knowledge with, this should give you a place to look. Request a copy and a membership application from P.O. Box 7586, Des Moines, IA 50322. Allow plenty of time for the mail relay.

Speaking of users' groups, Frank Hogg told me he hoped to start a Sculptor Users Group. Contact FHL for details. Sculptor is an advanced databased management system that runs under OS-9 as well as many other operating systems. Rumor has it that we may see it become a standard part of FHL's OS-9 68K system, the QT; cross your fingers. By the way, Frank tells me he was talking to someone in England who reported that OS-9 was running on the Sinclair QL there — and on those wafer tapes yet!

Turning toward the South, Brian Lantz in Tampa tells me that OS-9 users will soon be able to run an advanced debugger. He's been making a few suggestions about the product to Paul Searby at Computerware. The program was written originally by Chris Bone, an assembly language programmer who has helped write the "Byte Master" articles for RAINBOW. It reportedly boasts full-screen editing of memory — 12 lines with eight bytes each, the ability to do a disassembly from memory, a mini calculator, full access to the OS-9 Shell, the ability to set multiple breakpoints and skip subroutines, etc. It looks like a product a lot of assembly language programmers will be glad to get their hands on.

Computerware is also getting ready to release a Macro Assembler and a Text Processor. Lantz is putting the finishing touches on the latter and reports it is 95 percent NROFF compatible (NROFF stands for "New Run Off"). It is 100 percent compatible with TSC text processor files. Only about five percent of the commands —the ones that deal specifically with UNIX — are missing.

```
0020      DIM a,i,j,index:INTEGER
0033      FOR i=0 TO x(300)
0047        FOR j=0 TO y(300)
0058          z(i+j)=z(i)*y(j)+z(i+j)
0080          z=z(i+j)/10
0092          z(i+j)=MOD(z(i+j),10)
00AC          z(i+j+1)=z(i+j+1)+z
00CD        NEXT j
00D8      NEXT i
00E3      index=x(300)+y(300)+1
00F8      IF z(index)>0 THEN
0107        x(300)=index
0113      ELSE x(300)=index-1
0123      ENDIF
0127      END
PROCEDURE div
0000      BASE 0
0002      PARAM x(301),y(301),z(301):INTEGER
0020      DIM al,i,d,w,c,k,m,bx:INTEGER
0043      IF x(300)<>y(300) THEN
0056        al=y(300)
0061      ELSE
0065        al=x(300)
0070      ENDIF
0072      IF x(al)>y(al) THEN GOTO 2
0088      ENDIF
008A      RUN sub(x,y,z)
009E      IF z(z(300))>=0 THEN GOTO 1
00B3      ENDIF
00B5      FOR i=0 TO 300
00C6        z(i)=0
00D1      NEXT i
00DC      END
00DE 1    x=x
00E9      FOR i=0 TO 300
00FA        z(i)=0
0105      NEXT i
0110      z(0)=1
011A      END
011C 2    d=10/(y(y(300))+1)
0133      IF d=1 THEN GOTO 3
0142      ENDIF
0144      FOR i=0 TO x(300)
0158        x(i)=d*x(i)
0168      NEXT i
0176      FOR i=0 TO x(300)
018A        w=x(i)
0195        x(i)=MOD(w,10)
01A4        x(i+1)=x(i+1)+w/10
01C0      NEXT i
01CB      IF x(x(300)+1)>0 THEN
01E0        x(300)=x(300)+1
01F2      ENDIF
01F4      FOR i=0 TO y(300)
0208        y(i)=d*y(i)
0218      NEXT i
0226      FOR i=0 TO y(300)
023A        w=y(i)
0245        y(i)=MOD(w,10)
0254        y(i+1)=y(i+1)+w/10
0270      NEXT i
0278      IF y(y(300)+1)>0 THEN
0290        y(300)=y(300)+1
02A2      ENDIF
02A4 3    FOR k=x(300) TO y(300) STEP -1
02C5        IF x(k+1)=y(y(300)) THEN
02DE          c=9
02E5        ELSE
02E9          c=(x(k+1)*10+x(k))/y(y(300))
0308        ENDIF
030D 4      IF c*y(y(300)-1)<=(x(k+1)*10+x(k)-c*y(y(300)))*10+x(k-1) THEN

0355          GOTO 5
0359        ELSE
035D          c=c-1
0368          GOTO 4
036C        ENDIF
036E 5      m=k-y(300)
0380        FOR i=0 TO y(300)
0394          x(m+i)=x(m+i)-c*y(i)
03B6        NEXT i
03C1        FOR i=0 TO y(300)
03D5          IF x(m+i)>=0 THEN
03E8            GOTO 6
03EC          ENDIF
03EE          x(m+i+1)=x(m+i+1)+x(m+i)/10-1
0410          x(m+i)=x(m+i)+(1-x(m+i)/10)*10
0447 6        w=x(m+i)
0459          x(m+i)=MOD(w,10)
046C          x(m+i+1)=x(m+i+1)+w/10
0490        NEXT i
049B        IF x(k+1)>=0 THEN
04AD          GOTO 7
04B1        ENDIF
```

Lantz had been busy finishing the drivers for the new J & M hard disk system that was demonstrated at the Chicago RAINBOWfest. It supports from one to seven logical units and stores 5.12 million bytes of data. Lantz reported that this system does not use the halt line and the interrupts are never disabled, giving you complete type ahead on the CoCo keyboard. It also lets you boot OS-9 directly from the hard disk.

To give you an idea of the speed, a copy operation that takes 27 minutes floppy to floppy, takes eight and a half minutes from floppy to hard disk, and seven minutes from one logical unit on the hard disk to another. The price? Reportedly, J & M will offer the disk complete with the controller and software for $650. Not bad when you consider that two double-sided, 40-track floppy drives cost me more than $400 wholesale a little over a year ago!

And on the "OS-9-is-finally-coming-of-age" department, I saw two announcements recently — one for "Freeware," another for "Cheapware"!

Greg Morse, of softCODE, (10871 Roseland Gate, Richmond, British Columbia, Canada V7A 2R1), is offering a freeware modem program for OS-9. It is written in assembly language, supports the XMODEM protocol and comes with the source code.

The program requires 5,400 decimal bytes of memory plus a minimum of 2,000 bytes for data storage. It sends xon/xoff codes when it needs to write to disk and can upload a file blind or with prompts. It also lets you send commands to the OS-9 Shell while it is running.

Freeware means that if you like it, you will send Greg a donation. If you don't like it or "have a dull conscience," it is free. The tutorial value of the code alone would easily be worth the suggested $20 donation. The code runs 45 pages and almost every line is commented.

Cheapware features Kansas City BASIC for OS-9. It comes from Steve Odneal who is famous for his work with FLEX on the Color Computer. I understand he is also working on a hard disk system for the Color Computer — in fact, I saw a prototype at Irvine.

Kansas City BASIC is an interpreter that runs under OS-9. Its syntax resembles Microsoft Disk Extended BASIC. It is about 7,000 bytes long and comes with 4,000 lines of fully commented source code and a 20-page

```
0A83        FOR i=0 TO y(300)
0AC7          x(m+1)=x(m+1)+y(i)
0AE5          IF x(m+1)>9 THEN
0AF8            x(m+i+1)=x(m+i+1)+1
0B18            x(m+i)=x(m+i)-10
0B32          ENDIF
0B34        NEXT i
0B3F        c=c-1
0B4A 7      z(m)=c
0B59      NEXT k
0B64      a1=x(300)-y(300)
0B76      IF x(a1)>0 THEN
0B85        z(300)=a1
0B91      ELSE
0B95        z(300)=a1-1
0BA4      ENDIF
0BA6      bx=y(300)
0BB1      WHILE x(bx)=0 DO
0BC0        bx=bx-1
0BC8        IF bx=0 THEN GOTO 8
0BDA        ENDIF
0BDC      ENDWHILE
0BE0 8    x(300)=bx
0BE7      FOR i=x(300) TO 1 STEP -1
0C09        w=x(i)
0C14        x(i)=w/d
0C24        x(i-1)=x(i-1)+10*MOD(w,d)
0C44      NEXT i
0C4F      x(0)=x(0)/d
0C60      END
PROCEDURE printadd
0000      BASE 0
0002      PARAM x(301),y(301),z(301):INTEGER; zz:STRING[300]; printop
           :STRING[1]
0036      DIM i:INTEGER
0038      zz=""
0044      FOR i=0 TO z(300)
0058        zz=CHR$(z(i)+48)+zz
0068      NEXT i
0076      IF printop="Y" THEN
0083        PRINT "The sum is:"; zz
0096      ENDIF
0098      END
PROCEDURE printsub
0000      BASE 0
0002      PARAM x(301),y(301),z(301):INTEGER; zz:STRING[300]; printop
           :STRING[1]
0036      DIM i:INTEGER
003D      IF z(z(300))<0 THEN
004F        PRINT "The difference is negative"
006D        END
006F      ELSE
0073        zz=""
007A        FOR i=0 TO z(300)
008E          zz=CHR$(z(i)+48)+zz
00A1        NEXT i
00AC        IF printop="Y" THEN
00B9          PRINT "The difference is:"; zz
00D3        ENDIF
00D5        END
00D7      ENDIF
00D9      END
PROCEDURE printmult
0000      BASE 0
0002      PARAM x(301),y(301),z(301):INTEGER; zz:STRING[300]; printop
           :STRING[1]
0036      DIM i:INTEGER
003D      zz=""
0044      FOR i=0 TO z(300)
0058        zz=CHR$(z(i)+48)+zz
0068      NEXT i
0076      IF printop="Y" THEN
0083        PRINT "The product is:"; zz
009A      ENDIF
009C      END
PROCEDURE printdiv
0000      BASE 0
0002      PARAM x(301),y(301),z(301):INTEGER; xx,zz:STRING[300]; printop
           :STRING[1]
003A      DIM i:INTEGER
0041      xx=""
0048      FOR i=0 TO x(300)
005C        xx=CHR$(x(i)+48)+xx
0067      NEXT i
007A      zz=""
0081      FOR i=0 TO z(300)
0095        zz=CHR$(z(i)+48)+zz
00A8      NEXT i
00B3      IF printop="Y" THEN
00C0        PRINT "The quotient is:"; zz
00D8        PRINT "The remainder is:"; xx
00F1      ENDIF
00F3      END
PROCEDURE calltest
```

THE X-TEAM FOR OS-9

XTERM

XTERM is a full featured OS-9 communications program that takes full advantage of the power of OS-9. It works with the normal text screen, XSCREEN, or the Wordpak 80 column board.

XTERM is menu oriented for ease of use, it is simple to use even for the novice OS-9 user. And yet, XTERM is powerful enough for the expert OS-9 user.

Some of the features of XTERM include: full upload and download support with remote buffer operation; supports XON/XOFF protocol; 110/300/600/1200 baud, 5/6/7/8 bits, even/odd/no parity, full or half duplex; able to execute an OS-9 shell command from within XTERM.

XTERM works with a Color Computer using the standard serial interface, but also will work with a hardware serial port. Also, if you are using a hardware parallel printer port, you can print data to the printer as it is received.

XTERM $59.95

XMENU

XMENU is a system that creates a menu-driven environment for the Color Computer using OS-9. OS-9 now becomes easy-to-use with command selections made from menus. Menus are included to access OS-9 commands. An easy-to-use utility is provided that allows for the creation and maintenance of menus.

XMENU works with XSCREEN, the normal text screen, O-PAK, and the WORDPAK 80-column board.

XMENU 29.95

XSCREEN

XSCREEN creates a high resolution screen for the Color Computer using OS-9. This high resolution screen gives you 24 lines of text with 51, 64, or 85 characters per line. Characters can be either white on a black background or vice versa. Easy menu operation.

XSCREEN $19.95

XWORD

XWORD is a powerful word processing system for the Color Computer using OS-9. XWORD is feature packed with only a few features mentioned here.

Some of the editing features of XWORD include: true character oriented full screen editor; works with the normal text screen, XSCREEN, O-PAK, or WORDPAK 80 column card; full block commands with blocks displayed in inverse characters (except with normal text screen) for easy block manipulation; file size not limited to a buffer size; full find and replace commands with wildcard character; able to execute an OS-9 shell command in the middle of editing. Many, many more features, too many to mention here.

Some of the formatting features of XWORD include: proportional spacing supported; perfectly aligned hanging indents and columns, even when using proportional characters; full printer control with control of character size, emphasized, italics, overstrike, underlining (with or without spaces), super and sub-scripts; up to 10 header/footers; page numbering in decimal or Roman numerals; margins and headers can be set differently for even and odd pages; automatically reads printer initialization file to define XWORD for your printer (many included, and easy to write or modify your own). Many more features.

XWORD $79.95

XMERGE

XMERGE gives XWORD powerful mail merge capabilities. With it you are able to merge in data from a data file or from the keyboard to get professional looking results.

XMERGE 29.95 NEW

XDIR & XCAL

A package of two powerful utilities you won't want to be without. XDIR is an OS-9 directory program that prints full hierarchical directories. The directory does full sorting and has complete pattern matching, including wildcard and character classes.

XCAL is a powerful calculator for OS-9. Ideal for both programmers and for general use. XCAL features include: work in decimal, hexadecimal, binary; previous 25 results are stored; functions include AND, OR, NOT, XOR.

XDIR & XCAL $24.95 NEW

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manual. How cheap is cheap? Would you believe $25? Write: Steve Odneal, 8609 East 73 Terrace, Kansas City, MO 64133.

Dave Kaleita, chairman of the OS-9 Users Group Software Exchange Committee, reports that 11 additional disks have been planned since we published the "complete" listing in the May issue of RAINBOW. Here are the titles. I'll try to come up with a complete listing of the programs in a future edition of "KISSable OS-9."

Disk Number	Title
26	C Language and Math Library
27	Math & Electronics #2
28	Math & Electronics #3
29	File Maintenance #3
30	File Processing Utilities #4
31	Hardware Customizations #2
32	Hardware Customizations #3
33	System Utilities #2
34	Hardware Customizations #4
35	System Utilities #3
36	General Interest #3

Speaking of Cheapware, I also received a note asking me where to get a copy of the 80,000 word OS-9 User Group dictionary compressed in the *DynaSpell* format. Just send me a formatted double-sided disk and $10 to cover return postage and handling, and I'll send it right back.

Here's another quick tip before we call it quits for July. If you want to tell OS-9 not to verify the CRC of a module after it's loaded, try this: Run *Debug* and examine the byte at memory location $FF40. You should see a $CC. Change it to a $5F, then change the byte at $FF41 from $FF to $39. Everything will load twice as fast. It works, but what price speed? Let the user beware.

We leave you with a final definition — reportedly printed in the glossary of the OS-9 68K Users Manual.

> UNIX: An operating system similar to OS-9 but with less functionality and special features designed to soak up excess memory, disk space and CPU time on large, costly computers.

See you in August!

```
 0000    REM This routine will test the add, mult, & div procedures by dividing
 00A5    REM a 298 digit number by an 89 digit number.  It will inform you if
 00E8    REM the test was passed or failed.
 00A9    REM This test takes 434 seconds.
 00C8    BASE 9
 00CA    DIM x(300),y(300),z(300):INTEGER
 00E8    DIM xs,ys,zs,d1,d2:STRING[300]
 0194    DIM op:STRING[1]
 011F    DIM qs,rs,ms:STRING[300]
 0124    op="/"
 012C    d1="12345678901234567890123456789012345678901234567890123456789012345678901234
23456789012345678901234567890123456789012345678901234567890"
 01C8    d1=d1+d1
 01D4    d2="98765432109876543210987654321098765432109876543219"
 0203    d2=d2+d2
 020F    xs=d1
 0217    ys=d2
 021F    RUN math(x,y,z,xs,ys,zs,op,"I")
 024B    qs=zs
 0253    rs=zs
 025B    xs=qs
 0263    ys=d2
 026B    op="*"
 0273    RUN math(x,y,z,xs,ys,zs,op,"I")
 029F    ms=zs
 02A7    xs=ms
 02AF    ys=rs
 02B7    op="+"
 02BF    RUN math(x,y,z,xs,ys,zs,op,"I")
 02EB    IF zs=d1 THEN
 02F8      PRINT "Test passed"
 0307    ELSE
 030B      PRINT "Test failed"
 031A    ENDIF
 031C    END
PROCEDURE smalltest
 0000    REM This routine will test the add, mult, & div procedures by dividing
 00A5    REM a 140 digit number by a 40 digit number.  It will inform you if
 00E7    REM the test was passed or failed.
 00A8    REM This test takes 129 seconds.
 00C7    BASE 0
 00C9    DIM x(300),y(300),z(300):INTEGER
 00E7    DIM xs,ys,zs,d1,d2:STRING[300]
 0103    DIM op:STRING[1]
 010F    DIM qs,rs,ms:STRING[300]
 0123    op="/"
 0128    d1="12345678901234567890123456789012345678901234567890123456789012345678901234
23456789012345678901234567890123456789012345678901234567890"
 01D1    d2="98765432109876543210987654321098765432109876543219"
 0200    xs=d1
 0208    ys=d2
 0210    RUN math(x,y,z,xs,ys,zs,op,"I")
 023C    qs=zs
 0244    rs=xs
 024C    xs=qs
 0254    ys=d2
 025C    op="*"
 0264    RUN math(x,y,z,xs,ys,zs,op,"I")
 0290    ms=zs
 0298    xs=ms
 02A0    ys=rs
 02A8    op="+"
 02B0    RUN math(x,y,z,xs,ys,zs,op,"I")
 02DC    IF zs=d1 THEN
 02E9      PRINT "Test passed"
 02F8    ELSE
 02FC      PRINT "Test failed"
 0308    ENDIF
 030D    END
PROCEDURE quicktest
 0000    REM This routine will test the add, mult, & div procedures by dividing
 00A5    REM a 40 digit number by a 10 digit number.  It will inform you if
 00E6    REM the test was passed or failed.
 00A7    REM This test takes 11 seconds.
 00C5    BASE 0
 00C7    DIM x(300),y(300),z(300):INTEGER
 00E5    DIM xs,ys,zs,d1,d2:STRING[300]
 0101    DIM op:STRING[1]
 010D    DIM qs,rs,ms:STRING[300]
 0121    op="/"
 0129    d1="12345678901234567890123456789012345678901234567890"
 0158    d2="9876543210"
 0169    xs=d1
 0171    ys=d2
 0179    RUN math(x,y,z,xs,ys,zs,op,"I")
 01A5    qs=zs
 01AD    rs=zs
 01B5    xs=qs
 01BD    ys=d2
 01C5    op="*"
 01CD    RUN math(x,y,z,xs,ys,zs,op,"I")
 01F9    ms=zs
 0201    xs=ms
 0209    ys=rs
 0211    op="+"
 0219    RUN math(x,y,z,xs,ys,zs,op,"I")
 0245    IF zs=d1 THEN
 0252      PRINT "Test passed"
 0261    ELSE
 0265      PRINT "Test failed"
 0274    ENDIF
 0276    END
```

More than a book . . .

A MILESTONE

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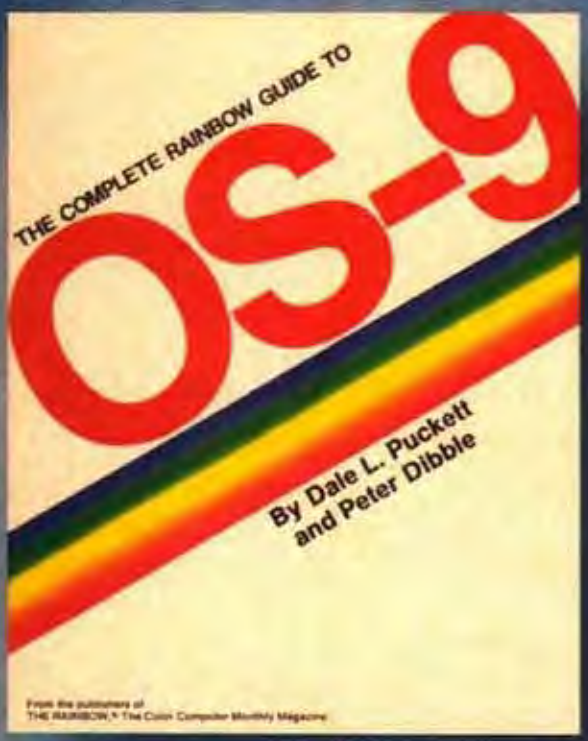

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MAIL09 Correction

The following are some 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. The remainder of the missing listings will appear next month. We apologize for any inconvenience this may have caused, either to Mr. Harris or to our readers.

Listing 2:

```
PROCEDURE shellcommand
 0000       DIM command:STRING[100]
 000C       DIM resp:BYTE
 0013       RUN clearscreen
 0017       INPUT "Enter Shell Command : ",command
 0035       SHELL command
 003A       PRINT
 003C       PRINT "            Hit any key to return to Main Menu"
 006E       GET #0,resp
 0077       END
```

Listing 3:

```
PROCEDURE onelabel
 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 dophone:BOOLEAN
 00B5       DIM id,fd,ppath,numentries,howmany,i:INTEGER
 00D0       DIM pname:STRING[2]
 00DC       DIM keyname:STRING[25]
 00E8       DIM entrynumber:INTEGER
 00EF       dophone:=FALSE
 00F5       pname:="/p"
 00FE       RUN clearscreen
 0102       PRINT "                              MAIL09"
 0125       PRINT "                         Make Individual Labels"
 0151       PRINT "                         ----------------------"
 017D       OPEN #fd,listfile:READ
 0189       OPEN #id,indexfile:READ
 0195       RUN getindex(id,index,numentries)
 01A9       CLOSE #id
 01AF       PRINT
 01B1       IF listfile="clist" THEN
 01C2         INPUT "      Company Name of desired label : ",keyname
 01F0       ELSE
 01F4         INPUT "      Last Name of desired label : ",keyname
 021F       ENDIF
 0221       RUN findentry(keyname,index,numentries,fd,label,entrynumber
             )
 0244       CLOSE #fd
 024A       IF entrynumber=-1 THEN
 0257         PRINT "     Entry does not exist!"
 0275       ELSE
 0279         PRINT  \ INPUT "     How many labels do you wish? ",howmany
 02A5         OPEN #ppath,pname:WRITE
 02B1         FOR i:=1 TO howmany
 02C2           RUN printlabel(ppath,label,dophone)
 02D6         NEXT i
 02E1         CLOSE #ppath
 02E7       ENDIF
 02E9       END
```

Listing 4:

```
PROCEDURE makelabels
 0000       TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
```

```
            :STRING[25]; fname:STRING[1Ø]; address1:STRING; address2
            :STRING; city:STRING[15]; state:STRING[1Ø]; zip:STRING
            [1Ø]; phone:STRING[14]
Ø969        TYPE indextype=name:STRING[25]; number:BYTE
Ø97F        PARAM label:labeltype
Ø988        PARAM index(1ØØ):indextype
Ø996        PARAM listfile:STRING[5]
Ø9A2        PARAM indexfile:STRING[6]
Ø9AE        DIM dophone:BOOLEAN
Ø9B5        DIM fd,id,ppath,numentries,i,seekpos:INTEGER
Ø9DØ        DIM pname:STRING[2]
Ø9DC        dophone:=FALSE
Ø9E2        pname:="/p"
Ø9EB        OPEN #fd,listfile:READ
Ø9F7        OPEN #id,indexfile:READ
ØAØ3        OPEN #ppath,pname:WRITE
ØAØF        RUN getindex(id,index,numentries)
ØA23        CLOSE #id
ØA29        FOR i:=1 TO numentries
ØA3A          seekpos:=index(i).number
ØA48          SEEK #fd,seekpos*SIZE(label)
ØA58          GET #fd,label
ØA62          RUN printlabel(ppath,label,dophone)
ØA76        NEXT i
ØA81        CLOSE #ppath
ØA87        CLOSE #fd
ØA8D        END
```

Listing 5:

```
PROCEDURE outputlist
 ØØØØ       TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
            :STRING[25]; fname:STRING[1Ø]; address1:STRING; address2
            :STRING; city:STRING[15]; state:STRING[1Ø]; zip:STRING
            [1Ø]; phone:STRING[14]
 Ø969       TYPE indextype=name:STRING[25]; number:BYTE
 Ø97F       PARAM outpath:INTEGER
 Ø98E       PARAM label:labeltype
 Ø9AF       PARAM index(1ØØ):indextype
 Ø9BD       PARAM listfile:STRING[5]
 Ø9A9       PARAM indexfile:STRING[6]
 Ø9B5       DIM dophone:BOOLEAN
 Ø9BC       DIM fd,id,numentries,i,seekpos:INTEGER
 Ø9D3       DIM date:STRING
 Ø9DA       OPEN #id,indexfile:READ
 Ø9E6       OPEN #fd,listfile:READ
 Ø9F2       dophone:=TRUE
 Ø9F8       RUN getindex(id,index,numentries)
 ØA1C       CLOSE #id
 ØA12       date:=DATE$
 ØA18       PRINT #outpath," Mailing List of "; date
 ØA36       PRINT #outpath
 ØA3C       PRINT #outpath
 ØA42       FOR i:=1 TO numentries
 ØA53         seekpos:=index(i).number
 ØA61         SEEK #fd,seekpos*SIZE(label)
 ØA71         GET #fd,label
 ØA7B         RUN printlabel(outpath,label,dophone)
 ØA8F       NEXT i
 ØA9A       CLOSE #fd
 ØAAØ       END
```

Listing 6:

```
PROCEDURE printlist
 ØØØØ       TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
            :STRING[25]; fname:STRING[1Ø]; address1:STRING; address2
            :STRING; city:STRING[15]; state:STRING[1Ø]; zip:STRING
            [1Ø]; phone:STRING[14]
 Ø969       TYPE indextype=name:STRING[25]; number:BYTE
 Ø97F       PARAM label:labeltype
 Ø988       PARAM index(1ØØ):indextype
 Ø996       PARAM listfile:STRING[5]
 Ø9A2       PARAM indexfile:STRING[6]
 Ø9AE       DIM pname:STRING[2]
 Ø9BA       DIM out:STRING[1Ø]
```


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```
ØØC6      DIM outpath:INTEGER
ØØCD      (* use printer as out path *)
ØØEA      out:="outputlist"
ØØF8      RUN clearscreen
ØØFF      PRINT "                                MAILØ9"
Ø125      PRINT "                          Print Mailing List"
Ø151      PRINT "                          ------------------"
Ø17D      pname:="/p"
Ø186      OPEN #outpath,pname:WRITE
Ø192      RUN out(outpath,label,index,listfile,indexfile)
Ø1BØ      KILL out
Ø1B5      CLOSE #outpath
Ø1BB      END
```

Listing 7:

```
PROCEDURE displaylist
ØØØØ      TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
           :STRING[25]; fname:STRING[1Ø]; address1:STRING; address2
           :STRING; city:STRING[15]; state:STRING[1Ø]; zip:STRING
           [1Ø]; phone:STRING[14]
ØØ69      TYPE indextype=name:STRING[25]; number:BYTE
ØØ7F      PARAM label:labeltype
ØØ88      PARAM index(1ØØ):indextype
ØØ96      PARAM listfile:STRING[5]
ØØA2      PARAM indexfile:STRING[6]
ØØAE      DIM resp:BYTE
ØØB5      DIM out:STRING[1Ø]
ØØC1      DIM outpath:INTEGER
ØØC8
ØØC9
ØØCA      (* use standard output for display *)
ØØEF      out:="outputlist"
Ø1ØØ      RUN clearscreen
Ø1Ø4      PRINT "                          MAILØ9"
Ø127      PRINT "                    Display Mailing List"
Ø151      PRINT "                    --------------------"
Ø17B      outpath:=Ø
Ø182      RUN out(outpath,label,index,listfile,indexfile)
Ø1AØ      KILL out
Ø1A5      PRINT  \ PRINT
Ø1A9      PRINT "            Hit any key to return to Main Menu"
Ø1DB      GET #Ø,resp
Ø1E4      END
```

Listing 8:

```
PROCEDURE deleteentry
ØØØØ      TYPE labeltype=companyname:STRING[25]; title:STRING[4]; lname
           :STRING[25]; fname:STRING[1Ø]; address1:STRING; address2
           :STRING; city:STRING[15]; state:STRING[1Ø]; zip:STRING
           [1Ø]; phone:STRING[14]
ØØ69      TYPE indextype=name:STRING[25]; number:BYTE
ØØ7F      PARAM label:labeltype
ØØ88      PARAM index(1ØØ):indextype
ØØ96      PARAM listfile:STRING[5]
ØØA2      PARAM indexfile:STRING[6]
ØØAE      DIM entrynumber,numentries,id,fd,i:INTEGER
ØØC5      DIM keyname:STRING[25]
ØØD1      OPEN #id,indexfile:UPDATE
ØØDD      RUN getindex(id,index,numentries)
ØØF1      RUN clearscreen
ØØF5      PRINT "                          MAILØ9"
Ø116      PRINT "                    Delete File Entry"
Ø13C      PRINT "                    ------------------"
Ø162      PRINT
Ø164      OPEN #fd,listfile:READ
Ø17Ø      IF listfile="clist" THEN
Ø181        INPUT "    Company Name of desired entry : ",keyname
Ø1AD      ELSE
Ø1B1        INPUT "    Last Name of desired entry : ",keyname
Ø1DA      ENDIF
Ø1DC      RUN findentry(keyname,index,numentries,fd,label,entrynumber
           )
Ø1FF      CLOSE #fd
Ø2Ø5      IF entrynumber=-1 THEN
Ø212        PRINT "Entry does not exist!"
Ø228      ELSE
```

```
022F        FOR i:=entrynumber TO numentries-1
0244          index(i):=index(i+1)
0256        NEXT i
0261        numentries:=numentries-1
026C        CLOSE #id
0272        DELETE indexfile
0277        CREATE #id,indexfile
0281        FOR i:=1 TO numentries
0292          PUT #id,index(i)
02A0        NEXT i
02AB      ENDIF
02AD      CLOSE #id
02B3      END
```

Listing 9:

```
PROCEDURE findentry
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 keyname:STRING[25]
0088      PARAM index(100):indextype
0099      PARAM numentries:INTEGER
00A0      PARAM fd:INTEGER
00A7      PARAM label:labeltype
00B0      PARAM entrynumber:INTEGER
00B7      DIM i:INTEGER
00BE      DIM found,pastname,dophone:BOOLEAN
00CD      DIM outpath:INTEGER
00D4      DIM resp:STRING[1]
00E0      outpath:=0
00E7      dophone:=TRUE
00ED      entrynumber:=-1
00F5      found:=FALSE
00FB      pastname:=FALSE
0101      i:=1
0108      WHILE i<=numentries AND NOT(found) AND NOT(pastname) DO
011F        IF index(i).name=keyname THEN
0132          WHILE index(i).name=keyname AND NOT(found) DO
014A            SEEK #fd,index(i).number*SIZE(label)
0160            GET #fd,label
016A            RUN printlabel(outpath,label,dophone)
017E            INPUT " Is this the entry you desire (y/n)? ",resp
01AB            IF resp="y" OR resp="Y" THEN
01C0              found:=TRUE
01C6              entrynumber:=i
01CE            ELSE
01D2              i:=i+1
01DD            ENDIF
01DF            pastname:=TRUE
01E5          ENDWHILE
01E9        ELSE
01ED          i:=i+1
01F8        ENDIF
01FA      ENDWHILE
01FE      END
```


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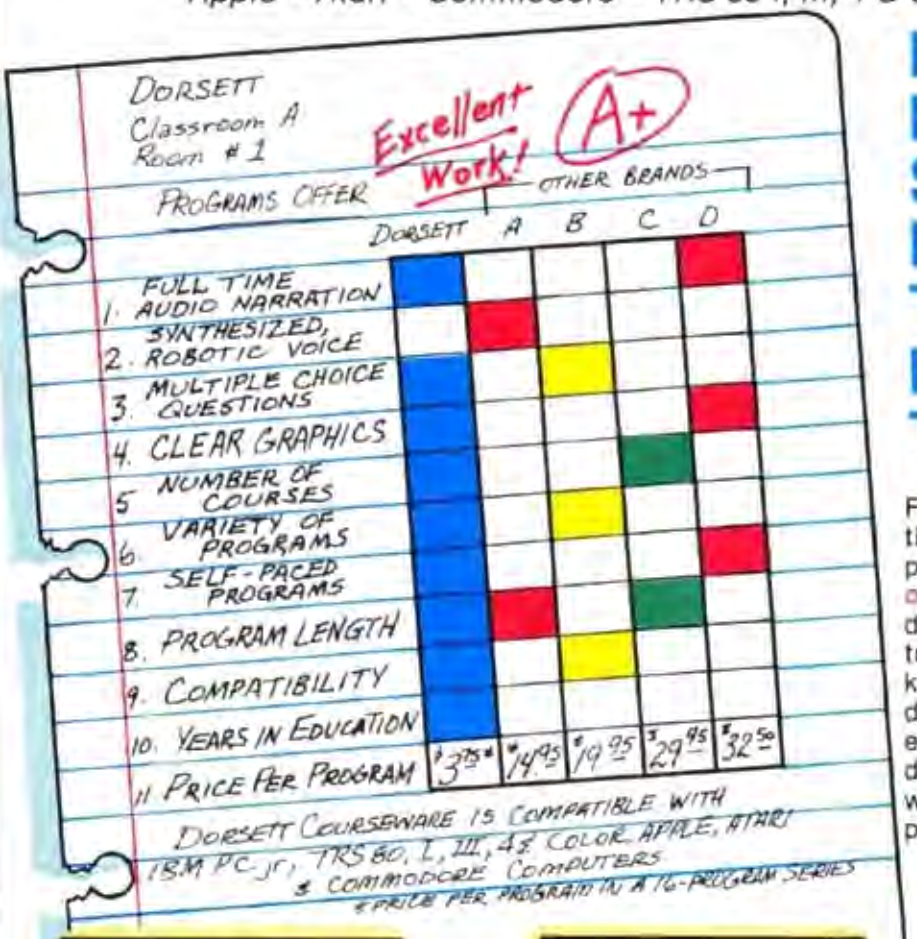

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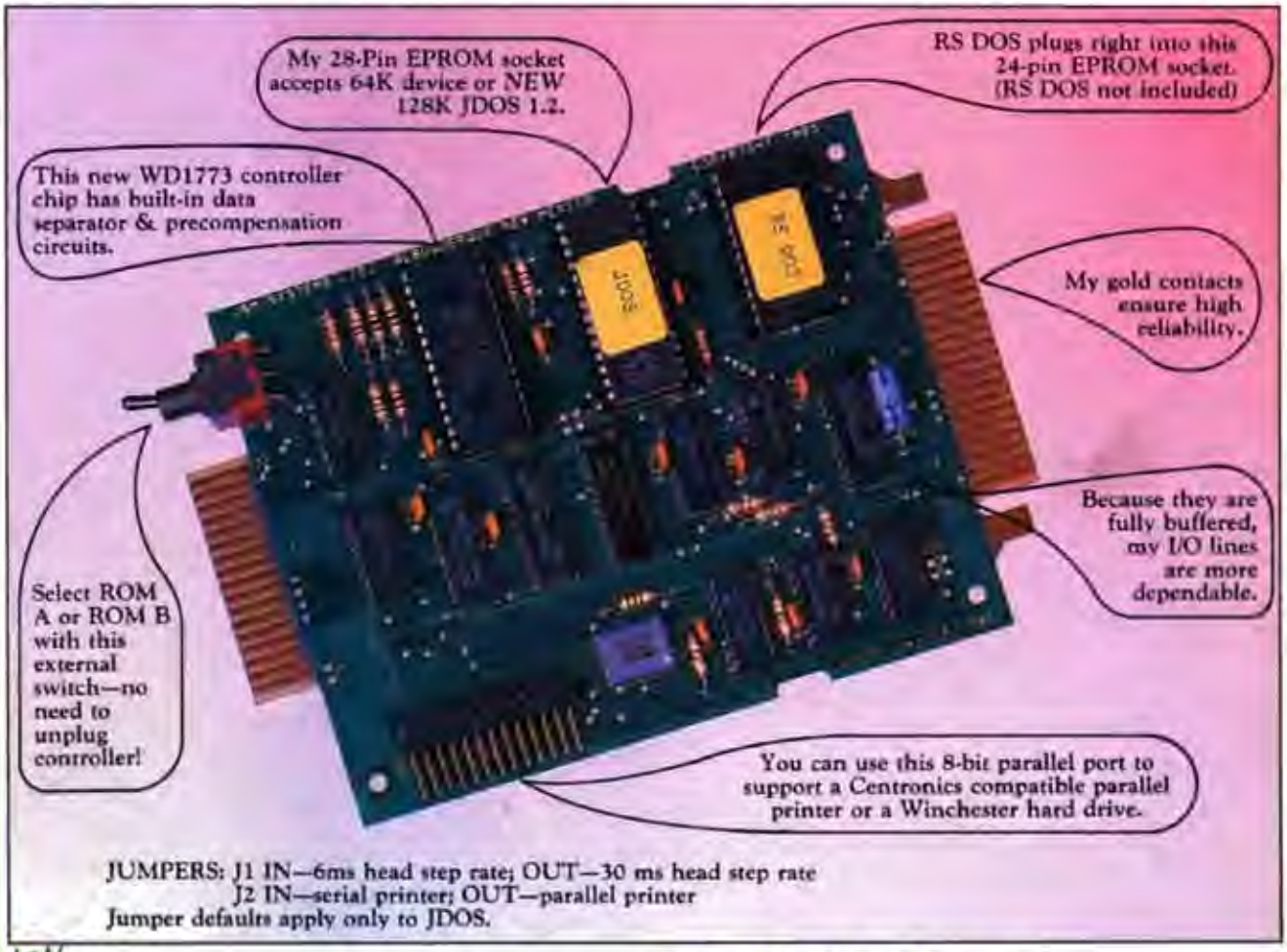

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